AMITY UNIVERSITY
RAJASTHAN

Syllabus Revision

Amity School of Engineering & Technology (ASET)

Course Name	Page No.
M.Tech. (CSE)	1
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B.Tech. (Data Science Engineering)	1448
B.Tech. (Robotics & IOT)	1494
B.Tech (Mechatronics)	1688

Master of Technology
(Computer Science &Engineering)

Programme Code: MTC

Duration – 2 Years Full Time

Programme Structure
And
Curriculum & Scheme of Examination (50:50)

2021-2023

AMITY UNIVERSITY
RAJASTHAN

Program Learning Outcomes – PLO

1. Students will be able to demonstrate role of Computer Science in the following core knowledge areas
   - Algorithms, Data Structures and Databases
   - Programming Languages and Compilers
   - Software Engineering and Development
   - Computer Hardware and Architecture
   - Data Communication and Computer Networks
2. Students will be able to analyze role of computer science and information technology, with mainstay in mathematics, basic sciences and engineering fundamentals.
3. Students will apply problem solving strategies to a range of modern computing paradigms related to computer programming, data intensive technologies, distributed and cloud computing, computational techniques.
4. Students will gain experiential learning on developing techno-commercially feasible and socially acceptable computing solutions to real world engineering problems thorough internship and projects, in industry.
5. Students will recognize the role of technological advances impacting society and the social, legal, ethical, cultural and communicative implications of computer technology and their usage.

Credits Summary

Semester	Core Courses (CC)	Domain Electives (DE)	Value Added Courses (VA)	Non-Teaching Credit Courses (NTCC)	Open Electives(OE)	Anandam	Total
1	10	03	04	06	-	02	25
2	15	03	04	05	03	02	32
3	07	04	04	03	03	02	23
4	-	-	-	30	-	-	30
Total	32	10	12	44	06	06	110

Total Credit=32+10+12+44+6+6=110

CC= Core Course, DE=Domain Elective, OE= Open Elective, VA=Value Added Course, NTCC=Non-Teaching Credit Courses

PROGRAMME STRUCTURE

FIRST SEMESTER

Subject Code	Course	Category	L	T	P/FW	Credit Units
MTC101	Data Structure & Algorithm Design	CC	2	1		3
MTC102	Object Oriented Software Engineering	CC	2	1		3
MTC103	Operating System and Unix	CC	2	1		3
MTC123	Operating System and Unix Lab	CC			2	1
MTC160	Seminar I(Critical Review of a Research Publication)	NTCC				3
MTC161	Seminar II (Critical Review of a Research Publication)	NTCC				3
Domain ElectiveI : Choose any one from the following courses						
MTC104	Software Project Planning & Management	DE	2	1		3
MTC105	Advance DBMS	DE	2	1		3
Value Added Courses						
BCS111	Communication Skills – I	VA	1			1
BSS111	Behavioural Science –I (Self Development and Interpersonal Skills)	VA	1			1
FLT111 FLG111 FLS111 FLC111	Foreign Language – I French German Spanish Chinese	VA	2			2
Non-Teaching Credit Course (NTCC)						
AND001	Anandam-I	NTCC	-	-	-	2
	Total					**25**

SECOND SEMESTER

Code	Course	Category	L	T	P/FW	Credit Units
MTC201	Compiler Design	CC	2	1		3
MTC202	Enterprise Java Application using J2EE	CC	2	1		3
MTC203	Advanced Computer Networks	CC	2	1		3
MTC204	Soft Computing	CC	2	1		3
MTC221	Compiler Design Lab	CC			2	1
MTC222	Enterprise Java Application using J2EE Lab	CC			2	1
MTC223	Advanced Computer Networks Lab	CC			2	1
MTC260	Minor Project	NTCC				5
Domain Elective II : Choose any one from the following courses						
MTC205	Cloud Computing	DE	2	1		3
MTC206	Advanced Computer Organization	DE	2	1		3
MTC207	Computer Oriented Operational Research	DE	2	1		3
OPEN ELECTIVE						
	OPEN ELECTIVEI	OE	3			3
VALUE ADDED						
BCS211	Communication Skills – II	VA	1			1
BSS211	Behavioural Science –II (Behavioral Communication and Relationship Management)	VA	1			1
FLT211 FLG211 FLS211 FLC211	Foreign Language – II French German Spanish Chinese	VA	2			2
Non-Teaching Credit Course (NTCC)						
AND002	Anandam-II	NTCC	-	-	-	2
	Total					**32**

THIRD SEMESTER

Code	Course	Category	L	T	P/FW	Credit Units
MTC301	Data Warehousing & Data Mining	CC	2	1		3
MTC302	Network Security & Management	CC	2	1		3
MTC321	Data Warehousing & Data Mining Lab	CC			2	1
MTC360	Dissertation (Evaluation of Plan and Critical Literature Review)	NTCC				3
Domain Elective : Choose any one from the following courses (Lab Courses to be clubbed with their respective theory courses)						
MTC303	Pattern Recognition & Image Processing	DE	2	1		3
MTC322	Pattern Recognition & Image Processing Lab	DE			2	1
MTC304	ASP. NET	DE	2	1		3
MTC324	ASP. NET Lab	DE			2	1
MTC305	Real Time Operating System	DE	3	1		4
MTC306	Mobile Computing	DE	3	1		4
MTC307	Ad Hoc & Wireless Sensor Network	DE	3	1		4
OPEN ELECTIVE						
	OPEN ELECTIVEII	OE	3			3
VALUE ADDED						
BCS311	Communication Skills – III	VA	1			1
BSS311	Behavioural Science –III (Leading Through Teams)	VA	1			1
FLT311 FLG311 FLS311 FLC311	Foreign Language – III French German Spanish Chinese	VA	2			2
Non-Teaching Credit Course (NTCC)						
AND003	Anandam-III	NTCC	-	-	-	2
	Total					**23**

FOURTH SEMESTER

Code	Course	Category	L	T	P/FW	Credit Units
MTC455	Dissertation	NTCC				30
	TOTAL					**30**

DATA STRUCTURES AND ALGORITHM DESIGN

Course Code: MTC 101 **CreditUnits: 03**

Course learning outcomes (CLO)

It is expected that by the end of the course, students will be comfortable in –

1. Explain the need for efficiency in data structures and algorithms.
2. Apply methods to analyse running time of essential data structures and estimate efficiency of the algorithms and implementations.
3. Apply the concept of abstract data type to represent and implement heterogeneous data structures.
4. Write programs using array-based lists, linked lists & skip lists.

Course Contents:

Module I
Overview of data structures, Review of Arrays, sparse matrices, Stacks, Queues, linked lists , doubly linked lists, Applications, dynamic storage management
Module II
Algorithm analysis, Efficiency of algorithms, Asymptotic Notations, Time complexity of an algorithm, Apriori Analysis, Analyzing Recursive Programs using various strategies
Module III
Divide and Conquer Paradigm: Divide and conquer recurrence equations and their solutions, Review of various sorting techniques using divide and conquer approach, Strassen's matrix multiplication.
Module IV
Trees: Basic terminology, Binary Trees and its representations, Binary Search Trees, Binary Search Tree traversals, Red-Black Trees, AVL Trees and B Trees, applications of trees, Graphs: Terminology, representations, traversals, spanning trees, shortest paths, Basic Graph Algorithms, Depth first search and Breadth first Search and its analysis, single source shortest path problem, Dijkstra's algorithm
Module V
Greedy Paradigm: Basic greedy strategy, Algorithms of Kruskal's and Prim's, greedy strategy in algorithms for the knapsack problem and Huffman trees.
Dynamic Programming paradigm, all pairs shortest path problem, longest common subsequence problems, 0 / 1 Knapsack problem, traveling sales person's problem.
Module VI
Back Tracking: general method, 4 Queen's Problem, Branch and Bound: general method, LC Search, Control Abstraction, Bounding, 0 / 1 Knapsack Problem.
Module VII
String Matching Algorithms: Knuth Morris and Pratt paradigm, Computation of the failure functions for the Boyer-Moore algorithm, NP – Complete and NP hard problem, SAT problems

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- Thomas H. Cormen, Charles E. Leiserson, and Ronald L. Rivest, "Introduction to Algorithms", MIT press and McGraw Hill, 2001.
- Udi Manber, "Introduction to Algorithms: A Creative Approach", Addison Wesley, 1989.
- Ellis Horowitz, Sartaj sahni, "Fundamentals of Data Structures" Galgotia book source, New Delhi, 1983.
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References:

- Ellis Horowitz, Sartaj sahni, “Fundamentals of Algorithms” Galgotia book source, New Delhi, 1986.
- Jean paul Tremblay and paul G. Soresson, “An introduction to Data structures with applications” Mcgraw Hill International editions.
- Seymour Libschutxz, “Theory and problems of Data structures”, Mcgraw Hill International editions. (Schaum’s outline series).
- Aho, Hopcroft Ullman, “The design and analysis of computer algorithms” Addison Wesley publishing company
- Robert L Cruse : "Data Structures and Program Design" (Prentice Hall India ,3rd Edition 1999)

OBJECT ORIENTED SOFTWARE ENGINEERING

Course Code: **MTC 102** **Credit Units: 03**

Course learning outcomes (CLO)

- To learn and understand various O-O concepts along with their applicability contexts.
- Given a problem, identify domain objects, their properties, and relationships among them.
- How to identify and model/represent domain constraints on the objects and (or) on their relationships
- Develop design solutions for problems on various O-O concepts
- To learn various modeling techniques to model different perspectives of object-oriented software design (UML)
- To learn software development life cycle for Object-Oriented solutions for Real-World Problems
- To learn O-O design solutions for the recurring problems

Course Contents:

Module I
Review of the traditional methodologies, Object oriented methodology, Advantage of Object oriented methodology

Module II
Fundamental concepts of Object Orientation: Object, Class, Abstraction, Interface, Implementation, Aggregation, Composition, Generalization, Sub-Class and Polymorphism, Architecture Style, Object-oriented software engineering, application & component systems, use case components, object components, layered architecture.

Module III
Sub- Systems, Services, Coupling, Cohesion and Layering, Static and dynamic aspects of collaborations
Reuse processes, Object oriented business engineering, applying business engineering to define processes & organization, application family engineering, component system engineering, application system engineering

Module IV
Organizing a reuse business: Its transaction, Management, working Component based software development: component definition, component meta model, component engineering vs application engineering

ModuleV
Visual Modeling, Object Oriented Modeling, Component based and Model driven development using UML:, UML Basics, Component specification, context realization, component realization cases, Actors, and 4+1View.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- Ivan Jacobson, Griss Jacobson, Patrick Johnsson, "Software Reuse: Architecture, Process and Organization for business Success, ACM press books, 1997

References:

- Joffrey S. Poutin, "Measuring Software Reuse: Principles Practices, EconomicModels", Addison Wesley, 2001
- Hans-Gerhard Gross, "Component based Software testing with UML", Springer-Verlag, Berlin, 2005

OPERATING SYSTEM AND UNIX

Course Code: MTC 103 **CreditUnits: 03**

Course learning outcomes (CLO)

CLO1: Students will be able to identify the role of Operating System. To understand the design of control unit.

CLO2: Students will be able to analyse andunderstanding CPU Scheduling, Synchronization, Deadlock Handling and Comparing CPU Scheduling Algorithms. Solve Deadlock Detection Problems.

CLO3: Students will be able to describe the role of paging, segmentation and virtual memory in operating systems.

CLO4: Students will be able to understand description of protection and security and also the Comparison of UNIX and Windows based OS.

CLO5: Students will be able to understand the concept of Defining I/O systems, Device Management Policies and Secondary Storage Structure and Evaluation of various Disk Scheduling Algorithms.

Course Contents:

Module I
Theory and implementation aspects of distributed operating systems. Inter-process communication and co-ordination in large distributed systems. Distributed resource management. Information management in distributed systems: security, integrity and concurrency problems.

Module II
Reviewto real time system, embedded systems and reactive systems; Hard and Soft Real Time Systems; Handling real time systems.

Module III
Unix operating System- Unix Architecture, Features of Unix, Unix File system. Unix system calls, Unix processes- UNIX process control and management, PCB, signals, forks and pipes, process scheduling, Filter-simple filters, grep, sed, AWK,

Module IV
Memory management in unix, Interprocess communication, I/O subsystem, editors and compilers for unix, LEX and YACC, shell programming,Interrupt processing, OS kernel FLIH, dispatcher, Networks, Routing, Connection strategies, remote file systems.

ModuleV
System Administration, multiprocessor systems, Distributed unixsytem Fault tolerance issues. OS issues related to the Internet, intranets, pervasive computing, embedded systems, mobile systems and wireless networks.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

***Text*:**
- The Design of the UNIX Operating System [Prentice-Hall Software Series]- Maurice Bach
- Real Time systems- Krishna- MHE

***References*:**
- Learning the Unix Operating System, Jerry Peek, O'Relly

- Programmer*s Reference Manual: Operating System Api For Intel Processors : Unix System V Release 4,Unix System Laboratories
- Unix Concepts & Applications- TMH- Sumitabha Das
- Distributed Operating Systems by Tanenbaum – Dorling Kindersley
- B. W. Kernighan & R. Pike, “The UNIX Programming Environment” Prentice Hall of India, 2000
- Sumitabha Das “ Your UNIX The ultimate guide” Tata McGraw Hill
- “Design of UNIX Operating System”, The Bach Prentice – Hall of India

OPERATING SYSTEM AND UNIX LAB

Course Code: MTC 123 **Credit Units: 01**

Requirements: Unix Operating System

Assignments will be provided for the following

- Overview UNIX Commands
- vi editor commands
- Programming in shell script
- Introduction to programming in AWK

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

Text & References:

- "Unix Programming Environment" The Kernighan and Pike Prentice – Hall of India
- "Unix –Shell Programming" Kochar
- " Unix Concepts and application" Das Sumitabha Tata Mcgraw Hill

SEMINAR I (CRITICAL REVIEW OF A RESEARCH PUBLICATION)

Course Code: **MTC 160** **Credit Units: 03**

SEMINAR II (CRITICAL REVIEW OF A RESEARCH PUBLICATION)

Course Code: **MTC 161** **Credit Units: 03**

SOFTWARE PROJECT PLANNING AND MANAGEMENT

Course Code: MTC 104 **CreditUnits: 03**

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Apply their knowledge of mathematics and computer science to the modelling, analysis, and measurement of software artefacts.
2. Analyse, specify and document software requirements for a software system.
3. Develop alternative design solutions to a given problem and recommend the best one within limitations of cost, time, knowledge, existing systems, and organizations.
4. Implement a given software design using development practices

Course Contents:

Module I
Exposure to Software Project Management: Software development as a project, Stakeholders in software project, Software product, process, resources, quality, and cost, Objectives, issues, and problems relating to software projects.

Module II
Overview of Project Planning: Steps in project planning; Defining scope and objectives; work breakdown structure; Deliverables and other products

Module III
Software Effort Estimation: Problem in software estimation; Effort estimation techniques COCOMO model.
Risk Analysis and Management: Nature and categories of risk in software development; risk Identification; Risk assessment; Risk mitigation, monitoring, and management;

Module IV
Selection of Appropriate Project Approach: Rapid application development; Waterfall model; V-process model; Spiral model; Prototyping,; Incremental delivery.

ModuleV
Software Quality Assurance : Planning for quality; Product versus process quality management; Procedural and quantitative approaches; Defect analysis and prevention; Statistical process control; Pareto analysis; Causal analysis; Quality standards; ISO 9000; Capability Maturity Model; Quality audit.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

- Software Project Management, Bob Hughes and Mike Cotterell: Tata McGraw-Hill Edition.
- Software Project Management, Joel Henry, Pearson Education.
- Software Project Management in practice, Pankaj Jalote, Pearson Education.2005
- Software Project Management by M. Cotterell
- Software Project Management by S. A. Kelkar
- Henry J. “Software Project Management-A Real world Guide to Success”. Addison Wesley

ADVANCE DBMS

Course Code: **MTC 105** **Credit Units: 03**

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Create and successfully apply logical database design principles, including E-R diagrams and database normalization.
2. Define query-optimizing transformations and actual evaluation of queries
3. Identify the concepts of Objected Oriented and Object Relational Databases
4. Recognize the need of Distributed DBMS and define transaction management, concurrency control, query optimization in distributed database environment.
5. Define other contemporary database models
6. Identify and correlate the ADBMS concepts with real world applications like ORACLE 11g

Course Contents:

Module I: Relational Databases
Integrity Constraints revisited, Extended ER diagram, Relational Algebra & Calculus, Functional, Muiltivalued and Join Dependency, Normal Forms, Rules about functional dependencies.

Module II: Query Processing and Optimization
Valuation of Relational Operations, Transformation of Relational Expressions, Indexing and Query Optimization, Limitations of Relational Data Model, Null Values and Partial Information.
Objected Oriented and Object Relational Databases
Modeling Complex Data Semantics, Specialization, Generalization, Aggregation and Association, Objects, Object Identity, Equality and Object Reference, Architecture of Object Oriented and Object Relational Databases

Module III: Parallel and Distributed Databases
Distributed Data Storage – Fragmentation & Replication, Location and Fragment
Transparency Distributed Query Processing and Optimization, Distributed Transaction Modeling and concurrency Control, Distributed Deadlock, Commit Protocols, Design of Parallel Databases, Parallel Query Evaluation.
Advanced Transaction Processing
Nested and Multilevel Transactions, Compensating Transactions and Saga, Long Duration Transactions, Weak Levels of Consistency, Transaction Work Flows, Transaction Processing Monitors.

Module IV
Multimedia databases,Databases on the Web and Semi–Structured Data
Case Study: Oracle Xi

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

***Text*:**

- Elmarsi, Navathe, Somayajulu, Gupta, "Fundamentals of Database Systems", 4th Edition, Pearson Education, 2007
- Garcia, Ullman, Widom, "Database Systems, The complete book", PearsonEducation, 2007
- R. Ramakrishnan, "Database Management Systems", McGraw Hill International Editions, 1998

***References*:**

- Date, Kannan, Swaminathan, “An Introduction to Database Systems”, 8th Edition Pearson Education, 2007
- Singh S.K., “Database System Concepts, design and application”, Pearson Education, 2006.
- Silberscatz, Korth, Sudarshan, “Database System Concepts”, Mcgraw Hill, 6th Edition, 2006
- W. Kim, “Modern Database Systems”, 1995, ACM Press, Addision – Wesley,
- D. Maier, “The Theory of Relational Databases”, 1993, Computer Science Press, Rokville, Maryland
- Ullman, J. D., “Principals of database systems”, Galgotia publications, 1999
- Oracle Xi Reference Manual
- Dietrich, and Urban, “An Advanced Course in Database Systems”, Pearson, 2008.

COMMUNICATION SKILLS – I

Course Code: BCS 111 **Credit Units: 01**

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Participate in conversation and in small- and whole-group discussion
2. Explore and use English as medium of communication in real life situation
3. Discuss topics and themes of a reading, using the vocabulary and grammar of the lesson
4. Identify features of a reading textbook and utilize them as needed
5. Prepare and deliver organized presentations in small groups and to whole class
6. Apply sentence mechanics and master spelling of high frequency words

Course Contents:

Module I: Listening Skills
Effective Listening: Principles and Barriers
Listening Comprehension on International Standards

Module II: Speaking Skills
Pronunciation and Accent
Reading excerpts from news dailies & magazines
Narrating Incident; Story telling.
Extempore & Role Plays

Module III: Reading Skills
Vocabulary: Synonyms, antonyms, diminutives, homonyms, homophones
Idioms & phrases
Foreign words in English

Module IV: Writing Skills
Writing Paragraphs
Précis Writing
Letter writing
Coherence and structure
Essay writing

Module V: Activities
News reading
Picture reading
Movie magic
Announcements

Examination Scheme:

Components	CT1	CT2	CAF	V	GD	GP	A
Weightage (%)	20	20	25	10	10	10	5

CAF – Communication Assessment File
GD – Group Discussion
GP – Group Presentation

Text & References:

- Working in English, Jones, Cambridge
- Business Communication, Raman – Prakash, Oxford
- Speaking Personally, Porter-Ladousse, Cambridge
- Speaking Effectively, Jermy Comfort, et.al, Cambridge

BEHAVIOURAL SCIENCE - I
(SELF-DEVELOPMENT AND INTERPERSONAL SKILLS)

Course Code: **BSS 111** **Credit Units: 01**

Course learning outcomes (CLOs)

At the successful completion of this course you (the student) should be able to:

i. Demonstrate awareness of self and the process of self-exploration.

ii. Demonstrate knowledge of strategies for developing a healthy self-esteem.

iii. Recognize the importance of attitudes and its effect on personality.

iv. Identify the difference between healthy and unhealthy expression of emotions and develop emotional competence necessary for personal and professional life.

Course Contents:

Module I: Understanding Self
Formation of self concept
Dimension of Self
Components of self
Self Competency

Module II: Self-Esteem: Sense of Worth
Meaning and Nature of Self Esteem
Characteristics of High and Low Self Esteem
Importance & need of Self Esteem
Self Esteem at work
Steps to enhance Self Esteem

Module III: Emotional Intelligence: Brain Power
Introduction to EI
Difference between IQ, EQ and SQ
Relevance of EI at workplace
Self assessment, analysis and action plan

Module IV: Managing Emotions and Building Interpersonal Competence
Need and importance of Emotions
Healthy and Unhealthy expression of emotions
Anger: Conceptualization and Cycle
Developing emotional and interpersonal competence
Self assessment, analysis and action plan

Module V: Leading Through Positive Attitude
Understanding Attitudes
Formation of Attitudes
Types of Attitudes
Effects of Attitude on
Behaviour
Perception
Motivation
Stress
Adjustment
Time Management
Effective Performance
Building Positive Attitude

Module VI:End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

- Towers, Marc: Self Esteem, 1st Edition 1997, American Media
- Pedler Mike, Burgoyne John, Boydell Tom, A Manager's Guide to Self-Development: Second edition, McGraw-Hill Book company.
- Covey, R. Stephen: Seven habits of Highly Effective People, 1992 Edition, Simon & Schuster Ltd.,
- Khera Shiv: You Can Win, 1st Edition, 1999, Macmillan
- Gegax Tom, Winning in the Game of Life: 1st Edition, Harmony Books
- Chatterjee Debashish, Leading Consciously: 1998 1st Edition, Viva Books Pvt. Ltd.
- Dr. Dinkmeyer Don, Dr. Losoncy Lewis, The Skills of Encouragement: St. Lucie Press.
- Singh, Dalip, 2002, Emotional Intelligence at work; First Edition, Sage Publications.
- Goleman, Daniel: Emotional Intelligence, 1995 Edition, Bantam Books
- Goleman, Daniel: Working with E.I., 1998 Edition, Bantam Books.

FRENCH - I

Course Code: **FLF 111** **Credit Units: 02**

Course learning outcomes (CLO)

At the successful completion of this course the students would be able to:

Perform communicative tasks (oral and written) like:

1. Identify and express in French vocabulary and grammar norms
2. Interpret different types of texts as well as cultural ideas and themes.
3. Demonstrate comprehension of nuance between script and sound in French
4. Narrate clearly ideas, themes in simple standard French

Course Contents:

Module A: pp. 01 to 37: Unités 1, 2, Unité 3 Objectif 1,2
Only grammar of Unité 3: objectif 3, 4 and 5

Contenu lexical:Unité 1: Découvrirla langue française: (oral et écrit)

1. se présenter, présenterquelqu'un, fairelaconnaissancedes autres, formules de politesse, rencontres
2. dire/interrogersi on comprend
3. Nommer les choses

Unité 2: Faire connaissance

1. donner/demander des informations sur unepersonne, premiers contacts, exprimersesgoûts et sespréférences
2. Parler de soi: parler du travail, de ses activités, de son pays, de sa ville.

Unité 3:Organiser son temps

1. dire la date et l'heure

Contenugrammatical:

1. organisation générale de la grammaire
2. articleindéfini, défini, contracté
3. nom, adjectif, masculin, féminin, singulier et pluriel
4. négation avec « de », "moiaussi", "moinon plus"
5. interrogation: Inversion, est-ce que, qui, que, quoi, qu'est-ce que, où, quand, comment, quel(s), quelle(s)
   Interro-négatif: réponses: oui, si, non
6. pronomtonique/disjoint- pour insister après unepréposition
7. futurproche

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project +Presentation
I – Interaction/Conversation Practice

Text & References:

- le livre à suivre: Campus: Tome 1

GERMAN - I

Course Code: **FLG 111** **Credit Units: 02**

Course learning outcomes (CLO)

At the successful completion of this course you should be able to:

1. **Identify** and **express** in German vocabulary and grammar norms
2. **Interpret** different types of texts as well as cultural ideas and themes.
3. **Demonstrate** comprehension of nuance between script and sound in German **Narrate** clearly ideas, themes in simple standard German

Course Contents:

Module I: Introduction
Selfintroduction: heissen, kommen, wohnwn, lernen, arbeiten, trinken, etc.
All personal pronouns in relation to the verbs taught so far.
Greetings: Guten Morgen!, Guten Tag!, Guten Abend!, Gute Nacht!, Danke sehr!, Danke!, Vielen Dank!, (es tut mir Leid!),
Hallo, wie geht's?: Danke gut!, sehr gut!, prima!, ausgezeichnet!,
Es geht!, nicht so gut!, so la la!, miserabel!

Module II: Interviewspiel
To assimilate the vocabulary learnt so far and to apply the words and phrases in short dialogues in an interview – game for self introduction.

Module III: Phonetics
Sound system of the language with special stress on Dipthongs

Module IV: Countries, nationalities and their languages
To make the students acquainted with the most widely used country names, their nationalitie and the language spoken in that country.

Module V: Articles
The definite and indefinite articles in masculine, feminine and neuter gender. All Vegetables, Fruits, Animals, Furniture, Eatables, modes of Transport

Module VI: Professions
To acquaint the students with professions in both the genders with the help of the verb "sein".

Module VII: Pronouns
Simple possessive pronouns, the use of my, your, etc.
The family members, family Tree with the help of the verb "to have"

Module VIII: Colours
All the color and color related vocabulary – colored, colorful, colorless, pale, light, dark, etc.

Module IX: Numbers and calculations – verb "kosten"
The counting, plural structures and simple calculation like addition, subtraction, multiplication and division to test the knowledge of numbers.
"Wie vielkostet das?"

Module X: Revision list of Question pronouns
W – Questions like who, what, where, when, which, how, how many, how much, etc.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project +Presentation
I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, TangramAktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

SPANISH – I

Course Code: FLS 111 **Credit Units: 02**

Course Learning Outcomes:

After successful completion of the course, students will be able to perform verbally and in writing certain social functions. Students will develop five language skills: reading, writing, listening, speaking & interacting with the Spanish & the Spanish speakers whom they come across in their daily or professional life in respect of

Students will be able to perform communicative tasks (oral and written) like:

-Self introduction

-Possessions.

-Family/friend description with verbs like SER/ESTAR/TENER/HAY

- Regular AR/ER/IR ending verbs conjugations

-Interrogative words

Course Contents:

Module I
A brief history of Spain, Latin America, the language, the culture…and the relevance of Spanish language in today's global context.
Introduction to alphabets

Module II
Introduction to '*Saludos*' (How to greet each other. How to present / introduce each other).
Goodbyes (despedidas)
The verb *llamarse*and practice of it.

Module III
Concept of Gender and Number
Months of the years, days of the week, seasons. Introduction to numbers 1-100, Colors, Revision of numbers and introduction to ordinal numbers.

Module IV
Introduction to *SER* and *ESTAR* (both of which mean To Be).Revision of '*Saludos*' and '*Llamarse*'. Some adjectives, nationalities, professions, physical/geographical location, the fact that spanish adjectives have to agree with gender and number of their nouns. Exercises highlighting usage of *Ser* and *Estar*.

Module V
Time, demonstrative pronoun (Este/esta, Aquel/aquellaetc)

Module VI
Introduction to some key AR /ER/IR ending regular verbs.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project +Presentation
I – Interaction/Conversation Practice

Text & References:

- Español, EnDirecto I A
- Español Sin Fronteras

CHINESE – I

Course Code: FLC 111 **Credit Units: 02**

Course learning outcomes (CLO)

At the successful completion of this course, you will be able to:

1. **Read, write and speak approx. 50** new Chinese words and understand basic grammarpoints.
2. **Interpret** words, phrases and sentences of day today conversation related to greetingfarewell and personal information like name age, residence, family etc.
3. **Write** Chinese characters, simple sentence and a paragraph on Self Introduction.
4. **Communicate** with Chinese speaking people using words, phrases and sentences related togreeting, farewell and personal information like name age, residence family etc.

Course Contents:

Module I
Show pictures, dialogue and retell.
Getting to know each other.
Practicing chart with Initials and Finals. (CHART – The Chinese Phonetic Alphabet Called "Hanyu Pinyin" in Mandarin Chinese.)
Practicing of Tones as it is a tonal language.
Changes in 3rd tone and Neutral Tone.

Module II
Greetings
Let me Introduce
The modal particle "ne".
Use of Please 'qing" – sit, have tea …….. etc.
A brief self introduction – Ni hao ma? Zaijian!
Use of "bu" negative.

Module III
Attributives showing possession
How is your Health? Thank you
Where are you from?
A few Professions like – Engineer, Businessman, Doctor, Teacher, Worker.
Are you busy with your work?
May I know your name?

Module IV
Use of "How many" – People in your family?
Use of "zhe" and "na".
Use of interrogative particle "shenme", "shui", "ma" and "nar".
How to make interrogative sentences ending with "ma".
Structural particle "de".
Use of "Nin" when and where to use and with whom. Use of guixing.
Use of verb "zuo" and how to make sentences with it.

Module V
Family structure and Relations.
Use of "you" – "mei you".
Measure words
Days and Weekdays.
Numbers.
Maps, different languages and Countries.

Examination Scheme:

Components	CT1	CT2	C	I	V	A

Weightage (%)	20	20	20	20	15	5

C – Project +Presentation
I – Interaction/Conversation Practice

Text & References:

- "Elementary Chinese Reader Part I" Lesson 1-10

COMPILER DESIGN

Course Code: MTC 201 Credit Units: 03

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Describe the theory and practices involved in compilation process, in particular, the lexical analysis, parsing code generation and optimization phases of compilation.
2. Understand the issues related to the designing of a compiler for a programming language.
3. To study the implementation of various compiler design issues by undertaking various case studies.

Course Contents:

Module I: Overview
Review of compiler phases – Informal Compiler Algorithm Notation – Symbol Table Structure – Intermediate Representations – Run Time Issues – Support for Polymorphic and Symbolic Languages.

Module II: Analysis & Attribute Grammars
Control Flow Analysis – Data Flow Analysis – Dependency analysis – Alias analysis
Attribute grammars: Analysis, use, tests, and circularity, Issues in type systems.

Module III: Machine Independent Optimization
The Principal Sources of Optimization.Causes of Redundancy, A Running Example: Quicksort ,Semantics-Preserving Transformations , Global Common Subexpressions , Copy Propagation,Dead-Code Elimination, Code Motion,Induction Variables and Reduction in Strength

Module IV: Machine Dependent tasks
Register Allocation – Local and Global Instruction Scheduling – Advanced Topics in Code Scheduling – Low Level Optimizations – Introduction to interprocedural analysis and scheduling.

Module V: ILP Compilation &Dynamic Compilation
ILP Compilation: Issues in compilation for ILP based processors. Effect of VLIW, Speculative, Predicated instructions, multithreaded processors.
Dynamic Compilation: Introduction, methods, case studies, implementation.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- Steven Muchnick. Advanced Compiler Design Implementation, Morgan Kauffmann Publishers, 1997
- Aho, A. V, Sethi, R. and Ullman, J. D. Compilers: Principles, Techniques and Tools, Addison Wesley, 1986

References:

- Appel, A. W. Modern Compiler Implementation in Java, Cambridge University Press, 2000.
- Kenneth. C. Louden, Compiler Construction. Principles and Practice. Thomson, 2003.

ENTERPRISE JAVA APPLICATIONS USING J2EE

Course Code: **MTC 202** **Credit Units: 03**

Course learning outcomes (CLO)

At the successful completion of this course the student should be able to:

1. Recognize the advanced concept of object oriented programming for java based applications.
2. Identify the utility of java class libraries and API.
3. Describe the concept of Swings, Servlets, JSP, Beans, J2EE, JDBC and ODBC with hands on coding experience.
4. Apply hands on real time applications development using standard tools.

Course Contents:

Module I
J2EE Architecture, N-Tier Architecture, Application Server, Application Server Services, Server Management and Control, Configuration, Monitoring and Mapping of Server, Deployment Issues, Performance Tuning and Security.

Module II
Implementing J2EE Applications, Database connection using JDBC API, Servlets, Java Server Pages. Overview of EJB, Session EJBs, Entity EJBs, and MDB, The Model-View-Controller Architecture, Overview of Struts, Implementation of Struts Framework.

Module III
Overview of XML, XML fundamentals, well-formed XML documents, components of XML document, DTD, Attributes and Entities of DTD, XML style sheets, XSL, CSS, XML namespaces, implementing J2EE Application using XML, Deployment descriptor, Mapping file.

Module IV
Hibernate: Principles of Object Relational Mapping, Hibernate configuration, HQL making objects persistent, Hibernate semantics, Session management, flushing, concurrency and Hibernate, Optimistic and Pessimistic Locking, Object mapping Mapping simple properties, Single and multi valued associations, Bi-directional associations, Indexed collections.

Module V
Application Servers (Case Study of any one of Apache Tomcat, BEA Weblogic, JBoss), Service-Oriented Architectures SOAP, SOAP message structure, handling errors WSDL, UDDI. Java Web Service JAX-RPC.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- Java 2 Unleashed (Techmedia – SAMS) By Jamie Jaworski
- Professional Java Server Programming (a Press) By Allamaraju
- Developing Java Servlets (Techmedia – SAMS) By James Goodwill
- Using Java 1.2 Special Edition (PHI) By Webber
- Jim Farley, William Crawford, O'Reilly and Associates, "Java Enterprise in a Nutshell", 2005
- Java Server Programming J2EE 1.4 Edition (Dreamtech)
- Brett McLaughlin, O'Reilly, "Java and XML, 2nd Edition, 2001

References:

- David Flanagan, Jim Parley, William Crawford & Kris Magnusson , Java Enterprise in a nutshell- A desktop Quick reference -O'REILLY, 2003
- Stephen Ausbury and Scott R. Weiner, Developing Java Enterprise Applications, Wiley-2001
- Jaison Hunder& William Crawford, Java Servlet Programming, O'REILLY, 2002
- Dietal and Deital, "JAVA 2" PEARSON publication
- Elliott Rusty Harold and W. Scott Means, O'Reilly, "XML in a Nutshell", 2001
- James Cooper, "Java Design Patternsn: A Tutorial", Addison Wesley
- Govind Sesadri, "Enterprise java Computing: Application and Architectures", Cambridge University Publications, 1999
- "Rule Based Expert Systems", Narosa Publishing House, 1994.

ADVANCED COMPUTER NETWORKS

Course Code: **MTC 203** **Credit Units: 03**

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Investigate various advanced LAN, MAN, WAN and wireless protocols used in computer network
2. Develop new Algorithms to solve complex problems associated with computer network and Network Security.
3. Create, Design and Maintain networks based on gained knowledge.

Course Contents:

Module I
Uses computer networks, Reference Models, TCP/IP suite of protocols, MAC protocols for high-speed LANS, MANs, and wireless LANs. (For example, FDDI, DQDB, HIPPI, Gigabit Ethernet, Wireless Ethernet, etc.)Fast access technologies. (For example, ADSL, Cable Modem, etc.)

Module II:
Network Layer Design Issues, Routing Algorithms, Congestion Control Algorithms, Quality of Service, Internet Working, Network Layer in Internet.
IPv6 basic protocol, extensions and options, support for QoS, security, etc., Changes to other protocols, Application Programming Interface for IPv6.

Module III
Mobile IP, IP Multicasting. Multicast routing protocols, address assignments, session discovery, etc.

Module IV
The Transport Protocol: The Transport Service, Elements of transport protocol, a simple Transport Protocol, Internet Transport Protocols UDP, Internet Transport Protocols TCP, TCP extensions for high-speed networks, transaction-oriented applications Performance Issues.
The Application Layer: DNS-(Domain Name System), Electronic Mail, World Wide Web Multimedia.

Module V
Overview of network security, Secure-HTTP, SSL, ESP, Key distribution protocols. Digital signatures, digital certificates-mail Security, Web security, Social Issues.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- Computer Networks - Andrew S Tanenbaum,4th Edition. Pearson Education/PHI
- Data Communications and Networking – Behrouz A. Forouzan. Third Edition TMH.

***References*:**

- Computer Communications and Networking Technologies –Michael A.Gallo, WilliamM .Hancock - Thomson Publication.
- W. Stallings. Cryptography and Network Security: Principles and Practice, 2nd Edition,Prentice Hall, 1998.
- W. R. Stevens. TCP/IP Illustrated, Volume 1: The protocols, Addison Wesley, 1994.
- C. E. Perkins, B. Woolf, and S. R. Alpert. Mobile IP: Design Principles and Practices,Addison Wesley, 1997.

SOFT COMPUTING

Course Code: MTC 204 **CreditUnits: 03**

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Investigate various artificial intelligence algorithms for automation.
2. Compare working of neural network, Fuzzy logic and Genetic Algorithms.
3. Develop various Algorithms to solve complex problems using soft computing.

Course Contents:

Module I: Soft Computing
Introduction of soft computing, soft computing vs. hard computing, various types of soft computing techniques, applications of soft computing. Artificial Intelligence : Introduction, Various types of production systems, characteristics of production systems, breadth first search, depth first search techniques, other Search Techniques like hill Climbing, Best first Search, A* algorithm, AO* Algorithms and various types of control strategies. Knowledge representation issues, Prepositional and predicate logic, monotonic and non monotonic reasoning, forward Reasoning, backward reasoning, Weak & Strong Slot & filler structures, NLP.

Module II: Neural Network
Structure and Function of a single neuron: Biological neuron, artificial neuron, definition of ANN, Taxonomy of neural net, Difference between ANN and human brain, characteristics and applications of ANN, single layer network, Perceptron training algorithm, Linear separability, Widrow&Hebb;s learning rule/Delta rule, ADALINE, MADALINE, AI v/s ANN. Introduction of MLP, different activation functions, Error back propagation algorithm, derivation of BBPA, momentum, limitation, characteristics and application of EBPA

Module III
Counter propagation network, architecture, functioning & characteristics of counter Propagation network, Hopfield/ Recurrent network, configuration, stability constraints, associative memory, and characteristics, limitations and applications. Hopfield v/s Boltzman machine. Adaptive Resonance Theory: Architecture, classifications, Implementation and training. Associative Memory.

Module IV: Fuzzy Logic
Fuzzy set theory, Fuzzy set versus crisp set, Crisp relation & fuzzy relations, Fuzzy systems: crisp logic, fuzzy logic, introduction & features of membership functions, Fuzzy rule base system : fuzzy propositions, formation, decomposition & aggregation of fuzzy rules, fuzzy reasoning, fuzzy inference systems, fuzzy decision making & Applications of fuzzy logic.

Module V: Genetic algorithm
Fundamentals, basic concepts, working principle, encoding, fitness function, reproduction, Genetic modeling: Inheritance operator, cross over, inversion & deletion, mutation operator, Bitwise operator, Generational Cycle, Convergence of GA, Applications & advances in GA, Differences & similarities between GA & other traditional methods.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

- S, Rajasekaran& G.A. Vijayalakshmi Pai, Neural Networks, Fuzzy Logic & Genetic Algorithms, Synthesis &Applications, PHI Publication.
- S.N. Sivanandam& S.N. Deepa, Principles of Soft Computing, Wiley Publications
- Rich E and Knight K, Artificial Intelligence, TMH, New Delhi.
- Bose, Neural Network fundamental with Graph , Algo.& Appl, TMH
- Kosko: Neural Network & Fuzzy System, PHI Publication
- Klir& Yuan, Fuzzy sets & Fuzzy Logic: Theory &Appli.,PHI Pub.

- Hagen, Neural Network Design, Cengage Learning

COMPILER DESIGN LAB

Course Code: MTC 221 **CreditUnits: 01**

Course Contents:

Programming Language: C/C++

Assignments:

1. WAP to check whether string is accepted or not for entered grammar.
2. WAP to convert Infix to Postfix notation.
3. WAP to convert Infix to Prefix notation.
4. WAP to find no of Tokens in an expression.
5. WAP to convert Regular Expression to NFA.
6. WAP to convert NFA to DFA.
7. WAP to calculate LEADING and TRAILING of a grammar.
8. WAP to calculate FIRST and FOLLOW of a grammar.
9. WAP to implement shift reduce parser.
10. WAP to implement top down parser.

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

ENTERPRISE JAVA APPLICATIONS USING J2EELAB

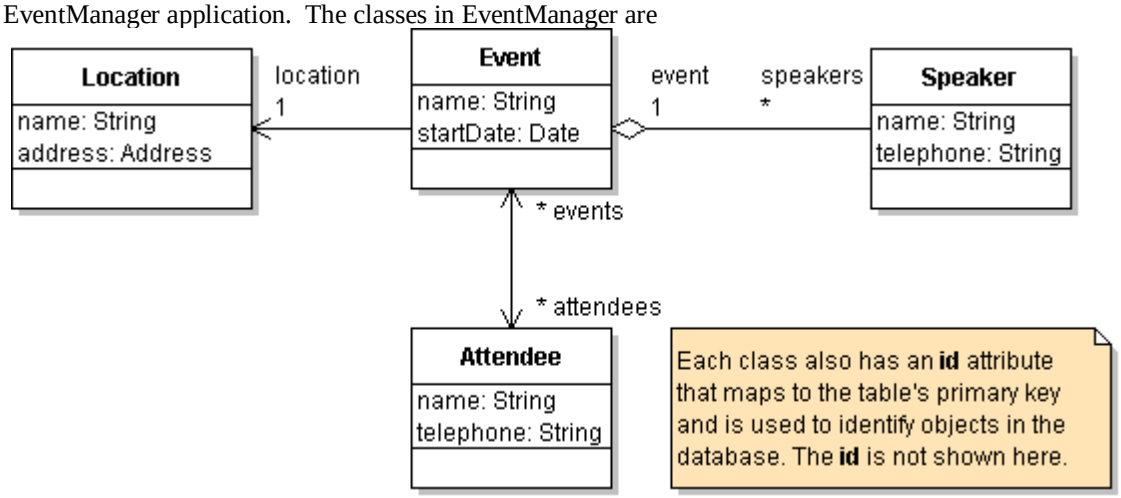
Course Code: MTC 222 Credit Units: 01

Course Contents:

Programming Language: JAVA

Assignments:

1. Write a Program to access a table Product Master from MySql4.1 database using Java code.
2. Write a Program using Servlet to display Visitor Count.
3. Write a Program using Servlet to Differentiate between Frequent visitor and a new visitor.
4. Write a Program for authentication, which validate the login-id and password by the servlet code.
5. Write a Program to connecting a database using user-id and password.
6. Write a Program to insert data into the database using the prepared statement.
7. Write a Program to read data from the database using the Resulset.
8. Write a Program to read data send by the client (HTML page) using servlet.
9. Write a Program to include a HTML page into a JSP page.
10. Write a Program to display httprequest Header in JSP.
11. Write a Program to handle the JSPException.
12. Write a Program to read data send by a client (HTML page) using JSP.
13. Write a Program to Develop Login Form in Struts.
14. Create an Enterprise application using Session Bean(Stateless) which convert the amount from Dollar to Rupees.
15. Write a Enterprise Session bean to simulate a income Tax Calculator.
16. Write a Entity bean to find a student record in student data base using primary key property.
17. Write a XML DTD document to validate and authenticate Student Details.
18. Create an XML version of the citations, Create an XML Schema that will be used to validate the XML, Create an XSL Stylesheet that will transform the citations data into HTML.
19. Write a Program to query record based on primary key using Hibernate.
20. Write a Program using Hibernate todevelop classes and Hibernate configuration to persist an EventManager application. The classes in EventManager are



Examination Scheme:

IA				EE		
A	Practical (Mid-Term)	PR	V	LR	PR (End Term)	V
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

ADVANCED COMPUTER NETWORKS LAB

Course Code: MTC 223 **Credit Units: 01**

Course Contents:

Various installations and connections of LAN, WAN, ETC

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

MINOR PROJECT

Course Code: MTC 260 Credit Units: 05

GUIDELINES FOR PROJECT FILE AND PROJECT REPORT

Research experience is as close to a professional problem-solving activity as anything in the curriculum. It provides exposure to research methodology and an opportunity to work closely with a faculty guide. It usually requires the use of advanced concepts, a variety of experimental techniques, and state-of-the-art instrumentation. Research is genuine exploration of the unknown that leads to new knowledge which often warrants publication. But whether or not the results of a research project are publishable, the project should be communicated in the form of a research report written by the student.

Sufficient time should be allowed for satisfactory completion of reports, taking into account that initial drafts should be critically analyzed by the faculty guide and corrected by the student at each stage.

PROJECT FILE

The Project File may be a very useful tool for undertaking an assignment along-with a normal semester, an exploratory study, sponsored projects, a project undertaken during summer period or any other period where the researcher is not working with a company/organization. The project/ assignment may also be a part of the bigger research agenda being pursued by a faculty/ institution/ department

The Project File is the principal means by which the work carried out will be assessed and therefore great care should be taken in its preparation. This file may be considered in continuous assessment.

In general, the File should be comprehensive and include:

A short account of the activities that were undertaken as part of the project;

A statement about the extent to which the project has achieved its stated objectives;

A statement about the outcomes of the evaluation and dissemination processes engaged in as part of the project;

Any activities planned but not yet completed as part of the project, or as a future initiative directly resulting from the project;

Any problems that have arisen and may be useful to document for future reference.

Project Report

The Project Report is the final research report that the student prepares on the project assigned to him. In case of sponsored project the lay out of the project could be as prescribed by the sponsoring organization. However, in other cases the following components should be included in the project report:

Title or Cover Page

The title page should contain Project Title; Student's Name; Programme; Year and Semester and Name of the Faculty Guide.

Acknowledgement(s)

Acknowledgment to any advisory or financial assistance received in the course of work may be given. It is incomplete without student's signature.

Abstract

A good"Abstract" should be straight to the point; not too descriptive but fully informative. First paragraph should state what was accomplished with regard to the objectives. The abstract does not have to be an entire summary of the project, but rather a concise summary of the scope and results of the project. It should not exceed more than 1000 words.

Table of Contents

Titles and subtitles are to correspond exactly with those in the text.

Introduction

Here a brief introduction to the problem that is central to the project and an outline of the structure of the rest of the report should be provided. The introduction should aim to catch the imagination of the reader, so excessive details should be avoided.

Materials and Methods

This section should aim at experimental designs, materials used (wherever applicable). Methodology should be mentioned in details including modifications undertaken, if any. It includes organization site(s), sample, instruments used with its validation, procedures followed and precautions.

Results and Discussion
Present results, discuss and compare these with those from other workers, etc. In writing this section, emphasis should be laid on what has been performed and achieved in the course of the work, rather than discuss in detail what is readily available in text books. Avoid abrupt changes in contents from section to section and maintain a lucid flow throughout the thesis. An opening and closing paragraph in every chapter could be included to aid in smooth flow.

Note that in writing the various secions, all figures and tables should as far as possible be next to the associated text, in the same orientation as the main text, numbered, and given appropriate titles or captions. All major equations should also be numbered and unless it is really necessary, do not write in "point" form.

While presenting the results, write at length about the the various statistical tools used in the data interpretation. The result interpretation should be simple but full of data and statistical analysis. This data interpretation should be in congruence with the written objectives and the inferences should be drawn on data and not on impression. Avoid writing straight forward conclusion rather, it should lead to generalization of data on the chosen sample.

Results and its discussion should be supporting/contradicting with the previous research work in the given area. Usually one should not use more than two researches in either case of supporing or contradicting the present case of research.

Conclusion(s) & Recommendations
A conclusion should be the final section in which the outcome of the work is mentioned briefly.
Check that your work answers the following questions:

- Did the research project meet its aims (check back to introduction for stated aims)?
- What are the main findings of the research?
- Are there any recommendations?
- Do you have any conclusion on the research process itself?

Implications for Future Research
This should bring out further prospects for the study either thrown open by the present work or with the purpose of making it more comprehensive.

Appendices
The Appendices contain material which is of interest to the reader but not an integral part of the thesis and any problem that have arisen that may be useful to document for future reference.

References
References should include papers, books etc. referred to in the body of the report. These should be written in the alphabetical order of the author's surname. The titles of journals preferably should not be abbreviated; if they are, abbreviations must comply with an internationally recognised system.

Examples

For research article
Voravuthikunchai SP, Lortheeranuwat A, Ninrprom T, Popaya W, Pongpaichit S, Supawita T. (2002) Antibacterial activity of Thai medicinal plants against enterohaemorrhagic *Escherichia coli* O157: H7. *Clin Microbiol Infect*, 8 (suppl 1): 116–117.

For book
Kowalski,M.(1976) Transduction of effectiveness in *Rhizobium meliloti*. SYMBIOTIC NITROGEN FIXATION PLANTS (editor P.S. Nutman IBP), 7: 63-67

The Layout Guidelines for the Project File & Project Report

- A4 size Paper
- Font: Arial (10 points) or Times New Roman (12 points)
- Line spacing: 1.5
- Top and bottom margins: 1 inch/ 2.5 cm; left and right margins: 1.25 inches/ 3 cm

ASSESSMENT OF THE PROJECT FILE AND THE PROJECT REPORT

Essentially, the assessment will be based on the quality of the report, the technical merit of the project and the project execution. Technical merit attempts to assess the quality and depth of the intellectual efforts put into the project. Project execution is concerned with assessing how much work has been put in.

The Project should fulfill the following ***assessment objectives***

- Range of Research Methods used to obtain information
- Execution of Research
- Data Analysis (Analyze Quantitative/ Qualitative information)
- Quality Control
- Conclusions

Assessment Scheme:

Continuous Evaluation: 40% (Based on punctuality, regularity of work, adherence to plan and methodology, refinements/ mid-course corrections etc. as reflected in the Project File.)

Final Evaluation: 60% (Based on the Documentation in the file, Final report layout, analysis and results, achievement of objectives, presentation/ viva)

CLOUD COMPUTING

Course Code: MTC 205 Credit Units: 03

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Analyze the trade-offs between deploying applications in the cloud and over the local infrastructure.
2. Compare the advantages and disadvantages of various cloud computing platforms.
3. Deploy applications over commercial cloud computing infrastructures such as Amazon Web Services, Windows Azure, and Google AppEngine.
4. Analyze the performance, scalability, and availability of the underlying cloud technologies and software.
5. Identify security and privacy issues in cloud computing.
6. Solve a real-world problem using cloud computing through group collaboration.

Course Contents:

Module I: Systems Modeling, Clustering and virtualization:
Scalable Computing over the Internet, Technologies for Network based systems, System models for Distributed and Cloud Computing, Software environments for distributed systems and clouds, Performance, Security and Energy Efficiency

Module II: Virtual Machines and Virtualization of Clusters and Data Centers:
Implementation Levels of Virtualization, Virtualization Structures/ Tools and mechanisms, Virtualization of CPU, Memory and I/O Devices, Virtual Clusters and Resource Management, Virtualization for Data Center Automation.

Module III: Cloud Platform Architecture:
Cloud Computing and service Models, Architectural Design of Compute and Storage Clouds, Public Cloud Platforms, Inter Cloud Resource Management, Cloud Security and Trust Management. Service Oriented Architecture, Message Oriented Middleware.

Module IV: Cloud Programming and Software Environments:
Features of Cloud and Grid Platforms, Parallel & Distributed Programming Paradigms, Programming Support of Google App Engine, Programming on Amazon AWS and Microsoft Azure, Emerging Cloud Software Environments.

Module V: Cloud Resource Management and Scheduling:
Policies and Mechanisms for Resource Management Applications of Control Theory to Task Scheduling on a Cloud, Stability of a Two Level Resource Allocation Architecture, Feedback Control Based on Dynamic Thresholds. Coordination of Specialized Autonomic Performance Managers, Resource Bundling, Scheduling Algorithms for Computing Clouds, Fair Queuing, Start Time Fair Queuing, Borrowed Virtual Time, Cloud Scheduling Subject to Deadlines, Scheduling MapReduce Applications Subject to Deadlines.

Module VI: Storage Systems:
Evolution of storage technology, storage models, file systems and database, distributed file systems, general parallel file systems. Google file system., Apache Hadoop, BigTable, Megastore, Amazon Simple Storage Service(S3)

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- Distributed and Cloud Computing, Kai Hwang, Geoffry C. Fox, Jack J. DongarraMK Elsevier.
- Cloud Computing, Theory and Practice, Dan C Marinescu, MK Elsevier.
- Cloud Computing, A Hands on approach, ArshadeepBahga, Vijay Madisetti, University Press

References:

- Cloud Computing, A Practical Approach, Anthony T Velte, Toby J Velte, Robert Elsenpeter, TMH
- Mastering Cloud Computing, Foundations and Application Programming, Raj Kumar Buyya, Christenvecctiola, S Tammaraiselvi, TMH

ADVANCED COMPUTER ORGANIZATION

Course Code: **MTC 206** **Credit Units: 03**

Course learning outcomes (CLO)

1. Understand the Concept of Parallel Processing and its applications. 2. Implement the Hardware for Arithmetic Operations.
3. Analyze the performance of different scalar Computers.
4. Develop the Pipelining Concept for a given set of Instructions.

5. Distinguish the performance of pipelining and non pipelining environment in a processor.

Course Contents:

Module I
Overview of Parallel computing, Parallelism in Uniprocessor Systems, Parallel computer structures, Pipeline computers, Array computers, Multiprocessor system, Dataflow computers. Architectural Classification schemes, parallel processing applications.

Module II: Pipelining Processing
An overlapped parallelism, Principal of Linear Pipelining, Classification of linear pipline Instruction and Arithmetic pipelines.
Principles of designing pipelined processors, Internal forwarding and register tagging. Hazard detection and resolution, Job sequencing and collision prevention, Characteristics of Vector processing, Multiple vector task dispatching.

Module III
SIMD array processor, SIMD computer organization, Masking and Data routing, SIMD Interconnection network: Static, Dynamic networks, Cube interconnection network, Shuffle exchange and Omega Network, SIMD Matrix multiplication.

Module IV: Multiprocessor Architecture
Tightly and loosely coupled multiprocessors, Introduction to Data flow computing and flow Graph, Introduction to 8 bit and 16 bit Intel Microprocessor architecture and register set.

Module V
Assembly language programming based on Pentiums; Instruction: Data transfer, Logic, Branch operations, Looping Counting, Indexing, Programming Technique, Counters and Time Delays, Stacks and subroutines, Conditional call and Return Instructions.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

- Hwang and Briggs, " Computer Architecture and parallel processing", McGraw Hill
- R.S Goankar, "Microprocessor Architecture, programming and application with the 8085", Pen Ram International.
- Peterson and Heresy, Quantitative approach to Computer architecture", Morgan Kaufman.
- Hwang, "Advanced Computing Architecture", McGraw Hill.
- Quin, "Parallel Computing, Theory and Practices", McGraw Hill.
- Daniel Tabak, "Advanced Microprocessor", McGraw Hill.
- Hall D.V, "Microprocessor and Interfacing, Program and hardware"

COMPUTER ORIENTED OPERATIONAL RESEARCH

Course Code: **MTC 207** **Credit Units: 03**

Course learning outcomes (CLO)

1 .To impart knowledge in concepts and tools of Operations Research

2. To understand mathematical models used in Operations Research
3. To apply these techniques constructively to make effective business decisions

Course Contents:

Module I: Linear Programming
Formulation of problem. Graphical and simplex method for maximization and minimization. Duality theory and sensitivity analysis.
Module II: Transportation Models
Stepping stone algorithm, MODI method and Vogel's Approximation Method (VAM) for selfing balanced, unbalanced transportation problems and problems of degeneracy and maximization.
Module III: Assignment Models
Assignment model for maximization and traveling salesman problems, Industrial Problems.
Module IV: Queuing Theory
Basic structured, Terminology, classification. Birth and death process. Sequencing. Processing in jobs through machines with the same processing order. Processing of 2 Jobs through machines with each having different processing order.
Module V: Network Models
Introduction to PERT and CPM. Fundamental concept of Network models and construction of network diagrams, PERT activity, time estimate. Critical path and project time duration, Probability of completing the project on or before specified time. Float of a activity.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

- HM Wagner, Principles of Operations Research, Prentice Hall
- PK Gupta and DS Hira, Operations Research, S Chand & Co

- Taha, Introduction to Operation Research
- F S Hiller and G I Liebermann, Introduction to Operation Research, Holden R

COMMUNICATION SKILLS - II

Course Code: **BCS 211** **Credit Units: 01**

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Identify essentials components of language
2. Make inferences and predictions about spoken discourse
3. Develop Creative & Literary Sensitivity in global situation
4. Identify features of a reading textbook and utilize them as needed

Course Contents:

Module I: Fundamentals of Communication
Role and purpose of communication: *7 C's of communication*
Barriers to effective communication
Enhancing listening
Forms of Communication: one-to-one, informal and formal

Module II: Verbal Communication (Written)
Business Letter
Social correspondence
Writing resume and Job applications

Module III: Speaking skills
Conversational English
Guidelines to give an effective presentation
Activities to include:
Presentations by students
Just a minute

Examination Scheme:

Components	CT1	CT2	CAF	V	GD	GP	A
Weightage (%)	20	20	25	10	10	10	5

CAF – Communication Assessment File
GD – Group Discussion
GP – Group Presentation

Text & References:

- Business Communication, Raman – Prakash, Oxford
- Textbook of Business Communication, Ramaswami S, Macmillan
- Speaking Personally, Porter-Ladousse, Cambridge

BEHAVIOURAL SCIENCE - II
(BEHAVIOURAL COMMUNICATION AND RELATIONSHIP MANAGEMENT)

Course Code: BCS 211 **Credit Units: 01**

Course Objective:

This course aims at imparting an understanding of:
Process of Behavioural communication
Aspects of interpersonal communication and relationship
Management of individual differences as important dimension of IPR

Course Contents:

Module I: Behavioural Communication
Scope of Behavioural Communication
Process – Personal, Impersonal and Interpersonal Communication
Guidelines for developing Human Communication skills
Relevance of Behavioural Communication in relationship management

Module II: Managing Individual Differences in Relationships
Principles
Types of issues
Approaches
Understanding and importance of self disclosure
Guidelines for effective communication during conflicts

Module III: Communication Climate: Foundation of Interpersonal Relationships
Elements of satisfying relationships
Conforming and Disconfirming Communication
Culturally Relevant Communication
Guideline for Creating and Sustaining Healthy Climate

Module IV: Interpersonal Communication
Imperatives for Interpersonal Communication
Models – Linear, Interaction and Transaction
Patterns – Complementary, Symmetrical and Parallel
Types – Self and Other Oriented
Steps to improve Interpersonal Communication

Module V: Interpersonal Relationship Development
Relationship circle – Peer/ Colleague, Superior and Subordinate
Initiating and establishing IPR
Escalating, maintaining and terminating IPR
Direct and indirect strategies of terminating relationship
Model of ending relationship

Module VI:End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

- Vangelist L. Anita, Mark N. Knapp, Inter Personal Communication and Human Relationships: Third Edition, Allyn and Bacon
- Julia T. Wood. Interpersonal Communication everyday encounter
- Simons, Christine, Naylor, Belinda: Effective Communication for Managers, 1997 1st Edition Cassell
- Harvard Business School, Effective Communication: United States of America
- Beebe, Beebe and Redmond; Interpersonal Communication, 1996; Allyn and Bacon Publishers.

FRENCH - II

Course Code: **FLF 211** **Credit Units: 02**

Course learning outcomes (CLO)

At the successful completion of this course you should be able to:

1. **Identify** and **express** in French vocabulary and grammar norms
2. **Interpret** different types of texts as well as cultural ideas and themes.
3. **Demonstrate** comprehension of nuance between script and sound in French
4. **Narrate** clearly ideas, themes in simple standard French

Course Contents:

Module A: pp.38 – 47: Unité 3: Objectif 3, 4, 5. 6

Module B: pp. 47 to 75 Unité 4, 5

Contenu lexical:

Unité 3: Organiser son temps

1. donner/demander des informations sur un emploi du temps, un horaire SNCF – Imaginer un dialogue
2. rédiger un message/ unelettre pour …

i) prendre un rendez-vous/ accepter et confirmer/ annuler
ii) inviter/accepter/refuser

3. Faire un programmed'activités
   imaginer une conversation téléphonique/un dialogue

Propositions- interroger, répondre

Unité 4:Découvrir son environnement

1. situerun lieu
2. s'orienter, s'informer sur un itinéraire.
3. Chercher, décrire un logement
4. connaîtrelesrythmes de lavie

Unité 5: s'informer

1. demander/donner des informations sur unemploi du temps passé.
2. donner une explication, exprimer le doute ou la certitude.
3. découvrirlesrelations entre lesmots
4. savoir s'informer

Contenu grammatical:

1. Adjectifsdémonstratifs
2. Adjectifspossessifs/exprimerlapossession à l'aide de:
   i. « de » ii. A+nom/pronomdisjoint
3. Conjugaisonpronominale – négative, interrogative - construction à l'infinitif
4. Impératif/exprimerl'obligation/l'interdiction à l'aide de « il faut…. »/ «il ne fautpas… »
5. passécomposé
6. Questions directes/indirectes

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project +Presentation
I – Interaction/Conversation Practice

Text & References:

- le livre à suivre: Campus: Tome 1

GERMAN – II

Course Code: **FLG 211** **Credit Units: 02**

Course learning outcomes (CLO)

At the successful completion of this course you should be able to:

1. **Identify** and **express** in German vocabulary and grammar norms
2. **Interpret** different types of texts as well as cultural ideas and themes.
3. **Demonstrate** comprehension of nuance between script and sound in German
4. **Narrate** clearly ideas, themes in simple standard German

Course Contents:

Module I: Everything about Time and Time periods
Time and times of the day.
Weekdays, months, seasons.
Adverbs of time and time related prepositions

Module II: Irregular verbs
Introduction to irregular verbs like to be, and others, to learn the conjugations of the same, (fahren, essen, lessen, schlafen, sprechen und ähnliche).

Module III: Separable verbs
To comprehend the change in meaning that the verbs undergo when used as such
Treatment of such verbs with separable prefixes

Module IV: Reading and comprehension
Reading and deciphering railway schedules/school time table
Usage of separable verbs in the above context

Module V: Accusative case
Accusative case with the relevant articles
Introduction to 2 different kinds of sentences – Nominative and Accusative

Module VI: Accusative personal pronouns
Nominative and accusative in comparison
Emphasizing on the universal applicability of the pronouns to both persons and objects

Module VII: Accusative prepositions
Accusative propositions with their use
Both theoretical and figurative use

Module VIII: Dialogues
Dialogue reading: 'In the market place'
'At the Hotel'

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project +Presentation
I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3

- Rosa-Maria Dallapiazza et al, TangramAktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

SPANISH – II

Course Code: **FLS 211** **Credit Units: 02**

Course learning outcomes (CLO)

At the successful completion of this course you should be able to:

1. **Identify** and **express** in Spanish vocabulary and grammar norms
2. **Interpret** different types of texts as well as cultural ideas and themes.
3. **Demonstrate** comprehension of nuance between script and sound in Spanish
4. **Narrate** clearly ideas, themes in simple standard Spanish

Course Contents:

Module I
Revision of earlier modules.

Module II
Some more AR/ER/IR verbs. Introduction to root changing and irregular AR/ER/IR ending verbs

Module III
More verbal phrases (eg, Dios Mio, Que lastima etc), adverbs*(bueno/malo, muy, mucho, bastante, poco).*
Simple texts based on grammar and vocabulary done in earlier modules.

Module IV
Possessive pronouns

Module V
Writing/speaking essays like my friend, my house, my school/institution, myself….descriptions of people, objects etc, computer/internet related vocabulary

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project +Presentation
I – Interaction/Conversation Practice

Text & References:

- Español, EnDirecto I A
- Español Sin Fronteras

CHINESE– II

Course Code: **FLC 211** **Credit Units: 02**

Course learning outcomes (CLO)

At the successful completion of this course you should be able to:

At the successful completion of this course, you will be able to:

1. **Read, write and speak approx. 100** New Chinese words and understand basic grammar points.
2. **Interpret** words, phrases and sentences of day today conversation related to hobbies and abilities,gratitude, apology and welcome, time, weather and directions
3. **Write** Chinese characters, simple sentence and a paragraph on simple topic like 'Self Introduction' and dialogue writing on "Conversation between two friends exchanging Personnel Information".
4. **Communicate** with Chinese speaking people using words, phrases and sentences related to hobbies and abilities. Express gratitude, apology and welcome.

Course Contents:

Module I
Drills
Practice reading aloud
Observe Picture and answer the question.
Tone practice.
Practice using the language both by speaking and by taking notes.
Introduction of basic sentence patterns.
Measure words.
Glad to meet you.

Module II
Where do you live?
Learning different colors.
Tones of "bu"
Buying things and how muchit costs?
Dialogue on change of Money.
More sentence patterns on Days and Weekdays.
How to tell time. Saying the units of time in Chinese. Learning to say useful phrases like – 8:00, 11:25, 10:30 P.M. everyday, afternoon, evening, night, morning 3:58, one hour, to begin, to end ….. etc.
Morning, Afternoon, Evening, Night.

Module III
Use of words of location like-li, wais hang, xia
Furniture – table, chair, bed, bookshelf,.. etc.
Description of room, house or hostel room..eg what is placed where and how many things are there in it?
Review Lessons – Preview Lessons.
Expression 'yao", "xiang" and "yaoshi" (if).
Days of week, months in a year etc.
I am learning Chinese. Is Chinese difficult?

Module IV
Counting from 1-1000
Use of "chang-chang".
Making an Inquiry – What time is it now? Where is the Post Office?
Days of the week. Months in a year.
Use of Preposition – "zai", "gen".
Use of interrogative pronoun – "duoshao" and "ji".
"Whose"??? Sweater etc is it?
Different Games and going out for exercise in the morning.

Module V
The verb “qu”
Going to the library issuing a book from the library
Going to the cinema hall, buying tickets
Going to the post office, buying stamps
Going to the market to buy things..etc
Going to the buy clothes …. Etc.
Hobby. I also like swimming.
Comprehension and answer questions based on it.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project +Presentation
I – Interaction/Conversation Practice

Text & References:

- “Elementary Chinese Reader Part I” Lesson 11-20

DATA WAREHOUSING AND DATA MINING

Course Code: MTC 301 CreditUnits: 03

Course learning outcomes (CLO)

1. Understand what data mining is and how data mining can be employed and applied to solve real problems.
2. Recognize wither a data mining solution is feasible alternative for a specific problem.
3. Apply basic statistical to evaluate the results of data mining models.
4. Develop a comprehensive understanding of how several data mining techniques can be applied to solve problems.

Course Contents:

Module I: Data Warehousing
An Introduction to data ware housing and characteristics of a data warehouse, various aspects of data marts. Data warehouse logical design: star schemas, fact tables, dimensions, other schemas, materialized, views, Data warehouse physical design: hardware and i/o considerations, parallelism, indexes.

Module II: On Line Analytical processing
OLTP and OLAP systems, Data Modelling, OLAP Tools, web OLAP, Decision support system.Developing a Data Ware house: Architectural strategies and Organization Issues, Design Considerations, Tools for Data Warehousing,

Module III: Data Mining
Data mining approaches and methods: concept description, classification, association rules, clustering, Mining complex types of data, Research trends in data warehousing and data mining. Objectives of Data Mining the Technical context for Data Mining, machine learning, decision support and computer technology.

Module IV: Data Mining Techniques and Algorithms
Process of data mining, Algorithms, Data base segmentation or clustering, predictive Modelling, Link Analysis, Data Mining Techniques, Automatic Cluster Detection, Decision trees and Neural Networks.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- "Mastering Data Mining: The Art and Science of Customer Relationship Management", by Berry and Lin off, John Wiley and Sons, 2001.
- "Data Ware housing: Concepts, Techniques, Products and Applications", by C.S.R. Prabhu, Prentice Hall of India, 2001.

References:

- "Data Mining: Concepts and Techniques", J.Han, M.Kamber, Academic Press, Morgan Kanf man Publishers, 2001.
- "Data Mining", by Pieter Adrians, DolfZantinge, Addison Wesley,2000.
- "Data Mining with Microsoft SQL Server", by Seidman, Prentice Hall of India,2001.

NETWORK SECURITY AND MANAGEMENT

Course Code: **MTC 302** **Credit Units: 03**

Course learning outcomes (CLO)

CLO6: Students will be able to understand the concept of different cryptography techniques transposition and substitution methods.

CLO7: Students will be able to analyse the DES, IDEA, Feistel Cipher cryptographic algorithm.

CLO8: Students will be able to Understand and analyse public key Cryptosystem using RSA and learn various techniques used for the distribution of key in public key cryptosystem.

CLO9: Students will be able to apply and evaluate Message authentication and hash function using MD5 and SHA and learn the concept of digital signature.

CLO10: Students will be able to understand the concept of IP security and password message protocols.

Course Contents:

Module I

Classical Cryptography,Various types of Cipher, Cryptanalysis, Computer Security, Threats to security, History of Computer security, Computer System Security and Access Controls (System access and data access). Threats - Viruses, worms, Trojan horse, bombs, trap doors, spoofs, email virus, macro Viruses, remedies, Intruders, Malicious software, Firewalls, vulnerabilities & Threats, Network Denial of service attack.

Module II

Technologies - Switching Design, Switching Types - Layer 2 and 3 Switching, Spanning Tree Protocol, Redundancy in Layer 2 Switched Networks, STP Terminology and Operation, Virtual LANs – Trunks - Inter-VLAN Routing - Multilayer Switching, Switching Security and Switching Design Considerations IPv4 Routing Design.

IPv4 Address Design - Private and Public Addresses – NAT - Subnet Masks - Hierarchical IP Address Design - IPv4 Routing Protocols – Classification - Metrics - Routing Protocol Comparison - IPv4 Routing Protocol Selection.

Module III

Network Security Design, Hacking – Vulnerabilities - Design Issues - Human Issues - Implementation Issues – Threats - Reconnaissance Attacks - Access Attacks - Information Disclosure Attacks - Denial of Service Attacks - Threat Defense - Secure Communication - Network Security Best Practices - SAFE Campus Design.

Module IV

Network Security-Kerberos, X.509, some network security projects- SDNS, DISNet,

Project MAX, Secure NFS Security- E-Mail Security, IP security, Web security, Server security- security for network server, web servers, mobile technologies (java and Java script etc)

Module V
Network Management Design: ISO Network Management Standard - Protocols and Tools – SNMP – MIB – RMON - Cisco NetFlow – Syslog – CiscoWorks - Network Management Strategy - SLCs and SLAs - IP Service-Level Agreements – Content Networking Design – Case Study – Venti Systems.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

***Text*:**
- Computer Security, Dictergouman, John Wiley & Sons
- Craig Zacker, "The Complete Reference: Upgrading and Troubleshooting Networks", Tata McGraw-Hill, 2000.

References:
- Computer Security: Art and Science, Mathew Bishop, Addison-Wisley
- Introduction to computer Security- Mathew Bishop, Addison-Wisley
- Network security, Kaufman, Perlman and Speciner, Pearson Education
- Cryptography and Network Security, William Stallings, Pearson Education
- Diane Tiare and Catherine Paquet, "Campus Network Design Fundamentals", Pearson Education, 2006.

DATA WAREHOUSING AND DATA MINING LAB

Course Code: MTC 321 **CreditUnits: 01**

Course Contents:

Software Required: Informatica Tool, Cognos, Todd.

Assignments:

1. Write a program to implement text mining.
2. Write a program to implement web mining.
3. Write a program to develop snowflake schema.
4. Write a program to develop the tree schema with the help of binary tree.
5. Write a program to implement BFS and DFS with respect to 2-D modeling.
6. Write a program to implement the basic step of informatics tool.
7. Write a Program to implement the K-means algorithm
8. Write a Program to implement PAM K-medoids algorithm
9. Write a Program to implement AGNES hierarchical clustering
10. Do the compare between K-Means, K-Medoid, hierarchical clustering Results

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

DISSERTATION (Evaluation of Plan and Critical Literature Review)

Course Code: MTC 360 **CreditUnits: 03**

PATTERN RECOGNITION AND IMAGE PROCESSING

Course Code: MTC 303 Credit Units: 03

Course learning outcomes (CLO)

To give the Student:-

- Understand the basic principles and methods of digital image processing,
- Be able to formulate solutions to general image processing problems,
- Have a comprehensive background in image filtering,
- Be prepared for research in image processing.

Course Contents:

Module I: Introduction
Machine perception, pattern recognition example, pattern recognition systems, the design cycle, learning and adaptation
Bayesian Decision Theory
Introduction, continuous features – two categories classifications, minimum error-rate classification- zero–one loss function, classifiers, discriminant functions, and decision surfaces

Module II:
Normal density:
Univariate and multivariate density, discriminant functions for thenormal density-different cases, Bayes decision theory – discrete features, compound

Bayesian decision theory and context

Module III: Un-supervised learning and clustering
Introduction, mixture densities and Identifiability, maximum likelihood estimates, application to normal mixtures, K-means clustering. Date description and clustering, similarity measures, criteria function for clustering

Module IV: Image Fundamentals and Transforms
Elements of visual perception – Image sampling and quantization, Basic relationship between pixels, Some basic grayscale transformations, Introduction to Fourier Transform and DFT, Properties of 2D Fourier Transform, FFT, Separable Image Transforms, Walsh, Hadamard, Discrete Cosine Transform, Haar, Slant, Karhunen, Loeve transforms.

Module V: Image Segmentation and Edge Detection:
Region Operations, Crack Edge Detection,
Edge Following, Gradient operators, Compass and laplace operators. Threshold detection methods, optimal thresholding, multispectral thresholding, thresholding in hierarchical data structures; edge based image segmentation- edge image thresholding, edge relaxation, border tracing, border detection,

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:
- "*Fundamentals of speech Recognition"*, LawerenceRabiner, Biing – Hwang JuangPearson education.
- "*Pattern classifications"*, Richard O. Duda, PeterE. Hart, David G. Stroke. Wiley studentedition, Second Edition.
- R.C Gonzalez and R.E. Woods, "*Digital Image Processing",* Addison Wesley.

***References*:**
- "Pattern Recognition and Image Analysis" – Earl Gose, Richard John baugh, Steve Jost
- A.K.Jain, "Fundamentals of Digital Image Processing", Prentice Hall of India.

"Digital Image Processing"– M. Anji Reddy, BS Publications.

PATTERN RECOGNITION AND IMAGE PROCESSING LAB

Course Code: MTC 323 Credit Units: 01

Course Contents:

1. Study of functions in MATLAB.
2. Linear and Non-linear operations on Images.
3. Implementation of different geometric transformations (Scaling, Rotation, Translation, Shear).
4. Implementation of Identity transformation, Contrast Stretching, Threshold and Log Transformation.
5. Plotting of Histogram for Low contrast, High Contrast, Blurred Images, Black & white images and Gray Images.
6. Smoothening and Sharpening of Images using spatial filters.
7. Implementation of Fourier Transformation of different types of Images.

8. Implementation of Edge detection in different-2 images.

9. Implementation of clustering.

10 Implementation of different algorithms in pattern recognition.

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

Text & References:

- Rafael C. Gonzalez & Richard E. Woods, "Image Processing Using MATLAB", 2nd edition, Pearson Education.
- "Pattern classifications", Richard O. Duda, PeterE. Hart, David G. Stroke. Wiley student edition, Second Edition

ASP .NET

Course Code: **MTC 304** **CreditUnits: 03**

Course learning outcomes (CLO)

At the successful completion of this course you should be able to:

1. Define object oriented terminology and C# programming concepts
2. Illustrate the role of inheritance, packages and interface to solve programming problems
3. Apply Exception handling for avoiding the run time errors

4. Apply the concept of multithreading to increase the execution speed of an application
5. Differentiate between C# and java programming language
6. Create projects using ASP.NET programming.

Course Contents:

Module I: Introduction to .NET technologies
Features of .NET, .NET Framework, CLR, MSIL, .NET class library, .NET Languages, CTS, assemblies, manifest, and metadata, What is ASP.NET?, Difference between ASP and ASP.NET.

Module II: Controls in ASP.NET
Overview of Dynamic Web page, Understanding ASP.NET Controls, Applications, Web servers, Installation of IIS. Web forms, web form controls -server controls, client controls. Adding controls to a web form, Buttons, Text Box, Labels, Checkbox, Radio Buttons, List Box. Adding controls at runtime. Running a web Application, creating a multiform web project. Form Validation: Client side validation, server Side validation, validation Controls: Required Field Comparison Range. Calendarcontrol, Ad rotator Control, Internet Explorer Control.

Module III: Overview of ADO.NET and XML
What is ADO.NET, from ADO to ADO.NET. ADO.NET architecture, Accessing Data using Data Adapters and Datasets, using Command & Data Reader, binding data to data bind Controls, displaying data in data grid, XML basics, attributes, fundamental XML classes: Document, text writer, text reader. XML validations, XML in ADO.NET, The XML Data Document.

Module IV: ASP.NET Applications
Creating, tracking, caching, error handling, Securing ASP.NET applications- form based applications, window based application.

Module V: Web services
Introduction, State management- View state, Session state, Application state, Building ASP.NET web services, working with ASP.NET applications, creating custom controls.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:
- ASP.NET Unleashed by Stephen Walther, SAMS publications

References:
- ASP.NET, Wrox Publications
- ASP.NET and VB.NET, Wrox Publication
- ASP.NET and C#.NET, Wrox publication.

ASP.NET LAB

Course Code: **MTC 324** **CreditUnits: 01**

Course Contents:

- Use of Controls in creating web pages
- Creating sessions
- Creating Custom controls
- Implementing security

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

REAL TIME OPERATING SYSTEM

Course Code: MTC 305 CreditUnits: 04

Course learning outcomes (CLO)

On completion of this course, the students will be able to

1. understand concepts of Real-Time systems and modeling
2. recognize the characteristics of a real-time system
3. understand and develop document on an architectural design of a real-time system
4. develop and document Task scheduling, resource management, real-time operating systems and fault tolerant applications of Real-Time Systems.

Course Contents:

Module I
Introduction to Real Time Systems, Prioritites, Embedded Systems, Task, Classification & Requirements, Deadlines, Soft, Hard.

Module II
Firm Real Time Systems, Introduction to Real Time Operating Systems, Basic Principles, system calls, Files, Processes, Design and implementation of processes, Communication between processes, operating system structures. Task Management, Inter Process Communication, Case Studies of Maruti II, HART OS, VRTX etc. Comparison and Study of RTOS -VxWorks and μCoS, Introduction to POSIX and OSEK standards, Principles, Polled loop systems, RTOS porting to a target.

Module III
Characterizing Real Time Systems and Task, Task Assignment & Scheduling Theory, Fixed and Dynamic Priority Scheduling, Uniprocessor (RM and EDF), Multiprocessor (Utilization Balancing, Next-fit for RM & Bin-Packing Assignment for EDF) Scheduling

Module IV
Event based, Process based, Graph models, Pettrinet models, RTOS tasks, RT scheduling, Interrupt processing, Synchronization, Control blocks, Memory requirements.

Module V
Fault, Fault Classes, Fault Tolerant Real Time System, Clocks, Clock Synchronization, Issues in Real Time Software Design.

ExaminationScheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text&References:

- Krishna, C.M, “Real Time Systems”, McGraw Hill
- Jane W.S. Liu, “Real Time Systems”, Pearson Education Asia
- Levi and Agarwal, “Real Time Systems”, McGraw Hill
- Mathi& Joseph, “Real Time System: Specification, Validation & Analysis”, PHI
- Hermann K,” Real time systems-design principles for distributed embedded Applications”, kluwer academic, 1995.
- Charles Crowley” operating systems- A design oriented approach” McGraw Hill.
- RAJ BUHR, DL Beily, “An introduction to real time systems” PHI, 1999.
- CM Krishna, Kang G. Shin, “Real time Systems”, Mc Graw Hill, 1997.

- Raymond J.A., Donald L Baily, “An introduction to real time operating systems” PHI, 1999.

MOBILE COMPUTING

Course Code: MTC 306 **CreditUnits: 04**

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Investigate various advanced wireless protocols for mobile communication.
2. Compare working of wired network and wireless networks.
3. Develop networking techniques to solve complex problems.
4. Create and maintain network used in wireless condition.

Course Contents:

Module I: Introduction
Wireless Networks, Wireless VS Wired Networks, Mobile Devices, Mobile Applications**,** Challenges in mobile computing, coping with uncertainties, resource poorness, bandwidth, etc. Cellular architecture, co-channel interference, frequency reuse, capacity increase by cell splitting, GSM Architecture, GSM-Air Interface, protocols, localization & calling,
Third Generation (3G) Mobile Services
Introduction to International Mobile Telecommunications 2000 (IMT 2000) vision, Wideband Code Division Multiple Access (W-CDMA), and CDMA 2000, Quality of services in 3G.
General Packet Radio Services (GPRS): GPRS Architecture, GPRS Network Nodes.

Module II: (Wireless) Medium Access Control
Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA.
Mobile Network Layer: Mobile IP (Goals, assumptions, entities and terminology, IP packet delivery, agent advertisement and discovery, registration, tunneling and encapsulation, optimizations), Dynamic Host Configuration Protocol (DHCP).
Mobile Transport Layer: Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmit/fast recovery, Transmission /time-out freezing, Selective retransmission, Transaction oriented TCP.

Module III: Database Issues
Hoarding techniques, caching invalidation mechanisms, client server computing with adaptation, power-aware and transactional models, query processing, recovery, and quality of service issues.
Data Dissemination: Communications asymmetry, classification of new data delivery mechanisms, push-based mechanisms, pull-based mechanisms, hybrid mechanisms, selective tuning (indexing) techniques.
Context Aware Computing: Ubiquitous computing, concept of context, context aware computing and applications, middleware support.
Mobile Middleware: Service discovery, adaptation, mobile agents.

Module IV: Mobile Data Communication
W LANs (Wireless LANs) IEEE 802.11 standard, Mobile IP.
Wireless Application Protocol (WAP): The Mobile Internet standard, WAP Gateway and Protocols, wireless mark up Languages (WML).
Wireless Local Loop (WLL): Introduction to WLL Architecture, wireless Local Loop Technologies.

Module V: Global Mobile Satellite Systems
Mobile Satellite Systems (GEO, MEO and LEO), case studies of the IRIDIUM and GLOBALSTAR systems. GPS.
Wireless Enterprise Networks: Introduction to Virtual Networks, Blue tooth technology, Blue tooth Protocols.

Mobile Ad hoc Networks (MANETs): Overview, Properties of a MANET, spectrum of MANET applications, routing and various routing algorithms, Wireless sensor Network, wireless Security.

ExaminationScheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text&References:

Text:

- "Wireless and Mobile Networks Architectures", by Yi-Bing Lin &ImrichChlamtac, John Wiley & Sons, 2001.
- "Mobile and Personal Communication systems and services", by Raj Pandya, Prentice Hall of India, 2001.

References:

- "Guide to Designing and Implementing wireless LANs", by Mark Ciampa, Thomson learning, Vikas Publishing House, 2001.
- "Wireless Web Development", Ray Rischpater, Springer Publishing, 2000.
- "The Wireless Application Protocol", by Sandeep Singhal, Pearson Education Asia, 2000.
- "Third Generation Mobile Telecommunication systems", by P. Stavronlakis, Springer Publishers, 2001.

AD HOC AND WIRELESS SENSOR NETWORK

Course Code: MTC 307 **CreditUnits: 04**

Course learning outcomes (CLO)

1. To understand the basics of Ad-hoc & Sensor Networks.
2. To learn various fundamental and emerging protocols of all layers.
3. To study about the issues pertaining to major obstacles in establishment and efficient management of Ad-hoc and sensor networks.
4. To understand the nature and applications of Ad-hoc and sensor networks.
5. To understand various security practices and protocols of Ad-hoc and Sensor Networks.

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Course Contents:

Module I: Introduction of ad-hoc/sensor networks
Key definitions of ad-hoc/sensor networks, Advantages of ad-hoc/sensor networks, Unique constraints and challenges, Driving Applications, Traffic Profiles , Types of Ad hoc Mobile Communications, Wireless Communications/Radio Characteristics, Mobile host movement and Movability Models, Challenges facing Ad Hoc Mobile Networks.

Module II: Ad Hoc wireless MAC protocols
Introduction, Synchronous and asynchronous MAC protocols, Problem in Ad Hoc channel access, Receiver-initiated and sender-initiated MAC protocols, Existing Ad Hoc MAC protocols, Issues in designing MAC protocols, Classifications of MAC protocols, MAC protocols, Ad Hoc Routing Protocols- Introduction, Issues in Designing a Routing Protocol for Ad Hoc Wireless Networks, Issues in designing routing protocols,
Classifications of Routing Protocols: Proactive Routing Protocol, Reactive Routing Protocol, Hybrid Routing Protocol, Advance Routing Protocols

Module III: Multicast routing In Ad Hoc Networks
Introduction, Issues in Designing a Multicast Routing Protocol, Operation of Multicast Routing Protocols, An Architecture Reference Model for Multicast RoutingProtocols, Classifications of Multicast Routing Protocols, Tree-Based Multicast Routing Protocols, Mesh- Based Multicast Routing Protocols, Summary of Tree-and Mesh-Based Protocols - Energy-Efficient Multicasting, Multicasting with Quality of Service Guarantees, Application Dependent Multicast Routing, Comparisons of Multicast Routing Protocols.

Module IV: Networking Sensors
Unique features, Deployment of ad-hoc/sensor network ,Sensor tasking and control, Transport layer and security protocols, Issues in Designing a Transport Layer Protocolfor Ad Hoc Wireless Networks, Design Goals of a Transport Layer Protocol for Ad Hoc Wireless Networks,Classification of Transport Layer Solutions, Security in Ad Hoc Wireless Networks, Network Security Requirements, Issues and Challenges in Security Provisioning.

Module V: Sensor Network Platforms and Tools
Berkley Motes, Sensor network programming challenges, Embedded Operating System, Simulators
Applications of Ad-Hoc/Sensor Network and Future Directions. QoS and Energy Management

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

- Siva Ram Murthy and B.S. Manoj “Ad Hoc Wireless Networks: Architectures and Protocols”,Pearson Education.
- C.K. Toh, “Ad Hoc Mobile Wireless Networks: Protocols and Systems”, Pearson Education.

- George Aggelou, “Mobile Wireless Networks”, Tata McGraw- Hill.
- Charles E. Perkins, Ad Hoc Networking, Pearson Education.

COMMUNICATION SKILLS - III

Course Code: BCS 311 **CreditUnits: 01**

Course learning outcomes (CLO)

At the successful completion of this course the student should be able to:

1. Inculcating creative thinking skills
2. Construct and showcase their communication skills in a creative manner.
3. Comprehending and demonstrating ways of self introduction
4. Outlining and illustrating presentation Skills

Course Contents:

Module I:Mechanics and Semantics of Sentences
Writing effective sentences
Style and Structure

Module II: Developing writing skills
Inter - office communication: Business Letter; E mails; Netiquette
Intra – office communication: Memos, Notices, Circulars, Minutes
Report Writing

Module III: Business Presentations
Planning, design and layoutof presentation
Information Packaging
Audience analysis
Audio visual aids
Speaking with confidence
Case Studies

Examination Scheme:

Components	CT1	CT2	CAF	V	GD	GP	A
Weightage (%)	20	20	25	10	10	10	5

CAF – Communication Assessment File
GD – Group Discussion
GP – Group Presentation

Text & References:

- Krishnaswamy, N, Creative English for Communication, Macmillan
- Raman Prakash, Business Communication, Oxford.

BEHAVIOURAL SCIENCE - III
(LEADING THROUGH TEAMS)

Course Code: BSS 311 **CreditUnits: 01**

Course learning outcomes (CLOs)

At the successful completion of this course you (the student) should be able to:

i. Demonstrate knowledge of strategies for developing a healthy interpersonal communication

ii. Recognize the importance of transactional analysis, script analysis

iii. Identify the difference between healthy and unhealthy expression of emotions and develop emotional competencenecessary for conflict resolution and impression management.

iv. Demonstrate knowledge of strategies for developing a healthy interpersonal relationship.

Course Contents:

Module I: Teams: An Overview
Team Design Features: team vs. group
Effective Team Mission and Vision
Life Cycle of a Project Team
Rationale of a Team, Goal Analysis and Team Roles

Module II: Team & Sociometry
Patterns of Interaction in a Team
Sociometry: Method of studying attractions and repulsions in groups
Construction of sociogram for studying interpersonal relations in a Team

Module III: Team Building
Types and Development of Team Building
Stages of team growth
Team performance curve
Profiling your Team: Internal & External Dynamics
Team Strategies for organizational vision
Team communication

Module IV: Team Leadership & Conflict Management
Leadership styles in organizations
Self Authorized team leadership
Causes of team conflict
Conflict management strategies
Stress and Coping in teams

Module V: Global Teams and Universal Values
Management by values
Pragmatic spirituality in life and organization
Building global teams through universal human values
Learning based on project work on Scriptures like Ramayana, Mahabharata, Gita etc.

Module VI:End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)

Weightage (%)	20	05	20	30	25

Text & References:

- Organizational Behaviour, Davis, K.
- Hoover, Judhith D. Effective Small Group and Team Communication, 2002,Harcourt College Publishers
- LaFasto and Larson: When Teams Work Best, 2001, Response Books (Sage), New Delhi
- Dick, Mc Cann&Margerison, Charles: Team Management, 1992 Edition, viva books
- J William Pfeiffer (ed.) Theories and Models in Applied Behavioural Science, Vol 2, Group (1996); Pfeiffer & Company
- Smither Robert D.; The Psychology of Work and Human Performance, 1994, Harper Collins College Publishers

FRENCH - III

Course Code: FLF 311 **CreditUnits: 02**

Course learning outcomes (CLO)

At the successful completion of this course you should be able to:

1. **Identify** and express in French vocabulary and grammar norms
2. **Interpret** different types of texts as well as cultural ideas and themes.
3. **Demonstrate comprehension** of nuance between script and sound in French
4. **Narrate clearly** ideas, themes in simple standard French

Course Contents:

Module B: pp. 76 – 88 Unité 6

Module C: pp. 89 to103 Unité 7

Contenu lexical: **Unité 6:se faire plaisir**

1. acheter: exprimerseschoix, décrire un objet (forme, dimension, poids et matières) payer
2. parler de lanourriture, deuxfaçons d'exprimerlaquantité, commanderunrepasaurestaurant
3. parler des différentes occasions de faire la fête

Unité 7: Cultiverses relations

1. maîtriserlesactes de la communication socialecourante (Salutations, présentations, invitations, remerciements)
2. annoncer un événement, exprimer un souhait, remercier, s'excuser par écrit.
3. caractériserunepersonne (aspect physique et caractère)

Contenu grammatical:

1. accord des adjectifsqualificatifs
2. articles partitifs
3. Négations avec de, ne…rien/personne/plus
4. Questions avec combien, quel…
5. expressions de la quantité
6. ne…plus/toujours - encore
7. pronomscompléments directs et indirects
8. accorddu participe passé (auxiliaire « avoir ») avec l'objetdirect
9. Impératifavecunpronomcomplémentdirect ou indirect
10. constructionavec « que » - Jecrois que/ Je pense que/ Je sais que

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project +Presentation
I – Interaction/Conversation Practice

Text & References:

- le livre à suivre: Campus: Tome 1

GERMAN - III

Course Code: FLG 311 **CreditUnits: 02**

Course learning outcomes (CLO)

After successful completion of the course, the students will be able perform orally and in writing certain social functions:

1. Students will be able to ask and tell time.
2. Students will be able to frame sentences using Separable verb.
3. Student will be able to write and speak sentences using modal verb.
4. Students will be able to frame sentences and speak using was/were/had.

Course Contents:

Module I: Modal verbs
Modal verbs with conjugations and usage
Imparting the finer nuances of the language

Module II: Information about Germany (ongoing)
Information about Germany in the form of presentations or "Referat"– neighbors, states and capitals, important cities and towns and characteristic features of the same, and also a few other topics related to Germany.

Module III: Dative case
Dative case, comparison with accusative case
Dative case with the relevant articles
Introduction to 3 different kinds of sentences – nominative, accusative and dative

Module IV: Dative personal pronouns
Nominative, accusative and dative pronouns in comparison

Module V: Dative prepositions
Dative preposition with their usage both theoretical and figurative use

Module VI: Dialogues
In the Restaurant,
At the Tourist Information Office,
A telephone conversation

Module VII: Directions
Names of the directions
Asking and telling the directions with the help of a roadmap

Module VIII: Conjunctions
To assimilate the knowledge of the conjunctions learnt indirectly so far

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project +Presentation
I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, TangramAktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

SPANISH – III

Course Code: FLS 311 **CreditUnits: 02**

Course learning outcomes (CLO)

After successful completion of the course, students will be able to perform orally and in writing certain social functions:

Students will be able to perform communicative tasks (oral and written) with proficiencies in,

a) Introduction of stem changing irregular verbs
b) Introduction of prepositions (Cerca de/ lejos de/ encima de etc.)
c) Present continuous tense **(Estar+ gerundio)**
d) Introduction of third person verbs Gustar/Parecer/Encantar/ Doler (to like/ to seem like/ to enchant/ to hurt.) etc
e) Interrogatives – How much/ How many
f) Introduction of irregular verbs.
g) Immediate future plans (Ir a + verbo)

Course Contents:

Module I
Revision of earlier semester modules
Set expressions (idiomatic expressions) with the verb *Tener*, *Poner, Ir*….
Weather

Module II
Introduction to *Gustar*…and all its forms. Revision of *Gustar* and usage of it

Module III
Translation of Spanish-English; English-Spanish. Practice sentences.
How to ask for directions (using estar)
Introduction to IR + A + INFINITIVE FORM OF A VERB

Module IV
Simple conversation with help of texts and vocabulary
En el restaurante
En el instituto
En el aeropuerto

Module V
Reflexives

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project +Presentation
I – Interaction/Conversation Practice

Text & References:

- Español, EnDirecto I A
- Español Sin Fronteras -Nivel Elemental

CHINESE – III

Course Code: FLC 311 **CreditUnits: 02**

Course Objective:

Foreign words are usually imported by translating the concept into Chinese, the emphasis is on the meaning rather than the sound. But the system runs into a problem because the underlying name of personal name is often obscure so they are almost always transcribed according to their pronciation alone. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I
Drills
Dialogue practice
Observe picture and answer the question.
Introduction of written characters.
Practice reading aloud
Practice using the language both by speaking and by taking notes.
Character writing and stroke order

Module II
Measure words
Position words e.g. inside, outside, middle, in front, behind, top, bottom, side, left, right, straight.
Directional words – beibian, xibian, nanbian, dongbian, zhongjian.
Our school and its different building locations.
What game do you like?
Difference between "hii" and "neng", "keyi".

Module III
Changing affirmative sentences to negative ones and vice versa
Human body parts.
Not feeling well words e.g.; fever, cold, stomach ache, head ache.
Use of the modal particle "le"
Making a telephone call
Use of "jiu" and "cal" (Grammar portion)
Automobiles e.g. Bus, train, boat, car, bike etc.
Traveling, by train, by airplane, by bus, on the bike, by boat.. etc.

Module IV
The ordinal number "di"
"Mei" the demonstrative pronoun e.g.mei tian, meinian etc.
use of to enter to exit
Structural particle "de" (Compliment of degree).
Going to the Park.
Description about class schedule during a week in school.
Grammar use of "li" and "cong".
Comprehension reading followed by questions.

Module V
Persuasion-Please don't smoke.
Please speak slowly
Praise – This pictorial is very beautiful
Opposites e.g. Clean-Dirty, Little-More, Old-New, Young-Old, Easy-Difficult, Boy-Girl, Black-White, Big-Small, Slow-Fast … etc.
Talking about studies and classmates
Use of "it doesn't matter"
Enquiring about a student, description about study method.
Grammar: Negation of a sentence with a verbal predicate.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project +Presentation
I – Interaction/Conversation Practice

Text & References:

- “Elementary Chinese Reader Part I, Part-2” Lesson 21-30

DISSERTATION

Course Code: MTC 455 CreditUnits: 30

GUIDELINES FOR DISSERTATION

Research experience is as close to a professional problem-solving activity as anything in the curriculum. It provides exposure to research methodology and an opportunity to work closely with a faculty guide. It usually requires the use of advanced concepts, a variety of experimental techniques, and state-of-the-art instrumentation. Research is genuine exploration of the unknown that leads to new knowledge which often warrants publication. But whether or not the results of a research project are publishable, the project should be communicated in the form of a research report written by the student.

Sufficient time should be allowed for satisfactory completion of reports, taking into account that initial drafts should be critiqued by the faculty guide and corrected by the student at each stage.

The File is the principal means by which the work carried out will be assessed and therefore great care should be taken in its preparation.

In general, the File should be comprehensive and include

A short account of the activities that were undertaken as part of the project;

A statement about the extent to which the project has achieved its stated goals.

A statement about the outcomes of the evaluation and dissemination processes engaged in as part of the project;

Any activities planned but not yet completed as part of the DISSERTION, or as a future initiative directly resulting from the project;

Any problems that have arisen that may be useful to document for future reference.

- Report Layout

The report should contain the following components:

- **Title or Cover Page**

The title page should contain the following information: Project Title; Student's Name; Course; Year; Supervisor's Name.

- **Acknowledgements** (optional)

Acknowledgment to any advisory or financial assistance received in the course of work may be given.

- **Abstract**

A good"Abstract" should be straight to the point; not too descriptive but fully informative. First paragraph should state what was accomplished with regard to the objectives. The abstract does not have to be an entire summary of the project, but rather a concise summary of the scope and results of the project

- **Table of Contents**

Titles and subtitles are to correspond exactly with those in the text.

- **Introduction**

Here a brief introduction to the problem that is central to the project and an outline of the structure of the rest of the report should be provided. The introduction should aim to catch the imagination of the reader, so excessive details should be avoided.

- **Materials and Methods**

This section should aim at experimental designs, materials used. Methodology should be mentioned in details including modifications if any.

- **Results and Discussion**

Present results, discuss and compare these with those from other workers, etc. In writing these section, emphasis should be given on what has been performed and achieved in the course of the work, rather than discuss in detail what is readily available in text books. Avoid abrupt changes in contents from section to section and maintain a lucid flow throughout the thesis. An opening and closing paragraph in every chapter could be included to aid in smooth flow.

Note that in writing the various secions, all figures and tables should as far as possible be next to the associated text, in the same orientation as the main text, numbered, and given appropriate titles or captions. All major equations should also be numbered and unless it is really necessary never write in "point" form.

- **Conclusion**

A conclusion should be the final section in which the outcome of the work is mentioned briefly.

- **Future prospects**

- **Appendices**

The Appendix contains material which is of interest to the reader but not an integral part of the thesis and any problem that have arisen that may be useful to document for future reference.

- **References / Bibliography**

This should include papers and books referred to in the body of the report. These should be ordered alphabetically on the author's surname. The titles of journals preferably should not be abbreviated; if they are, abbreviations must comply with an internationally recognised system.

Examples

For research article

Voravuthikunchai SP, Lortheeranuwat A, Ninrprom T, Popaya W, Pongpaichit S, Supawita T. (2002) Antibacterial activity of Thai medicinal plants against enterohaemorrhagic *Escherichia coli* O157: H7. *Clin Microbiol Infect*, **8** (suppl 1): 116–117.

For book

Kowalski,M.(1976) Transduction of effectiveness in *Rhizobium meliloti*. SYMBIOTIC NITROGEN FIXATION PLANTS (editor P.S. Nutman IBP), **7**: 63-67

ASSESSMENT OF THE DISSERTATION FILE

Essentially, marking will be based on the following criteria: the quality of the report, the technical merit of the project and the project execution.
Technical merit attempts to assess the quality and depth of the intellectual efforts put into the project.
Project execution is concerned with assessing how much work has been put in.
The File should fulfill the following ***assessment objectives:***

Range of Research Methods used to obtain information

Execution of Research

Data Analysis
Analyse Quantitative/ Qualitative information
Control Quality

Draw Conclusions

Examination Scheme:

Dissertation	50
Viva Voce	50
Total	**100**

ata, leading to production of a structured report.

Selecting the Dissertation Topic

It is usual to give you some discretion in the choice of topic for the dissertation and the approach to be adopted. You will need to ensure that your dissertation is related to your field of specialization.

Deciding this is often the most difficult part of the dissertation process, and perhaps, you have been thinking of a topic for some time.

It is important to distinguish here between ‘dissertation topic’ and ‘dissertation title’. The topic is the specific area that you wish to investigate. The title may not be decided until the dissertation has been written so as to reflect its content properly.

Few restrictions are placed on the choice of the topic. Normally we would expect it to be:

- relevant to business, defined broadly;
- related to one or more of the subjects or areas of study within the core program and specialisationstream;
- clearly focused so as to facilitate an in-depth approach, subject to the availability of adequate sources of information and to your own knowledge;
- of value and interest to you and your personal and professional development.

Planning the Dissertation
This will entail following:

- Selecting a topic for investigation.
- Establishing the precise focus of your study by deciding on the aims and objectives of the dissertation, or formulating questions to be investigated. Consider very carefully what is worth investigating and its feasibility.
- Drawing up initial dissertation outlines considering the aims and objectives of the dissertation. Workout various stages of dissertation
- Devising a timetable to ensure that all stages of dissertation are completed in time. The timetable should include writing of the dissertation and regular meetings with your dissertation guide.

The Dissertation plan or outline
It is recommended that you should have a dissertation plan to guide you right from the outset. Essentially, the dissertation plan is an outline of what you intend to do, chapter wise and therefore should reflect the aims and objectives of your dissertation.

There are several reasons for having a dissertation plan

- It provides a focus to your thoughts.
- It provides your faculty-guide with an opportunity, at an early stage of your work, to make constructive comments and help guide the direction of your research.
- The writing of a plan is the first formal stage of the writing process, and therefore helps build up your confidence.
- In many ways, the plan encourages you to come to terms with the reading, thinking and writing in a systematic and integrated way, with plenty of time left for changes.
- Finally, the dissertation plan generally provides a revision point in the development of your dissertation report in order to allow appropriate changes in the scope and even direction of your work as it progresses.

Keeping records
This includes the following:

- Making a note of everything you read; including those discarded.
- Ensuring that when recording sources, author's name and initials, date of publication, title, place of publication and publisher are included. (You may consider starting a card index or database from the outset). Making an accurate note of all quotations at the time you read them.
- Make clear what is a direct a direct quotation and what is your paraphrase.

Dissertation format
All students must follow the following rules in submitting their dissertation.

- Front page should provide title, author, Name of degree/diploma and the date of submission.
- Second page should be the table of contents giving page references for each chapter and section.
- The next page should be the table of appendices, graphs and tables giving titles and page references.
- Next to follow should be a synopsis or abstract of the dissertation (approximately 500 words)
- Next is the 'acknowledgements'.
- Chapter I should be a general introduction, giving the background to the dissertation, the objectives of the dissertation, the rationale for the dissertation, the plan, methodological issues and problems. The limitations of the dissertation should also be hinted in this chapter.
- Other chapters will constitute the body of the dissertation. The number of chapters and their sequence will usually vary depending on, among others, on a critical review of the previous relevant work relating to your major findings, a discussion of their implications, and conclusions, possibly with a suggestion of the direction of future research on the area.
- After this concluding chapter, you should give a list of all the references you have used. These should be cross - references with your text. For articles from journals, the following details are required e.g.

  Draper P and Pandyal K. 1991, The Investment Trust Discount Revisited, Journal of Business Finance and Accounting, Vol18, No6, Nov, pp 791-832.

  For books, the following details are required:
  Levi, M. 1996, International Financial Management, Prentice Hall, New York, 3rd Ed, 1996

- Finally, you should give any appendices. These should only include relevant statistical data or material that cannot be fitted into the above categories.

The Layout Guidelines for the Dissertation

- A4 size Paper
- Font: Arial (10 points) or Times New Roman (12 points)
- Line spacing: 1.5

- Top and bottom margins: 1 inch/ 2.5 cm; left and right margins: 1.25 inches/ 3 cm

Guidelines for the assessment of the Dissertation
While evaluating the dissertation, faculty guide will consider the following aspects:

1. Has the student made a clear statement of the objective or objective(s).
2. If there is more than one objective, do these constitute parts of a whole?
3. Has the student developed an appropriate analytical framework for addressing the problem at hand.
4. Is this based on up-to-date developments in the topic area?
5. Has the student collected information / data suitable to the frameworks?
6. Are the techniques employed by the student to analyse the data / information appropriate and relevant?
7. Has the student succeeded in drawing conclusion form the analysis?
8. Do the conclusions relate well to the objectives of the project?
9. Has the student been regular in his work?
10. Layout of the written report.

Assessment Scheme:

Continuous Evaluation:		40%
(Based on Abstract, Regularity, Adherence to initial plan, Records etc.)		
Final Evaluation: Based on,		60%
Contents & Layout of the Report,	20	
Conceptual Framework,	05	
Objectives & Methodology and	05	
Implications & Conclusions	10	
Viva & Presentation	20	

AMITY UNIVERSITY
RAJASTHAN

AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY (ASET)

Bachelor of Technology

(Information Technology)

Programme Code: BIT

Duration – 4 Years Full Time

(Programme Structure)

Choice Based Credit System (CBCS)

AMITY UNIVERSITY
RAJASTHAN

Program Learning Outcomes – PLO

1. Students will be able to demonstrate role of Computer Science in the following core knowledge areas
   - Algorithms, Data Structures and Databases
   - Programming Languages and Compilers
   - Software Engineering and Development
   - Computer Hardware and Architecture
   - Data Communication and Computer Networks
2. Students will be able to analyze role of computer science and information technology, with mainstay in mathematics, basic sciences and engineering fundamentals.
3. Students will apply problem solving strategies to a range of modern computing paradigms related to computer programming, data intensive technologies, distributed and cloud computing, computational techniques.
4. Students will gain experiential learning on developing techno-commercially feasible and socially acceptable computing solutions to real world engineering problems thorough internship and projects, in industry.
5. Students will recognize the role of technological advances impacting society and the social, legal, ethical, cultural and communicative implications of computer technology and their usage.

Credits Summary

Semester	Core Courses (CC)	Domain Electives (DE)	Value Added Courses (VA)	Non-Teaching Credit Courses (NTCC)	Open Electives(OE)	Anandam	Total
1	22	-	04	00	-	02	28
2	24	-	04	01	03	02	34
3	15	04	04	00	03	02	28
4	14	04	04	00	03	02	27
5	12	04	04	05	03	02	30
6	14	04	04	00	03	02	27
7	07	04	04	04	03	02	24
8	11	-	-	15	-		26
Total	119	20	28	25	18	14	224

Total Credit=119+20+28+25+18+14=224
CC= Core Course, DE=Domain Elective, OE= Open Elective, VA=Value Added Course, NTCC=Non-Teaching Credit Courses

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AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY (ASET)

Program Name: B.Tech.(IT)

FIRST SEMESTER

Code	Course	Category	L	T	P/FW	Credit Units
Core Courses						
AM101	Applied Mathematics – I	CC	3	1	-	4
AP 102	Applied Physics - I – Fields & Waves	CC	2	1	-	3
BME 103	Engineering Mechanics	CC	2	1	-	3
BCS 104	Introduction to Computers & Programming in C	CC	2	1	-	3
BEE 105	Basic Electrical Engineering	CC	2	1	-	3
BME 106	Engineering Graphics	CC	1	-	-	1
Practical Courses						
AP 122	Applied Physics - I lab	CC	-	-	2	1
BME 123	Engineering Mechanics Lab	CC	-	-	2	1
BCS 124	Programming in C Lab	CC	-	-	2	1
BEE 125	Basic Electrical Engineering Lab	CC	-	-	2	1
BME 126	Engineering Graphics Lab	CC	-	-	2	1
Value Added Courses						
BCS 101	English	VA	1	-	-	1
BSS 104	Behavioral Science-I(Understanding Self for Effectiveness)	VA	1	-	-	1
FLT 101 FLG 101 FLS 101 FLC 101	Foreign Language – I French German Spanish Chinese	VA	2	-	-	2
Non-Teaching Credit Course (NTCC)						
AND001	Anandam-I	NTCC	-	-	-	2
Total						**28**

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Program Name: B.Tech.(IT)

SECOND SEMESTER

Code	Course	Category	L	T	P/FW	Credit Units
Core Courses						
AM 201	Applied Mathematics – II	CC	3	1	-	4
AP 202	Applied Physics - II – Modern Physics	CC	2	1	-	3
AC 203	Applied Chemistry	CC	2	1	-	3
BCS 204	Data Structures Using C	CC	2	1	-	3
BME 205	Elements of Mechanical Engineering	CC	2	1	-	3
BCS 206	Domain Workshop/Seminar	NTCC	-	-	-	1
EVS 001	Environmental Studies	CC	4	-	-	4
Practical Courses						
AP 222	Applied Physics – II Lab	CC	-	-	2	1
AC 223	Applied Chemistry Lab	CC	-	-	2	1
BCS 224	Data Structures Using C Lab	CC	-	-	2	1
BME 225	Elements of Mechanical Engineering Lab	CC	-	-	2	1
Open Elective						
	OPEN ELECTIVE- 1	**OE**	**3**	**-**	**-**	**3**
Value Added Courses						
BCS 201	English	VA	1	-	-	1
BSS 204	Behavioural Science – II (Problem solving and Creative Thinking)	VA	1	-	-	1
FLT 201 FLG 201 FLS 201 FLC 201	Foreign Language – II French German Spanish Chinese	VA	2	-	-	2
Non-Teaching Credit Course (NTCC)						

AND002	Anandam-II	NTCC	-	-	-	2
Total						**34**

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AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY(ASET)

Program Name: B.Tech.(IT)

THIRD SEMESTER

Code	Course	Category	L	T	P/FW	Credit Units
Core Courses						
AM 301	Applied Mathematics – III	CC	2	1	-	3
BCS 302	Database Management Systems	CC	2	1	-	3
BCS 303	Operating Systems with Unix	CC	2	1	-	3
BCS 304	Object Oriented Programming using C++	CC	2	1	-	3
Practical Courses						
BCS 322	Database Management Systems lab	CC	-	-	2	1
BCS 323	Operating Systems with Unix lab	CC	-	-	2	1
BCS 324	Object Oriented Programming using C++ lab	CC	-	-	2	1
Domain Elective-I : Choose any ONE from the following courses along with corresponding labs						
BCS 305	Digital Electronics	DE	2	1	-	3
BCS 306	Website Design	DE				
BCS 325	Digital Electronics lab	DE	-	-	2	1
BCS 326	Website Design Lab	DE				
Open Elective Course						
	OPEN ELECTIVE- 2	**OE**	**3**	**-**	**-**	**3**
Value Added Courses						
BCS 301	Communication Skills – I	VA	1	-	-	1
BSS 304	Behavioral Science – III (Interpersonal Communication)	VA	1	-	-	1
FLT 301 FLG 301 FLS 301 FLC 301	Foreign Language – III French German Spanish Chinese	VA	2	-	-	2
Non-Teaching Credit Course (NTCC)						

AND003	Anandam-III	NTCC	-	-	-	2
Total						**28**

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AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY (ASET)

Program Name: B.Tech.(IT)

FOURTH SEMESTER

Code	Course	Category	L	T	P/FW	Credit Units
Core Courses						
BIT 401	Management Information System	CC	3		-	3
BCS 402	Discrete Mathematics	CC	2	1	-	3
BCS 403	Computer Graphics	CC	2	1	-	3
BCS404	Data Communication & Computer Networks	CC	2	1	-	3
Practical Courses						
BCS 423	Computer Graphics Lab	CC	-	-	2	1
BCS 424	Data Communication & Computer Networks Lab	CC	-	-	2	1
Domain Elective-II : Choose any one from the following courses						
BCS 405	Hypertext Preprocessor (PHP)	DE	2	1	-	3
BCS406	E-Commerce and ERP	DE	4	-	-	4
BCS 425	PHP Lab	DE	-	-	2	1
Open Elective Courses						
	OPEN ELECTIVE-3	**OE**	**3**	**-**	**-**	**3**
Value Added Courses						
BCS 401	Communication Skills – II	VA	1	-	-	1
BSS 404	Behavioural Science – IV	VA	1	-	-	1
FLT 401 FLG 401 FLS 401 FLC 401	Foreign Language – IV French German Spanish Chinese	VA	2	-	-	2
Non-Teaching Credit Course (NTCC)						
AND004	Anandam-IV	NTCC	-	-	-	2
Total						**27**

PRACTICAL TRAINING – I: 6 – 8 WEEKS

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AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY (ASET)

Program Name: B.Tech.(IT)

FIFTH SEMESTER

Code	Course	Category	L	T	P/FW	Credit Units
Core Courses						
BCS 502	Software Engineering	CC	2	1	-	3
BCS 503	Computer Architecture	CC	2	1	-	3
BCS 504	Java Programming	CC	3	-	-	3
BIT 550	Internship - I (Evaluation)	NTCC	-	-	-	5
Practical Courses						
BCS 522	Software Engineering Lab	CC	-	-	2	1
BCS 523	Computer Architecture Lab	CC	-	-	2	1
BCS 524	Java Programming Lab	CC	-	-	2	1
Domain Elective-III : Choose any ONE from the following courses along with their corresponding labs						
BCS 505	Python Programming	DE	2	1	-	3
BCS 506	Advance Networking	DE	2	1	-	3
BCS 525	Python Programming Lab	DE	-	-	2	1
BCS 526	Advance Networking Lab	DE	-	-	2	1
Open Elective Courses						
	OPEN ELECTIVE- 4	OE	3	-	-	3
Value Added Courses						
BCS 501	Communication Skills – III	VA	1	-	-	1
BSS 504	Behavioural Science –V (Group Dynamics and Team Building)	VA	1	-	-	1
FLT 501 FLG 501 FLS 501	Foreign Language – V French German Spanish	VA	2	-	-	2

FLC 501	Chinese					
Non-Teaching Credit Course (NTCC)						
AND005	Anandam-V	NTCC	-	-	-	2
Total						**30**

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AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY (ASET)

Program Name: B.Tech.(IT)

SIXTH SEMESTER

Code	Course	Category	L	T	P/FW	Credit Units
Core Courses						
BCS 602	Software Testing & Quality Assurance	CC	3	-	-	3
BCS 603	Analysis and Design of Algorithm	CC	2	1	-	3
BCS 604	Microprocessor	CC	2	1	-	3
BIT605	Computer Oriented Numerical Methods	CC	2	1	-	3
Practical Courses						
BCS 622	Software Testing and Quality Assurance Lab	CC	-	-	2	1
BCS 624	Microprocessor Lab	CC	-	-	2	1
Domain Elective-IV : Choose any ONE from the following courses along with their corresponding labs						
BCS 606	Advanced Java Programming	DE	2	1	-	3
BCS 607	Software Project Management	DE	2	1	-	3
BCS 608	Cloud Computing	DE	2	1	-	3
BCS 626	Advanced Java Programming Lab	DE	-	-	2	1
BCS 627	Software Project Management Lab	DE	-	-	2	1
BCS 628	Cloud Computing Lab	DE	-	-	2	1
Open Elective Course						
	OPEN ELECTIVE- 5	OE	3	-	-	3
Value Added Courses						
BCS 601	Communication Skills – IV	VA	1	-	-	1
BSS 604	Behavioral Science – VI (Stress and Coping Strategies)	VA	1	-	-	1
FLT 601 FLG 601 FLS 601 FLC 601	Foreign Language – VI French German Spanish Chinese	VA	2	-	-	2
Non-Teaching Credit Course (NTCC)						
AND006	Anandam-VI	NTCC	-	-	-	2

Total				27

PRACTICAL TRAINING – II: 6 – 8 WEEKS

AMITY UNIVERSITY
RAJASTHAN

AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY (ASET)

Program Name: B.Tech.(IT)

SEVENTH SEMESTER

Code	Course	Category	L	T	P/FW	Credit Units
Core Courses						
BIT 701	Internet of Things (IoT)	CC	2	1	-	3
BCS 703	Information Storage & Management (EMC^2)	CC	3	-	-	3
BIT 750	Internship – II(Evaluation)	NTCC	-	-	-	4
Practical Courses						
BIT 721	Internet of Things (IoT) Lab	CC	-	-	2	1
Domain Elective-V : Choose any ONE from the following courses along with their corresponding labs						
BCS 702	Artificial Intelligence	DE	2	1	-	3
BIT 702	Operations Research	DE	2	1	-	3
BCS 705	Programming with ASP.Net	DE	2	1	-	3
BCS 706	Mobile Computing	DE	3	1	-	4
BCS 707	Data Warehousing & Data Mining	DE	2	1	-	3
BCS 722	Artificial Intelligence Lab	DE	-	-	2	1
BIT 722	Operations Research Lab	DE	-	-	2	1
BCS 725	Programming with ASP.Net Lab	DE	-	-	2	1
BCS 727	Data Warehousing & Data Mining Lab	DE	-	-	2	1
Open Elective Course						
	OPEN ELECTIVE- 6	OE	3	-	-	3
Value Added Courses						
BCS 701	Communication Skills – V	VA	1	-	-	1
BSS 704	Behavioural Science – VII (Individual, Society and Nation)	VA	1	-	-	1
FLT 701 FLG 701 FLS 701 FLC 701	Foreign Language – VII French German Spanish Chinese	VA	2	-	-	2
Non-Teaching Credit Course (NTCC)						
AND007	Anandam-VII	NTCC	-	-	-	2

Total				**24**

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AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY (ASET)

Program Name: B.Tech.(IT)

EIGTH SEMESTER

SEMESTER VIII

Code	Course	Category	L	T	P/FW	Credit Units
Core Courses						
BCS 801	Soft Computing	CC	2	1	-	3
BCS 802	Cryptography & Network Security	CC	2	1	-	3
BCS 803	Digital Image Processing	CC	2	1	-	3
BIT 860	Project	NTCC	-	-	-	15
Practical Courses						
BCS 821	Soft Computing in MATLAB Lab	CC	-	-	2	1
BCS 823	Digital Image Processing Lab	CC	-	-	2	1
Total						**26**

Note:-

CC - Core Course,
VA - Value Added Course,
OE - Open Elective,
DE - Domain Elective,
FW - Field Work

APPLIED MATHEMATICS - I

Course Code: AM 101 **CreditUnits: 04**

2.1 Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Investigate the basic concept and applications of differential and integral Calculus.
2. Apply Leibnitz's theorem, Taylor's theorem and mean value theorems.
3. Calculate asymptotes, curvature, tangents & normals, maxima & minima, partialderivatives and approximate calculation of a function.
4. Find the length, area, volumes and solid of revolution using integration
5. Create an interest in finding the solution of problem, length, area, volume etc of the curveand application of Vector calculus.
6. Recognize and solve the ordinary differential equations.

Course Contents:

Module I: Differential Calculus
Successive differentiation, Leibnitz's theorem (without proof), Mean value theorem, Taylor's theorem (proof), Remainder terms, Asymptote & Curvature, Partial derivatives, Chain rule, Differentiation of Implicit functions, Exact differentials, Tangents and Normals, Maxima, Approximations, Differentiation under integral sign, Jacobians and transformations of coordinates.

Module II: Integral Calculus
Fundamental theorems, Reduction formulae, Properties of definite integrals, Applications to length, area, volume, surface of revolution, improper integrals, Multiple Integrals-Double integrals, Applications to areas, volumes.

Module III: Ordinary Differential Equations
Formation of ODEs, Definition of order, degree & solutions, ODE of first order: Method of separation of variables, homogeneous and non homogeneous equations, Exactness & integrating factors, Linear equations & Bernoulli equations, General linear ODE of n^{th} order, Solution of homogeneous equations, Operator method, Method of undetermined coefficients, Solution of simple simultaneous ODE.

Module IV: Vector Calculus
Scalar and Vector Field, Derivative of a Vector, Gradient, Directional Derivative, Divergence and Curl and their Physical Significance, Arc Length, Tangent, Directional Derivative, Evaluation of Line Integral, Green's Theorem in Plane (without proof), Representation of Surfaces, Tangent Plane and Surface Normal, Surface Integral, Stoke's Theorem (without proof), Gauss Divergence Theorem (without proof).

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- Differential Calculus by Shanti Narain
- Integral Calculus by Shanti Narain

References:

- Differential Equation by A.R. Forsyth
- Higher Engineering Mathematics by H.K. Dass

APPLIED PHYSICS - I - FIELDS AND WAVES

Course Code: **AP 102** **CreditUnits: 03**

Course Learning Outcomes:

By the end of the session students should be able to:

1) Define the various terms and principles involved in SHM

2) Explain plane progressive and ultrasonic waves

3) Explain and interpret the wave nature of light

4) Apply the various concepts of vector analysis to situations of practical interest

5) Calculate the value of electric field and magnetic field component by using the Maxwell's equations.

Course Contents:

Module I: Oscillations & Waves

Oscillations: Introduction to S.H.M. Damped Oscillations: Differential Equation and its solution, logarithmic decrement, Quality Factor, Different conditions of damping of harmonic oscillations. Forced oscillations: Amplitude and Frequency Response, Resonance, Sharpness of Resonance

Plane Progressive Waves: Differential Equation and Solution, Superposition of Progressive Waves stationary waves.

Ultrasonics: Generation and application of ultrasonicwaves.

Module II: Wave Nature of Light

Interference: Coherent Sources, Conditions of interference, Interference due to division of wavefront, Fresnels biprism Interference due to division of amplitude, Newton's rings, Interference due to thin films, .

Diffraction: Fresnel and Fraunhofer diffraction, Fraunhofer diffraction at a single slit, double slit, N Slits, Transmission grating, Rayleigh criterion and Resolving power of grating.

Polarization: Birefringence, Nicol prism, Production and analysis of plane, circularly and elliptically polarized light, Half and quarter wave plates, Optical rotation, Polarimeter.

Module III: Electromagnetics

Scalar and vector fields, gradient of a scalar field, physical significance of gradient, equipotential surface. Line, surface and volume integrals, Divergence and curl of vector field and mathematical analysis physical significance, Electric flux, Gauss' law, Proof and Applications, Gauss divergence and Stokes theorems.

Differential form of Gauss' Law, Amperes' Law, Displacement current, Faradays Law, Maxwell equations in free space & isotropic media (Integral form & differential form), EM wave propagation in free space, Poynting vector.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

- Waves & oscillation, A. P. French
- Physics of waves, W. C. Elmore & M. A. Heald
- Introduction to Electrodynamics, D. J. Griffith
- Electrodynamics, Gupta, Kumar & Singh
- Optics, A. K. Ghatak
- Engineering Physics, Satya Prakash

ENGINEERING MECHANICS

Course Code: **BME 103** **CreditUnits: 03**

Course learning outcomes (CLO)

1: Able to analyse the force system and its effects.

2: Explain the nature of forces acting upon a system.

3: Evaluate the static and dynamic system's problem

Course Contents:

Module I: Force system & Structure
Free body diagram, Equilibrium equations and applications. Plane truss, perfect and imperfect truss, assumption in the truss analysis, analysis of perfect plane trusses by the method of joints, method of section.

Module II:Friction
Static and Kinetic friction, laws of dry friction, co-efficient of friction, angle of friction, angle of repose, cone of friction, friction lock, efficiency of screw jack, transmission of power through belt

Module III: Distributed Force
Determination of center of gravity, center of mass and centroid by direct integration and by the method of composite bodies, mass moment of inertia and area moment of inertia by direct integration and composite bodies method, radius of gyration, parallel axis theorem, Pappus theorems and its application, polar moment of inertia.

Module IV: Work -Energy
Work energy equation, conservation of energy, Virtual work, impulse, momentum conservation, impact of bodies, co-efficient of restitution, loss of energy during impact, D'alembert principle

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

- S.S. Bhavikatti, Engineering Mechanics, New Age International Ltd
- Timoshenko, Engineering Mechanics, McGraw Hill
- R. S. Khurmi, Engineering Mechanics, S. Chand Publication
- H. Shames & G. K. M. Rao, Engineering Mechanics, Pearson Education, 2006

INTRODUCTION TO COMPUTERS AND PROGRAMMING IN C

Course Code: BCS 104 **CreditUnits: 03**

Course learning outcomes (CLO)

It is expected that by the end of the course, students will be comfortable in -

1. Attempting algorithmic solutions to problems
2. Designing and coding moderate sized programs running to the order of a few hundred lines of code, and
3. Reading, understanding and modifying code written by others.

Course Contents:

Module I: Introduction
Introduction to computer, history, von-Neumann architecture, memory system (hierarchy, characteristics and types), H/W concepts (I/O Devices), S/W concepts (System S/W & Application S/W, utilities). Data Representation: Number systems, character representation codes, Binary, octal, hexadecimal and their interconversions. Binary arithmetic, floating point arithmetic, signed and unsigned numbers, Memory storage unit.

Module II: Programming in C
History of C, Introduction of C, Basic structure of C program, Concept of variables, constants and data types in C, Operators and expressions: Introduction, arithmetic, relational, Logical, Assignment, Increment and decrement operator, Conditional, bitwise operators, Expressions, Operator precedence and associativity. Managing Input and output Operation, formatting I/O.

Module III: Fundamental Features in C
C Statements, conditional executing using if, else, nesting of if, switch and break Concepts of loops, example of loops in C using for, while and do-while, continue and break. Storage types (automatic, register etc.), predefined processor, Command Line Argument.

Module IV: Arrays and Functions
One dimensional arrays and example of iterative programs using arrays, 2-D arrays Use in matrix computations. Concept of Sub-programming, functions Example of user defined functions. Function prototype, Return values and their types, calling function, function argument, function with variable number of argument, recursion.

Module V: Advanced features in C
Pointers, relationship between arrays and pointers Argument passing using pointers, Array of pointers. Passing arrays as arguments.
Strings and C string library.
Structure and Union. Defining C structures, Giving values to members, Array of structure, Nested structure, passing strings as arguments.
File Handling.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- "ANSI C" by E Balagurusamy

- Yashwant Kanetkar, “Let us C”, BPB Publications, 2nd Edition, 2001.
- Herbert Schildt, “C: The complete reference”, Osbourne Mcgraw Hill, 4th Edition, 2002.
- V. Raja Raman, “Computer Programming in C”, Prentice Hall of India, 1995.

***References*:**

- **Kernighan & Ritchie, “C Programming Language”, The (Ansi C Version), PHI, 2nd Edition.**
- **J. B Dixit, “Fundamentals of Computers and Programming in ‘C’.**
- P.K. Sinha and Priti Sinha, “Computer Fundamentals”, BPB publication.

BASIC ELECTRICAL ENGINEERING

Course Code: **BEE 105** **Credit Units: 03**

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Develop a practical approach for analysis of resistive circuits and solution of resistive circuits with independent sources.
2. Able to apply two terminal element relationships for inductors and capacitors in an electrical network.
3. Capable of analysis of single phase AC circuits, the representation of alternating quantities and determining the power in these circuits.
4. To acquire the knowledge about the constructional concepts & working principles for the applications of DC machines, AC machines & measuring instruments.
5. Able to identify, formulate, and solve the electrical engineering problems.

Course Contents:

Module I: Basic Electrical Quantities
Basic Electrical definitions-Energy, Power, Charge, Current, Voltage, Electric Field Strength, Magnetic Flux Density, etc., Resistance, Inductance and Capacitance. Ideal Source, Independent Source and Controlled Source

Module II: Network Analysis Techniques & Theorems
Circuit Principles: Ohm's Law, Kirchoff's Current Law, Kirchoff's Voltage Law Network Reduction: Star–Delta Transformation, Source Transformation, Nodal Analysis, Loop analysis. Superposition theorem, Thevenin's Theorem, Norton's theorem and Reciprocity theorem.practical application

Module III: Alternating Current Circuits
Peak, Average and RMS values for alternating currents, Power calculation:
reactive power, active power, Complex power, power factor, impedance, reactance, conductance, susceptance Resonance: series Resonance, parallel resonance, basic definition of Q factor & Band-width.

Module IV: Transformers
Basic Transformer Operation principle, Construction, Voltage relations, current relations, Linear circuit models, open circuit test, short circuit test, Transformer Efficiency.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

- R.J. Smith, R.C. Dorf: Circuits, devices and Systems
- B.L. Thareja: Electrical Technology: Part -1 & 2
- V. Deltoro: Electrical Engineering fundamentals
- Schaum's Series: Electrical Circuits

APPLIED PHYSICS - I LAB

Course Code: AP 122 **Credit Units: 01**

List of Experiments:

1. To determine the wavelength of sodium light by Newton's rings method.
2. To determine the dispersive power of the material of prism with the help of a spectrometer.
3. To determine the specific rotation of sugar by Bi-quartz or Laurent half shade polarimeter.
4. To determine the speed of ultrasonic waves in liquid by diffraction method.
5. To determine the width of a narrow slit using diffraction phenomena.
6. To determine the temperature coefficient of platinum wire, using a platinum resistance thermometer and a Callender&Griffth's bridge.
7. To determine the value of specific charge (ratio of e/m) of an electron by Thomson method.
8. To determine the internal resistance of Leclanche cell with the help of Potentiometer.
9. To determine the resistance per unit length of a Carey Foster's bridge wire and also to find out the specific resistance of a given wire.
10. To plot graph showing the variation of magnetic field with distance along the aixs of a circular coil carrying current, and hence estimate the radius of the coil.
11. To determine the value of acceleration due to gravity ('g') in the laboratory using bar pendulum.
12. To determine the moment of inertia of a flywheel about its own axis of rotation.
13. To determine the density of material of the given wire with the help of sonometer.

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

ENGINEERING MECHANICS LAB

Course Code: BME 123 **CreditUnits: 01**

Engineering Mechanics:

1. To verify the law of Force Polygon
2. To verify the law of Moments using Parallel Force apparatus. (Simply supported type)
3. To determine the co-efficient of friction between wood and various surface (like
4. Leather, Wood, Aluminum) on an inclined plane.
5. To find the forces in the members of Jib Crane.
6. To determine the mechanical advantage, Velocity ratio and efficiency of a screw jack.
7. To determine the mechanical advantage, Velocity ratio and Mechanical efficiency of the
8. Wheel and Axle
9. To determine the MA, VR, η of Worm Wheel (2-start)
10. Verification of force transmitted by members of given truss.
11. To verify the law of moments using Bell crank lever
12. To find CG and moment of Inertia of an irregular body using Computation method

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

PROGRAMMING IN C LAB

Course Code: **BCS 124** **CreditUnits: 01**

Software Required: Turbo C

Course Contents:

- C program involving problems like finding the nth value of cosine series, Fibonacci series. Etc.
- C programs including user defined function calls
- C programs involving pointers, and solving various problems with the help of those.
- File handling

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

Basic Electrical Engineering Lab

Course Code: BEE 125 **CreditUnits: 01**

List of Experiments:

1. To verify KVL & KCL in the given network.
2. To verify Superposition Theorem.
3. To verify Maximum Power Transfer Theorem.
4. To verify Reciprocity Theorem.
5. To determine and verify RTh, VTh, RN, IN in a given network.
6. To perform open circuit & short circuit test on a single-phase transformer.
7. To study transient response of a given RLC Circuit.
8. To perform regulation, ratio & polarity test on a single-phase transformer.
9. To measure power & power factor in a three phase circuit by two wattmeter method.
10. To measure power & power factor in a three phase load using three ammeter & three voltmeter method.

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

ENGINEERING GRAPHICS LAB

Course Code: BME 125 **CreditUnits: 01**

Course Objective:

This course will provide students concepts on the drawings of different curves like straight line, parabola, ellipse etc. After completion of this course, students will be able to draw different figures manually and will be capable of using various instruments involved in drawings.

Course Contents:

Module I: General
Importance, Significance and scope of engineering drawing, Lettering, Dimensioning, Scales, Sense of proportioning, Different types of projections, Orthographic Projection, B.I.S. Specifications.

Module II: Projections of Point and Lines
Introduction of planes of projection, Reference and auxiliary planes, projections of points and Lines in different quadrants, traces, inclinations, and true lengths of the lines, projections on Auxiliary planes, shortest distance, intersecting and non-intersecting lines.

Module III: Planes other than the Reference Planes
Introduction of other planes (perpendicular and oblique), their traces, inclinations etc., Projections of points and lines lying in the planes, conversion of oblique plane into auxiliary Plane and solution of related problems.

Module IV: Projections of Plane Figures
Different cases of plane figures (of different shapes) making different angles with one or both reference planes and lines lying in the plane figures making different given angles (with one of both reference planes). Obtaining true shape of the plane figure by projection.

Module V: Projection of Solids
Simple cases when solid is placed in different positions, Axis faces and lines lying in the faces of the solid making given angles.

Module VI:Development of Surface
Development of simple objects with and without sectioning. Isometric Projection

Examination Scheme:

IA				EE		
A	Practical (Mid-Term)	PR	V	LR	PR (End Term)	V
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

Text & References:

- M.B. Shah & B.C. Rana, Engineering Drawing, Pearson Education, 2007
- PS Gill, Engineering Drawing, Kataria Publication
- ND Bhatt, Engineering Drawing, Charotar publications
- N Sidheshwar, Engineering Drawing, Tata McGraw Hill
- CL Tanta, Mechanical Drawing, “Dhanpat Rai”

ENGLISH

Course Code: BCS 101 **CreditUnits: 01**

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Participate in conversation and in small- and whole-group discussion
2. Explore and use English as medium of communication in real life situation
3. Discuss topics and themes of a reading, using the vocabulary and grammar of the lesson
4. Identify features of a reading textbook and utilize them as needed
5. Prepare and deliver organized presentations in small groups and to whole class
6. Apply sentence mechanics and master spelling of high frequency words

Course Contents:

Module I: Vocabulary
Use of Dictionary
Use of Words: Diminutives, Homonyms & Homophones

Module II: Essentials of Grammar - I
Articles
Parts of Speech
Tenses

Module III: Essentials of Grammar - II
Sentence Structure, Subject -Verb agreement
Punctuation

Module IV: Communication
The process and importance, Principles & benefits of Effective Communication

Module V: Spoken English Communication
Speech Drills, Pronunciation and accent, Stress and Intonation

Module VI: Communication Skills-I
Developing listening skills, Developing speaking skills

Module VII: Communication Skills-II
Developing Reading Skills
Developing writing Skills

Module VIII: Written English communication
Progression of Thought/ideas, Structure of Paragraph, Structure of Essays

Module IX: Short Stories
Of Studies, by Francis Bacon
Dream Children, by Charles Lamb
The Necklace, by Guy de Maupassant
A Shadow, by R.K.Narayan
Glory at Twilight, Bhabani Bhattacharya

Module X: Poems

All the Worlds a Stage	Shakespeare
To Autumn	Keats
O! Captain, My Captain.	Walt Whitman
Where the Mind is Without Fear	Rabindranath Tagore
Psalm of Life	H.W. Longfellow

Examination Scheme:

Components	A	CT	HA	EE
Weightage (%)	05	15	10	70

Text & References:

- Madhulika Jha, Echoes, Orient Long Man
- Ramon & Prakash, Business Communication, Oxford.
- Sydney Greenbaum Oxford English Grammar, Oxford.
- Successful Communications, MalraTreece (Allyn and Bacon)
- Effective Technical Communication, M. Ashraf Rizvi.

*** 30 hrsProgramme to be continued for Full year**

BEHAVIOURAL SCIENCE - I
(UNDERSTANDING SELF FOR EFFECTIVENESS)

Course Code: **BSS 104** **CreditUnits: 01**

Course learning outcomes (CLOs)

At the successful completion of this course you (the student) should be able to:

i. Demonstrate awareness of self and the process of self-exploration.

ii. Demonstrate knowledge of strategies for developing a healthy self-esteem.

iii. Recognize the importance of attitudes and its effect on personality.

iv. Identify the difference between healthy and unhealthy expression of emotions and develop emotional competence necessary for personal and professional life.

Course Contents:

Module I: Self: Core Competency
Understanding of Self
Components of Self – Self identity
Self concept
Self confidence
Self image

Module II: Techniques of Self Awareness
Exploration through Johari Window
Mapping the key characteristics of self
Framing a charter for self
Stages – self awareness, self acceptance and self realization

Module III: Self Esteem & Effectiveness
Meaning and Importance
Components of self esteem
High and low self esteem
Measuring your self esteem

Module IV: Building Positive Attitude
Meaning and nature of attitude
Components and Types of attitude
Importance and relevance of attitude

Module V: Building Emotional Competence
Emotional Intelligence – Meaning, components, Importance and Relevance
Positive and Negative emotions
Healthy and Unhealthy expression of emotions

Module VI:End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

- Organizational Behaviour, Davis, K.

- Hoover, Judhith D. Effective Small Group and Team Communication, 2002,Harcourt College Publishers
- Dick, Mc Cann&Margerison, Charles: Team Management, 1992 Edition, viva books
- Bates, A. P. and Julian, J.: Sociology - Understanding Social Behaviour
- Dressler, David and Cans, Donald: The Study of Human Interaction
- Lapiere, Richard. T – Social Change
- Lindzey, G. and Borgatta, E: Sociometric Measurement in the Handbook of Social Psychology, Addison – Welsley, US.
- Rose, G.: Oxford Textbook of Public Health, Vol.4, 1985.
- LaFasto and Larson: When Teams Work Best, 2001, Response Books (Sage), New Delhi
- J William Pfeiffer (ed.) Theories and Models in Applied Behavioural Science, Vol 2, Group (1996); Pfeiffer & Company
- Smither Robert D.; The Psychology of Work and Human Performance, 1994, Harper Collins College Publishers

FRENCH - I

Course Code: **FLT 101** **CreditUnits: 02**

Course learning outcomes (CLO)

At the successful completion of this course the students would be able to:

Perform communicative tasks (oral and written) like:

1. Identify and express in French vocabulary and grammar norms
2. Interpret different types of texts as well as cultural ideas and themes.
3. Demonstrate comprehension of nuance between script and sound in French
4. Narrate clearly ideas, themes in simple standard French

Course Contents:

Module A: pp. 01 to 37: Unités 1, 2, Unité 3 Object if 1, 2
Only grammar of Unité 3: object if 3, 4 and 5

Contenu lexical :Unité 1 : Découvrir la langue française : (oral et écrit)

1. se présenter, présenter quelqu'un, faire la connaissance des autres, formules de politesse, rencontres
2. dire/interroger si on comprend
3. Nommer les choses

Unité 2: Faire connaissance

1. donner/demander des informations sur une personne, premiers contacts, exprimer ses goûts et ses préférences
2. Parler de soi: parler du travail, de ses activités, de son pays, de sa ville.

Unité 3:Organiser son temps

1. dire la date et l'heure

Contenu grammatical :

1. organisation générale de la grammaire
2. article indéfini, défini, contracté
3. nom, adjectif, masculin, féminin, singulier et pluriel
4. négation avec « de », "moi aussi", "moi non plus"
5. interrogation : Inversion, est-ce que, qui, que, quoi, qu'est-ce que, où, quand, comment, quel(s), quelle(s)

Interro-négatif : réponses : oui, si, non

6. pronom tonique/disjoint- pour insister après une préposition
7. futurproche

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- le livre à suivre: Campus: Tome 1

GERMAN - I

Course Code: **FLG 101** **CreditUnits: 02**

2.1 Course learning outcomes (CLO)

At the successful completion of this course you should be able to:

1. **Identify** and **express** in German vocabulary and grammar norms
2. **Interpret** different types of texts as well as cultural ideas and themes.
3. **Demonstrate** comprehension of nuance between script and sound in German
4. **Narrate** clearly ideas, themes in simple standard German

Course Contents:

Module I: Introduction
Selfintroduction: heissen, kommen, wohnwn, lernen, arbeiten, trinken, etc.
All personal pronouns in relation to the verbs taught so far.
Greetings: Guten Morgen!, Guten Tag!, Guten Abend!, Gute Nacht!, Danke sehr!, Danke!, Vielen Dank!, (es tut mir Leid!),
Hallo, wie geht's?: Danke gut!, sehr gut!, prima!, ausgezeichnet!,
Es geht!, nicht so gut!, so la la!, miserabel!

Module II: Interviewspiel
To assimilate the vocabulary learnt so far and to apply the words and phrases in short dialogues in an interview – game for self introduction.

Module III: Phonetics
Sound system of the language with special stress on Dipthongs

Module IV: Countries, nationalities and their languages
To make the students acquainted with the most widely used country names, their nationalitie and the language spoken in that country.

Module V: Articles
The definite and indefinite articles in masculine, feminine and neuter gender. All Vegetables, Fruits, Animals, Furniture, Eatables, modes of Transport

Module VI: Professions
To acquaint the students with professions in both the genders with the help of the verb "sein".

Module VII: Pronouns
Simple possessive pronouns, the use of my, your, etc.
The family members, family Tree with the help of the verb "to have"

Module VIII: Colours
All the color and color related vocabulary – colored, colorful, colorless, pale, light, dark, etc.

Module IX: Numbers and calculations – verb "kosten"
The counting, plural structures and simple calculation like addition, subtraction, multiplication and division to test the knowledge of numbers.
"Wie vielkostet das?"

Module X: Revision list of Question pronouns
W – Questions like who, what, where, when, which, how, how many, how much, etc.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, TangramAktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

SPANISH – I

Course Code: **FLS 101** **CreditUnits: 02**

Course Learning Outcomes:

After successful completion of the course, students will be able to perform verbally and in writing certain social functions. Students will develop five language skills: reading, writing, listening, speaking & interacting with the Spanish & the Spanish speakers whom they come across in their daily or professional life in respect of

Students will be able to perform communicative tasks (oral and written) like:

-Self introduction

-Possessions.

-Family/friend description with verbs like SER/ESTAR/TENER/HAY

- Regular AR/ER/IR ending verbs conjugations

-Interrogative words

Course Contents:

Module I
A brief history of Spain, Latin America, the language, the culture…and the relevance of Spanish language in today's global context.
Introduction to alphabets

Module II
Introduction to '*Saludos*' (How to greet each other. How to present / introduce each other).
Goodbyes (despedidas)
The verb *llamarse*and practice of it.

Module III
Concept of Gender and Number
Months of the years, days of the week, seasons. Introduction to numbers 1-100, Colors, Revision of numbers and introduction to ordinal numbers.

Module IV
Introduction to *SER* and *ESTAR* (both of which mean To Be).Revision of '*Saludos*' and '*Llamarse*'. Some adjectives, nationalities, professions, physical/geographical location, the fact that spanish adjectives have to agree with gender and number of their nouns. Exercises highlighting usage of *Ser* and *Estar*.

Module V
Time, demonstrativepronoun (Este/esta, Aquel/aquellaetc)

Module VI
Introduction to some key AR /ER/IR ending regular verbs.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español, EnDirecto I A
- Español Sin Fronteras

CHINESE – I

Course Code: FLC 101 **Credit Units: 02**

Course learning outcomes (CLO)

At the successful completion of this course, you will be able to:

1. **Read, write and speak approx. 50** new Chinese words and understand basic grammarpoints.
2. **Interpret** words, phrases and sentences of day today conversation related to greetingfarewell and personal information like name age, residence, family etc.
3. **Write** Chinese characters, simple sentence and a paragraph on Self Introduction.
4. **Communicate** with Chinese speaking people using words, phrases and sentences related togreeting, farewell and personal information like name age, residence family etc.

Course Contents:

Module I
Show pictures, dialogue and retell.
Getting to know each other.
Practicing chart with Initials and Finals. (CHART – The Chinese Phonetic Alphabet Called "Hanyu Pinyin" in Mandarin Chinese.)
Practicing of Tones as it is a tonal language.
Changes in 3rd tone and Neutral Tone.

Module II
Greetings
Let me Introduce
The modal particle "ne".
Use of Please 'qing" – sit, have tea …….. etc.
A brief self introduction – Ni hao ma? Zaijian!
Use of "bu" negative.

Module III
Attributives showing possession
How is your Health? Thank you
Where are you from?
A few Professions like – Engineer, Businessman, Doctor, Teacher, Worker.
Are you busy with your work?
May I know your name?

Module IV
Use of "How many" – People in your family?
Use of "zhe" and "na".
Use of interrogative particle "shenme", "shui", "ma" and "nar".
How to make interrogative sentences ending with "ma".
Structural particle "de".
Use of "Nin" when and where to use and with whom. Use of guixing.
Use of verb "zuo" and how to make sentences with it.

Module V
Family structure and Relations.
Use of "you" – "mei you".
Measure words
Days and Weekdays.
Numbers.
Maps, different languages and Countries.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

"Elementary Chinese Reader Part I" Lesson 1-10

APPLIED MATHEMATICS - II

Course Code: AM 201 **Credit Units: 04**

Course learning outcomes (CLO)

List the course learning outcomes (CLO) that prescribe the knowledge, attitudes, skills and practicesthat students are expected to acquire and demonstrate in completing this course.

At the successful completion of this course you (the student) should be able to:

1. Investigate the basic concept about Linear Algebra and Probability.
2. Create an interest in finding the solution of Linear equations and Probability.
3. Apply basic concepts of Linear Algebra to define the consistent and inconsistent system, and Probability operations to solving problems.
4. Develop the formulation of linear equation their existence, eigen value and eigen vector etc. as well as about basic discrete and continuous distributions and their applications.

Course Contents:

Module I: Linear Algebra
Hermitian and Skew Hermitian Matrix, Unitary Matrix, Orthogonal Matrix, Elementary Row Transformation, Reduction of a Matrix to Row Echelon Form, Rank of a Matrix, Consistency of Linear Simultaneous Equations, Gauss Elimination Method, Gauss-Jordan Method, Eigen Values and Eigen Vectors of a Matrix, Caley-Hamilton Theorem, Diagonalization of a Matrix, Vector Space, Linear Independence and Dependence of Vectors, Linear Transformations.

Module II: Infinite Series
Definition of Sequence, Bounded Sequence, Limit of a Sequence, Series, Finite and Infinite Series, Convergence and Divergence of Infinite series, Cauchy's Principle of Convergence, Positive Term Infinite Series, Comparison test, D'Alembert's Ratio test. Raabe's Test, Cauchy's nth root Test. Logarithmic Test, Alternating Series, Leibnitz's Test, Absolute and conditioinal convergence, Uniform Convergence, Power Series and its Interval of Convergence.

Module III: Complex Analysis
De Moivre's Theorem and Roots of Complex Numbers, Logarithmic Functions, Circular, Hyperbolic Functions and their Inverses.
Functions of a Complex Variables, Limits, Continuity and Derivatives, Analytic Function, Cauchy-Riemann Equations (without proof), Harmonic Function, Harmonic Conjugates, Conformal Mapping, Bilinear Transformations, Complex Line Integral, Cauchy Integral Theorem, Cauchy Integral Formula, Derivative of Analytic Function, Power Series, Taylor Series, Laurent Series, Zeroes and Singularities, Residues, Residue Theorem, Evaluation of Real Integrals of the Form and $\int_{-\infty}^{\infty} \frac{f(x)}{F(x)} dx$.

Module IV: Statistics and Probability
Moments, Skewness, Kurtosis, Random Variables and Probability Distribution, Mean and Variance of a Probability Distribution, Binomial Distribution, Poisson Distribution and Normal Distribution.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

- Engineering Mathematics by Erwin Kreyszig.
- Engineering Mathematics by R.K. Jain and S.R.K. Iyengar.
- Higher Engineering Mathematics by H.K. Dass.
- Engineering Mathematics by B.S. Grewal.
- Differential Calculus by Shanti Narain.

- Integral Calculus by Shanti Narain.
- Linear Algebra- Schaum Outline Series.

APPLIED PHYSICS - II - MODERN PHYSICS

Course Code: **AP 202** **CreditUnits: 03**

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1) Define and understand space and time and the variations in other related fundamentalquantities such as mass, velocity and force.

2) Solve simple problems relating to the above concepts.

3) Explain by extending the understanding as laid down in Quantum theory to other phenomenon as observed in sub-atomic Physics and also to solve simple problems inQuantum Theory

4) Appreciate and understand the various spectra as observed during electronictransitions

5) Understand the way nature has endowed properties to materials.

Course Contents:

Module I: Special Theory of Relativity
Michelson-Morley experiment, Importance of negative result, Inertial & non-inertial frames of reference, Einstein's postulates of Special theory of Relativity, Space-time coordinate system, Relativistic Space Time transformation (Lorentz transformation equation), Transformation of velocity, Addition of velocities, Length contraction and Time dilation, Mass-energy equivalence (Einstein's energy mass relation) & Derivation of Variation of mass with velocity,

Module II: Wave Mechanics
Wave particle duality, De-Broglie matter waves, phase and group velocity, Heisenberg uncertainty principle, wave function and its physical interpretation, Operators, expectation values. Time dependent & time independent Schrödinger wave equation for free & bound states, square well potential (rigid wall), Step potential.

Module III: Atomic Physics
Vector atom model, LS and j-j coupling, Zeceman effect (normal & anomalous), Paschen-Bach effect, X-ray spectra and energy level diagram, Moseleys Law, Lasers – Einstein coefficients, conditions for light amplification, population inversion, optical pumping, three level and four level lasers, He-Ne and Ruby laser, Properties and applications of lasers.

Module IV: Solid State Physics
Sommerfield's free electron theory of metals, Fermi energy, Introduction to periodic potential &Kronig-Penny model (Qualitative) Band Theory of Solids, Semi-conductors: Intrinsics and Extrinsic Semiconductors, photoconductivity and photovotaics, Basic aspects of Superconductivity, Meissner effect.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

- Concept of Modern Physics, A. Beiser

- Applied Physics II, Agarawal& Goel
- Solid State Physics, S. O. Pallai
- Physics of Atom, Wehr& Richards

APPLIED CHEMISTRY

Course Code: AC 203 **Credit Units: 03**

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Understand the structure and chemical transformations of molecules.
2. Understand the application of chemical process in industries.
3. Basic idea about water treatment, lubrication, corrosion, fuel, spectroscopy etc.

Course Contents:

Module I: Water Technology
Introduction and specifications of water,
Hardness and its determination (EDTA method only),
Alkalinity,
Boiler feed water, boiler problems – scale, sludge, priming & foaming: causes & prevention, Boiler problems – caustic embrittlement & corrosion: causes & prevention,
Carbonate & phosphate conditioning, colloidal conditioning &calgon treatment
Water softening processes: Lime – soda process, Ion exchange method,
Water for domestic use.

Module II: Fuels
Classification, calorific value of fuel, (gross and net),
Determination of calorific value of fuels, bomb calorimeter,
Solid fuels - Proximate and ultimate analysis,
Octane & Cetane No. and its significance.
Numericals on combustion

Module III: Instrumental Methods of analysis
Introduction; Principles of spectroscopy; Laws of absorbance
IR: Principle, Instrumentation, Application
UV: Principle, Instrumentation, Application
NMR: Principle, Instrumentation, Application

Module III: Lubricants
Introduction; Mechanism of Lubrication;
Types of Lubricants; Chemical structure related to Lubrication;
Properties of lubricants; Viscosity and Viscosity Index; Iodine Value; Aniline Point; Emulsion number; Flash Point; Fire Point; Drop Point; Cloud Point; Pour Point.
Selection of Lubricants.

Module VI: Corrosion
Introduction, Mechanism of dry and wet corrosion,
Types of corrosion-Galvanic, Concentration cell, soil, pitting, intergranular, waterline. Passivity.
Factors influencing corrosion.
Corrosion control.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- Engineering Chemistry- Jain and Jain
- Engineering Chemistry- Sunita Rattan
- Engineering Chemistry-Shashi Chawla

References:

- Engineering Chemistry –Dara and Dara
- Spectroscopy- Y.R Sharma
- Corrosion Engineering – Fontenna and Greene

DATA STRUCTURES USING C

Course Code: **BCS 204** **CreditUnits: 03**

Course learning outcomes (CLO)

Upon successful completion of this course, students should be able to-:

1. Explain the systematic methods of efficiently organizing and accessing data in data structures and algorithms.
2. Identify the properties and structural patterns in data structures.
3. Apply abstract data types to the design of data structures.
4. Analyse algorithms using a mathematical notation and experimental studies.
5. Perform comparative analysis of the typical data structures and algorithms.
6. Design and Analyse recursive algorithms in data structures.
7. Write code in pseudocode and high-level programming languages for the implementation of various data structures and algorithms.

Course Contents:

Module I: Introduction to Data structures
Data structures: Definition, Types. Algorithm design, Complexity, Time-Space Trade offs. Use of pointers in data structures. Array Definition and Analysis, Representation of Linear Arrays in Memory, Traversing of Linear Arrays, Insertion And Deletion, Single Dimensional Arrays, Two Dimensional Arrays, Multidimensional Arrays, Function Associated with Arrays, Character String in C, Character String Operations, Arrays as parameters, Implementing One Dimensional Array, Sparse matrix.

Module II: Introduction to Stacks and queue
Stack: Definition, Array representation of stacks, Operations Associated with Stacks- Push & Pop, Polish expressions, Conversion of infix to postfix, infix to prefix (and vice versa),Application of stacks recursion, polish expression and their compilation, conversion of infix expression to prefix and postfix expression, Tower of Hanoi problem.
Queue: Definition, Representation of Queues, Operations of queues- QInsert, QDelete, Priority Queues, Circular Queue, Deque.

Module III: Dynamic Data Structure
Linked list: Introduction to Singly linked lists: Representation of linked lists in memory, Traversing, Searching, Insertion into, Deletion from linked list, doubly linked list, circular linked list, generalized list. Applications of Linked List-Polynomial representation using linked list and basic operation. Stack and queue implementation using linked list.

Module IV: Trees and Graphs
Trees: Basic Terminology, Binary Trees and their representation, expression evaluation, Complete Binary trees, extended binary trees, Traversing binary trees, Searching, Insertion and Deletion in binary search trees, General trees, AVL trees, Threaded trees, B trees.
Graphs: Terminology and Representations, Graphs & Multigraphs, Directed Graphs, Sequential representation of graphs, Adjacency matrices, Transversal Connected Component and Spanning trees.

Module V: Sorting and Searching and file structures
Sorting: Insertion Sort, Bubble sort, Selection sort, Quick sort, two-way Merge sort, Heap sort, Partition exchange sort, Shell sort, Sorting on different keys, External sorting.
Searching: Linear search, Binary search
File structures: Physical storage media, File Organization, Linked organization of file, Inverted file, Organization records into blocks, Sequential blocks, Hash function, Indexing & Hashing, Multilevel indexing, Tree Index, Random file, Primary Indices, Secondary Indices, B tree index files.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- Horowitz and Sahani, "Fundamentals of Data structures", Galgotia publications
- Tannenbaum, "Data Structures", PHI
- R.L. Kruse, B.P. Leary, C.L. Tondo, "Data structure and program design in C" PHI
- "Data structures and algorithms" – Schaum Series.
- File Structures An object-Oriented Approach with C++ by Michael J. Folk, Bill Zoellick, BregRiccardi, Published by Addison Wesley (1st ISE Reprint,1999).

References:

- J. P. Tremblay and P. G. Sorenson, Introduction to Data Structures with Applications, McGraw – Hill Computer Science Series, Mc-Graw – Hill New York, 1984
- Algorithms by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Published by Prentice-Hall India (1999).
- Data Structures Using C and C++ second edition by YeddidyahLangsam, Moshe J.Augenstein, Aaron M. Tenen Baum, Published by Prentice-Hall India
- Data Structures and Algorithm analysis in C++ by Mark Allen Weiss, Published by Addison Wesley (3rd Indian Reprint 2000).
- "Data Structures" – R. S. Salaria

TERM PAPER

Course Code: BCS 320 Credit Units: 02

A term (or research) paper is primarily a record of intelligent reading in several sources on a particular subject. The students will choose the topic at the beginning of the session in consultation with the faculty assigned. The progress of the paper will be monitored regularly by the faculty. At the end of the semester the detailed paper on the topic will be submitted to the faculty assigned. The evaluation will be done by Board of examiners comprising of the faculties.

GUIDELINES FOR TERM PAPER

The procedure for writing a term paper may consist of the following steps:

1. Choosing a subject
2. Finding sources of materials
3. Collecting the notes
4. Outlining the paper
5. Writing the first draft
6. Editing & preparing the final paper

1. Choosing a Subject

The subject chosen should not be too general.

2. Finding Sources of Materials

a) The material sources should be not more than 10 years old unless the nature of the paper is such that it involves examining older writings from a historical point of view.
b) Begin by making a list of subject-headings under which you might expect the subject to be listed.
c) The sources could be books and magazine articles, news stories, periodicals, scientific journals etc.

3. Collecting the Notes

Skim through sources, locating the useful material, then make good notes of it, including quotes and information for footnotes.

a) Get facts, not just opinions. Compare the facts with author's conclusion.
b) In research studies, notice the methods and procedures, results & conclusions.
c) Check cross references.

4. Outlining the paper

a) Review notes to find main sub-divisions of the subject.
b) Sort the collected material again under each main division to find sub-sections for outline so that it begins to look more coherent and takes on a definite structure. If it does not, try going back and sorting again for main divisions, to see if another general pattern is possible.

5. Writing the first draft

Write the paper around the outline, being sure that you indicate in the first part of the paper what its purpose is. You may follow the following:

a) statement of purpose
b) main body of the paper
c) statement of summary and conclusion

Avoid short, bumpy sentences and long straggling sentences with more than one main idea.

6. Editing &Preparing the final Paper

a) Before writing a term paper, you should ensure you have a question which you attempt to answer in your paper. This question should be kept in mind throughout the paper. Include only information/ details/ analyses of relevance to the question at hand. Sometimes, the relevance of a particular section may be clear to you but not to your readers. To avoid this, ensure you briefly explain the relevance of every section.
b) Read the paper to ensure that the language is not awkward, and that it "flows" properly.

c) Check for proper spelling, phrasing and sentence construction.
d) Check for proper form on footnotes, quotes, and punctuation.
e) Check to see that quotations serve one of the following purposes:
(i) Show evidence of what an author has said.
(ii) Avoid misrepresentation through restatement.
(iii) Save unnecessary writing when ideas have been well expressed by the original author.
f) Check for proper form on tables and graphs. Be certain that any table or graph is self-explanatory.

Term papers should be composed of the following sections:
1) Title page
2) Table of contents
3) Introduction
4) Review
5) Discussion&Conclusion
6) References
7) Appendix

Generally, the introduction, discussion, conclusion and bibliography part should account for a third of the paper and the review part should be two thirds of the paper.

Discussion
The discussion section either follows the results or may alternatively be integrated in the results section. The section should consist of a discussion of the results of the study focusing on the question posed in the research paper.

Conclusion
The conclusion is often thought of as the easiest part of the paper but should by no means be disregarded. There are a number of key components which should not be omitted. These include:
a) summary of question posed
b) summary of findings
c) summary of main limitations of the study at hand
d) details of possibilities for related future research

Reference
From the very beginning of a research project, you should be careful to note all details of articles gathered. The bibliography should contain ALL references included in the paper. References not included in the text in any form should NOT be included in the bibliography.
The key to a good bibliography is consistency. Choose a particular convention and stick to this.

Conventions
Monographs
Crystal, D. (2001), Language and the internet. Cambridge: Cambridge University Press.

Edited volumes
Gass, S./Neu, J. (eds.) (1996), Speech acts across cultures. Challenges to communication in a second language. Berlin/ NY: Mouton de Gruyter.
[(eds.) is used when there is more than one editor; and (ed.) where there is only one editor. In German the abbreviation used is (Hrsg.) for Herausgeber].

Edited articles
Schmidt, R./Shimura, A./Wang, Z./Jeong, H. (1996), Suggestions to buy: Television commercials from the U.S., Japan, China, and Korea. In: Gass, S./Neu, J. (eds.) (1996), Speech acts across cultures. Challenges to communication in a second language. Berlin/ NY: Mouton de Gruyter: 285-316.

Journal articles
McQuarrie, E.F./Mick, D.G. (1992), On resonance: A critical pluralistic inquiry into advertising rhetoric. Journal of consumer research 19, 180-197.

Electronic book
Chandler, D. (1994), Semiotics for beginners [HTML document]. Retrieved [5.10.'01] from the World Wide Web, http://www.aber.ac.uk/media/Documents/S4B/.

Electronic journal articles
Watts, S. (2000) Teaching talk: Should students learn 'real German'? [HTML document]. German as a Foreign Language Journal [online] 1. Retrieved [12.09.'00] from the World Wide Web, http://www.gfl-journal.com/.

Other websites
Verterhus, S.A. (n.y.), Anglicisms in German car advertising. The problem of gender assignment [HTML document]. Retrieved [13.10.'01] from the World Wide Web, http://olaf.hiof.no/~sverrev/eng.html.

Unpublished papers
Takahashi, S./DuFon, M.A. (1989), Cross-linguistic influence in indirectness: The case of English directives performed by native Japanese speakers. Unpublished paper, Department of English as a Second Language, University of Hawai'i at Manoa, Honolulu.

Unpublished theses/ dissertations
Möhl, S. (1996), AlltagssituationeniminterkulturellenVergleich: Realisierung von Kritik und AblehnungimDeutschen und Englischen. Unpublished MA thesis, University of Hamburg.
Walsh, R. (1995), Language development and the year abroad: A study of oral grammatical accuracy amongst adult learners of German as a foreign language. Unpublished PhD dissertation, University College Dublin.

Appendix
The appendix should be used for data collected (e.g. questionnaires, transcripts, ...) and for tables and graphs not included in the main text due to their subsidiary nature or to space constraints in the main text.

Assessment Scheme:

Continuous Evaluation: (Based on abstract writing, interim draft, general approach, research orientation, readings undertaken etc.)	40%
Final Evaluation: (Based on the organization of the paper, objectives/ problem profile/ issue outlining, comprehensiveness of the research, flow of the idea/ ideas, relevance of material used/ presented, outcomes vs. objectives, presentation/ viva etc.)	60%

ENVIRONMENTAL STUDIES

Course Code: EVS 001 **Credit Units: 04**

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Understand the importance, need and scope of the subject.
2. Evaluate local, regional and global environmental topics related to resource use and management.
3. Measure environmental variables and interpret results.
4. Interpret the results of scientific studies of environmental problems and propose solutions to these.
5. Implement "Sustainable development", in day to day activities.

Course Contents:

Module I: The multidisciplinary nature of environmental studies
Definition, scope and importance
Need for public awareness

Module II: Natural Resources
Renewable and non-renewable resources:
Natural resources and associated problems
Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.
Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, case studies.
Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

- Role of an individual in conservation of natural resources.
- Equitable use of resources for sustainable lifestyles.

Module III: Ecosystems
Concept of an ecosystem
Structure and function of an ecosystem
Producers, consumers and decomposers
Energy flow in the ecosystem
Ecological succession
Food chains, food webs and ecological pyramids
Introduction, types, characteristic features, structure and function of the following ecosystem:

a. Forest ecosystem
b. Grassland ecosystem
c. Desert ecosystem
d. Aquatic ecosystems (ponds, streams, lakes, rivers, ocean estuaries)

Module IV: Biodiversity and its conservation
Introduction – Definition: genetic, species and ecosystem diversity
Biogeographical classification of India
Value of biodiversity: consumptive use, productive use, social, ethical aesthetic and option values
Biodiversity at global, national and local levels
India as a mega-diversity nation
Hot-spots of biodiversity
Threats to biodiversity: habitat loss, poaching of wildlife, man wildlife conflicts

Endangered and endemic species of India
Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity

Module V: Environmental Pollution
Definition
Causes, effects and control measures of:
a. Air pollution
b. Water pollution
c. Soil pollution
d. Marine pollution
e. Noise pollution
f. Thermal pollution
g. Nuclear pollution

Solid waste management: Causes, effects and control measures of urban and industrial wastes.
Role of an individual in prevention of pollution.
Pollution case studies.
Disaster management: floods, earthquake, cyclone and landslides.

Module VI: Social Issues and the Environment
From unsustainable to sustainable development
Urban problems and related to energy
Water conservation, rain water harvesting, watershed management
Resettlement and rehabilitation of people; its problems and concerns. Case studies.
Environmental ethics: Issues and possible solutions
Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.
Wasteland reclamation
Consumerism and waste products
Environmental Protection Act
Air (Prevention and Control of Pollution) Act
Water (Prevention and control of Pollution) Act
Wildlife Protection Act
Forest Conservation Act
Issues involved in enforcement of environmental legislation
Public awareness

Module VII: Human Population and the Environment
Population growth, variation among nations
Population explosion – Family Welfare Programmes
Environment and human health
Human Rights
Value Education
HIV / AIDS
Women and Child Welfare
Role of Information Technology in Environment and Human Health
Case Studies

Module VIII: Field Work
Visit to a local area to document environmental assets-river / forest/ grassland/ hill/ mountain.
Visit to a local polluted site – Urban / Rural / Industrial / Agricultural
Study of common plants, insects, birds
Study of simple ecosystems-pond, river, hill slopes, etc (Field work equal to 5 lecture hours)

Examination Scheme:

Components	CT	HA	S/V/Q	A	EE
Weightage (%)	15	5	5	5	70

Text &References:

- Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
- BharuchaErach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad 380 013, India, Email:mapin@icenet.net (R)
- Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p
- Clark R.S., Marine Pollution, Clanderson Press Oxford (TB)

- Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Publ. House, Mumabai, 1196p
- De A.K., Environmental Chemistry, Wiley Eastern Ltd.
- Down to Earth, Centre for Science and Environment (R)
- Gleick, H.P. 1993. Water in Crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute Oxford Univ. Press. 473p
- Hawkins R.E., Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay (R)
- Heywood, V.H &Waston, R.T. 1995. Global Biodiversity Assessment. Cambridge Univ. Press 1140p.
- Jadhav, H & Bhosale, V.M. 1995. Environmental Protection and Laws. Himalaya Pub. House, Delhi 284 p.
- Mckinney, M.L. & School, R.M. 1996. Environmental Science Systems & Solutions, Web enhanced edition. 639p.
- Mhaskar A.K., Matter Hazardous, Techno-Science Publication (TB)
- Miller T.G. Jr. Environmental Science, Wadsworth Publishing Co. (TB)
- Odum, E.P. 1971. Fundamentals of Ecology. W.B. Saunders Co. USA, 574p
- Rao M N. &Datta, A.K. 1987. Waste Water treatment. Oxford & IBH Publ. Co. Pvt. Ltd. 345p.
- Sharma B.K., 2001. Environmental Chemistry. Geol Publ. House, Meerut
- Survey of the Environment, The Hindu (M)
- Townsend C., Harper J, and Michael Begon, Essentials of Ecology, Blackwell Science
- Trivedi R.K., Handbook of Environmental Laws, Rules Guidelines, Compliances and Standards, Vol I and II, Enviro Media (R)
- Trivedi R. K. and P.K. Goel, Introduction to air pollution, Techno-Science Publication (TB)
- Wanger K.D., 1998 Environnemental Management. W.B. Saunders Co. Philadelphia, USA 499p

ELEMENTS OF MECHANICAL ENGINEERING

Course Code: BME 205 **Credit Units: 03**

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Investigate – Basic machines used in the field of mechanical engineering
2. Create – Mathematical models of fundamental physical phenomenon and apply them to predict the behaviour of engineering systems
3. Apply – this knowledge to analyse the working of IC Engines, Steam Turbines, Lathe machines etc.
4. Develop – Ability to perform and conduct basic experiments and evaluate the results of the same.

Course Contents:

Module I:Fundamental Concepts
Definition of thermodynamics, system, surrounding and universe, phase, concept of continuum, macroscopic & microscopic point of view, Thermodynamic equilibrium, property, state, path, process, cyclic process, Zeroth, first and second law of thermodynamics, Carnot Cycle, Introduction to I.C. Engines-two & four stoke S.I. and C.I. engines. Otto cycle. Diesel cycle.

Module II: Stress And Strain Analysis
Simple stress and strain: introduction, normal shear, and stresses-strain diagrams for ductile and brittle materials. Elastic constants, one-dimensional loadings of members of varying cross-section, Strain Energy, Properties of material-strength, elasticity, stiffness, malleability, ductility, brittleness, hardness and plasticity etc; Concept of stress and strain stress strain diagram, tensile test, impact test and hardness test.

Module III:Casting& Forging
Introduction of casting, pattern, mould making procedures, sand mould casting, casting defects, allowances of pattern. Forging-introduction, upsetting & drawing out, drop forging, press forging & m/c forging

Module IV: Welding& Sheet metal working:
Introduction of welding processes, classification, gas welding, arc welding, resistance welding. Introduction to sheet metal shop, Shearing, trimming, blanking, piercing, shaving, notching, stretch forming, nibbling coining, embossing and drawing.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

- Engineering thermodynamics, by P.K. Nag, Tata McGraw Hill.
- Thermal Engineering, by D.S. Kumar. S.K. Kataria and Sons.
- Thermal Engineering by PL Ballaney; Khanna Publishers, Delhi.
- Engineering Thermodynamics: Work and Heat Transfer, by Rogers and Mayhew, ELBS Publications
- Heine, R.W. C.R. Loper and P.C. Rosenthal, Principles of metal casting McGraw Hill
- Welding Technology by R.S. Parmar, Khanna Publishers.
- Thermodynamics and Heat Engines Volume-I, by R. Yadav: Central Publications.
- Ganesan, V. *Internal Combustion Engine*, Tata McGraw-Hill.

APPLIED PHYSICS – II LAB

Course Code: **AP 222** **Credit Units: 01**

List of Experiments:

1. To determine the wavelength of sodium light by Newton's rings method.
2. To determine the dispersive power of the material of prism with the help of a spectrometer.
3. To determine the specific rotation of sugar by Bi-quartz or Laurent half shade polarimeter.
4. To determine the speed of ultrasonic waves in liquid by diffraction method.
5. To determine the width of a narrow slit using diffraction phenomena.
6. To determine the temperature coefficient of platinum wire, using a platinum resistance thermometer and a Callender&Griffth's bridge.
7. To determine the value of specific charge (ratio of e/m) of an electron by Thomson method.
8. To determine the internal resistance of Leclanche cell with the help of Potentiometer.
9. To determine the resistance per unit length of a Carey Foster's bridge wire and also to find out the specific resistance of a given wire.
10. To plot graph showing the variation of magnetic field with distance along the aixs of a circular coil carrying current, and hence estimate the radius of the coil.
11. To determine the value of acceleration due to gravity ('g') in the laboratory using bar pendulum.
12. To determine the moment of inertia of a flywheel about its own axis of rotation.
13. To determine the density of material of the given wire with the help of sonometer.

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

APPLIED CHEMISTRY LAB

Course Code: **AC 223** **Credit Units: 01**

Course Contents:

List of Experiments:

(Any 10 Experiments)

1. To determine the ion exchange capacity of a given cation exchanger.
2. To determine the temporary, permanent and total hardness of a sample of water by complexometric titration method.
3. To determine the type and extent of alkalinity of given water sample.
4. To determine the number of water molecules of crystallization in Mohr's salt (ferrous ammonium sulphate) provided standard potassium dichromate solution (0.1N) using diphenylamine as internal indicator.
5. To determine the ferrous content in the supplied sample of iron ore by titrimetric analysis against standard $K_2Cr_2O_7$ solution using potassium ferricyanide $[K_3Fe(CN)_6]$ as external indicator.
6. (a) To determine the surface tension of a given liquid by drop number method.
   (b) To determine the composition of a liquid mixture A and B (acetic acid and water) by surface tension method.
7. To prepare and describe a titration curve for phosphoric acid – sodium hydroxide titration using pH-meter.
8. (a) To find the cell constant of conductivity cell.
   (b) Determine the strength of hydrochloric acid solution by titrating it against standard sodium hydroxide solution conductometrically
9. Determination of Dissolved oxygen in the given water sample.
10. To determine the total residual chlorine in water.
11. Determination of amount of oxalic acid and H_2SO_4 in 1 L of solution using N/10 NaOH and N/10 $KMnO_4$ solution.
12. Determination of viscosity of given oil by means of Redwood viscometer I.
13. To determine flash point and fire point of an oil by Pensky Martin's Apparatus
14. To determine the Iodine value of the oil.

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

DATA STRUCTURES USING C LAB

Course Code: BCS 224 **Credit Units: 01**

Software Required:Turbo C++

Assignment will be provided for following:

- Practical application of sorting and searching algorithm.
- Practical application of various data structure like linked list, queue, stack, tree

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

ELEMENTS OF MECHANICAL ENGINEERING - LAB (EEM)

Course Code: BME 225 **CreditUnits: 01**

Course Contents:

1. Welding

   (a) Arc Welding
   - Butt Joint
   - Lap Joint
   - T Joint

   (b) Gas Welding
   - Butt Joint
   - Lap Joint
   - Brazing of Broken pieces

2. Foundry
   - Sand mould casting by single piece pattern& Split pattern bracket with cores

3. Sheet Metal
   - Dust Bin
   - Mug
   - Funnel
   - Cylindrical Mug with handle-Rectangular

4. Fitting Shop
   - Male – Female Joint
   - Rectangular piece
   - Filing the job

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

ENGLISH

Course Code: BCS 201 **Credit Units: 01**

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Identify essentials components of language
2. Make inferences and predictions about spoken discourse
3. Develop Creative & Literary Sensitivity in global situation
4. Identify features of a reading textbook and utilize them as needed
5. Explore and use English as medium of communication in real life situation

Course Contents:

Module I: Vocabulary

Use of Dictionary
Use of Words: Diminutives, Homonyms & Homophones

Module II: Essentials of Grammar - I
Articles
Parts of Speech
Tenses

Module III: Essentials of Grammar - II
Sentence Structure
Subject -Verb agreement
Punctuation

Module IV: Communication
The process and importance
Principles & benefits of Effective Communication

Module V: Spoken English Communication
Speech Drills
Pronunciation and accent
Stress and Intonation

Module VI: Communication Skills-I
Developing listening skills
Developing speaking skills

Module VII: Communication Skills-II
Developing Reading Skills
Developing writing Skills

Module VIII: Written English communication
Progression of Thought/ideas
Structure of Paragraph
Structure of Essays

Module IX: Short Stories
Of Studies, by Francis Bacon
Dream Children, by Charles Lamb
The Necklace, by Guy de Maupassant
A Shadow, by R.K.Narayan
Glory at Twilight, Bhabani Bhattacharya

Module X: Poems

All the Worlds a Stage	Shakespeare
To Autumn	Keats
O! Captain, My Captain.	Walt Whitman
Where the Mind is Without Fear	Rabindranath Tagore
Psalm of Life	H.W. Longfellow

Examination Scheme:

Components	A	CT	HA	EE
Weightage (%)	05	15	10	70

Text & References:

- Madhulika Jha, Echoes, Orient Long Man
- Ramon & Prakash, Business Communication, Oxford.
- Sydney Greenbaum Oxford English Grammar, Oxford.
- Successful Communications, MalraTreece (Allyn and Bacon)
- Effective Technical Communication, M. Ashraf Rizvi.

BEHAVIOURAL SCIENCE - II
(PROBLEM SOLVING AND CREATIVE THINKING)

Course Code: **BSS 204** **CreditUnits: 01**

Course learning outcomes (CLOs)

At the successful completion of this course you (the student) should be able to:

i. Demonstrate awareness of self and the process of self-exploration.

ii. Demonstrate knowledge of strategies for developing a healthy self-esteem.

iii. Recognize the importance of attitudes and its effect on personality.

iv. Identify the difference between healthy and unhealthy expression of emotions and develop emotional competence necessary for personal and professional life.

Course Contents:

Module I: Thinking as a tool for Problem Solving
What is thinking: The Mind/Brain/Behaviour
Critical Thinking and Learning:
Making Predictions and Reasoning
Memory and Critical Thinking
Emotions and Critical Thinking
Thinking skills

Module II: Hindrances to Problem Solving Process
Perception, Expression, Emotion, Intellect, Work environment

Module III: Problem Solving
Recognizing and Defining a problem, Analyzing the problem (potential causes), Developing possible alternatives, Evaluating Solutions, Resolution of problem, Implementation,
Barriers to problem solving:
Perception,
Expression
Emotion
Intellect
Work environment

Module IV: Plan of Action
Construction of POA, Monitoring, Reviewing and analyzing the outcome

Module V: Creative Thinking
Definition and meaning of creativity, The nature of creative thinking, Convergent and Divergent thinking, Idea generation and evaluation (Brain Storming), Image generation and evaluation, Debating, The six-phase model of Creative Thinking: ICEDIP model

Module VI:End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)

Weightage (%)	20	05	20	30	25

Text & References:

- Michael Steven: How to be a better problem solver, Kogan Page, New Delhi, 1999
- Geoff Petty: How to be better at creativity; Kogan Page, New Delhi, 1999
- Richard Y. Chang and P. Keith, Kelly: Wheeler Publishing, New Delhi, 1998.
- Phil Lowe Koge Page: Creativity and Problem Solving, New Delhi, 1996
- J William Pfeiffer (ed.) Theories and Models in Applied Behavioural Science, Vol 3, Management (1996); Pfeiffer & Company
- Bensley, Alan D.: Critical Thinking in Psychology – A Unified Skills Approach, (1998), Brooks/Cole Publishing Company.

FRENCH - II

Course Code: **FLT 201** **Credit Units: 02**

Course learning outcomes (CLO)

At the successful completion of this course you should be able to:

1. **Identify** and **express** in French vocabulary and grammar norms
2. **Interpret** different types of texts as well as cultural ideas and themes.
3. **Demonstrate** comprehension of nuance between script and sound in French
4. **Narrate** clearly ideas, themes in simple standard French

Course Contents:

Module A : pp.38 – 47 : Unité 3: Objectif 3, 4, 5, 6

Module B: pp. 47 to 75 Unité 4, 5

Contenu lexical: **Unité 3 : Organiser son temps**

1. donner/demander des informations sur un emploi du temps, un horaire SNCF – Imaginer un dialogue
2. rédiger un message/ une lettre pour …
   i) prendre un rendez-vous/ accepter et confirmer/ annuler
   ii) inviter/accepter/refuser
3. Faire un programmed'activités
   imaginer une conversation téléphonique/un dialogue
   Propositions- interroger, répondre

Unité 4: **Découvrir son environnement**

1. situer un lieu
2. s'orienter, s'informer sur un itinéraire.
3. Chercher, décrire un logement
4. connaître les rythmes de la vie

Unité 5: s'informer

1. demander/donner des informations sur un emploi du temps passé.
2. donner une explication, exprimer le doute ou la certitude.
3. découvrir les relations entre les mots
4. savoir s'informer

Contenu grammatical:

1. Adjectifsdémonstratifs
2. Adjectifs possessifs/exprimer la possession à l'aide de :
   i. « de » ii. A+nom/pronom disjoint
3. Conjugaison pronominale – négative, interrogative - construction à l'infinitif
4. Impératif/exprimer l'obligation/l'interdiction à l'aide de « il faut…. »/ «il ne faut pas… »
5. passé composé
6. Questions directes/indirectes

ExaminationScheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- **le livre à suivre: Campus: Tome 1**

GERMAN – II

Course Code: **FLG 201** **Credit Units: 02**

Course learning outcomes (CLO)

At the successful completion of this course you should be able to:

1. **Identify** and **express** in German vocabulary and grammar norms
2. **Interpret** different types of texts as well as cultural ideas and themes.
3. **Demonstrate** comprehension of nuance between script and sound in German
4. **Narrate** clearly ideas, themes in simple standard German

Course Contents:

Module I: Everything about Time and Time periods
Time and times of the day.
Weekdays, months, seasons.
Adverbs of time and time related prepositions

Module II: Irregular verbs
Introduction to irregular verbs like to be, and others, to learn the conjugations of the same, (fahren, essen, lessen, schlafen, sprechen und ähnliche).

Module III: Separable verbs
To comprehend the change in meaning that the verbs undergo when used as such
Treatment of such verbs with separable prefixes

Module IV: Reading and comprehension
Reading and deciphering railway schedules/school time table
Usage of separable verbs in the above context

Module V: Accusative case
Accusative case with the relevant articles
Introduction to 2 different kinds of sentences – Nominative and Accusative

Module VI: Accusative personal pronouns
Nominative and accusative in comparison
Emphasizing on the universal applicability of the pronouns to both persons and objects

Module VII: Accusative prepositions
Accusative propositions with their use
Both theoretical and figurative use

Module VIII: Dialogues
Dialogue reading: 'In the market place'
'At the Hotel'

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3

- Rosa-Maria Dallapiazza et al, TangramAktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

SPANISH – II

Course Code: **FLS 201** **Credit Units: 02**

Course learning outcomes (CLO)

At the successful completion of this course you should be able to:

1. **Identify** and **express** in Spanish vocabulary and grammar norms
2. **Interpret** different types of texts as well as cultural ideas and themes.
3. **Demonstrate** comprehension of nuance between script and sound in Spanish
4. **Narrate** clearly ideas, themes in simple standard Spanish

Course Contents:

Module I
Revision of earlier modules.

Module II
Some more AR/ER/IR verbs. Introduction to root changing and irregular AR/ER/IR ending verbs

Module III
More verbal phrases (eg, Dios Mio, Que lastima etc), adverbs*(bueno/malo, muy, mucho, bastante, poco).*
Simple texts based on grammar and vocabulary done in earlier modules.

Module IV
Possessive pronouns

Module V
Writing/speaking essays like my friend, my house, my school/institution, myself….descriptions of people, objects etc, computer/internet related vocabulary

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español, EnDirecto I A
- Español Sin Fronteras

CHINESE – II

Course Code: **FLC 201** **Credit Units: 02**

Course learning outcomes (CLO)

At the successful completion of this course you should be able to:

At the successful completion of this course, you will be able to:

1. **Read, write and speak approx. 100** New Chinese words and understand basic grammar points.
2. **Interpret** words, phrases and sentences of day today conversation related to hobbies and abilities, gratitude, apology and welcome, time, weather and directions
3. **Write** Chinese characters, simple sentence and a paragraph on simple topic like 'Self Introduction' and dialogue writing on "Conversation between two friends exchanging Personnel Information".
4. **Communicate** with Chinese speaking people using words, phrases and sentences related to hobbies and abilities. Express gratitude, apology and welcome.

Course Contents:

Module I
Drills
Practice reading aloud, Observe Picture and answer the question., Tone practice., Practice using the language, both by speaking and by taking notes.
Introduction of basic sentence patterns.Measure words., Glad to meet you.

Module II
Where do you live?
Learning different colors.Tones of "bu", Buying things and how muchit costs?
Dialogue on change of Money.
More sentence patterns on Days and Weekdays.
How to tell time. Saying the units of time in Chinese. Learning to say useful phrases like – 8:00, 11:25, 10:30 P.M. everyday, afternoon, evening, night, morning 3:58, one hour, to begin, to end ….. etc.
Morning, Afternoon, Evening, Night.

Module III
Use of words of location like-li, wais hang, xia
Furniture – table, chair, bed, bookshelf,.. etc.
Description of room, house or hostel room..eg what is placed where and how many things are there in it?
Review Lessons – Preview Lessons.
Expression 'yao", "xiang" and "yaoshi" (if).
Days of week, months in a year etc.
I am learning Chinese. Is Chinese difficult?

Module IV
Counting from 1-1000, Use of "chang-chang", Making an Inquiry – What time is it now? Where is the Post Office?,Days of the week. Months in a year, Use of Preposition – "zai", "gen", Use of interrogative pronoun – "duoshao" and "ji", "Whose"??? Sweater etc is it?
Different Games and going out for exercise in the morning.

Module V
The verb "qu"
- Going to the library issuing a book from the library
- Going to the cinema hall, buying tickets
- Going to the post office, buying stamps
- Going to the market to buy things..etc
- Going to the buy clothes …. Etc.

Hobby. I also like swimming.

Comprehension and answer questions based on it.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- "Elementary Chinese Reader Part I" Lesson 11-20

DATABASE MANAGEMENT SYSTEMS

Course Code: **BCS 302** **Credit Units**: **03**

Course learning outcomes (CLO)

At the successful completion of this course, the student should be able to:

- Investigate about what is database, different types of databases, and why they are valuable assets for decision making.
- Analyse and critically evaluate the importance of various keys and importance of ER Modelling with relationship in ER diagram and Normalization.
- Analyse transaction and Implement to create the SQL query in a database and to extract useful information.
- Develop a set of queries to handle a specified set of typical user inquiries for information extraction from the database through SQL.

Course Contents:

Module I: **Introduction**

Concept and goals of DBMS, Database Languages, Database Users, Database Abstraction.
Basic Concepts of ER Model, Relationship sets, Keys, Mapping, Design of ER Model

Module II: **Hierarchical model &Network Model**

Concepts, Data definition, Data manipulation and implementation.
Network Data Model, DBTG Set Constructs, and Implementation

Module III: **Relational Model**

Relational database, Relational Algebra, Relational & Tuple Calculus.

Module IV: **Relational Database Design and Query Language**

SQL, QUEL, QBE, Normalization using Functional Dependency, Multivalued dependency and Join dependency.

Module V: **Concurrency Control and New Applications**

Lock Based Protocols, Time Stamped Based Protocols, Deadlock Handling, Crash Recovery. Distributed Database, Objective Oriented Database, Multimedia Database, Data Mining, Digital Libraries.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- Korth, Silberschatz, "Database System Concepts", 4th Ed., TMH, 2000.
- Steve Bobrowski, "Oracle & Architecture", TMH, 2000

References:

- Date C. J., "An Introduction to Database Systems", 7th Ed., Narosa Publishing, 2004
- Elmsari and Navathe, "Fundamentals of Database Systems", 4th Ed., A. Wesley, 2004
- Ullman J. D., "Principles of Database Systems", 2nd Ed., Galgotia Publications, 1999.

OPERATING SYSTEMS WITH UNIX

Course Code: **BCS 303** **Credit Units**: **03**

Course learning outcomes (CLO)

CLO1: Students will be able to identify the role of Operating System. To understand the design of control unit.

CLO2: Students will be able to analyse andunderstanding CPU Scheduling, Synchronization, Deadlock Handling and Comparing CPU Scheduling Algorithms. Solve Deadlock Detection Problems.

CLO3: Students will be able to describe the role of paging, segmentation and virtual memory in operating systems.

CLO4: Students will be able to understand description of protection and security and also the Comparison of UNIX and Windows based OS.

CLO5: Students will be able to understand the concept of Defining I/O systems, Device Management Policies and Secondary Storage Structure and Evaluation of various Disk Scheduling Algorithms.

Course Contents:

Module I: **Introduction to operating system**

Operating system and function, Evolution of operating system, Batch, Interactive, multiprogramming, Time Sharing and Real Time System, multiprocessor system, Distributed system, System protection. Operating System structure, Operating System Services, System Program and calls.

Module II: **Process Management**

Process concept, State model, process scheduling, job and process synchronization, structure of process management, Threads.

Interprocess Communication and Synchronization:Principle of Concurrency, Producer Consumer Problem, Critical Section problem, Semaphores, Hardware Synchronization, Critical Regions, Conditional critical region, Monitor, Inter Process Communication.

CPU Scheduling: Job scheduling functions, Process scheduling, Scheduling Algorithms, Non Preemptive and preemptive Strategies, Algorithm Evaluation, Multiprocessor Scheduling.

Deadlock: System Deadlock Model, Deadlock Characterization, Methods for handling deadlock, Prevention strategies, Avoidance and Detection, Recovery from deadlock combined approach.

Module III: **Memory Management**

Single Contiguous Allocation: H/W support, S/W support, Advantages and disadvantages, Fragmentation, Paging, Segmentation, Virtual memory concept, Demand paging, Performance, Paged replaced algorithm, Allocation of frames, Thrashing, Cache memory, Swapping, Overlays

Module IV: **Device management**

Principles of I/O hardware, Device controller, Device Drivers, Memory mapped I/O, Direct Access Memory, Interrupts, Interrupt Handlers, Application I/O interface, I/O Scheduling, Buffering, Caching, Spooling,

Disk organization, Disk space management, Disk allocation Method, Disk Scheduling, Disk storage.

Module V: **File System and Protection and security**

File Concept, File Organization and Access Mechanism, File Directories, Basic file system, File Sharing, Allocation method, Free space management.

Policy Mechanism, Authentication, Internal excess Authorization.

Examination Scheme:

Components	CA	A	CT	EE

Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- A. Silberschatz, P.B. Galvin ″Operating System Concepts″, John Willey & son
- A. S Tanenbaum, Modern Operating System, 2nd Edition, PHI.

References:

- Milenekovic, ″Operating System Concepts″, McGraw Hill
- Dietel, ″An introduction to operating system″, Addision Wesley
- Tannenbaum, ″Operating system design and implementation″, PHI
- B. W. Kernighan & R. Pike, ″The UNIX Programming Environment″ Prentice Hall of India, 2000
- Sumitabha Das ″ Your UNIX The ultimate guide″ Tata Mcgraw Hill
- ″Design of UNIX Operating System ″ The Bach Prentice − Hall of India

OBJECT ORIENTED PROGRAMMING USING C++

Course Code: **BCS 304** **CreditUnits**: **03**

Course learning outcomes (CLO)

It is expected that by the end of the course, students will be comfortable in –

1. Understand object-oriented programming and advanced C++ concepts.
    a. Be able to explain the difference between object-oriented programming and procedural programming.
    b. Be able to program using more advanced C++ features such as composition of objects, operator overloads, dynamic memory allocation, inheritance and polymorphism, file I/O, exception handling, etc.
    c. Be able to build C++ classes using appropriate encapsulation and design principles.
2. Improve your problem-solving skills
    a. Be able to apply object oriented or non-object-oriented techniques to solve bigger computing problems.
    b. Goal: to make you a good programmer. Apply methods to analyse running time of essential data structures and estimate efficiency of the algorithms and implementations.

Course Contents:

Module I: Introduction

Review of C, Difference between C and C++, Procedure Oriented and Object Oriented Approach. Basic Concepts: Objects, classes, Principals like Abstraction, Encapsulation, Inheritance and Polymorphism. Dynamic Binding, Message Passing. Characteristics of Object-Oriented Languages. Introduction to Object-Oriented Modeling techniques (Object, Functional and Dynamic Modeling).

Module II: Classes and Objects

Abstract data types, Object & classes, attributes, methods, C++ class declaration, Local Class and Global Class, State identity and behaviour of an object, Local Object and Global Object, Scope resolution operator, Friend Functions, Inline functions, Constructors and destructors, instantiation of objects, Types of Constructors, Static Class Data, Array of Objects, Constant member functions and Objects, Memory management Operators.

Module III: Inheritance

Inheritance, Types of Inheritance, access modes – public, private & protected, Abstract Classes, Ambiguity resolution using scope resolution operator and Virtual base class, Aggregation, composition vs classification hiérarchies, Overriding inheritance methods, Constructors in derived classes, Nesting of Classes.

Module IV: Polymorphism

Polymorphism, Type of Polymorphism − Compile time and runtime, Function Overloading, Operator Overloading (Unary and Binary) Polymorphism by parameter, Pointer to objects, this pointer, Virtual Functions, pure virtual functions.

Module V: Strings, Files and Exception Handling

Manipulating strings, Streams and files handling, formatted and Unformatted Input output. Exception handling, Generic Programming − function template, class Template Standard Template Library: Standard Template Library, Overview of Standard Template Library, Containers, Algorithms, Iterators, Other STL Elements, The Container Classes, General Theory of Operation, Vectors.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- A.R. Venugopal, Rajkumar, T. Ravishanker"Mastering C++", TMH, 1997
- R. Lafore, "Object Oriented Programming using C++", BPB Publications, 2004.
- "Object Oriented Programming with C++" By E. Balagurusamy.
- Schildt Herbert, "C++: The Complete Reference", Wiley DreamTech, 2005.

References:

- Parasons, "Object Oriented Programming with C++", BPB Publication, 1999.
- Steven C. Lawlor, "The Art of Programming Computer Science with C++", Vikas Publication, 2002.
- Yashwant Kanethkar, "Object Oriented Programming using C++", BPB, 2004

APPLIED MATHEMATICS - III

Course Code: **AM 301** **Credit Units**: **03**

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Investigate the basic concept about partial differential equations.
2. Create an interest in finding the solution by Fourier Series and Fourier Transforms.
3. Apply basic concepts of Laplace Transformation.
4. Develop the physical problems using optimization techniques.

Course Contents:

Module I:Partial Differential Equations

Formation of PDE, Equations solvable by direct integration, Linear equations of the first order, Non-linear equations of the first order, Charpit′s method, Homogeneous linear equations with constant coefficients, Non homogeneous linear equations.

Module II: Fourier Series

Periodic Functions, Fourier Series, Functions having points of discontinuity, Even or Odd Functions, Change of Interval, Half-range series, Parseval′s Formula, Complex form of Fourier series, Practical Harmonic Analysis, Fourier Transforms, Sine and Cosine Transforms.

Module III: Laplace Transformation

Definition, Transforms of elementary functions, Properties of Laplace transforms, Existence conditions, Transforms of derivatives, Transforms of integrals, Evaluation of integrals by Laplace transform, Inverse transforms, Other methods of finding inverse transforms, Convolution theorem, Application to differential equations, Simultaneous linear equations with constant coefficients, Unit step functions, Periodic functions.

Module IV: Linear Programming

Formulation of the problem, Graphical method, Canonical and Standard forms of L.P.P. Simplex Method, Artificial variable Techniques-M-method, Two phase method, Degeneracy, Dual simplex method.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- Differential Calculus by Shanti Narain
- Integral Calculus by Shanti Narain
- Higher Engineering Mathematics by B.S. Grewal

References:

- Differential Equations by A.R. Forsyth
- Higher Engineering Mathematics by H.K. Dass
- Partial Differential Equations by I.N. Snedon

DIGITAL ELECTRONICS

Course Code: BCS 305 **Credit Units: 03**

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Identify and explain fundamental concepts of digital logic design including basic and universal gates, number systems, binary coded systems, basic components of combinational and sequential circuits and concept of logic families.
2. Use the acquired knowledge to apply techniques related to the design and analysis of digital electronic circuits including Boolean algebra and multi-variable Karnaugh map methods.
3. Analyze small-scale combinational and sequential digital circuits.
4. Synthesize small-scale combinational and synchronous sequential digital circuit using Boolean algebra and K-maps.

Course Contents:

Module I: Boolean Functions

Analog & digital signals, AND, OR, NOT, NAND, NOR & XOR gates, Boolean algebra, Standard representation of logical functions, K-map representation and simplification of logical function, don't care conditions, XOR & XNOR simplifications of K-maps, Tabulation method.

Module II: Combinational Circuits

Adders, Subtractors, Multiplexer, de-multiplexer, decoder & encoder, code converters, Comparators, decoder / driver for display devices, Implementation of logic functions using multiplexer / de-multiplexer,

Module III: Sequential Circuits

Flip-flops: SR, JK, D & T flip flops – Truth table, Excitation table, Conversion of flip-flops, race around condition, Master Slave flip flop, shift registers: SIPO, PISO, PIPO, SIPO, Bi-directional; Counters: ripple & synchronous counters – up / down; Synchronous Sequential circuit: design procedure.

Module IV: Logic families

Logic families: RTL, DTL, TTL, ECL

Module V: Data Converters

Data converters: ADC – successive approximation, linear ramp, dual slope; DAC – Binary Weighted, R-2R ladder type

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

- Moris Mano: Digital Circuits Systems
- R. P. Jain: Digital Logic& Circuits
- Thomas L. Floyd: Digital Fundamentals
- Malvino and Leech: Digital Principles & Applications

DATABASE MANAGEMENT SYSTEMS LAB

Course Code: BCS 322 **Credit Units: 01**

Software Required: Oracle 9i

Topics covered in lab will include:

- Database Design
- Data Definition (SQL)
- Data Retrieval (SQL)
- Data Modification (SQL)
- Views
- Triggers and Procedures
- PL\SQL

Examination Scheme:

IA				EE		
A	Practical (Mid-Term)	PR	V	LR	PR (End Term)	V
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

OPERATING SYSTEM WITH UNIX LAB

Course Code: **BCS 323** **Credit Units**: **01**

Software Required:UNIX SCO

Assignments will be provided for the following

- Introduction to UNIX Commands
- Introduction to vi editor
- Programming in shell script
- Introduction to programming in C Shell

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

Text & References:

- ″Unix Programming Environment″ The Kernighan and Pike Prentice − Hall of India
- ″Unix −Shell Programming″ Kochar
- ″ Unix Concepts and application″ Das Sumitabha Tata Mcgraw Hill

OBJECT ORIENTED PROGRAMMING USING C++ LAB

Course Code: **BCS 324** **CreditUnits** : **01**

Software Required: Turbo C++

Course Contents:

- Creation of objects in programs and solving problems through them.
- Different use of private, public member variables and functions and friend functions.
- Use of constructors and destructors.
- Operator overloading
- Use of inheritance in and accessing objects of different derived classes.
- Polymorphism and virtual functions (using pointers).
- File handling.

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

WEBSITE DESIGN

Course Code: **BCS 406** **CreditUnits**: **03**

Course learning outcomes (CLO)

Program Outcome of this course (POs)

1. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
2. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Course Contents:

Module I: Overview of Internet

Introduction to Internet and WWW, Concept of Networking and Layers of OSI Model, Internet protocols like TCP/IP, http, telnet and ftp, URL, email, domain name, Web Browsers.

Module II: Principles of Web Design

Key issues to be considered in web site design. Structure of a Web Page: Introduction to HTML, Elements of HTML syntax, Head and Body sections, Building HTML documents, Inserting text, images, hyperlinks, Backgrounds and Color Control, HTML Editors & Tools: Use of different HTML editors and tools like Netscape Communicator and Microsoft Front Page etc

Module III: HTML Tags

Use of Different HTML tags in web pages. Table Handling: Table layout & presentation, constructing tables in a web page, developing a web page in a table. Ordered and unordered lists. Frames: Developing Web pages using frames. Advantages and disadvantages of frames. Creating forms, Role of Databases in web applications. Use of at least one graphical and animation tools like Adobe Fireworks, Abode Photoshop, Gif Animator, Gimpetc.

Module IV: Cascading style-sheet (CSS) in HTML

Introduction to Cascading Style Sheets (CSS), Types of Style Sheets (Inline, Internal and External), CSS for Website Layout and Print Layout.
Types of various CSS Selectors, CSS properties: Type Properties, Background Properties, Block Properties, Box Model Properties, List Properties, Border Properties, Positioning Propeties.

Module V: Introduction to Java Script

Role of java script in a web page, Script writing basics, Adding interactivity to a web page, creating dynamic web pages,
Similarities to java, embedding JavaScript code, embedding java applets in a web page**,** Form validation using java script

Projects:

Creating a discussion form, creating an online store, creating a job site.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- Ramesh Bangia, "Web Technology", Firewall media
- C. Xavier, "World Wide Web Design with HTML", Tata McGraw Hill.
- Unleashed ASP, Techmedia

References:

- Rick Dranell, "HTML4 unleashed", Techmedia Publication.
- Shelly Powers, "Dynamic Web Publishing Unleashed", Techmedia.
- Don Gosselin, "JavaScript", Vikas Publication
- **Mark Swank & Drew Kittel, "World Wide Web Database", Sams net.**

WEBSITE DESIGN LAB

Course Code: **BCS 423** **Credit Units**: **01**

Software Required: Java

List of Assignment:

1. Design a HTML page using all the basic tags.
2. Design a page containing your educational qualification in a table.
3. Design a page containing an ordered list/unordered list.
4. Design a HTML page for your resume.
5. Design a form in HTML to enter different attribute of student information.
6. Design a home page for ASE using Frame.
7. Design another page and connect these to the home page.
8. Write a function in Javascript for input validation.
9. Write a function in Javascript to calculate monthly installation of the loan.
10. Write an input form and save its data in a database using ASP.
11. Display the data stored in database in tabular form on the page.

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

DIGITAL ELECTRONICS LAB

Course Code: **BCS 325** **Credit Units**: **01**

List of Experiments:

1. To verify the truth tables of OR, AND, NOR, NAND, EX-OR, EX-NOR gates.
2. To obtain half adder, full adder and subtractor using gates and verify their truth tables.
3. To verify the truth tables of RS, JK and D flip- flops.
4. To design and study a binary counter.
5. To design and study synchronous counter.
6. To design and study ripple counter.
7. To convert BCD number into excess 3 form
8. To design and study a decade counter.
9. To design and study a sequence detector.
10. To implement control circuit using multiplexer.

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

COMMUNICATION SKILLS - I

Course Code: **BCS 301** **Credit Units**: **01**

Course learning outcomes (CLO)

At the successful completion of this course the student should be able to:

1. Inculcating creative thinking skills
2. Construct and showcase their communication skills in a creative manner.
3. Comprehending and demonstrating ways of self introduction
4. Outlining and illustrating presentation Skills

Course Contents:

Module I: **Introduction to Writing Skills**

Effective Writing Skills
Avoiding Common Errors
Paragraph Writing
Note Taking
Writing Assignments

Module II: **Letter Writing**

Types
Formats

Module III

Memo
Agenda and Minutes
Notice and Circulars

Module IV: **Report Writing**

Purpose and Scope of a Report
Fundamental Principles of Report Writing
Project Report Writing
Summer Internship Reports

Examination Scheme:

Components	CT1	CT2	CAF	V	GD	GP	A
Weightage (%)	20	20	25	10	10	10	5

CAF – Communication Assessment File

GD – Group Discussion

GP – Group Presentation

Text & References:

- Business Communication, Raman – Prakash, Oxford
- Creative English for Communication, Krishnaswamy N, Macmillan
- Textbook of Business Communication, Ramaswami S, Macmillan
- Working in English, Jones, Cambridge
- A Writer's Workbook Fourth edition, Smoke, Cambridge
- Effective Writing, Withrow, Cambridge

- Writing Skills, Coe/Rycroft/Ernest, Cambridge
- Welcome!, Jones, Cambridge

BEHAVIOURAL SCIENCE - III

(INTERPERSONAL COMMUNICATION)

Course Code: BSS 304 **CreditUnits: 01**

Course Objective:

This course provides practical guidance on
Enhancing personal effectiveness and performance through effective interpersonal communication
Enhancing their conflict management and negotiation skills

Course Contents:

Module I: Interpersonal Communication: An Introduction

Importance of Interpersonal Communication

Types − Self and Other Oriented

Rapport Building − NLP, Communication Mode

Steps to improve Interpersonal Communication

Module II: BehaviouralCommunication

Meaning and Nature of behavioural communication
Persuasion, Influence, Listening and Questioning
Guidelines for developing Human Communication skills
Relevance of Behavioural Communication for personal and professional development

Module III: Interpersonal Styles

Transactional Analysis

Life Position/Script Analysis

Games Analysis
Interactional and Transactional Styles

Module IV: Conflict Management

Meaning and nature of conflicts
Styles and techniques of conflict management
Conflict management and interpersonal communication

Module V: Negotiation Skills

Meaning and Negotiation approaches (Traditional and Contemporary)

Process and strategies of negotiations
Negotiation and interpersonal communication

Module VI:End-of-Semester Appraisal

Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

- Vangelist L. Anita, Mark N. Knapp, Inter Personal Communication and Human Relationships: Third Edition, Allyn and Bacon

- Julia T. Wood. Interpersonal Communication everyday encounter
- Simons, Christine, Naylor, Belinda: Effective Communication for Managers, 1997 1st Edition Cassel
- Goddard, Ken: Informative Writing, 1995 1st Edition, Cassell
- Harvard Business School, Effective Communication: United States of America
- Foster John, Effective Writing Skills: Volume-7, First Edition 2000, Institute of Public Relations (IPR)
- Beebe, Beebe and Redmond; Interpersonal Communication, 1996; Allyn and Bacon Publishers.

FRENCH - III

Course Code: **FLT 301** **Credit Units**: **02**

Course learning outcomes (CLO)

At the successful completion of this course you should be able to:

1. **Identify** and express in French vocabulary and grammar norms
2. **Interpret** different types of texts as well as cultural ideas and themes.
3. **Demonstrate comprehension** of nuance between script and sound in French

- **Narrate clearly** ideas, themes in simple standard French

Course Contents:

Module B: pp. 76 – 88 Unité 6

Module C: pp. 89 to103 Unité 7

Contenu lexical: **Unité 6:se faire plaisir**

1. acheter : exprimer ses choix, décrire un objet (forme, dimension, poids et matières) payer
2. parler de la nourriture, deux façons d'exprimer la quantité, commander un repas au restaurant
3. parler des différentes occasions de faire la fête

Unité 7: Cultiverses relations

1. maîtriser les actes de la communication sociale courante (Salutations, présentations, invitations, remerciements)
2. annoncer un événement, exprimer un souhait, remercier, s'excuser par écrit.
3. caractériser une personne (aspect physique et caractère)

Contenu grammatical:

1. accord des adjectifs qualificatifs
2. articles partitifs
3. Négations avec de, ne...rien/personne/plus
4. Questions avec combien, quel...
5. expressions de la quantité
6. ne...plus/toujours - encore
7. pronoms compléments directs et indirects
8. accord du participe passé (auxiliaire « avoir ») avec l'objet direct
9. Impératif avec un pronom complément direct ou indirect
10. construction avec « que » - Je crois que/ Je pense que/ Je sais que

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

Text & References:

- **le livre à suivre: Campus: Tome 1**

GERMAN - III

Course Code: **FLG 301** **Credit Units**: **02**

Course learning outcomes (CLO)

After successful completion of the course, the students will be able perform orally and in writing certain social functions:

1. Students will be able to ask and tell time.
2. Students will be able to frame sentences using Separable verb.
3. Student will be able to write and speak sentences using modal verb.
4. Students will be able to frame sentences and speak using was/were/had.

Course Contents:

Module I: **Modal verbs**
Modal verbs with conjugations and usage
Imparting the finer nuances of the language

Module II: **Information about Germany (ongoing)**
Information about Germany in the form of presentations or "Referat"– neighbors, states and capitals, important cities and towns and characteristic features of the same, and also a few other topics related to Germany.

Module III: **Dative case**
Dative case, comparison with accusative case
Dative case with the relevant articles
Introduction to 3 different kinds of sentences – nominative, accusative and dative

Module IV: **Dative personal pronouns**
Nominative, accusative and dative pronouns in comparison

Module V: **Dative prepositions**
Dative preposition with their usage both theoretical and figurative use

Module VI: **Dialogues**
In the Restaurant,
At the Tourist Information Office,
A telephone conversation

Module VII: **Directions**
Names of the directions
Asking and telling the directions with the help of a roadmap

Module VIII: **Conjunctions**
To assimilate the knowledge of the conjunctions learnt indirectly so far

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, TangramAktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

SPANISH – III

Course Code: **FLS 301** **Credit Units**: **02**

Course Learning Outcomes:

After successful completion of the course, students will be able to perform orally and in writing certain social functions:

Students will be able to perform communicative tasks (oral and written) with proficiencies in,

a) Introduction of stem changing irregular verbs
b) Introduction of prepositions (Cerca de/ lejos de/ encima de etc.)
c) Present continuous tense **(Estar+ gerundio)**
d) Introduction of third person verbs Gustar/Parecer/Encantar/ Doler (to like/ to seem like/ to enchant/ to hurt.) etc
e) Interrogatives – How much/ How many
f) Introduction of irregular verbs.
g) Immediate future plans (Ir a + verbo)

Course Contents:

Module I
Revision of earlier semester modules

Set expressions (idiomatic expressions) with the verb *Tener*, *Poner*, *Ir....*
Weather

Module II

Introduction to *Gustar*...and all its forms. Revision of *Gustar* and usage of it

Module III

Translation of Spanish-English; English-Spanish. Practice sentences.

How to ask for directions (using estar)

Introduction to IR + A + INFINITIVE FORM OF A VERB

Module IV
Simple conversation with help of texts and vocabulary
En el restaurante
En el instituto
En el aeropuerto

Module V
Reflexives

ExaminationScheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

Text & References:

- Español, EnDirecto I A

- Español Sin Fronteras-Nivel Elemental

CHINESE – III

Course Code: FLC 301 CreditUnits: 02

Course Objective:

Foreign words are usually imported by translating the concept into Chinese, the emphasis is on the meaning rather than the sound. But the system runs into a problem because the underlying name of personal name is often obscure so they are almost always transcribed according to their pronciation alone. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I

Drills

Dialogue practice

Observe picture and answer the question.

Introduction of written characters.

Practice reading aloud

Practice using the language both by speaking and by taking notes.

Character writing and stroke order

Module II

Measure words

Position words e.g. inside, outside, middle, in front, behind, top, bottom, side, left, right, straight.

Directional words – beibian, xibian, nanbian, dongbian, zhongjian.

Our school and its different building locations.

What game do you like?

Difference between ″hii″ and ″neng″, ″keyi″.

Module III

Changing affirmative sentences to negative ones and vice versa

Human body parts, Not feeling well words e.g.; fever, cold, stomach ache, head ache.

Use of the modal particle ″le″, Making a telephone call, Use of ″jiu″ and ″cal″ (Grammar portion),

Automobiles e.g. Bus, train, boat, car, bike etc.

Traveling, by train, by airplane, by bus, on the bike, by boat..etc.

Module IV

The ordinal number ″di″, ″Mei″ the demonstrative pronoun e.g.mei tian, meianetc.

Use of to enter to exit, Structural particle ″de″ (Compliment of degree).

Going to the Park, Description about class schedule during a week in school, Grammar use of ″li″ and ″cong″.

Comprehension reading followed by questions.

Module V

Persuasion-Please don′t smoke, Please speak slowly, Praise – This pictorial is very beautiful, Opposites e.g. Clean-Dirty, Little-More, Old-New, Young-Old, Easy-Difficult, Boy-Girl, Black-White, Big-Small, Slow-Fast ... etc.

Talking about studies and classmates, Use of ″it doesn′t matter″, Enquiring about a student, description about study method.

Grammar: Negation of a sentence with a verbal predicate.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

Text & References:

- "Elementary Chinese Reader Part I, Part-2" Lesson 21-30

MANAGEMENT INFORAMTION SYSTEM

Course Code: BIT 401 Credit Units: 03

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:
1. Explain basic concepts for IT/IS management
2. Discuss organizational, business and strategic issues surrounding IT/IS, and
3. Analyse and evaluate uses of strategic IT/IS in practice.

Course Contents:

Module I
Foundation of Information Systems: Introduction to information system in business, fundamentals of information systems, solving business problems with information system, concept of balanced MIS, effectiveness & efficiency criteria.

Module II
System Analysis Design function, CASE Tools, Project Feasibility, Information Requirement & Decision Analysis, Preparing System Proposal, Input / Output design, Procedures & control design, System development, Testing & Quality assurance.

Module III
Implementation, Operation, Evaluation and Maintenance, Structured System Methodologies, Automated systems development, Hardware / Software selection, Systems function management. Business application of Information Technology: Internet & Electronic commerce, internet, extranet & enterprise solutions, information system for business operations, information system for managerial decision support, information system for strategic advantage.

Module IV
Managing Information Technology: Enterprise and global management, security & ethical challenges planning & implementing changes.

Module V
Advanced Concepts In Information Systems: Enterprise resource planning, Supply Chain Management, C.R.M., Procurement Management.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

- Brian, "Introduction to Information System", McGraw Hill
- Brain, "Management Information System", TMH
- Ashok Kumar Sharma, "Analysis Design & Implementation of Information Systems: A Transition to Objects"
- Vikas, Alter, "Information System: A management perspectives Addison Wesley
- Arore& Bhatia, "Information System for Managers", Excel Bansal. "Information
- System Analysis and Design", New Age Murdick, "Information System for Modem Management", PHI.

DISCRETE MATHEMATICS

Course Code: **BCS 403** **Credit Units**: **03**

Course learning outcomes (CLO)

After completing this course, students will be able to:

a. Proof and logics
b. Set, relations.
c. Formulate Lattices as partially ordered sets, their properties
d. Join and meet irreducible elements of a lattice and introduction to Boolean algebra.
e. Understand some basic properties of Boolean algebra to solve problem by different method and definition of graphs.

Course Contents:

Module I:Formal Logic

Statement, Symbolic Representation and Tautologies, Quantifiers, Predicator and validity, Normal form. Propositional Logic, Predicate Logic, First Order Logic.

Module II: Proof & Relation

Techniques for theorem proving: Direct Proof, Proof by Contra position, Proof by exhausting cares and proof by contradiction, principle of mathematical induction, principle of complete induction. Recursive definitions, solution methods for linear, first-order recurrence relations with constant coefficients.

Module III: Sets and Combinations

Sets, Subtracts, power sets, binary and unary operations on a set, set operations/set identities, fundamental country principles, principle of inclusion, exclusion and pigeonhole principle, permutation and combination, Pascal′s triangles, Comparing rates of growth: big theta, little oh, big oh and big omega.

Module IV: Relation/function and matrices

Relation/function and matrices: Relation, properties of binary relation, operation on binary relation, closures, partial ordering, equivalence relation, Function, properties of function, composition of function, inverse, binary and n-ary operations,
characteristic function, Permutation function, composition of cycles, Boolean matrices, Boolean matrices multiplication.

Module V: Lattices & Boolean Algebra

Lattices: definition, sub lattices, direct product, homomorphism Boolean algebra: definition, properties, isomorphic structures (in particulars, structures with binary operations) sub algebra, direct product and homo-

morphism, Boolean function, Boolean expression, representation & minimization of Boolean function.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- J.P. Tremblay & R. Mamohan, "Discrete Mathematical Structure with Application to Computer Science," TMH, New Delhi (2000).
- Kolman, Busby & Ross "Discrete Mathematical Structures", PHI.
- Iyengar, Chandrasekaran and Venkatesh, "Discrete Mathematics", Vikas Publication.
- Peter Linz, "An Introduction to Formal Languages and Automata", Narosa Publishing House.

References:

- J. Truss, "Discrete Mathematics", Addison Wesley.
- C.L. Liu, "Elements of Discrete Mathematics", McGraw Hill Book Company.
- M. Lipson &Lipshutz, "Discrete Mathematics", Schaum's Outline series.
- J. E. Hopcroft & J. D. Ullman, "Introduction to Automata Theory, Languages and Computation", Addison Weliy.

COMPUTER GRAPHICS

Course Code: **BCS 404** **CreditUnits**: **03**

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. **Investigate the structure of modern computer graphics systems**
2. **Create key algorithms for rasterize, modelling and rendering graphical data**
3. **Apply experience in constructing interactive computer graphics programs**
4. **Develop design and problem-solving skills with application to computer graphics**

Course Contents:

Module I: **Introduction to Graphics and Graphics Hardware System**

Video display devices, CRT, LCD Display devices Raster scan displays, Random scan displays, Raster scan systems, Random scan Systems.

Input devices, keyboard, mouse, Trackball and spaceball, Joystick, Data glove, Digitizers, Image scanners, Touch panels, Light pens, Voice systems.

Hardcopy devices, Printers, Plotters.

Module II: **Output Primitives and Clipping operations**

Algorithms for drawing 2D Primitives lines (DDA and Bresenham′s line algorithm), circles (Bresenham′s and midpoint circle algorithm), ellipses (midpoint ellipse algorithm), other curves(conic sections, polynomials and spline curves).

Antialiasing and filtering techniques

Line clipping (cohen-sutherland algorithm), clip windows, circles, ellipses, polygon, clipping with Sutherland Hodgeman algorithm.

Module III: **Geometric transformation**

2D Transformation: Basic transformation, Translation, Rotation, scaling, Matrix Representations and Homogeneous coordinates, window to viewport transformation.

3D Concepts: Parallel projection and Perspective projection, 3 D Transformation.

Module IV: 3 D Object Representation, Colour models and rendering

Polygon meshes in 3 D, Spheres, Ellipsoid, Bezier curves and Bezier surfaces, Bspline curves and surfaces, solid modeling, sweep representation, constructive solid geometry methods. Achromatic and color models.

Shading, rendering techniques and visible surface detection method: Basic illumination, diffuse reflection, specular reflection, transparency, shadows. Polygon rendering method, Gouraud&Phong shading, Ray tracing method, recursive ray tracing, radio-sity method. Depth-buffer method,A-buffer method, Depth-sorting method(painter's algorithm), Oct-tres method.

Module V: Introduction to multimedia

File formats for BMP, GIF, TIFF, IPEG, MPEG-II, Animation techniques and languages. Design of animation sequences, Computer Animation languages, Elementary filtering techniques and elementary Image Processing techniques

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- Foley et. al., "Computer Graphics Principles& practice", 2nd ed. AWL, 2000.
- D. Hearn and P. Baker, "Computer Graphics", Prentice Hall, 1986.
- R. Plastock and G. Kalley, "Theory and Problems of Computer Graphics", Schaum's Series, McGraw Hill, 1986

References:

- R.H. Bartels, J.C. Beatty and B.A. Barsky, "An Introduction to Splines for use in Computer Graphics and Geometric Modeling", Morgan Kaufmann Publishers Inc., 1987.
- C.E. Leiserson, T.H. Cormen and R.L. Rivest, "Introduction to Algorithms", McGraw-Hill Book Company, 1990.
- W. Newman and R. Sproul, "Principles of Interactive Computer Graphics, McGraw-Hill, 1973.
- F.P. Preparata and M.I. Shamos, "Computational Geometry: An Introduction", Springer-Verlag New York Inc., 1985.
- D. Rogers and J. Adams, "Mathematical Elements for Computer Graphics", MacGraw-Hill International Edition, 1989
- David F. Rogers, "Procedural Elements for Computer Graphics", McGraw Hill Book Company, 1985.
- Alan Watt and Mark Watt, "Advanced Animation and Rendering Techniques", Addison-Wesley, 1992

DATA COMMUNICATION AND COMPUTER NETWORKS

Course Code: **BCS405** **Credit Units: 03**

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Evaluate storage architectures and key data center elements in classic, virtualized and cloud environments
2. Explain physical and logical components of a storage infrastructure including storage subsystems, RAID and intelligent storage systems
3. Describe storage networking technologies such as FCSAN, IP-SAN, FCoE, NAS and object-based, and unified storage
4. Understand and articulate business continuity solutions – backup and replications, along with archive for managing fixed content

5. Explain key characteristics, services, deployment models, and infrastructure components for a cloud computing
6. Describe information security requirements and solutions, and identify parameters for managing and monitoring storage infrastructure in classic, virtualized and cloud environments

Course Contents:

Module I: Introduction

Introduction to computer networks, evolution of computer networks and its uses, reference models, example networks

The physical layer: Theoretical basis for data communication, transmission media, wireless transmission, telecom infrastructure, PSTN, communication satellites, mobile telephone system

Module II: The data link layer

Data link layer design issues, error detection and correction, data link protocols, sliding window protocols, example of data link protocols- HDLC, PPP Access

Module III: Medium access layer
Channel allocation problem, multiple access protocols, ALOHA, CSMA/CD, CSMA/CA, IEEE Standard 802 for LAN and MAN, Bridges, Wireless LANs. Introduction to wireless WANs: Cellular Telephone and Satellite Networks, SONETISDH, Virtual-Circuit Networks: Frame Relay and ATM.

Module V: The network layer

Network layer concepts, design issues, static and dynamic routing algorithms, shortest path routing, flooding, distance vector routing, link state routing, distance vector routing, multicast routing, congestion controland quality of service, internetworking, Ipv4

Module VI: The transport layer
The transport services, elements of transport protocols, TCP and UDP
The application layer: Brief introduction to presentation and session layer, DNS,E-mail, WWW

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

DATA COMMUNICATION ANDCOMPUTER NETWORKS LAB

Course Code: BCS425 CreditUnits: 01

Equipments Required:

Switch Network Cables, Patch Chord- Fiber optical and twisted pair cable, LAN cards, RJ-45 connectors etc.

Platforms required: Linux Server

Course Contents:

- Introduction and Installation of Linux
- Administrating Linux
- Setting up a Local Area Network
- Connecting to the Internet
- Setting up Print Server
- Setting up File Server
- Setting up Mail Server
- Setting up FTP Server
- Setting up Web Server
- Setting up MySQL Database Server

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

COMPUTER GRAPHICS LAB

Course Code: **BCS 424** **CreditUnits**: **01**

Software Required: Turbo C++

Course Contents:

Assignments will be provided for the following:

- Geometrical shapes based on graphics algorithms
- 2D Geometric transformation translation, rotation, scaling, reflection.
- Clipping
- Animation

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

Domain Elective-II :Choose any one from the following courses

E-COMMERCE AND ERP

Course Code: BCS407 **Credit Units: 04**

Course Objective:

This course examines the evolution of enterprise resource planning (ERP) systems - from internally focused client/server systems to externally focused e-business. This class studies the types of issues that managers will need to consider in implementing cross-functional integrated ERP systems. The objective of this course is to make students aware of the potential and limitations of ERP systems. This objective will be reached through hands-on experience, case studies, lectures, guest speakers and a group project. The course would equip students with the basics of E-Commerce, technologies involved with it and various issues associated with.

Course Contents:

Module I: Introduction and Concepts

Networks and commercial transactions - Internet and other novelties; Networks and electronic transactions today, Model for commercial transactions; Internet environment - internet advantage, world wide web and other internet sales venues; Online commerce solutions.

Security Technologies: Why is internet insecure? A brief introduction to Cryptography; Public key solution. Digital payment systems; First virtual internet payment system; cyber cash model Operational process of Digicash, Ecash Trail; Using Ecash; Smart cards; Electronic Data Interchange: Its basics; EDI versus Internet and EDI over Internet.

Module II: Introduction ERP

An Overview, Enterprise-An Overview, Benefits of ERP, ERP and Related Technologies, Business Process Reengineering (BPR), Data Warehousing, Data Mining, On-line Analytical Processing (OLAP), Supply Chain Management

Module III: ERP Implementation

To be or not to be, ERP Implementation Lifecycle, Implementation Methodology, Not all Packages are Created Equal!, ERP Implementation-The Hidden Costs, Organizing the Implementation, Vendors, Consultants and Users, Contracts with Vendors, Consultants and Employees, Project Management and Monitoring, After ERP Implementation.

Module IV: The Business Modules

Business Modules in an ERP Package, Finance, Manufacturing (Production), Human Resources, Plant Maintenance, Materials Management, Quality Management, Sales and Distribution

Module V: The ERP Market

ERP Market Place, SAP AG, PeopleSoft, Baan Company, JD Edwards World Solutions Company, Oracle Corporation, QAD, System Software Associates, Inc. (SSA)

ERP-Present and Future

Turbo Charge the ERP System, Enterprise Integration Applications (EIA), ERP and E-Commerce, ERP and Internet, Future Directions in ERP, Appendices"

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- S. Sadagopan, "Enterprise Resource Planning", Tata McGraw Hill 2000
- Bajaj, Kamlesh K. and Nag, Debjani, E-Commerce: The Cutting Edge of Business, Tata McGraw-Hill Publishing Company

References:

- Alexis Leon, “Enterprise Resource Planning”, Tata McGraw Hill 2001
- Loshin, Pete and Murphy, Paul, *Electronic Commerce*, Second edition, 1990, Jaico Publishing House, Mumbai.

HYPERTEXT PREPROCESSOR (PHP)

Course Code: **BCS 406** **CreditUnits**: **03**

Course learning outcomes (CLO)

Program Outcome of this course (POs)

1. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
2. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
3. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Course Contents:

Module I: PHP Introduction

Introduction, Installation, PHP Syntax, PHP Variables, Echo Statements, PHP Data Types, Strings Operation, Constants

Module II: Operators & Control Statements

PHP Operators, PHP If...Else...Elseif, Switch, Looping, PHP Functions, Arrays.

Module III: Form Handeling using PHP

Form Handling in PHP, Form Validation, GET/POST Method in HTML Forms, PHP Form URL.

Module IV: Advanced functions in PHP

PHP - Multidimensional Arrays, Date and Time,
PHP Include Files function,
PHP File Handling, File Open/Read, File Creation in PHP,
File Upload function.
PHP Cookies, PHP Sessions, Filters in PHP, PHP Error Handling, PHP Exception

Module V: MySQL Connectivity in PHP

Introduction to MySQL Database, MySQL Connectivity with PHP,
MySQL Functions:
Create Database,
Create Table,
Data Insertion,
Data fetching using Select Statements,
DeleteOpertaion,
Update Operation.

Note: All database related operation required to be performed on PhpMyAdmin tool.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References*:*

Text:

- Beginning PHP, Apache, MySQL Web Development
- Michael K. Glass, Yann Le Scouarnec, Elizabeth Naramore, Gary Mailer, Jeremy Stolz, Jason Gerner

References*:*

- PHP Manual.

PHP LAB

Course Code: **BCS 426** **CreditUnits: 01**

Course Contents:

1. WAP to display the "Hello World" on Webpage using PHP
2. WAP to perform the logic of Control Statements.
3. WAP to perform the functinality of Looping Statements.
4. WAP to perform the funtionality of HTML Form submission in PHP
5. WAP to perform the funtionality of Database (MySql) Connectivity with PHP Applications
6. CASE Project: A News Board
7. CASE Project: Prepare Admin Panel for previous News Board Project
8. CASE Project: Student Information Management System (SIMS)
9. CASE Project: Prepare Admin Panel for previous SIMS

10-12. **Project:** An open ended project (based on PHP+MySql) which will be submitted by students (in group)

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

COMMUNICATION SKILLS - II

Course Code: **BCS 401** **Credit Units**: **01**

Course learning outcomes (CLO)

At the successful completion of this course the student should be able to:

1. Identify steps to professional communication
2. Identify the key components of meeting, agendas and meeting minutes
3. Understand the key skills and behaviors required to facilitate a group discussion/presentation
4. Polish current affairs & rapport building

Course Contents:

Module I: Social Communication Skills

Small Talk
Conversational English
Appropriateness
Building rapport

Module II: Context Based Speaking

In general situations
In specific professional situations
Discussion and associated vocabulary

Simulations/Role Play

Module III: Professional Skills

Presentations
Negotiations
Meetings
Telephony Skills

Examination Scheme:

Components	CT1	CT2	CAF	V	GD	GP	A
Weightage (%)	20	20	25	10	10	10	5

CAF – Communication Assessment File

GD – Group Discussion

GP – Group Presentation

Text & References:

- Essential Telephoning in English, Garside/Garside, Cambridge
- Working in English, Jones, Cambridge
- Business Communication, Raman – Prakash, Oxford
- Speaking Personally, Porter-Ladousse, Cambridge
- Speaking Effectively, Jermy Comfort, et.al, Cambridge
- Business Communication, Raman – Prakash, Oxford

BEHAVIOURAL SCIENCE – IV
(RELATIONSHIP MANAGEMENT)

Course Code: BSS 404 **CreditUnits: 01**

Course learning outcomes (CLO)

At the successful completion of this course you (the student) would be able to:

1. Identify the basis of interpersonal relationship.
2. Describe the importance of interpersonal relationship and bridging individual differences.
3. Recognize the development and strategies for effective interpersonal relationship.
4. Explain and apply the theories of relationship concepts of impression management.

Course Contents:

Module I: Understanding Relationships
Importance of relationships
Role and relationships
Maintaining healthy relationships

Module II: Bridging Individual Differences
Understanding individual differences
Bridging differences in Interpersonal Relationship – TA
Communication Styles

Module III: Interpersonal Relationship Development
Importance of Interpersonal Relationships
Interpersonal Relationships Skills
Types of Interpersonal Relationships

Module IV: Theories of Interpersonal Relationships
Theories: Social Exchange, Uncertainty Reduction Theory
Factors Affecting Interpersonal Relationships
Improving Interpersonal Relationships

Module V: Impression Management
Meaning & Components of Impression Management
Impression Management Techniques (Influencing Skills)
Impression Management Training-Self help and Formal approaches

Module VI:End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

- Vangelist L. Anita, Mark N. Knapp, Inter Personal Communication and Human Relationships: Third Edition, Allyn and Bacon
- Julia T. Wood. Interpersonal Communication everyday encounter
- Simons, Christine, Naylor, Belinda: Effective Communication for Managers, 1997 1st Edition Cassell
- Goddard, Ken: Informative Writing, 1995 1st Edition, Cassell

- Harvard Business School, Effective Communication: United States of America
- Foster John, Effective Writing Skills: Volume-7, First Edition 2000, Institute of Public Relations (IPR)
- Beebe, Beebe and Redmond; Interpersonal Communication, 1996; Allyn and Bacon Publishers.

FRENCH - IV

Course Code: **FLT 401** **Credit Units: 02**

Course learning outcomes (CLO)

At the successful completion of this course the student should be able to:

- To buy their own food in a French supermarket
- To ask and express their needs
- To tell about their food habits
- To ask for a price
- To order food at a restaurant
- To give an appointment
- To invite someone to go out with
- Understand an announcement
- Know about Paris Metropolitan map
- Talk about his/her time-table
- Express a professional wish
- Formulate a project
- Read a board

Course Contents:

Module C: pp. 104 – 139 : Unités 8,9

Contenu lexical :Unité 8: Découvrir le passé

1. parler du passé, des habitudes et des changements.
2. parler de la famille, raconter une suite d'événements/préciser leur date et leur durée.
3. connaîtrequelques moments de l'histoire

Unité 9: Entreprendre

1. faire un projet de la réalisation: (exprimer un besoin, préciser les étapes d'une réalisation)
2. parlerd'uneentreprise
3. parler du futur

Contenu grammatical:

1. Imparfait
2. Pronom « en »
3. Futur
4. Discoursrapporté au présent
5. Passé récent
6. Présentprogressif

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- **le livre à suivre: Campus: Tome 1**

GERMAN - IV

Course Code: FLG 401 **Credit Units: 02**

Course learning outcomes (CLO)

After successful completion of the course, the students will be able to perform orally and in writing certain social functions:

1. understand and give instructions
2. understand and reply to a letter
3. speak about learning languages
4. find a particular information in a text
5. understand a conversation

Course Contents:

Module I: Present perfect tense
Present perfect tense, usage and applicability
Usage of this tense to indicate near past
Universal applicability of this tense in German

Module II: Letter writing
To acquaint the students with the form of writing informal letters.

Module III: Interchanging prepositions
Usage of prepositions with both accusative and dative cases
Usage of verbs fixed with prepositions
Emphasizing on the action and position factor

Module IV: Past tense
Introduction to simple past tense
Learning the verb forms in past tense
Making a list of all verbs in the past tense and the participle forms

Module V: Reading a Fairy Tale
Comprehension and narration
- Rotkäppchen
- Froschprinzessin
- Die Fremdsprache

Module VI: Genitive case
Genitive case – Explain the concept of possession in genitive
Mentioning the structure of weak nouns

Module VII: Genitive prepositions
Discuss the genitive propositions and their usage: (während, wegen, statt, trotz)

Module VIII: Picture Description
Firstly recognize the persons or things in the picture and identify the situation depicted in the picture;
Secondly answer questions of general meaning in context to the picture and also talk about the personal experiences which come to your mind upon seeing the picture.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer

- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, TangramAktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

SPANISH - IV

Course Code: **FLS 401** **Credit Units: 02**

Course learning outcomes (CLO)

At the successful completion of this course you should be able to:

1. **Identify** and **express** in Spanish vocabulary and grammar norms
2. **Interpret** different types of texts as well as cultural ideas and themes.
3. **Demonstrate** comprehension of nuance between script and sound in Spanish
4. **Narrate** clearly ideas, themes in simple standard Spanish

Course Contents:

Module I
Revision of earlier semester modules
Introduction to Present Continuous Tense (Gerunds)

Module II
Translation with Present Continuous Tense
Introduction to Gustar, Parecer, Apetecer, doler

Module III
Imperatives (positive and negative commands of regular verbs)

Module IV
Commercial/business vocabulary

Module V
Simple conversation with help of texts and vocabulary
En la recepciondelhotel
En el restaurante
En la agencia de viajes
En la tienda/supermercado

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español Sin Fronteras (Nivel – Elemental)

CHINESE – IV

Course Code: FLC 401 **CreditUnits: 02**

Course Objective:

How many characters are there? The early Qing dynasty dictionary included nearly 50,000 characters the vast majority of which were rare accumulated characters over the centuries. An educate person in China can probably recognize around 6000 characters. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I
Dialogue Practice
Observe picture and answer the question
Pronunciation and intonation
Character writing and stroke order.
Electronic items

Module II
Traveling – The Scenery is very beautiful
Weather and climate
Grammar question with – "bushi …. Ma?"
The construction "yao … le" (Used to indicate that an action is going to take place)
Time words "yiqian", "yiwai" (Before and after).
The adverb "geng".

Module III
Going to a friend house for a visit meeting his family and talking about their customs.
Fallen sick and going to the Doctor, the doctor examines, takes temperature and writes prescription.
Aspect particle "guo" shows that an action has happened some time in the past.
Progressive aspect of an actin "zhengzai" Also the use if "zhe" with it.
To welcome someone and to see off someone …. I cant go the airport to see you off… etc.

Module IV
Shipment. Is this the place to checking luggage?
Basic dialogue on – Where do u work?
Basic dialogue on – This is my address
Basic dialogue on – I understand Chinese
Basic dialogue on – What job do u do?
Basic dialogue on – What time is it now?

Module V
Basic dialogue on – What day (date) is it today?
Basic dialogue on – What is the weather like here.
Basic dialogue on – Do u like Chinese food?
Basic dialogue on – I am planning to go to China.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- "Elementary Chinese Reader, Part-2" Lesson 31-38

SOFTWARE ENGINEERING

Course Code: BCS 502 **Credit Units: 03**

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Apply their knowledge of mathematics, sciences, and computer science to the modelling, analysis, and measurement of software artefacts.
2. Analyze, specify and document software requirements for a software system.
3. Develop alternative design solutions to a given problem and recommend the best one within limitations of cost, time, knowledge, existing systems, and organizations.
4. Implement a given software design using s development practices.

Course Contents:

Module I: Introduction
Software life cycle models: Waterfall, Prototype, Evolutionary and Spiral models, Overview of Quality Standards like ISO 9001, SEI-CMM

Module II: Software Metrics and Project Planning
Size Metrics like LOC, Token Count, Function Count, Design Metrics, Data Structure Metrics, Information Flow Metrics. Cost estimation, static, Single and multivariate models, COCOMO model, Putnam Resource Allocation Model, Risk management.

Module III: Software Requirement Analysis, design and coding
Problem Analysis, Software Requirement and Specifications, Behavioural and non-behavioural requirements, Software Prototyping Cohesion & Coupling, Classification of Cohesiveness & Coupling, Function Oriented Design, Object Oriented Design, User Interface Design Top-down and bottom-up Structured programming, Information hiding,

Module IV: Software Reliability, Testing and Maintenance
Failure and Faults, Reliability Models: Basic Model, Logarithmic Poisson Model, Software process, Functional testing: Boundary value analysis, Equivalence class testing, Decision table testing, Cause effect graphing, Structural testing: path testing, Data flow and mutation testing, unit testing, integration and system testing, Debugging, Testing Tools, &Standards.Management of maintenance, Maintenance Process, Maintenance Models, Reverse Engineering, Software RE-engineering

Module V: UML
Introduction to UML,Use Case Diagrams, Class Diagram: State Diagram in UMLActivity Diagram in UMLSequence Diagram in UMLCollaboration Diagram in UML

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- K. K. Aggarwal & Yogesh Singh, "Software Engineering", 2nd Ed, New Age International, 2005.
- R. S. Pressman, "Software Engineering – A practitioner's approach", 5th Ed., McGraw Hill Int. Ed., 2001.

References:

- R. Fairley, "Software Engineering Concepts", Tata McGraw Hill, 1997.
- P. Jalote, "An Integrated approach to Software Engineering", Narosa, 1991.

- Stephen R. Schach, “Classical & Object Oriented Software Engineering”, IRWIN, 1996.
- James Peter, W. Pedrycz, “Software Engineering”, John Wiley & Sons.
- Sommerville, “Software Engineering”, Addison Wesley, 1999.

COMPUTER ARCHITECTURE

Course Code: BCS 503 **Credit Units: 03**

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Investigate the Operate logical components and relate them with the various components of computer.
2. Create the general organization of the central processing unit.
3. Apply various computer memories and system communication mechanisms.
4. Develop various parallel processing architectures.

Course Contents:

Module I: Register Transfer Language
Register Transfer, Bus and Memory Transfers, Arithmetic Micro-operations, Logic Micro-operations, Shift Micro-operations, Arithmetic Logic shift Unit.

Module II: Basic Computer Organizations and Design
Instruction Codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory-Reference Instructions, Input-Output and Interrupt, Design of Accumulator Logic. Hardwired and Microprogrammed control: Control Memory, Address Sequencing, Design of Control Unit

Module III: Central Processing Unit
Introduction, General Register Organization, Stack Organization, Instruction representation, Instruction Formats, Instruction type, Addressing Modes, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer RISC and CISC
Computer Arithmetic: Introduction, Multiplication Algorithms, Division Algorithms, Floating-Point Arithmetic Operations

Module IV: Memory and Intrasystem Communication and Input output organisation
Memory: Memory types and organization Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory, Memory Management Hardware
Intrasystem communication and I/O: Peripheral Devices, Input-Output
Controller and I/O driver, IDE for hard disk, I/O port and Bus concept, Bus cycle, Synchronous and asynchronous transfer, Interrupt handling in PC, Parallel Port, RS – 232 interface, Serial port in PC, Serial I/O interface, Universal serial bus IEEE 1394, Bus Arbitration Techniques, Uni-bus and multi-bus architectures EISA Bus, VESA Bus.

Module V: Pipelining, Vector Processing and Multiprocessors
Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processors.
Multiprocessors: Characteristics of Multiprocessors, Interconnection Structures, Interprocessor Arbitration, Interprocessor Communication and Synchronization, Advanced computer architecture, Pentium and Pentinum – Pro, Power PC Architecture

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- Morris Mano, Computer System Architecture, 3rd Edition – 1999, Prentice-Hall of India Private Limited.

- Harry & Jordan, Computer Systems Design & Architecture, Edition 2000, Addison Wesley, Delhi.

References:

- WIliam Stallings, Computer Organization and Architecture, 4th Edition-2000, Prentice-Hall of India Private Limited.
- Kai Hwang-McGraw-Hill, Advanced Computer Architecture.
- Kai Hwang & Faye a Briggs, McGrew Hill, inc., Computer Architecture & Parallel Processing.
- John D. Carpinelli, Computer system Organization & Architecture, Edition 2001, Addison Wesley, Delhi
- John P Hayes, McGraw-Hill Inc, Computer Architecture and Organization.
- M. Morris Mano and Charles, Logic and Computer Design Fundamentals, 2nd Edition Updated, Pearson Education, ASIA.
- Hamacher, "Computer Organization," McGraw hill.
- Tennenbaum," Structured Computer Organization," PHI
- B. Ram, "Computer Fundamentals architecture and organization," New age international Gear C. w., "Computer Organization and Programming, McGraw hill

JAVA PROGRAMMING

Course Code: **BCS 504** **Credit Units: 03**

Course learning outcomes (CLO)

At the successful completion of this course you should be able to:

1. Define object oriented terminology and JAVA programming concepts
2. Illustrate the role of inheritance, packages and interface to solve programming problems
3. Apply Exception handling for avoiding the run time errors
4. Apply the concept of multithreading to increase the execution speed of an application
5. Differentiate between C++ and java programming language
6. Create projects using Java programming.

Course Contents:

Module I

Concepts of OOP, Features of Java, How Java is different from C++, Data types, Control Statements, identifiers, arrays, operators. Inheritance: Multilevel hierarchy, method overriding, Abstract classes, Final classes, String Class.

Module II

Defining, Implementing, Applying Packages and Interfaces, Importing Packages. Fundamentals, Types, Uncaught Exceptions, Multiple catch Clauses, Java's Built-in Exception.

Module III

Creating, Implementing and Extending thread, thread priorities, synchronization suspending, resuming and stopping Threads, Constructors, Various Types of String Operations. Exploring Various Basic Packages of Java: Java. lang, Java. util, Java.i.o

Module IV

Event handling Mechanism, Event Model, Event Classes, Sources of Events, Event Listener Interfaces
AWT: Working with Windows, AWT Controls, Layout Managers

Module V

AppletClass, Architecture, Skeleton, Display Methods.
Swings: Japplet, Icons, labels, Text Fields, Buttons, Combo Boxes.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- JAVA The Complete Reference by Patrick Naughton & Herbert Schild, TMH
- Introduction to JAVA Programming a primar, Balaguruswamy.

References:

- "Introduction to JAVA Programming" Daniel/Young PHI
- Jeff Frentzen and Sobotka, "Java Script", Tata McGraw Hill,1999

SOFTWARE ENGINEERING LAB

Course Code: **BCS 522** **Credit Units: 01**

Software Required: Rational Rose

Assignments will be provided for the following:

- Use of Rational Rose for visual modeling.
- Creating various UML diagrams such as use case, sequence, collaboration, activity, state diagram, and class diagrams.

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

COMPUTER ARCHITECTURE LAB

Course Code: BCS 523 **Credit Units: 01**

Course Contents:

S. NO.	NAME OF EXPERIMENTS	EQUIPMENT REQUIRED
	Part – A	
1)	Design 4 bit combinational circuit shifter for left right and circular shift (using MUX).	Digital trainer kit with P/S
2)	To design a BCD adder (4 bit)	IC Name
3)	To design combinational circuit that performs following logic operations. AND, OR, XOR, NOT using MUX.	4 bit binary adder – 7483 Decoder (2 x 4) - 74139
4)	Design a 4 bit combinational circuit decrementer using 4 full adder circuit.	MUX (2 x 1) Quad – 74157
5)	Transfer of Data from different registers to a common by using MUX.	MUX (4 x 1) Dual – 74153
6)	Transfer of data from different registers to a common bus by using decoders and tristate buffers.	Register (4 bit) – 74195
7)	Verify arithmetic operations by using MUX and full adders	Bidirectional – 74194
8)	Transfer of data from one register to another register by using bus.	RAM – 7489
	Part – B **(Experiments based on PC trainer kit)**	
9)	Write a program to initialise CRT controlled and displays a pass message on screen.	AND, OR, NOT, XOR, GATE AND – 7408 OR – 7432 NOT – 7404 XOR – 7486 NAND – 7400
10)	Write a program to transmit a character and display it on a video monitor.	
11)	Write a program to initialisekey board and display a scan code of the key pressed in seven segment display.	
12)	Write a program to generate beeps of different frequencies as generated at the time of reset.	
13)	Write a program to initialise printer on a dual display cared at address O36C and print data from a specified address.	WIRE (SINGLE CORE THICK)
14)	Write a program to refresh dynamic memory of the PC and read back from the same memory.	LED'S (RED, GREEN, YELLOW) WIRE CUTTER PC TRAINER 48 channel logic state analyzer

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

JAVA PROGRAMMING LAB

Course Code: **BCS 524** **Credit Units: 01**

Software Required: JDK1.3

Assignments will be provided for the following:

- Java programs using classes & objects and various control constructs such as loops etc, and data structures such as arrays, structures and functions
- Java programs for creating Applets for display of images and texts.
- Programs related to Interfaces & Packages.
- Input/Output and random files programs in Java.
- Java programs using Event driven concept.
- Programs related to network programming.

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

INTERNSHIP - I

Course Code: BCS 550 **Credit Units: 05**

Course Objective:

The objective of this course is to provide practical training on some live projects that will increase capability to work on actual problem in industry. This training may undergo in an industrial environment or may be an in house training on some latest software which is in high demand in market. This training will be designed such that it will useful for their future employment in industry.

Examination Scheme:

Feedback from industry/work place	20
Training Report	40
Viva	15
Presentation	25
Total	**100**

Domain Elective-III : Choose any ONE from the following courses along with their corresponding labs

ADVANCED NETWORKING

Course Code: BCS506 **Credit Units: 03**

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Investigate various advanced TCP/IP protocols for computer network
2. Compare working of wired network and wireless networks.
3. Develop networking techniques to solve complex problems.
4. Create and maintain network for institute or small organizations.

Course Contents:

Module I: TCP/IP Protocol

Layered protocols, internet Addressing, mapping internet address to physical address, internet protocol, OSPF, RIP, RARP, BOOTP, DHCP, BGP, ARP, IP, Ipv6, ICMP, IGMP
Transport protocols: UDP, TCP and SNMP

Module II: Connection oriented networks

Frame relay, B-ISDN,ATM protocol stack, ATM switching, internetworking with ATM Networks, traffic management in ATM, ATM QoS

Module III: High Speed LAN
LAN Ethernet, fast Ethernet, gigabit Ethernet, FDDI, DSL, ADSL

Module IV: Wireless communication
Wireless networks, wireless channels, channel access, network architecture, IEEE 802.11, bluetooth

Module V: Network Analysis and Modeling

Queuing theory, modeling network as a graph, network management system and standard

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- High performance communication networks by: J. Walrand& Pravin Varaiya, Morgan Kaufman, 1999.
- Internetworking with TCP/IP Vol.1: Principles, Protocols, and Architecture (4th Edition) by Douglas E. Comer
- ATM networks: Concepts, Protocols, Applications by: Handel, AddisionWesseley.

- Cryptography & Networks Security Stallings, William 3rd edition

References:

- Computer networks: Tanenbaum, Andrew S, Prentice Hall
- Data communication & networking: Forouzan, B. A.
- Computer network protocol standard and interface Uyless, Black

ADVANCED NETWORKING LAB

Course Code: BCS526 **Credit Units: 01**

Equipments Required:

Switch, Network Cables, Patch Chord- Fiber optical and twisted pair cable, LAN cards, RJ-45 connectors Routers, Modem, etc.
Software required: TURBO C++
Operating System: Linux/Windows Server

Course Contents:

- Configuring Routers
- Introduction to Socket programming
- Implementation of Socket Programming
- Troubleshoot common network failures
- Gaining Access to the Routers and Switches

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

COMMUNICATION SKILLS - III

Course Code: **BCS 501** **Credit Units: 01**

Course learning outcomes (CLO)

At the successful completion of this course the student should be able to:

1.) Create right selection of words and ideas while also choosing the appropriate channel of formal communication.

2.) Demonstrate the ability to analyse a problem and devise a solution in a group.

3.) Demonstrate proficiency in the use of written communication.

4.) Recognize the mannerisms and methodology of Interview and Become more expressive in their body language.

Course Contents:

Module I
Reading Comprehension
Summarizing
Paraphrasing

Module II
Essay Writing
Dialogue Report

Module III
Writing Emails
Brochure
Leaflets

Module IV: Introduction to Phonetics
Vowels
Consonants
Accent and Rhythm
Accent Neutralization
Spoken English and Listening Practice

Examination Scheme:

Components	CT1	CT2	CAF	V	GD	GP	A
Weightage (%)	20	20	25	10	10	10	5

CAF – Communication Assessment File
GD – Group Discussion
GP – Group Presentation

Text & References:

- Effective English for Engineering Students, B Cauveri, Macmillan India
- Creative English for Communication, Krishnaswamy N, Macmillan
- A Textbook of English Phonetics, Balasubramanian T, Macmillan

BEHAVIOURAL SCIENCE - V
(GROUP DYNAMICS AND TEAM BUILDING)

Course Code: BSS 504 **CreditUnits: 01**

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Recognize their personality and individual differences and identify its importance of diversity at workplace and ways to enhance it.
2. Recognize effective socialization strategies and importance of patriotism and taking accountability of integrity.
3. Recognize different types of human rights and its importance.
4. Identify Indian values taught by different religions.
5. Identify long term goals and recognize their talent, strengths and styles to achieve them.

Course Contents:

Module I: Group formation
Definition and Characteristics
Importance of groups
Classification of groups
Stages of group formation
Benefits of group formation

Module II: Group Functions
External Conditions affecting group functioning: Authority, Structure, Org. Resources, Organizational policies etc.
Internal conditions affecting group functioning: Roles, Norms, Conformity, Status, Cohesiveness, Size, Inter group conflict.
Group Cohesiveness and Group Conflict
Adjustment in Groups

Module III: Teams
Meaning and nature of teams
External and internal factors effecting team
Building Effective Teams
Consensus Building
Collaboration

Module IV: Leadership
Meaning, Nature and Functions
Self leadership
Leadership styles in organization
Leadership in Teams

Module V: Power to empower: Individual and Teams
Meaning and Nature
Types of power
Relevance in organization and Society

Module VI:End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)

Weightage (%)	20	05	20	30	25

Text & References:

- Organizational Behaviour, Davis, K.
- Hoover, Judhith D. Effective Small Group and Team Communication, 2002,Harcourt College Publishers
- Dick, Mc Cann&Margerison, Charles: Team Management, 1992 Edition, viva books
- Bates, A. P. and Julian, J.: Sociology - Understanding Social Behaviour
- Dressers, David and Cans, Donald: The Study of Human Interaction
- Lapiere, Richard. T – Social Change
- Lindzey, G. and Borgatta, E: Sociometric Measurement in the Handbook of Social Psychology, Addison – Welsley, US.
- Rose, G.: Oxford Textbook of Public Health, Vol.4, 1985.
- LaFasto and Larson: When Teams Work Best, 2001, Response Books (Sage), New Delhi
- J William Pfeiffer (ed.) Theories and Models in Applied Behavioural Science, Vol 2, Group (1996); Pfeiffer & Company
- Smither Robert D.; The Psychology of Work and Human Performance, 1994, Harper Collins College Publishers

FRENCH - V

Course Code: **FLT 501** **Credit Units: 02**

Course learning outcomes (CLO)

At the successful completion of this course the students would be able to:
Perform communicative tasks (oral and written) like:
1. Identify and express in basic French vocabulary and grammar norms.
2. Interpret different types of texts, cultural ideas and themes.
3. Demonstrate comprehension of nuance between script and sound in French
4. Express clearly ideas, themes in simple standard French

Course Contents:

Module D: pp. 131 – 156 Unités 10,11

Contenu lexical: Unité 10: Prendre des décisions

1. Faire des comparaisons
2. décrire un lieu, le temps, les gens, l'ambiance
3. rédiger une carte postale

Unité 11: faire face aux problèmes

1. Exposer un problème.
2. parler de la santé, de la maladie
3. interdire/demander/donner uneautorisation
4. connaître la vie politique française

Contenu grammatical:

1. comparatif - comparer des qualités/ quantités/actions
2. supposition: Si + présent, futur
3. adverbe - caractériserune action
4. pronom "Y"

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- **le livre à suivre: Campus: Tome 1**

GERMAN - V

Course Code: **FLG 501** **Credit Units: 02**

Course learning outcomes (CLO)

After successful completion of the course, the students will be able to perform orally and in writing certain social functions:

1 1. Students will be able to ask and tell time.
2 2. Students will be able to frame sentences using Separable verb.
3 3. Student will be able to write and speak sentences using the modal verb.
4 4. Students will be able to frame sentences and speak using was/were/had.

Course Contents:

Module I: Genitive case
Genitive case – Explain the concept of possession in genitive
Mentioning the structure of weak nouns

Module II: Genitive prepositions
Discuss the genitive propositions and their usage: (während, wegen, statt, trotz)

Module III: Reflexive verbs
Verbs with accusative case
Verbs with dative case
Difference in usage in the two cases

Module IV: Verbs with fixed prepositions
Verbs with accusative case
Verbs with dative case
Difference in the usage of the two cases

Module V: Texts
A poem 'Maxi'
A text Rocko

Module VI: Picture Description
Firstly recognize the persons or things in the picture and identify the situation depicted in the picture;
Secondly answer questions of general meaning in context to the picture and also talk about the personal experiences which come to your mind upon seeing the picture.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, TangramAktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

SPANISH - V

Course Code: FLS 501 **Credit Units: 02**

Course Learning Outcomes:

After successful completion of the course, students will be able to perform orally and in writing certain social functions:

Students will be able to perform communicative tasks (oral and written) with proficiencies in,

a) Introduction & Usage of stem changing irregular verbs in Future tense
b) Introduction & Usage of stem changing irregular verbs in Gerundio tense
c) Telephone Conversation
d) Proposing a plan, rescheduling a plan and/or cancelling a plan
e) Comparatives
f) Introduction of Direct and Indirect Object Pronouns.
g) Usage and Familiarity with Preterito Perfecto

Course Contents:

Module I
Revision of earlier semester modules

Module II
Future Tense

Module III
Presentations in English on
Spanish speaking countries'
Culture
Sports
Food
People
Politics
Society
Geography

Module IV
Situations:
En el hospital
En la comisaria
En la estacion de autobus/tren
Enel banco/cambio

Module V
General revision of Spanish language learnt so far.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español Sin Fronteras, Greenfield

CHINESE – V

Course Code: **FLC 501** **CreditUnits: 02**

Course learning outcomes (CLO)

At the successful completion of this course, you will be able to:

1 **1. Read, write and speak approx. 100** New Chinese words and understand basic grammar points.

2 **2. Interpret** words, phrases and sentences of day today conversation related to using numbers and time words in their sentences, discussing weather, talking about directions, size quantity, right wrong & expressing mood.

3 **3. Write** Chinese characters, simple sentence and a paragraph on simple topic like 'Self Introduction' and dialogue writing on "Conversation between two friends discussing weather."

Course Contents:

Module I

Drills
Dialogue practice
Observe picture and answer the question.
Pronunciation and intonation.
Character writing and stroke order

Module II

Intonation
Chinese foods and tastes – tofu, chowmian, noodle, Beijing duck, rice, sweet, sour….etc. Learning to say phrases like – Chinese food, Western food, delicious, hot and spicy, sour, salty, tasteless, tender, nutritious, god for health, fish, shrimps, vegetables, cholesterol is not high, pizza, milk, vitamins, to be able to cook, to be used to, cook well, once a week, once a month, once a year, twice a week……
Repetition of the grammar and verbs taught in the previous module and making dialogues usingit.
Compliment of degree "de".

Module III

Grammar the complex sentence "suiran … danshi…."
Comparison – It is colder today than it was yesterday…..etc.
The Expression "chule….yiwai". (Besides)
Names of different animals.
Talking about Great Wall of China
Short stories

Module IV

Use of "huozhe" and "haishi"
Is he/she married?
Going for a film with a friend.
Having a meal at the restaurant and ordering a meal.

Module V

Shopping – Talking abut a thing you have bought, how much money you spent on it? How many kinds were there? What did you think of others?
Talking about a day in your life using compliment of degree "de". When you get up? When do you go for class? Do you sleep early or late? How is Chinese? Do you enjoy your life in the hostel?
Making up a dialogue by asking question on the year, month, day and the days of the week and answer them.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- “Elementary Chinese Reader ” Part-II Lesson 39-46

SOFTWARE TESTING AND QUALITY ASSURANCE

Course Code:BCS 602 **CreditUnits: 03**

Course learning outcomes (CLO)

At the successful completion of this course, the student should be able to:

1) Distinguish between Software quality and Quality control.
2) Explain Software testing concept and its applications.
3) Represent knowledge using various testing techniques.
4) Use the appropriate testing techniques in achieving desired goals.

Course Contents:

Module I: Introduction

Terminology; Evolving Nature of Area

Module II: V & V Limitations

Theoretical Foundations; Impracticality of Testing All data; Impracticality of Testing All Paths; No Absolute Proof of Correctness

Module III: The Role of V & V in Software Evolution

Types of Products, Requirements; Specifications, Designs, Implementations, Changes, V & V Objectives, Correctness, Consistency, Necessity, Sufficiency, Performance.

Module IV: Software V & V Approaches and their Applicability

Software Technical Reviews, Software Testing: Levels of Testing, Module, Integration, System, Regression, Testing Techniques and their Applicability, Functional Testing and Analysis, Structural Testing and Analysis, Error-Oriented Testing and Analysis, Hybrid Approaches, Integration Strategies, Transaction Flow Analysis, Stress Analysis, Failure Analysis, Concurrency Analysis, Performance Analysis, Proof of Correctness, Simulation and Prototyping, Requirements Tracing.

Module V: Software V & V Planning

Identification of V & V Goals, Selection of V & V Techniques: Requirements, Specifications, Designs, Implementations, Changes, Organizational Responsibilities, Development Organization, Independent Test Organization, Software Quality Assurance, Independent V & V Contractor, V & V Standards, Integrating V & V Approaches, Problem Tracking, Tracking Test Activities, Assessment.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- William Perry, "Effective Methods for Software Testing", John Wiley & Sons, New York, 1995.
- Louise Tamres, "Software Testing", Pearson Education Asia, 2002
- Robert V. Binder, "Testing Object-Oriented Systems-Models, Patterns and Tools", Addison Wesley, 1999.

References:

- CemKaner, Jack Falk, Nguyen Quoc, "Testing Computer Software", Second Edition, Van Nostrand Reinhold, New York, 1993.
- K.K. Aggarwal & Yogesh Singh, "Software Engineering", 2nd Ed., New Age International Publishers, New Delhi, 2005
- Boris Beizer, "Software Testing Techniques", Second Edition, Wiley-Dreamtech India, New Delhi, 2003
- Boris Beizer, "Black-Box Testing – Techniques for Functional Testing of Software and Systems", John Wiley & Sons Inc., New York, 1995.

ANALYSIS AND DESIGN OF ALGORITHM

Course Code: **BCS603** **CreditUnits: 03**

Course learning outcomes (CLO)

At the successful completion of this course you should be able to:

1. Analyse time and space complexity of the given program/algorithms.
2. Apply Divide and conquer approach to solve real world problem
3. Implement sorting on a set of given unsorted values & searching algorithms
4. To impart the knowledge Greedy Method
5. To familiarize with Dynamic programming algorithms and its applications.
6. Apply Graph data structure on real life problems
7. To learn the back tracking & Brach and bound algorithms approach.
8. Identify the class of given the algorithms using Computational Complexity

Course Contents:

Module I: Introduction

Algorithm Design paradigms - motivation, concept of algorithmic efficiency, run time analysis of algorithms, Asymptotic Notations. Recurrences- substitution method, recursion tree method, master method

Module II: Divide and conquer
Structure of divide-and-conquer algorithms: examples; Binary search, quick sort, Merge sort**,** Strassen Multiplication; Analysis of divide and conquer run time recurrence relations.
Greedy Method
Overview of the greedy paradigm examples of exact optimization solution (minimum cost spanning tree), Approximate solution (Knapsack problem), Single source shortest paths, traveling salesman

Module III: Dynamic programming
Overview, difference between dynamic programming and divide and conquer, Applications: Shortest path in graph, chain Matrix multiplication, Traveling salesman Problem, longest Common sequence, knapsack problem

Module IV: Graph searching and Traversal
Overview, Representation of graphs, strongly connected components, Traversal methods (depth first and breadth first search)
Back tracking
Overview, 8-queen problem, and Knapsack problem
Brach and bound
LC searching Bounding, FIFO branch and bound, LC branch and bound application: 0/1 Knapsack problem, Traveling Salesman Problem

Module V: Computational Complexity
Complexity measures, Polynomial Vs non-polynomial time complexity; NP-hard and NP-complete classes, examples.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- E. Horowitz, S. Sahni, and S. Rajsekaran, "Funadmentals of Computer Algorithms," Galgotia Publication
- T. H. Cormen, Leiserson, Rivest and Stein, "Introduction of Computer algorithm,"

References:

- Sara Basse, A. V. Gelder, "Computer Algorithms," Addison W
- J.E Hopcroft, J.D Ullman, "Design and analysis of algorithms"
- D. E. Knuth, " The art of Computer Program

COMPUTER ORIENTED NUMERICAL METHODS

Course Code: BIT 605 **Credit Units: 03**

Course learning outcomes (CLO)

At the successful completion of this course, the student should be able to:

CLO1. The student will know the Fundamentals of System Programming and able to understand about Machine instructions.

CLO2. The student will know the usage of Assemblers. And able to understand about compilers.

CLO3. The student has been able to understand how to link a program through linkers and how to load a program to loaders

CLO4. The student will learn about MS-Dos compiler as well as the debugging process.

CLO5. The student is aware about various types of operating systems.

Course Contents:

Module I: Solution of Algebraic and Transcendental Equation
Error, types of errors, errors in a series approximation, Bisection Method, Iteration method, Method of false position, Newton-Raphson method
Solutions of Simultaneous equation
Gauss elimination method, Jacobi iteration method, Gauss Seidal method

Module II: Interpolation
Finite Differences, Difference tables
Polynomial Interpolation**:**Newton's forward and backward formula
Central Difference Formulae: Gauss forward and backward formula.
Interpolation with unequal intervals: Lagrange's Interpolation, Newton Divided difference formula

Module III: Numerical Integration and Differentiation

Introduction, Numerical differentiation Numerical Integration: Trapezoidal rule, Simpson's 1/3 and 3/8 rules.

Module IV: Solution of differential Equations
Euler's Method, Modified Euler's Method, Taylor series Method, Runga-Kutta Methods.

Module V: Statistical Computation
Curve fitting by method of least squares, fitting of straight lines, polynomials, exponential curves etc, Data fitting with Cubic splines.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- Rajaraman V, "Computer Oriented Numerical Methods", Pearson Education
- Gerald &Whealey, "Applied Numerical Analyses", AW
- Jain, Iyengar and Jain, "Numerical Methods for Scientific and Engineering Computations", New Age Int.
- Grewal B S, "Numerical methods in Engineering and Science", Khanna Publishers, Delhi

References:

- T Veerarajan, T Ramachandran, "Theory and Problems in Numerical Methods, TMH
- Pradip Niyogi, "Numerical Analysis and Algorithms", TMH
- Francis Scheld, " Numerical Analysis", TMH
- Sastry S. S, "Introductory Methods of Numerical Analysis", Pearson Education.
- Gupta C.B., Vijay Gupta, "Introduction to Statistical Methods", Vikas Publishing.
- Goyal, M, "Computer Based Numerical and Statistical Techniques", Firewall Media, New Delhi.

MICROPROCESSORS

Course Code: BCS 604 CreditUnits: 03

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1) Obtain basic development skills for microprocessor / microcontroller applications.
2) They can Gain a detailed understanding of any system for a specific application.
3) Student are able to design a any hardware based on application.
4) To familiarize the Architecture of 8085 and 8086microprocessor.
5) To classify the types and characteristics of buses in microprocessor.
6) To analyze the features, addressing mode and programming of Intel 8085 and 8086microprocessor.

Course Contents:

Module I: Introduction to Microcomputer Systems
Introduction to Microprocessors and microcomputers, Study of 8 bit Microprocessor, 8085 pin configuration, Internal Architecture and operations,interrupts, Stacks and subroutines, various data transfer schemes.

Module II: ALP and timing diagrams

Introduction to 8085 instruction set, advance 8085 programming, Addressing modes, Counters and time Delays, Instruction cycle, machine cycle, T-states, timing diagram for 8085 instruction.

Module III: Memory System Design & I/O Interfacing

Interfacing with 8085.Interfacing with input/output devices (memory mapped, peripheral I/O), Cache memory system. Study of following peripheral devices 8255, 8253, 8257, 8255, 8251.

Module IV: Architecture of 16-Bit Microprocessor
Difference between 8085 and 8086, Block diagram and architecture of 8086 family, pin configuration of 8086, Minimum mode & Maximum mode Operation. Internal architecture of 8086, Bus Interface Unit, Register Organization, Instruction Pointer, Stack & Stack pointer, merits of memory segmentation, Execution Unit, Register Organization.

Module V: Pentium Processors
.Internal architecture of 8087, Operational overview of 8087, Introduction to 80186, 80286, 80386 & 80486 processors, Pentium processor.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- Ramesh. S. Gaonkar, "Microprocessor architecture Programming and Application with 8085" Penram International Publishing, 4th Edition
- B. Ram, "Fundamentals of microprocessors and microcomputer" Dhanpat Rai, 5th Edition.]
- Douglas V Hall.

References:

- M. Rafiquzzaman, "Microprocessor Theory and Application" PHI – 10th Indian Reprint.

- Naresh Grover, “Microprocessor comprehensive studies Architecture, Programming and Interfacing” Dhanpat Rai, 2003.
- Gosh,” 0000 to 8085” PHI.

SOFTWARE TESTING AND QUALITY ASSURANCE LAB

Course Code: **BCS622** **CreditUnits: 01**

***Practical list for software testing and quality assurance**

List of experiments:

1. Write a test case to test login window using manual testing
2. Write a test case to test triangle using manual testing
3. Write a test case to test valid mobile no using manual testing
4. Write a test case to test ATM machine no using manual testing
5. Write the script to test the “save” functionality of notepad using rational robot
6. Write the script to test “find” functionality of notepad using rational robot
7. Write the script to test “replace” functionality of notepad using rational robot
8. Write the script to test “+” functionality of window calculator using rational robot
9. Write the script to test “*” functionality of window calculator using rational robot
10. Write the script to test “%” functionality of window calculator using rational robot
11. Write the script to test “/” functionality of window calculator using rational robot
12. Write the script to test login page of window using rational robot
13. Write the script to test Date field of window using rational robot
14. Write the script to test drop drown field of window using rational robot
15. Write the script to test hyperlink of web site using rational robot

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

MICROPROCESSOR LAB

Course Code: BCS 624 **CreditUnits: 01**

Course Contents:

1. To load the numbers 49H and 53H in the memory location 9510 and 9511
2. respectively and add the contents of memory location 9601
3. To write assembly language programming for 8 bit addition with and without carry.
4. To write assembly language programming for 8 bit subtraction with and without borrow.
5. To write assembly language programming for 8 bit multiplication and division.
6. To write assembly language programming for sorting an array of numbers in ascending and descending order.
7. To write assembly language programming with additional instructions.
8. To write and execute a program using stacks.
9. To study and program the programmable peripheral interface (8255) board.
10. To study and program the programmable interval timer (8253) board.
11. To study and program the programmable DMA controller (8257) board.
12. To study and program the programmable interrupt controller (8259) board.

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

Domain Elective-III : Choose any one from the following course

ADVANCED JAVA PROGRAMMING

Course Code: **BCS 606** **Credit Units: 03**

Course learning outcomes (CLO)

At the successful completion of this course you should be able to:

1. Define object oriented terminology and JAVA programming concepts
2. Illustrate the role of inheritance, packages and interface to solve programming problems
3. Apply RMI for networking
4. Apply the concept of JSP to work with web
5. Differentiate between C++ and java programming language
6. Create projects using JSP and database connectivity.

Course Contents:

Module I
Introduction to Java RMI, RMI services, RMI client, Running client and server, Introduction of Swing, Swing Components, Look and Feel for Swing Components, Introduction to Multimedia Programming.

Module II
ODBC and JDBC Drivers, Connecting to Database with the java.sql Package, Using JDBC Terminology; Evolving Nature of Area.

Module III
Introduction to Servlets, Servlet Life Cycle, Servlet based Applications, Servlet and HTML. JSP: Introduction to JSP, JSP implicit objects, JSP based Applications, Java. Net.

Module IV

Enterprise Java Beans:-EJB roles—EJB Client-Object -container-Transaction Management—implementing a Basic EJB Object-Implementing session Beans-Implementing Entity Beans-Deploying an enterprise Java Beans Object-Changes in EJB1.1 specification.

Module V
The Model-View-Controller Architecture What is Struts, Struts Tags, Creating Beans, Other Bean Tags, Bean Output, Creating HTML Forms, The Action Form class The Action class, Simple Struts: a simple Struts application

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- Java 2 Unleashed (Techmedia – SAMS), Jamie Jaworski
- Professional Java Server Programming (a Press), Allamaraju
- Developing Java Servlets (Techmedia – SAMS), James Goodwill sing Java 1.2 Special Edition (PHI), Webber

References:

- David Flanagan,Jim Parley, William Crawford & Kris Magnusson, Java Enterprise in a nutshell - A desktop Quick reference - O'REILLY, 2003
- Stephen Ausbury and Scott R. Weiner, Developing Java Enterprise Applications, Wiley-2001
- Jaison Hunder& William Crawford, Java Servlet Programming, O'REILLY, 2002
- Dietal and Deital, "JAVA 2" PEARSON publication

ADVANCED JAVA PROGRAMMING LAB

Course Code: BCS 626 **Credit Units: 01**

Programming Language: Java

1. WAP to display label on a frame with the help of JFrame
2. WAP to display six buttons on a panel using JFrame.
3. WAP. To display an image and a string in a label on the JFrame.
4. WAP that implement a JApplet that display a simple label
5. WAP that implement a JApplet and display the following frame
   a. Customer name
   b. Customer number
   c. Age
   d. Address
6. WAP to access a table Product Master from MS-Access using Java code.
7. WAP that implement a simple servlet program.
8. WAP for authentication, which validate the login-id and password by the servlet code.
9. WAP to connecting a database using user-id and password.
10. WAP to insert data into the database using the prepared statement.
11. WAP to read data from the database using the Resulset.
12. WAP to read data send by the client (HTML page) using servlet.
13. WAP to include a HTML page into a JSP page.
14. WAP to handle the JSPException.
15. WAP to read data send by a client (HTML page) using JSP.

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

SOFTWARE PROJECT MANAGEMENT

Course Code: **Bcs 607** **Credit Units: 04**

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Apply their knowledge of mathematics and computer science to the modelling, analysis, and measurement of software artefacts.

2. Analyse, specify and document software requirements for a software system.

3. Develop alternative design solutions to a given problem and recommend the best one within limitations of cost, time, knowledge, existing systems, and organizations.

4. Implement a given software design using development practices

Course Contents:

Module I: Introduction to Software Project Management
The nature of software production; Key objectives of effective management: quality, productivity, risk reduction; role of the software project manager.

Module II: Planning the Project
Business Planning: determining objectives, forecasting demand for product, proposal writing, requirement analysis, legal issues (patent, copyright, liability, warranty);

Module III: Technical planning
Life cycle models, types of plans, plan documentation methods: PERT and CPM, Gantt charts, work breakdown structures, standards,

Module IV: Planning for risk management and control
Entry and exit criteria, intermediate checkpoints, performance prediction and analysis people, prototyping and modeling, inspections and reviews, process and process assessment, development methods, metrics, configuration management, testing and quality assurance, capacity planning, estimating - what it takes to do the job: cost (direct and indirect), resources, time, size and complexity of product risk determination, role of requirements and design in estimating, financial planning-budgeting, resource allocation, organizational considerations (teams, hierarchies, etc), technology, human factors and usability, tools and environments, transition of product to the user.

Module V: Managing and Evaluating the Project
Managing the task: project control, managing the plan, reviews, feedback and reporting mechanisms, configuration management, quality control and quality assurance, managing change, readjusting goals and milestones, risk management, testing phases, formalized support activities; Managing the team: Team organizations, recruiting and staffing-picking the right people, technical leadership, avoiding obsolescence-training etc.; Managing the context: Communication skill, decision theory, business management, assessing the organization?s ability to perform the process, probability and statistics; Managing product support and maintenance, Evaluation of the project.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- Tom Demarco, Controlling Software Project Management, Measurement, Prentice Hall, New Jersey.

References:

- Tom Glib, Finzi Susannah, Principles of Software Engineering Management, Addison Wesley, England.
- Bob Hughes and Mike Cotterell; Software Project Management, third edition, Tata McGraw Hill Publishing Company Ltd., New Delhi.
- Pankaj Jalote; Software Project Management in Practice, Pearson Education Asia.
- Watts S. Humphrey; Winning with Software? An Executive Strategy, Pearson Education Asia.
- Philip Metzger, Managing a Programming Project, Prentice Hall, New Jersey.

SOFTWARE PROJECT MANAGEMENT LAB

Course Code: Bcs 627 **Credit Units: 01**

Course Contents:

Implementation of software project management concepts using tools like MS Project, Rational Requisite Pro, Purify, etc., selected case studies.

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

CLOUD COMPUTING

Course Code: **BCS 608** **CreditUnits**: **03**

Course learning outcomes (CLO)

1. Students will be able to identify the role of Cloud Computing. To understand the working of current cloud technology trends.
2. Students will be able to analyse and understand cloud computing concepts and opportunities related with the cloud.
3. Students will be able to describe the role of network-based systems, distributed and cloud computing and virtualization.
4. Students will be able to understand description of virtual cluster-based systems and virtualization for data center automation.
5. Students will be able to create cloud-based systems with MS-Azure, Amazon-AWS, Google-GCP and configure the virtualization over there.

Course Contents:

Module I: Systems Modeling, Clustering and virtualization:
Scalable Computing over the Internet, Technologies for Network based systems, System models for Distributed and Cloud Computing, Software environments for distributed systems and clouds, Performance, Security and Energy Efficiency

Module II: Virtual Machines and Virtualization of Clusters and Data Centers:
Implementation Levels of Virtualization, Virtualization Structures/ Tools and mechanisms, Virtualization of CPU, Memory and I/O Devices, Virtual Clusters and Resource Management, Virtualization for Data Center Automation.

Module III: Cloud Platform Architecture:
Cloud Computing and service Models, Architectural Design of Compute and Storage Clouds, Public Cloud Platforms, Inter Cloud Resource Management, Cloud Security and Trust Management. Service Oriented Architecture, Message Oriented Middleware.

Module IV: Cloud Programming and Software Environments:
Features of Cloud and Grid Platforms, Parallel & Distributed Programming Paradigms, Programming Support of Google App Engine, Programming on Amazon AWS and Microsoft Azure, Emerging Cloud Software Environments.

Module V: Cloud Resource Management and Scheduling:
Policies and Mechanisms for Resource Management Applications of Control Theory to Task Scheduling on a Cloud, Stability of a Two Level Resource Allocation Architecture, Feedback Control Based on Dynamic Thresholds. Coordination of Specialized Autonomic Performance Managers, Resource Bundling, Scheduling Algorithms for Computing Clouds, Fair Queuing, Start Time Fair Queuing, Borrowed Virtual Time, Cloud Scheduling Subject to Deadlines, Scheduling MapReduce Applications Subject to Deadlines.

Module VI: Storage Systems:
Evolution of storage technology, storage models, file systems and database, distributed file systems, general parallel file systems. Google file system., Apache Hadoop, BigTable, Megastore, Amazon Simple Storage Service(S3)

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- Distributed and Cloud Computing, Kai Hwang, Geoffry C. Fox, Jack J. DongarraMK Elsevier.
- Cloud Computing, Theory and Practice, Dan C Marinescu, MK Elsevier.
- Cloud Computing, A Hands on approach, ArshadeepBahga, Vijay Madisetti, University Press

References:

- Cloud Computing, A Practical Approach, Anthony T Velte, Toby J Velte, Robert Elsenpeter, TMH

Mastering Cloud Computing, Foundations and Application Programming, Raj Kumar Buyya, Christenvecctiola, S Tammaraiselvi, TMH

COMMUNICATION SKILLS - IV

Course Code: BCS 601 **Credit Units: 01**

Course learning outcomes (CLO)

At the successful completion of this course the student should be able to:

1. Demonstrate professional attitude needed for interview preparedness, power dressing, and respectful self orientation.
2. Showcase their leadership skills with effective team work.
3. Outline the basic etiquettes in expressing their credentials for professional and HR setup

Course Contents:

Module I: Business/Technical Language Development
Advanced Grammar: Syntax, Tenses, Voices
Advanced Vocabulary skills: Jargons, Terminology, Colloquialism
Individualised pronunciation practice

Module II: Social Communication
Building relationships through Communication
Communication, Culture and Context
Entertainment and Communication
Informal business/ Technical Communication

Module III: Business Communication
Reading Business/ Technical press
Listening to Business/ Technical reports (TV, radio)
Researching for Business /Technology

Module IV: Presentations
Planning and getting started
Design and layoutof presentation
Information Packaging
Making the Presentation

Examination Scheme:

Components	CT1	CT2	CAF	V	GD	GP	A
Weightage (%)	20	20	25	10	10	10	5

CAF – Communication Assessment File
GD – Group Discussion
GP – Group Presentation

Text & References:

- Business Vocabulary in Use: Advanced Mascull, Cambridge
- Business Communication, Raman – Prakash, Oxford
- Business Communications, Rodgers, Cambridge
- Working in English, Jones, Cambridge
- New International Business English, Jones/Alexander, Cambridge

BEHAVIOURAL SCIENCE – VI
(STRESS AND COPING STRATEGIES)

Course Code: BSS 604 **CreditUnits: 01**

Course learning outcomes (CLO)

At the successful completion of this course you (the student) would be able to:

1. Identify stress and that an individual come across.
2. Recognize the causes of stress in their lives.
3. Analyse symptoms and how they are affecting lives.
4. Create ways to effectively cope with it.

Course Contents:

Module I: Stress
Meaning & Nature
Characteristics
Types of stress
Module II: Stages and Models of Stress
Stages of stress
The physiology of stress
Stimulus-oriented approach.
Response-oriented approach.
The transactional and interact ional model.
Pressure – environment fit model of stress.
Module III: Causes and symptoms of stress
Personal
Organizational
Environmental
Module IV: Consequences of stress
Effect on behaviour and personality
Effect of stress on performance
Individual and Organizational consequences with special focus on health

Module V: Strategies for stress management
Importance of stress management
Healthy and Unhealthy strategies
Peer group and social support
Happiness and well-being

Module VI: End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

- Blonna, Richard; Coping with Stress in a Changing World: Second edition
- Pestonjee, D.M, Pareek, Udai, Agarwal Rita; Studies in Stress And its Management
- Pestonjee, D.M.; Stress and Coping: The Indian Experience
- Clegg, Brian; Instant Stress Management – Bring calm to your life now

FRENCH - VI

Course Code: FLT 601 **Credit Units: 02**

Course Objective:

To strengthen the language of the students both in oral and written so that they can:
i) express their sentiments, emotions and opinions, reacting to information, situations;
ii) narrate incidents, events;
iii) perform certain simple communicative tasks.

Course Contents:

Module D: pp. 157 – 168 – Unité 12

Unité 12: s'évader

1. présenter, caractériser, définir
2. parler de livres, de lectures
3. préparer et organiser un voyage
4. exprimer des sentiments et des opinions
5. téléphoner
6. faire une réservation

Contenu grammatical:

1. proposition relative avec pronom relatif "qui", "que", "où" - pour caractériser
2. faire + verbe

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- le livre à suivre: Campus: Tome 1

GERMAN - VI

Course Code: FLG 601 **Credit Units: 02**

Course learning outcomes (CLO)

After successful completion of the course, the students will be able to perform orally and in writing certain social functions:

1 understand and give instructions
2 understand and reply to a letter
3 speak about learning languages
4 find a particular information in a text

Course Contents:

Module I: Adjective endings
Adjective endings in all the four cases discussed so far
Definite and indefinite articles
Cases without article

Module II: Comparative adverbs
Comparative adverbs as and like

Module III: Compound words
To learn the structure of compound words and the correct article which they take
Exploring the possibility of compound words in German

Module IV: Infinitive sentence
Special usage of 'to' sentences called zu+ infinitive sentences

Module V: Texts
A Dialogue: 'Ein schwieriger Gast'
A text: 'Abgeschlossene Vergangenheit'

Module VI: Comprehension texts
Reading and comprehending various texts to consolidate the usage of the constructions learnt so far in this semester.

Module VII: Picture Description
Firstly recognize the persons or things in the picture and identify the situation depicted in the picture;
Secondly answer questions of general meaning in context to the picture and also talk about the personal experiences which come to your mind upon seeing the picture.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, TangramAktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

SPANISH – VI

Course Code: **FLS 601** **Credit Units: 02**

Course learning outcomes (CLO)

At the successful completion of this course you should be able to:

1 **Identify** and **express** in Spanish vocabulary and grammar norms
2 **Interpret** different types of texts as well as cultural ideas and themes.
3 **Demonstrate** comprehension of nuance between script and sound in Spanish
4 **Narrate** clearly ideas, themes in simple standard Spanish

Course Contents:

Module I
Revision of the earlier modules

Module II
Present Perfect Tense

Module III
Commands of irregular verbs

Module IV
Expressions with **Tener que** and **Hay que**

Module V
En la embajada
Emergency situations like fire, illness, accident, theft

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español, EnDirecto I A
- Español Sin Fronteras

CHINESE – VI

Course Code: **FLC 601** **Credit Units: 02**

Course learning outcomes (CLO)

At the successful completion of this course you should be able to:

At the successful completion of this course, you will be able to:

1 **Read, write and speak approx. 100** New Chinese words and understand basic grammar points.

2 **Interpret** words, phrases and sentences of day today conversation related to colour, shopping, transportation, medical care, Sports and entertainment etc

3 **Write** Chinese characters, simple sentence and a paragraph on simple topic like colour, shopping, transportation, medical care, Sports and entertainment etc.

4. **Communicate** with Chinese speaking people using words, phrases and sentences related to colour, shopping, transportation, medical care, Sports and entertainment etc

Course Contents:

Module I

Drills
Dialogue practice
Observe picture and answer the question.
Pronunciation and intonation.
Character writing and stroke order.

Module II

Going out to see a science exhibition
Going to the theatre.
Train or Plane is behind schedule.
Indian Economy-Chinese Economy
Talking about different Seasons of the Year and Weather conditions. Learning to say phrases like-spring, summer, fall, winter, fairly hot, very cold, very humid, very stuffy, neither hot nor cold, most comfortable, pleasant …. etc.

Module III

Temperature – how to say – What is the temperature in May here?How is the weather in summer in your area?
Around 30 degrees
Heating, air-conditioning
Is winter is Shanghai very cold?
Talking about birthdays and where you were born?
The verb "shuo" (speak) saying useful phrases like speak very well, do not speak very well, if speak slowly then understand if speak fast then don't understand, difficult to speak, difficult to write, speak too fast, speak too slow, listen and can understand, listen and cannot understand … etc.
Tell the following in Chinese – My name is …. I was born in … (year). My birthday is …… Today is … (date and day of the week). I go to work (school) everyday. I usually leave home at . (O'clock). In the evening, I usually ……. (do what)? At week end, I ……. On Sundays I usually …… It is today….. It will soon be my younger sisters birthday. She was born in ….. (year). She lives in ……. (where). She is working (or studying)…… where… She lives in …….. (where.)

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Elementary Chinese Reader Part-2, 3; Lesson 47-54

INTERNET OF THINGS

Course Code: **BIT 701** **CreditUnits: 03**

INTERNET OF THINGSLAB

Course Code: **BIT 721** **CreditUnits: 01**

INFORMATION STORAGE AND MANAGEMENT

Course Code: BCS 703 **Credit Units: 03**

Course learning outcomes (CLO)

At the end of this course the students will be able to

1 Describe the challenges found in today's complex information management environment

2 Describe storage technology solutions (such as DAS, NAS, SAN and Virtualization technologies)

3 Explain the key business drivers for storage: Information Availability and Business Continuity

4 Illustrate common storage management roles and responsibilities

5 Describe the processes and technologies for identifying, analyzing security risks in storage infrastructure

Course Contents:

Module I: Introduction to Storage Technology

Data proliferation and the varying value of data with time & usage, Sources of data and states of data creation, Data center requirements and evolution to accommodate storage needs

Overview of basic storage management skills and activities, The five pillars of technology, Overview of storage infrastructure components, Evolution of storage, Information Lifecycle Management concept, Data categorization within an enterprise, Storage and Regulations

Module II: Storage Systems Architecture

Intelligent disk subsystems overview, Contrast of integrated vs. modular arrays, Component architecture of intelligent disk subsystems, Disk physical structure- components, properties, performance, and specifications, Logical partitioning of disks, RAID & parity algorithms, hot sparing, Physical vs. logical disk organization, protection, and back end management, Array caching properties and algorithms, Front end connectivity and queuing properties, Front end to host storage provisioning, mapping, and operation, Interaction of file systems with storage, Storage system connectivity protocols

Module III: Introduction to Networked Storage

JBOD, DAS, SAN, NAS, & CAS evolution, Direct Attached Storage (DAS) environments: elements, connectivity, & management

Storage Area Networks (SAN): elements & connectivity, Fibre Channel principales, standards, & network management principles, SAN management principles

Network Attached Storage (NAS): elements, connectivity options, connectivity protocols (NFS, CIFS, ftp), & management principles, IP SAN elements, standards (iSCSI, FCIP, iFCP), connectivity principles, security, and management principles,

Content Addressable Storage (CAS): elements, connectivity options, standards, and management principles, Hybrid Storage solutions overview including technologies like virtualization & appliances.

Module IV: Introduction to Information Availability

Business Continuity and Disaster Recovery Basics, Local business continuity techniques, Remote business continuity techniques, Disaster Recovery principles & techniques

Module V: Managing & Monitoring

Management philosophies (holistic vs. system & component), Industry management standards (SNMP, SMI-S, CIM), Standard framework applications, Key management metrics (thresholds, availability, capacity, security, performance), Metric analysis methodologies & trend analysis, Reactive and pro-active management best practices, Provisioning & configuration change planning, Problem reporting, prioritization, and handling techniques, Management tools overview

Module VI: Security & Virtualization

Storage Security (Importance of Information security, elements and attributes of security), Developing a storage security model (Restricting Access Path, Vulnerability Management, Understanding Vulnerabilities), Securing Data Storage (Storage Security domains, Risk assessment Methodology, Security elements, threats against applications, Controlling user access to data, threats again backup, recovery and archive)

Virtualization (Define virtualization, types of virtualization), Storage Virtualization (Storage functionality, Virtual storage, Comparison of virtualization architectures, challenges of storage virtualization), Block level virtualization, File level virtualization.

Case Studies and Labs on the Simulator

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- Information Storage and Management, Wiley Publication ISBN: 978-81-265-2147-0

References:

- Marc Farley Osborne, "Building Storage Networks", Tata McGraw Hill
- Robert Spalding, "Storage Networks: The Complete Reference", Tata McGraw Hill

Internship – II (Evaluation)

Course Code: BCS 750 **CreditUnits: 04**

Course Objective:

The objective of this course is to provide practical training on some live projects that will increase capability to work on actual problem in industry. This training may undergo in an industrial environment or may be an in house training on some latest software which is in high demand in market. This training will be designed such that it will useful for their future employment in industry.

Examination Scheme:

Feedback from industry/work place	20
Training Report	40
Viva	15
Presentation	25
Total	**100**

Domain Elective-V : Choose any ONE from the following courses along with their corresponding labs

ARTIFICIAL INTELLIGENCE

Course Code: BCS 702 **CreditUnits: 03**

Course Learning Outcome:

To develop semantic-based and context-aware systems to acquire, organize process, share and use the knowledge embedded in multimedia content. Research will aim to maximize automation of the complete knowledge lifecycle and achieve semantic interoperability between Web resources and services. The field of Robotics is a multi disciplinary as robots are amazingly complex system comprising mechanical, electrical, electronic H/W and S/W and issues germane to all these.

Course Contents:

Module I: Problem solving and Scope of AI
Introduction to Artificial Intelligence. Applications- Games, theorem proving, natural language processing, vision and speech processing, robotics, expert systems. AI techniques- search knowledge, abstraction.
Problem Solving
State space search; Production systems, search space control: depth-first, breadth-first search. Heuristic search - Hill climbing, best-first search, branch and bound. Problem Reduction, Constraint Satisfaction End, Means-End Analysis.

Module II: Knowledge Representation
Knowledge Representation issues, first order predicate calculus, Horn Clauses, Resolution, Semantic Nets, Frames, Partitioned Nets, Procedural Vs Declarative knowledge, Forward Vs Backward Reasoning.

Module III: Understanding Natural Languages
Introduction to NLP, Basics of Syntactic Processing, Basics of Semantic Analysis, Basics of Parsing techniques, context free and transformational grammars, transition nets, augmented transition nets, Shanks Conceptual Dependency, Scripts, Basics of grammar free analyzers, Basics of sentence generation, and Basics of translation.

Module IV
Expert System: Need and justification for expert systems, knowledge acquisition, Case studies: MYCIN, RI.
Learning: Concept of learning, learning automation, genetic algorithm, learning by inductions, neural nets.
Programming Language: Introduction to programming Language, LISP and PROLOG.
Handling Uncertainties: Non-monotonic reasoning, Probabilistic reasoning, use of certainty factors, Fuzzy logic.

Module V: Introduction to Robotics
Fundamentals of Robotics, Robot Kinematics: Position Analysis, Dynamic Analysis and Forces, Trajectory Planning, Sensors and vision system.
Robot Programming languages & systems: Introduction, the three levels of robot programming, requirements of a robot programming language, problems peculiar to robot programming languages.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- E. Rich and K. Knight, "Artificial intelligence", TMH, 2nd ed., 1992.
- N.J. Nilsson, "Principles of AI", Narosa Publ. House, 1990.
- John J. Craig, "Introduction to Robotics", Addison Wesley publication
- Richard D. Klafter, Thomas A. Chmielewski, Michael Negin, "Robotic Engineering – An integrated approach", PHI Publication
- Tsuneo Yoshikawa, "Foundations of Robotics", PHI Publication

References:

- D.W. Patterson, “Introduction to AI and Expert Systems”, PHI, 1992.
- Peter Jackson, “Introduction to Expert Systems”, AWP, M.A., 1992.
- R.J. Schalkoff, “Artificial Intelligence - an Engineering Approach”, McGraw Hill Int. Ed., Singapore, 1992.
- M. Sasikumar, S. Ramani, “Rule Based Expert Systems”, Narosa Publishing House, 1994.

ARTIFICIAL INTELLIGENCE LAB

Course Code: BCS 721 **CreditUnits: 01**

Course Contents:

Assignments will be provided for the following:

- Programming in LISP
- Programming in Prolog
- Programming for Robotics

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

OPERATIONAL RESEARCH

Course Code: BIT 702 Credit Units: 03

Course Objective:

In a rapidly changing environment an understanding is sought which will facilitate the choice and the implementation of more effective solutions, which, typically, may involve complex interactions among people, materials and money. Organizations may seek a very wide range of operational improvements - for example, greater efficiency, better customer service, higher quality or lower cost. Whatever the business, engineering aim, Operation Research can offer the flexibility and adaptability to provide objective help. This course introduces students to the principles of operational research.

Course Contents:

Module I: Linear Programming
Formulation of problem. Graphical and simplex method for maximization and minimization. Duality theory and sensitivity analysis

Module II:Transportation Models
Stepping stone algorithm, MODI method and Vogel's Approximation Method (VAM) for selfing balanced, unbalanced transportation problems and problems of degeneracy and maximization.

Module III:Assignment Models
Assignment model for maximization and traveling salesman problems, Industrial Problems

Module IV:Queuing Theory
Basic structured, Terminology, classification. Birth and death process. Sequencing: Processing in jobs through machines with the same processing order. Processing of 2 jobs through machines with each having different processing order.

Module V:Network Models
Introduction to PERT and CPM. Fundamental concept of Network models and construction of network diagrams. PERT activity, time estimate. Critical path and project time duration. Probability of completing the project on or before specified time. Float of a activity.

Module VI: Games Theory
Zero Sum two person competitive games, Minimax and maximini principle Arithmetic, algebraic, matrix algebra method,. Solution by dominance, sub game, Graphical and linear programming method.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

- HM Wagner, Principles of Operations Research, Prentice Hall
- Heizer, J. & Render B., Operations Management, Pearson Education (8/e), 2006
- PK Gupta and DS Hira, Operations Research, S. Chand & Co.
- Taha, Introduction to Operation Research
- F.S. Hiller and G.I. Libermann, Introduction to Operation Research, Holden Ray.

OPERATIONS RESEARCH (PROGRAMMING) LAB

Course Code: BIT 722 **Credit Units: 01**

Course Contents:

1. Program on C or C++ for Linear Programming.
2. Program on C or C++ for Simplex Problem.
3. Program on C or C++ for Assignment Problem.
4. Program on C or C++ for Transportation Problem.
5. Program on C or C++ for PART, CPM Problem.
6. Program on C or C++ for Sequencing Problem.

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

PROGRAMMING WITH ASP .NET

Course Code: **BCS 705** **CreditUnits: 03**

Course learning outcomes (CLO)

At the successful completion of this course you should be able to:

1. Define object oriented terminology and C# programming concepts
2. Illustrate the role of inheritance, packages and interface to solve programming problems
3. Apply Exception handling for avoiding the run time errors
4. Apply the concept of multithreading to increase the execution speed of an application
5. Differentiate between C# and java programming language
6. Create projects using ASP.NET programming.

Course Contents:

Module I: Introduction to .NET technologies
Features of .NET, .NET Framework, CLR, MSIL, .NET class library, .NET Languages, CTS, assemblies, manifest, and metadata, What is ASP.NET?, Difference between ASP and ASP.NET.

Module II: Controls in ASP.NET
Overview of Dynamic Web page, Understanding ASP.NET Controls, Applications, Web servers, Installation of IIS. Web forms, web form controls -server controls, client controls. Adding controls to a web form, Buttons, Text Box, Labels, Checkbox, Radio Buttons, List Box. Adding controls at runtime. Running a web Application, creating a multiform web project. Form Validation: Client side validation, server Side validation, validation Controls: Required Field Comparison Range. Calendarcontrol, Ad rotator Control, Internet Explorer Control.

Module III: Overview of ADO.NET and XML
What is ADO.NET, from ADO to ADO.NET. ADO.NET architecture, Accessing Data using Data Adapters and Datasets, using Command & Data Reader, binding data to data bind Controls, displaying data in data grid, XML basics, attributes, fundamental XML classes: Document, text writer, text reader. XML validations, XML in ADO.NET, The XML Data Document.

Module IV: ASP.NET Applications
Creating, tracking, caching, error handling, Securing ASP.NET applications- form based applications, window based application.

Module V: Web services
Introduction, State management- View state, Session state, Application state, Building ASP.NET web services, working with ASP.NET applications, creating custom controls.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- ASP.NET Unleashed by Stephen Walther, SAMS publications

References:

- ASP.NET, Wrox Publications
- ASP.NET and VB.NET, Wrox Publication
- ASP.NET and C#.NET, Wrox publication.

PROGRAMMING WITH ASP.NET LAB

Course Code: **BCS 725** **Credit Units: 01**

Course Contents:

- Use of Controls in creating web pages
- Creating sessions
- Creating Custom controls
- Implementing security

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

MOBILE COMPUTING

Course Code: BCS 706 **Credit Units: 04**

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1 1. Investigate various advanced wireless protocols for mobile communication.
2 2. Compare working of wired network and wireless networks.
3 3. Develop networking techniques to solve complex problems.
4 4. Create and maintain network used in wireless condition.

Course Contents:

Module I:Introduction to Personal Communications Services (PCS)
PCS Architecture, Mobility management, Networks signaling.
Global System for Mobile Communication (GSM) system overview: GSM Architecture, Mobility management, Network signaling.

Module II: General Packet Radio Services (GPRS) &Wireless Application Protocol (WAP)
GPRS Architecture, GPRS Network Nodes.
Mobile Data Communication: WLANs (Wireless LANs) IEEE 802.11 standard, Mobile IP.
Wireless Application Protocol (WAP): The Mobile Internet standard, WAP Gateway and Protocols, wireless mark up Languages (WML).

Module III:Third Generation (3G) Mobile Services
Introduction to International Mobile Telecommunications 2000 (IMT 2000) vision, Wideband Code Division Multiple Access (W-CDMA), and CDMA 2000, Quality of services in 3G.
Wireless Local Loop(WLL): Introduction to WLL Architecture, wireless Local Loop Technologies.

Module IV: Global Mobile Satellite Systems
Global Mobile Satellite Systems; case studies of the IRIDIUM and GLOBALSTAR systems.
Wireless

Module V:Enterprise Networks
Introduction to Virtual Networks, Blue tooth technology, Blue tooth Protocols. Advanced techniques in mobile computing.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- "Wireless and Mobile Networks Architectures", by Yi-Bing Lin &ImrichChlamtac, John Wiley & Sons, 2001.
- "Mobile and Personal Communication systems and services", by Raj Pandya, Prentice Hall of India, 2001.

References:

- "Guide to Designing and Implementing wireless LANs", by Mark Ciampa, Thomson learning, Vikas Publishing House, 2001.
- "Wireless Web Development", Ray Rischpater, Springer Publishing, 2000.
- "The Wireless Application Protocol", by Sandeep Singhal, Pearson Education Asia, 2000.
- "Third Generation Mobile Telecommunication systems", by P.Stavronlakis, Springer Publishers, 2001.

DATA WAREHOUSING AND DATA MINING

Course Code: **BCS 707** **Credit Units: 03**

Course learning outcomes (CLO)

1. Understand what data mining is and how data mining can be employed and applied to solve real problems.
2. Recognize wither a data mining solution is feasible alternative for a specific problem.
3. Apply basic statistical to evaluate the results of data mining models.
4. Develop a comprehensive understanding of how several data mining techniques can be applied to solve problems.

Course Contents:

Module I: Data Warehousing
An Introduction to data ware housing and characteristics of a data warehouse, various aspects of data marts. Data warehouse logical design: star schemas, fact tables, dimensions, other schemas, materialized, views, Data warehouse physical design: hardware and i/o considerations, parallelism, indexes.

Module II: On Line Analytical processing
OLTP and OLAP systems, Data Modelling, OLAP Tools, web OLAP, Decision support system.Developing a Data Ware house: Architectural strategies and Organization Issues, Design Considerations, Tools for Data Warehousing,

Module III: Data Mining
Data mining approaches and methods: concept description, classification, association rules, clustering, Mining complex types of data, Research trends in data warehousing and data mining. Objectives of Data Mining the Technical context for Data Mining, machine learning, decision support and computer technology.

Module IV: Data Mining Techniques and Algorithms
Process of data mining, Algorithms, Data base segmentation or clustering, predictive Modelling, Link Analysis, Data Mining Techniques, Automatic Cluster Detection, Decision trees and Neural Networks.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- "Mastering Data Mining: The Art and Science of Customer Relationship Management", by Berry and Lin off, John Wiley and Sons, 2001.
- "Data Ware housing: Concepts, Techniques, Products and Applications", by C.S.R. Prabhu, Prentice Hall of India, 2001.

References:

- "Data Mining: Concepts and Techniques", J.Han, M.Kamber, Academic Press, Morgan Kanf man Publishers, 2001.
- "Data Mining", by Pieter Adrians, DolfZantinge, Addison Wesley,2000.
- "Data Mining with Microsoft SQL Server", by Seidman, Prentice Hall of India,2001.

Course Code: BCS 727 **CreditUnits: 01**

Course Contents:

Software Required: Informatica Tool, Cognos, Todd.

Assignments:

1. Write a program to implement text mining.
2. Write a program to implement web mining.
3. Write a program to develop snowflake schema.
4. Write a program to develop the tree schema with the help of binary tree.
5. Write a program to implement BFS and DFS with respect to 2-D modeling.
6. Write a program to implement the basic step of informatics tool.
7. Write a Program to implement the K-means algorithm
8. Write a Program to implement PAM K-medoids algorithm
9. Write a Program to implement AGNES hierarchical clustering
10. Do the compare between K-Means, K-Medoid, hierarchical clustering Results

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

COMMUNICATION SKILLS - V

Course Code: **BCS 701** **Credit Units: 01**

Course learning outcomes (CLO)

At the successful completion of this course students should be able to:

1. Investigate their personal strengths and insights to be revealed in a Formal Setup of Communication.
2. Create right selection of words and ideas while choosing the appropriate channel of formal communication
3. Apply acquired knowledge with the appropriate selection of channel of formal communication.

Course Contents:

Module I
Introduction to Public Speaking
Business Conversation
Effective Public Speaking
Art of Persuasion

Module II: Speaking for Employment
Types of Interview
Styles of Interview
Facing Interviews-Fundamentals and Practice Session
Conducting Interviews- Fundamentals and Practice Session
Question Answer on Various Dimensions

Module III
Resume Writing
Covering Letters
Interview Follow Up Letters

Module IV: Basic Telephony Skills
Guidelines for Making a Call
Guidelines for Answering a Call

Module V: Work Place Speaking
Negotiations
Participation in Meetings
Keynote Speeches

Examination Scheme:

Components	CT1	CT2	CAF	V	GD	GP	A
Weightage (%)	20	20	25	10	10	10	5

CAF – Communication Assessment File
GD – Group Discussion
GP – Group Presentation

Text & References:

- Jermy Comfort, Speaking Effectively, et.al, Cambridge
- Krishnaswamy, N, Creative English for Communication, Macmillan
- Raman Prakash, Business Communication, Oxford.
- Taylor, Conversation in Practice,

BEHAVIOURAL SCIENCE - VII
(INDIVIDUAL, SOCIETY AND NATION)

Course Code: BSS 704 **Credit Units: 01**

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Recognize their personality and individual differences and identify its importance of diversity at workplace and ways to enhance it.
2. Recognize effective socialization strategies and importance of patriotism and taking accountability of integrity.
3. Recognize different types of human rights and its importance.
4. Identify Indian values taught by different religions.
5. Identify long term goals and recognize their talent, strengths and styles to achieve them.

Course Contents:

Module I: Individual differences& Personality

Personality: Definition& Relevance
Importance of nature & nurture in Personality Development
Importance and Recognition of Individual differences in Personality
Accepting and Managing Individual differences (adjustment mechanisms)
Intuition, Jugement, Perception & Sensation (MBTI)
BIG5 Factors

Module II: Managing Diversity
Defining Diversity
Affirmation Action and Managing Diversity
Increasing Diversity in Work Force
Barriers and Challenges in Managing Diversity

Module III: Socialization
Nature of Socialization
Social Interaction
Interaction of Socialization Process
Contributions to Society and Nation

Module IV: Patriotism and National Pride
Sense of pride and patriotism
Importance of discipline and hard work
Integrity and accountability

Module V: Human Rights, Values and Ethics
Meaning and Importance of human rights
Human rights awareness
Values and Ethics- Learning based on project work on Scriptures like- Ramayana, Mahabharata, Gita etc.

Module VI: End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

Davis, K. Organizational Behaviour,
Bates, A. P. and Julian, J.: Sociology - Understanding Social Behaviour
Dressler, David and Cans, Donald: The Study of Human Interaction
Lapiere, Richard. T – Social Change
Lindzey, G. and Borgatta, E: Sociometric Measurement in the Handbook of Social Psychology, Addison – Welsley, US.Rose, G.: Oxford Textbook of Public Health, Vol.4, 1985.
Robbins O.B. Stephen; OrganizationalBehaviour

FRENCH - VII

Course Code: **FLT 701** **CreditUnits: 02**

Course learning outcomes (CLO)

At the successful completion of this course the students would be able to:
Perform communicative tasks (oral and written) like:
1. Identify and express in French vocabulary and grammar norms
2. Interpret different types of texts as well as cultural ideas and themes.
3. Demonstrate comprehension of nuance between script and sound in French
4. Narrate clearly ideas, themes in simple standard French

Course Contents:

Module A: Unités 1 – 3: pp. 06 - 46

Contenu lexical :

Unité 1: Rédiger et présenter son curriculum vitae
Exprimer une opinion
Caractériser, mettre en valeur
Parler des rencontres, des lieux, des gens

Unité 2: Imaginer - Faire des projets
Proposer - conseiller
Parler des qualités et des défauts
Faire une demande écrite
Raconter une anecdote
Améliorer son image

Unité 3: Exprimer la volonté et l'obligation
Formuler des souhaits
Exprimer un manque/un besoin
Parler de l'environnement, des animaux, des catastrophes naturelles

Contenu grammatical :

Le passé : passé composé/imparfait
Pronoms compléments directs/indirects, y/en (idées/choses)
Propositons relatives introduites par qui, que, où
Comparatif et superlatif
Le conditionnel présent
Situer dans le temps
Féminin des adjectifs
La prise de paroles : expressions
Le subjonctif : volonté, obligation

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- **le livre à suivre: Campus: Tome 2**

GERMAN - VII

Course Code: FLG 701 **Credit Units: 02**

Course Objective:

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.
To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany
Introduction to Advanced Grammar and Business Language and Professional Jargon

Course Contents:

Module I: Dass- Sätze
Explain the use of the conjunction "-that", where verb comes at the end of the sentence

Module II: IndirekteFragesätze
To explain the usage of the "Question Pronoun" as the Relative Pronoun in a Relative Sentence, where again the verb falls in the last place in that sentence.

Module III: Wenn- Sätze
Equivalent to the conditional "If-" sentence in English. Explain that the verb comes at the end of the sentence.

Module IV: Weil- Sätze
Explain the use of the conjunction "because-" and also tell that the verb falls in the last place in the sentence.

Module V: Comprehension texts
Reading and comprehending various texts to consolidate the usage of the constructions learnt so far in this semester.

Module VI: Picture Description
Firstly recognize the persons or things in the picture and identify the situation depicted in the picture;
Secondly answer questions of general meaning in context to the picture and also talk about the personal experiences which come to your mind upon seeing the picture.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, TangramAktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

SPANISH - VII

Course Code: FLS 701 **Credit Units: 02**

Course Objective:

To enable students acquire working knowledge of the language; to give them vocabulary, grammar, expressions used on telephonic conversation and other situations to handle everyday Spanish situations with ease.

Course Contents:

Module I
Revision of earlier semester modules

Module II
Zodiac signs. More adjectives…to describe situations, state of minds, surroundings, people and places.

Module III
Various expressions used on telephonic conversation (formal and informal)

Module IV
Being able to read newspaper headlines and extracts (Material to be provided by teacher)

Module V
Negative commands (AR ending verbs)

Module VI
Revision of earlier sessions and introduction to negative ER ending commands, introduction to negative IR ending verbs

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- EspañolEnDirecto I A, 1B
- Español Sin Fronteras
- Material provided by the teacher from various sources

CHINESE – VII

Course Code: FLC 701 **CreditUnits: 02**

Course Objective:

The story of Cinderella first appears in a Chinese book written between 850 and 860 A.D. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I
Drills
Dialogue practice
Observe picture and answer the question.
About china part –I Lesson 1,2.

Module II
Pronunciation and intonation
Character Writing and stroke order.

Module III
Ask someone what he/she usually does on weekends?
Visiting people, Party, Meeting, After work….etc.

Module IV
Conversation practice
Translation from English to Chinese and vise-versa.
Short fables.

Module V
A brief summary of grammar.
The optative verb "yuanyi".
The pronoun "ziji".

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- "Kan tushuohua" Part-I Lesson 1-7

DIGITAL IMAGE PROCESSING

Course Code: **BCS 803** **CreditUnits: 03**

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Investigate the fundamental concepts of a digital image processing system.
2. Create the spatial domain and frequency domain image enhancement techniques.
3. Apply which tools of image processing should be applied in order to solve the real problems.
4. Develop Matlab algorithms for digital image processing operations such as histogram equalization, image enhancement, image restoration, image analysis, image compression, morphology, representation and description, filtering and denoising.

Course Contents:

Module I: Introduction and Digital Image Fundamentals
The origins of Digital Image Processing, Examples of Fields that Use Digital Image Processing, Fundamentals Steps in Image Processing, Elements of Digital Image Processing Systems, Image Sampling and Quantization, Some basic relationships like Neighbours, Connectivity, Distance Measures between pixels, Linear and Non Linear Operations.

Module II: Image Enhancement in the Spatial Domain
Some basic Gray Level Transformations, Histogram Processing, Enhancement Using Arithmetic and Logic operations, Basics of Spatial Filters, Smoothening and Sharpening Spatial Filters, Combining Spatial Enhancement Methods.

Module III: Image Enhancement in the Frequency Domain:
Introduction to Fourier Transform and the frequency Domain, Smoothing and Sharpening Frequency Domain Filters, Homomorphic Filtering.
Image Restoration
A model of The Image Degradation / Restoration Process, Noise Models, Restoration in the presence of Noise Only Spatial Filtering, Pereodic Noise Reduction by Frequency Domain Filtering, Linear Position-InvarientDedradations, Estimation of Degradation Function, Inverse filtering, Wiener filtering, Constrained Least Square Filtering, Geometric Mean Filter, Geometric Transformations.

Module IV: Image Compression
Coding, Interpixel and Psychovisual Redundancy, Image Compression models, Elements of Information Theory, Error free comparison, Lossy compression, Image compression standards.**Image Segmentation:** Detection of Discontinuities, Edge linking and boundary detection, Threshold, Region Oriented Segmentation, Motion based segmentation.

Module V: Representation and Description
Representation, Boundary Descriptors, Regional Descriptors, Use of Principal Components for Description, Introduction to Morphology, Some basic Morphological Algorithms.
Object Recognition
Patterns and Pattern Classes, Decision-Theoretic Methods, Structural Methods.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- Rafael C. Conzalez& Richard E. Woods, "Digital Image Processing", 2nd edition, Pearson Education.
- A. K. Jain, "Fundamental of Digital Image Processing", PHI.

References:

- RosefieldKak, "Digital Picture Processing",
- W.K. Pratt, "Digital Image Processing",

CRYPTOGRAPHY AND NETWORK SECURITY

Course Code: **BCS 802** **CreditUnits: 03**

Course learning outcomes (CLO)

CLO1: Students will be able to understand the concept of different cryptography techniques transposition and substitution methods.

CLO2: Students will be able to analyse the DES, IDEA, Feistel Cipher cryptographic algorithm.

CLO3: Students will be able to Understand and analyse public key Cryptosystem using RSA and learn various techniques used for the distribution of key in public key cryptosystem.

CLO4: Students will be able to apply and evaluate Message authentication and hash function using MD5 and SHA and learn the concept of digital signature.

CLO5: Students will be able to understand the concept of IP security and password message protocols.

Course Contents:

Module I

Codes and Ciphers – Some Classifical systems – Statistical theory of cipher systems-Complexity theory of crypto systems – Stream ciphers, Block ciphers.

Stream Ciphers: Rotor based system – shift register based systems – Design considerations for stream ciphers – Cryptanalysis of stream ciphers – Combined encryption and encoding.

Block Ciphers – DES and variant, modes of use of DES.

Module II

Public key systems – Knacksack systems – RSK – Diffie Hellman Exchange – Authentication and Digital signatures, Elliptic curve based systems.

Module III

Network Security: Hash function – Authentication:

Protocols – Digital Signature standards.

Electronics Mail Security – PGP (Pretty Good Privacy) MIME, data Compression technique.

Module IV

IP Security: Architecture, Authentication Leader, Encapsulating security Payload – Key Management.

Web security: Secure Socket Layer & Transport Layer security, Secure electronics transactions, Firewalls Design principle, established systems.

Module V

Telecommunication Network architecture, TMN management layers, Management information Model, Management servicing and functions, Structure of management information and TMN information model.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

- William Stallings" Cryptography and Network Security: Principles and Practices" PHI
- "Applied Cryptography", Bruce Schiener

DIGITAL IMAGE PROCESSING LAB

Course Code: **BCS 822** **Credit Units: 01**

Software Required: Java

List of Assignements:

Experiments will be based on Image Representation, Image transformation, Image Enhancements, Edge Detection, Morphological Image processing and Segmentation.

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

PROJECT

Course Code: **BCS 860** **CreditUnits: 15**

GUIDELINES FOR PROJECT FILE

Research experience is as close to a professional problem-solving activity as anything in the curriculum. It provides exposure to research methodology and an opportunity to work closely with a faculty guide. It usually requires the use of advanced concepts, a variety of experimental techniques, and state-of-the-art instrumentation. Research is genuine exploration of the unknown that leads to new knowledge which often warrants publication. But whether or not the results of a research project are publishable, the project should be communicated in the form of a research report written by the student.

Sufficient time should be allowed for satisfactory completion of reports, taking into account that initial drafts should be critiqued by the faculty guide and corrected by the student at each stage.

The File is the principal means by which the work carried out will be assessed and therefore great care should be taken in its preparation.

In general, the File should be comprehensive and include

A short account of the activities that were undertaken as part of the project;

A statement about the extent to which the project has achieved its stated goals.

A statement about the outcomes of the evaluation and dissemination processes engaged in as part of the project;

Any activities planned but not yet completed as part of the project, or as a future initiative directly resulting from the project;

Any problems that have arisen that may be useful to document for future reference.

- Report Layout

The report should contain the following components:

- **Title or Cover Page**

The title page should contain the following information: Project Title; Student's Name; Course; Year; Supervisor's Name.

- **Acknowledgements** (optional)

Acknowledgment to any advisory or financial assistance received in the course of work may be given.

- **Abstract**

A good"Abstract" should be straight to the point; not too descriptive but fully informative. First paragraph should state what was accomplished with regard to the objectives. The abstract does not have to be an entire summary of the project, but rather a concise summary of the scope and results of the project

- **Table of Contents**

Titles and subtitles are to correspond exactly with those in the text.

- **Introduction**

Here a brief introduction to the problem that is central to the project and an outline of the structure of the rest of the report should be provided. The introduction should aim to catch the imagination of the reader, so excessive details should be avoided.

- **Materials and Methods**

This section should aim at experimental designs, materials used. Methodology should be mentioned in details including modifications if any.

- **Results and Discussion**

Present results, discuss and compare these with those from other workers, etc. In writing these section, emphasis should be given on what has been performed and achieved in the course of the work, rather than discuss in detail what is readily available in text books. Avoid abrupt changes in contents from section to section and maintain a lucid flow throughout the thesis. An opening and closing paragraph in every chapter could be included to aid in smooth flow.

Note that in writing the various secions, all figures and tables should as far as possible be next to the associated text, in the same orientation as the main text, numbered, and given appropriate titles or captions. All major equations should also be numbered and unless it is really necessary never write in "point" form.

- **Conclusion**

A conclusion should be the final section in which the outcome of the work is mentioned briefly.

- **Future prospects**

- **Appendices**

The Appendix contains material which is of interest to the reader but not an integral part of the thesis and any problem that have arisen that may be useful to document for future reference.

- **References / Bibliography**

This should include papers and books referred to in the body of the report. These should be ordered alphabetically on the author's surname. The titles of journals preferably should not be abbreviated; if they are, abbreviations must comply with an internationally recognised system.

Examples

For research article

Voravuthikunchai SP, Lortheeranuwat A, Ninrprom T, Popaya W, Pongpaichit S, Supawita T. (2002) Antibacterial activity of Thai medicinal plants against enterohaemorrhagic *Escherichia coli* O157: H7. *Clin Microbiol Infect*, **8** (suppl 1): 116–117.

For book

Kowalski,M.(1976) Transduction of effectiveness in *Rhizobium meliloti*. SYMBIOTIC NITROGEN FIXATION PLANTS (editor P.S. Nutman IBP), **7**: 63-67

ASSESSMENT OF THE PROJECT FILE

Essentially, marking will be based on the following criteria: the quality of the report, the technical merit of the project and the project execution.
Technical merit attempts to assess the quality and depth of the intellectual efforts put into the project.
Project execution is concerned with assessing how much work has been put in.
The File should fulfill the following ***assessment objectives:***

Range of Research Methods used to obtain information

Execution of Research

Data Analysis
Analyse Quantitative/ Qualitative information
Control Quality

Draw Conclusions

Examination Scheme:

Dissertation	50
Viva Voce	50
Total	**100**

AMITY UNIVERSITY
RAJASTHAN

AMITY SCHOOL OF ENGINEERING & TECHNOLOGY (ASET)

PROGRAM STRUCTURE & SYLLABUS

B. Tech. (Electronics & Communication Engineering)

Program Code: BEC

Duration – 4 Years Full Time

Program Outcomes (POs)

B.Tech. (Electronics & Communication Engineering)

PLO.1-An ability to apply and understand the knowledge of mathematics, science and engineering.

PL0.2-Knowledge and understanding of mathematics through differential and integral calculus, and basic sciences and engineering topics (including computing science) necessary to analyze and design complex electrical and electronic devices, software, and systems containing embedded hardware and software components and their design.

PLO.3-Develop and deploy engineering/technological solutions using latest techniques & tools/CAD (VHDL, MATLAB, Or-cad, VLSI, Antenna Design) imbibing concern for eco-system, and an attitude to serve society & humanity at large.

PLO.4-Graduateswill successfully engage themselves in practice of multidisciplinary engineering or relevant fields; They will pursue wide-spectrum careers appropriately as technologists,innovators, consultants, managers & entrepreneurs and will advance in their profession.

PLO.5-An ability to design and conduct experiments as well as to analyze and interpret data.

PLO.6-An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, health and safety.

PLO7-An ability to identify, formulate, and solve engineering problems.

PLO8-Knowledge of probability and statistics, including applications appropriate to the electrical engineering (Electronics, Communication, Processing and Embedded technology)

Credit Summary

Semester	Core course (CC)	Domain Electives (DE)	Values Added Course (VAC)	Open Electives	NTCC	Total
I	24	-	4	-	2	30
II	19	-	8	3	2	32
III	20	3	4	3	2	32
IV	16	3	4	3	2	28
V	15	3	4	3	5	30
VI	19	3	4	3	2	31
VII	18	-	4	3	5	30
VIII	8	3	--	--	12	23
Total	**139**	**15**	**32**	**18**	**32**	**236**

Semester I						
Code	**Course**	**Categor**	**L**	**T**	**P**	**Credit**

		y				s
Core Courses						
AM 101	Applied Mathematics – I	CC	3	1	-	4
AP 102	Applied Physics - I – Fields & Waves	CC	2	1		3
AC 103	Applied Chemistry	CC	2	1		3
BME 104	Element of Mechanical Engineering	CC	2	1		3
BCS 105	Introduction to Computers & Programming in C	CC	2	1		3
BEE 106	Basic Electrical Engineering	CC	2	1		3
Practical Courses						
AP 122	Applied Physics lab	CC	-	-	2	1
AC 123	Applied Chemistry lab	CC	-	-	2	1
BME 124	Element of Mechanical Engineering lab	CC	-	-	2	1
BCS 125	Programming in C lab	CC	-	-	2	1
BEE 126	Basic Electrical Engineering Lab	CC	-	-	2	1
Value Added Courses						
BCS 101	English	VA	1	-	-	1
BSS 104	Behavioral Science-I Understanding Self For Effectiveness- I		1	-	-	1
FLT 101 FLG 101 FLS 101 FLC 101	Foreign Language – I French German Spanish Chinese		2	-	-	2
Non-Teaching Credit Course (NTCC)						
AND001	Anandam-I	NTCC	-	-	-	2
Total						**30**

Semester II						
Code	**Course**	**Category**	**L**	**T**	**P**	**Credits**
Core Courses						

AM 201	Applied Mathematics – II	CC	3	1	-	4
AP 202	Applied Physics - II – Modern Physics	CC	2	1		3
BCS 203	Object Oriented Programming using C++	CC	2	1		3
BME 204	Engineering Mechanics	CC	2	1		3
BME 205	Engineering Graphics	CC	1			1
BME 206	Domain Workshop	CC	1	-	-	1
Practical Courses						
AP 222	Applied Physics - II – Modern Physics lab	CC	-	-	2	1
BCS 223	Object Oriented Programming using C++ lab	CC	-	-	2	1
BME 224	Engineering Mechanics lab	CC	-	-	2	1
BME 225	Engineering Graphics lab	CC	-	-	2	1
Open Elective						
	OPEN ELECTIVE – I	OE	3	-	-	3
Value Added Courses						
BCS 201	English	VA	1	-	-	1
BSS 204	Behavioral Science-II (Problem Solving & Creation thinking)	VA	1	-	-	1
FLF 201 FLG 201 FLS 201 FLC 201	Foreign Language – II French German Spanish Chinese	VA	2	-	-	2
EVS 001	Environmental Studies	VC	4	-	-	4
Non-Teaching Credit Course (NTCC)						
AND002	Anandan-II	NTCC	-	-	2	2
Total						**32**

	Semester III					
Code	**Course**	**Category**	**L**	**T**	**P**	**Credits**
Core Courses						
AM 301	Applied Mathematics – III	CC	3	-	-	3

BEC 302	Analog Electronics-I	CC	3	1	-	4
BEC 303	Circuits & Systems	CC	3	1	-	4
BEC 304	Signal & Systems	CC	2	1	-	3
BEC 305	Java Programming	CC	3	-	-	3
Practical Courses						
BEC 322	Analog Electronics-I Lab	CC	-	-	2	1
BEC 323	Circuits & Systems Lab	CC	-	-	2	1
BEC 325	Java Programming Lab	CC	-	-	2	1
Domain Elective-I: Student must select one course from the following courses						
BEC 306	Electromagnetic Properties of Materials	DE	2	1		3
BEC 307	Measurements & Instrumentation	DE	2	1		3
Open Elective						
	OPEN ELECTIVE – II	OE	3		-	3
Value Added Courses						
BCS 301	Communication Skills – I	VA	1	-	-	1
BSS 304	Behavioral Science-III (Interpersonal Communication)	VA	1	-	-	1
FLT 301 FLG 301 FLS 301 FLC 301	Foreign Language – III French German Spanish Chinese	VA	2	-	-	2
AND003	Anandan-III	NTCC	-	-	2	2
Total						**32**

Semester IV						
Code	**Course**	**Category**	**L**	**T**	**P**	**Credits**
Core Courses						
BEC 401	Digital Circuits & Systems-I	CC	3	-		3
BEC 402	Analog Electronics-II	CC	3	-		3
BEC 403	Communication Systems	CC	3	-	-	3
BEE 404	Control System	CC	3	-		3
Practical Courses						
BEC 421	Digital Circuits & Systems-I Lab	CC			2	1
BEC 422	Analog Electronics-II Lab	CC			2	1
BEC 423	Communication Systems Lab	CC			2	1
BEE 424	Control System Lab	CC			2	1
Domain Elective-II: Student has to select one course from the following courses						
BEC 405	Computer Oriented Numerical Methods	DE	2	1		3
BEC 406	Electromagnetic Field Theory	DE	2	1		3
Open Elective						
	OPEN ELECTIVE – III	OE	3			3
Value Added Courses						
BCS 401	Communication Skills – II	VA	1	-	-	1
BSS 404	Behavioral Science-IV (Relationship Management)	VA	1	-	-	1
FLT 401 FLG 401 FLS 401 FLC 401	Foreign Language – IV French German Spanish Chinese	VA	2	-	-	2
AND004	Anandan-IV	NTCC	-	-	2	2
Total						**28**

Semester V						
Code	**Course**	**Category**	**L**	**T**	**P**	**Credits**
Core Courses						
BEC 501	Microprocessor and Microcontroller Systems	CC	3	-		3
BEC 502	Digital Circuits & Systems-II	CC	3	-	-	3
BEC 503	Digital Communications	CC	3	-		3
BCS 510	Web Development	CC	2	-	-	2
Practical Courses						
BEC 521	Microprocessor and Micro Controller Lab	CC			2	1
BEE 528	MATLAB theory and practices	CC	-	-	2	1
BEC 522	Digital Circuits & Systems-II Lab	CC			2	1
BCS 530	Web Development Lab	CC	-	-	2	1
BEC 550	Practical Training (Evaluation)	NTCC	-	-	-	3
Domain Elective-III: Student has to select one course from the following courses						
BEC 505	Telecommunication Networks	DE	3			3
BEC 506	Operating Systems	DE	3			3
BEE 505	Computer System Architecture	DE	3			3
Open Elective						
	OPEN ELECTIVE – IV	OE	3			3
Value Added Courses						
BCS 501	Communication Skills – III	VA	1	-	-	1
BSS 504	Behavioral Science-V (Understanding self for effectiveness	VA	1	-	-	1
 FLT 501 FLG 501 FLS 501 FLC 501	Foreign Language – V French German Spanish Chinese	VA	2	-	-	2
AND005	Anandan-V	NTCC	-	-	2	2
Total						**30**

Semester VI						
Code	**Course**	**Category**	**L**	**T**	**P**	**Credits**
Core Courses						
BEC 601	VLSI Design	CC	3	-		3
BEC 602	Digital Signal Processing	CC	3	-		3
BEC 603	Microwave Engineering	CC	3	-		3
BEE 601	Power Electronics	CC	3	-	-	3
BCS 610	Programming with Python	CC	2	-	-	2
Practical Courses						
BEC 621	VLSI Design lab	CC			2	1
BEC 622	Digital Signal Processing lab	CC			2	1
BEC 623	Microwave Engineering lab	CC			2	1
BEE 621	Power Electronics Lab	CC		-	2	1
BCS 630	Programming with Python Lab	CC	-	-	2	1
Domain Elective-IV: Student has to select one course from the following courses						
BEC 605	Measurement & Measuring Instruments	DE	3			3
BEC 606	Data Structures and IT	DE	3			3
BEC 607	Information Theory & Coding	DE	3			3
Open Elective						
	OPEN ELECTIVE – V	OE	3			3
Value Added Courses						
BCS 601	Communication Skills – IV	VA	1	-	-	1
BSS 604	Understanding self for Effectiveness – VI	VA	1	-	-	1
FLT 601 FLG 601 FLS 601 FLC 601	Foreign Language – VI French German Spanish Chinese	VA	2	-	-	2
AND006	Anandan-VI	NTCC	-	-	2	2
Total						**31**

Semester VII						
Code	**Course**	**Category**	**L**	**T**	**P**	**Credits**
Core Courses						
BEC 701	Radar & Satellite Communications	CC	3	-		3
BEC 702	Digital Image Processing	CC	3	-		3
BEC 703	Analog CMOS IC Design	CC	3	-		3
BCS 710	Advanced Programming with Python	CC	2	-	-	2
Practical Courses						
BEC 721	Radar & Satellite Communications Lab	CC			2	1
BEC 722	Digital Image Processing lab	CC			2	1
BEC 723	Analog CMOS IC Design lab	CC			2	1
BCS 730	Advanced Programming with Python Lab	PC	-	-	2	1
BEC 750	Industrial Training (Evaluation)	CC				3
BEC 760	Seminar	CC				3
Open Elective						
	OPEN ELECTIVE – VI	OE	3			3
Value Added Courses						
BCS 701	Communication Skills – V	VA	1	-	-	1
BSS 704	Understanding self for effectiveness – VII	VA	1	-	-	1
FLT 701 FLG 701 FLS 701 FLC 701	Foreign Language – VII French German Spanish Chinese	VA	2	-	-	2
AND007	Anandan-VII	NTCC	-	-	2	2
TOTAL						**30**

Semester VIII						
Code	**Course**	**Category**	**L**	**T**	**P**	**Credits**
Core Courses						
BEC 801	Antenna & Wave Propagation	CC	3	-	-	3
BEC 802	Embedded System Design and Device Driver Development	CC	3	-		3
Practical Courses						
BEC 822	Embedded System Design and Device Driver Development lab	CC		-	2	1
BEC 821	Antenna & Wave Propagation Lab	CC		-	2	1
BEC 861	Project	CC				12
Domain Elective-V: Student must select one course from the following courses						
BEC 803	Instrumentation	DE	3			3
BEC 804	Nano science & Nanotechnology	DE	3			3
BEC 805	Robotics & Automation	DE	3			3
Total						**23**
Note: CC - Core Course, VA - Value Added Course, OE - Open Elective, DE - Domain Elective, FW - Field Work						
Total Credits						**226**

Course Name	Course Code	LTP	Credit	Semester
APPLIED MATHEMATICS – I	AM 101	4	4	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Investigate the basic concept about Calculus and differential equations.
CLO 2	Create an interest in finding the solution of problem, length, area, volume etc of the curve and application of Vector calculus.
CLO 3	Apply the basic concepts of Calculus to find Asymptotes, curvature, tangents & normal's, maxima & minima, partial derivatives and approximate calculation of a function.
CLO 4	Develop the formulation of the problem and differential equation, define its nature by using the fundamental of calculus and its applications.

Course Objective:

The knowledge of Mathematics is necessary for a better understanding of almost all the Engineering and Science subjects. Here our intention is to make the students acquainted with the concept of basic topics from Mathematics, which they need to pursue their Engineering degree in different disciplines.

Course Contents:

Module I: Differential Calculus

Successive differentiation, Leibnitz's theorem (without proof), Mean value theorem, Taylor's theorem (proof), Remainder terms, Asymptote & Curvature, Partial derivatives, Chain rule, Differentiation of Implicit functions, Exact differentials, Tangents and Normals, Maxima, Approximations, Differentiation under integral sign, Jacobians and transformations of coordinates.

Module II: Integral Calculus

Fundamental theorems, Reduction formulae, Properties of definite integrals, Applications to length, area, volume, surface of revolution, improper integrals, Multiple Integrals-Double integrals, Applications to areas, volumes.

Module III: Ordinary Differential Equations

Formation of ODEs, Definition of order, degree & solutions, ODE of first order : Method of separation of variables, homogeneous and non homogeneous equations, Exactness & integrating factors, Linear equations & Bernoulli equations, General linear ODE of n^{th} order, Solution of homogeneous equations, Operator method, Method of undetermined coefficients, Solution of simple simultaneous ODE.

Module IV: Vector Calculus

Scalar and Vector Field, Derivative of a Vector, Gradient, Directional Derivative, Divergence and Curl and their Physical Significance, Arc Length, Tangent, Directional Derivative, Evaluation of Line Integral, Green's Theorem in Plane (without proof), Representation of Surfaces, Tangent Plane and Surface Normal, Surface Integral, Stoke's Theorem (without proof), Gauss Divergence Theorem (without proof).

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text:

- Differential Calculus by Shanti Narain
- Integral Calculus by Shanti Narain

References:

- Differential Equation by A.R. Forsyth
- Higher Engineering Mathematics by H.K. Dass

Course Name	Course Code	LTP	Credit	Semester
APPLIED PHYSICS - I - FIELDS AND WAVES	AP 102	3:0:0	3	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	develop an understanding of the various concepts of simple harmonic motion for with and without damping.
CLO 2	solve simple problems on simple harmonic motion and related topics.
CLO 3	explain and interpret the wave nature of light.
CLO 4	solve simple problems on the applications of wave nature of light
CLO 5	define and understand vector calculus and electromagnetics
CLO 6	solve numerical problems on vector calculus and electromagnetics

Course Objective:

Aim of this course is to introduce the students to fundamentals of graduate level physics, which form the basis of all applied science and engineering

Course Contents:

Module I: Oscillations & Waves Oscillations

Introduction to S.H.M. Damped Oscillations: Differential Equation and its solution, logarithmic decrement, Quality Factor, Different conditions of damping of harmonic oscillations. Forced oscillations: Amplitude and Frequency Response, Resonance, Sharpness of Resonance

Plane. Progressive Waves: Differential Equation and Solution, Superposition of Progressive Waves stationary waves. Ultrasonics: Generation and application of ultrasonicwaves.

Module II: Wave Nature of Light Interference:

Coherent Sources, Conditions of interference, Interference due to division of wavefront, Fresnels biprism Interference due to division of amplitude, Newton's rings, Interference due to thin films .Diffraction: Fresnel and Fraunhofer diffraction, Fraunhofer diffraction at a single slit, double slit, N Slits, Transmission grating, Rayleigh criterion and Resolving power of grating. Polarization: Birefringence, Nicol prism, Production and analysis of plane, circularly and elliptically polarized light, Half and quarter wave plates, Optical rotation, Polarimeter.

Module III: Electromagnetics

Scalar and vector fields, gradient of a scalar field, physical significance of gradient, equipotential surface. Line, surface and volume integrals, Divergence and curl of vector field and mathematical analysis physical significance, Electric flux, Gauss' law, Proof and Applications, Gauss divergence and Stokes theorems.

Differential form of Gauss' Law, Amperes' Law, Displacement current, Faradays Law, Maxwell equations in free space & isotropic media (Integral form & differential form), EM wave propagation in free space, Poynting vector.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text

- Waves & oscillation, A. P. French
- Physics of waves, W. C. Elmore & M. A. Heald
- Introduction to Electrodynamics, D. J. Griffith

Reference

- Electrodynamics, Gupta, Kumar & Singh
- Optics, A. K. Ghatak
- Engineering Physics, Satya Prakash

Course Name	Course Code	LTP	Credit	Semester
APPLIED CHEMISTRY	AC 103	3:0:0	3	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Understand the structure and chemical transformations of molecules.
CLO 2	Understand the application of chemical process in industries.
CLO 3	Basic idea about water treatment, lubrication, corrosion, fuel, spectroscopy etc.

Course Objective:

Four basic sciences, Physics, Chemistry, Mathematics and Biology are the building blocks in engineering and technology. Chemistry is essential to develop analytical capabilities of students, so that they can characterize, transform and use materials in engineering and apply knowledge in their field. All engineering fields have unique bonds with chemistry whether it is Aerospace, Mechanical, Environmental and other fields the makeup of substances is always a key factor, which must be known. For electronics and computer science engineering, apart from the material, computer modeling and simulation knowledge can be inherited from the molecule designing. The upcoming field of technology like Nanotechnology and Biotechnology depends fully on the knowledge of basic chemistry. With this versatile need in view, course has been designed in such a way so that the student should get an overview of the whole subject.

Course Contents:

Module I: Water Technology
Introduction and specifications of water, Hardness and its determination (EDTA method only), Alkalinity, Boiler feed water, boiler problems – scale, sludge, priming & foaming: causes & prevention, Boiler problems – caustic embitterment & corrosion: causes & prevention, Carbonate & phosphate conditioning, colloidal conditioning & calgon treatment Water softening processes: Lime – soda process, Ion exchange method, Water for domestic use.

Module II: Fuels
Classification, calorific value of fuel, (gross and net), Determination of calorific value of fuels, bomb calorimeter, Solid fuels - Proximate and ultimate analysis, Octane & Cetane No. and its significance. Numericals on combustion.

Module III: Instrumental Methods of analysis
Introduction; Principles of spectroscopy; Laws of absorbance IR : Principle, Instrumentation, Application UV : Principle, Instrumentation, Application NMR : Principle, Instrumentation, Application

Module III: Lubricants
Introduction; Mechanism of Lubrication; Types of Lubricants; Chemical structure related to Lubrication; Properties of lubricants; Viscosity and Viscosity Index; Iodine Value; Aniline Point; Emulsion number; Flash Point; Fire Point; Drop Point; Cloud Point; Pour Point. Selection of Lubricants.

Module VI: Corrosion
Introduction, Mechanism of dry and wet corrosion, Types of corrosion-Galvanic, Concentration cell, soil, pitting, intergranular, waterline. Passivity. Factors influencing corrosion. Corrosion control.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text:
- Engineering Chemistry- Jain and Jain
- Engineering Chemistry - Sunita Rattan
- Engineering Chemistry - Shashi Chawla

References:
- Engineering Chemistry – Dara and Dara
- Spectroscopy- Y.R Sharma
- Corrosion Engineering – Fontenna and Greene

Course Name	Course Code	LTP	Credit	Semester
ELEMENT OF MECHANICAL ENGINEERING	BME 104	3:0:0	3	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Investigate – Basic machines used in the field of mechanical engineering.
CLO 2	Create – Mathematical models of fundamental physical phenomenon and apply them to predict the behaviour of engineering systems
CLO 3	Apply – this knowledge to analyse the working of IC Engines, Steam Turbines, Lathe machines etc.
CLO 4	Develop – Ability to perform and conduct basic experiments and evaluate the results of the same.

Course Objective:

The objective of this course is to impart the basic knowledge of thermodynamics, stress- strain, materials & their properties and various manufacturing processes to the students of all engineering discipline.

Course Contents:

Module I: Fundamental Concepts
Definition of thermodynamics, system, surrounding and universe, phase, concept of continuum, macroscopic & microscopic point of view, Thermodynamic equilibrium, property, state, path, process, cyclic process, Zeroth, first and second law of thermodynamics, Carnot Cycle, Introduction to I.C. Engines-two &four stoke S.I. and C.I. engines. Otto cycle. Diesel cycle.

Module II: Stress And Strain Analysis
Simple stress and strain: introduction, normal shear, and stresses-strain diagrams for ductile and brittle materials. Elastic constants, one-dimensional loadings of members of varying cross-section, Strain Energy, Properties of material-strength, elasticity, stiffness, malleability, ductility, brittleness, hardness and plasticity etc; Concept of stress and strain stress strain diagram, tensile test, impact test and hardness test.

Module III: Casting & Forging
Introduction of casting, pattern, mould making procedures, sand mould casting, casting defects, allowances of pattern. Forging-introduction, upsetting & drawing out, drop forging, press forging & m/c forging

Module IV: Welding & Sheet metal working
Introduction of welding processes, classification, gas welding, arc welding, resistance welding. Introduction to sheet metal shop, Shearing, trimming, blanking, piercing, shaving, notching, stretch forming, nibbling coining, embossing and drawing.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text

- Engineering thermodynamics, by P.K. Nag, Tata McGraw Hill.
- Thermal Engineering, by D.S. Kumar. S.K. Kataria and Sons.

- Thermal Engineering by PL Ballaney; Khanna Publishers, Delhi.
- Engineering Thermodynamics: Work and Heat Transfer, by Rogers and Mayhew, ELBS Publications

Reference

- Heine, R.W. C.R. Loper and P.C. Rosenthal, Principles of metal casting McGraw Hill
- Welding Technology by R.S. Parmar, Khanna Publishers.
- Thermodynamics and Heat Engines Volume-I, by R. Yadav: Central Publications.
- Ganesan, V. Internal Combustion Engine, Tata McGraw-Hill.
- Mathur, M.L. and Sharma, R.P. Internal Combustion Engine. Dhanpat Rai Publication

Course Name	Course Code	LTP	Credit	Semester
INTRODUCTION TO COMPUTERS AND PROGRAMMING IN C	BCS 105	3:0:0	3	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Able to figure out the basic architecture and components of computers
CLO 2	Will be able to understand the syntax of programs in C language
CLO 3	Build C language programs and projects

Course Objective:

The objective of this course module is to acquaint the students with the basics of computers system, its components, data representation inside computer and to get them familiar with various important features of procedure oriented programming language i.e. C.

Course Contents:

Module I: Introduction

Introduction to computer, history, von-Neumann architecture, memory system (hierarchy, characteristics and types), H/W concepts (I/O Devices), S/W concepts (System S/W & Application S/W, utilities). Data Representation: Number systems, character representation codes, Binary, octal, hexadecimal and their interconversions. Binary arithmetic, floating point arithmetic, signed and unsigned numbers, Memory storage unit.

Module II: Programming in C

History of C, Introduction of C, Basic structure of C program, Concept of variables, constants and data types in C, Operators and expressions: Introduction, arithmetic, relational, Logical, Assignment, Increment and decrement operator, Conditional, bitwise operators, Expressions, Operator precedence and associativity. Managing Input and output Operation, formatting I/O.

Module III: Fundamental Features in C

C Statements, conditional executing using if, else, nesting of if, switch and break Concepts of loops, example of loops in C using for, while and do-while, continue and break. Storage types (automatic, register etc.), predefined processor, Command Line Argument.

Module IV: Arrays and Functions

One dimensional arrays and example of iterative programs using arrays, 2-D arrays Use in matrix computations. Concept of Sub-programming, functions Example of user defined functions. Function prototype, Return values and their types, calling function, function argument, function with variable number of argument, recursion.

Module V: Advanced features in C

Pointers, relationship between arrays and pointers Argument passing using pointers, Array of pointers. Passing arrays as arguments. Strings and C string library. Structure and Union. Defining C structures, Giving values to members, Array of structure, Nested structure, passing strings as arguments. File Handling.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text:

- "ANSI C" by E Balagurusamy

- Yashwant Kanetkar, “Let us C”, BPB Publications, 2nd Edition, 2001.
- Herbert Schildt, “C:The complete reference”, Osbourne Mcgraw Hill, 4th Edition, 2002.
- V. Raja Raman, “Computer Programming in C”, Prentice Hall of India, 1995.

References:

- Kernighan & Ritchie, “C Programming Language”, The (Ansi C Version), PHI, 2nd Edition.
- J. B Dixit, “Fundamentals of Computers and Programming in ‘C’.
- P.K. Sinha and Priti Sinha, “Computer Fundamentals”, BPB publication.

Course Name	Course Code	LTP	Credit	Semester

BASIC ELECTRICAL ENGINEERING	BEE 106	3:0:0	3	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Develop a practical approach for analysis of resistive circuits and solution of resistive circuits with independent sources.
CLO 2	Able to apply two terminal element relationships for inductors and capacitors in an electrical network.
CLO 3	Capable of analysis of single phase AC circuits, the representation of alternating quantities and determining the power in these circuits.
CLO 4	To acquire the knowledge about the constructional concepts & working principles for the applications of DC machines, AC machines & measuring instruments.
CLO 5	Able to identify, formulate, and solve the electrical engineering problems.

Course Objective:

The objective of the course is to provide a brief knowledge of Electrical Engineering to students of all disciplines. This Course includes some theorems related to electrical, some law's related to flow of current, voltages, basic knowledge of Transformer, basic knowledge of electromagnetism, basic knowledge of electrical network.

Course Contents:

Module I: Basic Electrical Quantities
Basic Electrical definitions-Energy, Power, Charge, Current, Voltage, Electric Field Strength, Magnetic Flux Density, etc., Resistance, Inductance and Capacitance. Ideal Source, Independent Source and Controlled Source

Module II: Network Analysis Techniques & Theorems
Circuit Principles: Ohm's Law, Kirchoff's Current Law, Kirchoff's Voltage Law Network Reduction: Star–Delta Transformation, Source Transformation, Nodal Analysis, Loop analysis. Superposition theorem Thevenin's Theorem, Norton's theorem and Reciprocity theorem.,Practical applications

Module III: Alternating Current Circuits
Peak, Average and RMS values for alternating currents, Power calculation: reactive power, active power, Complex power, power factor, impedance, reactance, conductance, susceptance Resonance: series Resonance, parallel resonance, basic definition of Q factor & Band-width.

Module IV: Transformers
Basic Transformer Operation principle, Construction, Voltage relations, Current relations, Linear circuit models, Open circuit test, Short circuit test, Transformer Efficiency.

Examination Scheme:

Components	**A**	**CT**	**S/V/Q**	**HA**	**EE**
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text

- R.J. Smith, R.C. Dorf: Circuits, devices and Systems
- B.L. Thareja: Electrical Technology : Part -1 & 2

Reference

- V. Deltoro: Electrical Engineering fundamentals
- Schaum’s Series: Electrical Circuits

Course Name	Course Code	LTP	Credit	Semester
APPLIED PHYSICS LAB - I	AP 122	0:0:1	1	1

List of Experiments:

1. To determine the wavelength of sodium light by Newton's rings method.
2. To determine the dispersive power of the material of prism with the help of a spectrometer.
3. To determine the specific rotation of sugar by Bi-quartz or Laurent half shade polarimeter.
4. To determine the speed of ultrasonic waves in liquid by diffraction method.
5. To determine the width of a narrow slit using diffraction phenomena.
6. To determine the temperature coefficient of platinum wire, using a platinum resistance thermometer and a Callender & Griffth's bridge.
7. To determine the value of specific charge (ratio of e/m) of an electron by Thomson method.
8. To determine the internal resistance of Leclanche cell with the help of Potentiometer.
9. To determine the resistance per unit length of a Carey Foster's bridge wire and also to find out the specific resistance of a given wire.
10. To plot graph showing the variation of magnetic field with distance along the aixs of a circular coil carrying current, and hence estimate the radius of the coil.
11. To determine the value of acceleration due to gravity ('g') in the laboratory using bar pendulum.
12. To determine the moment of inertia of a flywheel about its own axis of rotation.
13. To determine the density of material of the given wire with the help of sonometer.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

Course Name	Course Code	LTP	Credit	Semester
APPLIED CHEMISTRY LAB	AC 123	0:0:1	1	1

List of Experiments:

1. To determine the ion exchange capacity of a given cation exchanger.
2. To determine the temporary, permanent and total hardness of a sample of water by complexometric titration method.
3. To determine the type and extent of alkalinity of given water sample.
4. To determine the number of water molecules of crystallization in Mohr's salt (ferrous ammonium sulphate) provided standard potassium dichromate solution (0.1N) using diphenylamine as internal indicator.
5. To determine the ferrous content in the supplied sample of iron ore by titrimetric analysis against standard $K_2Cr_2O_7$ solution using potassium ferricyanide $[K_3Fe(CN)_6]$ as external indicator.
6. (a) To determine the surface tension of a given liquid by drop number method.
   (b) To determine the composition of a liquid mixture A and B (acetic acid and water) by surface tension method.
7. To prepare and describe a titration curve for phosphoric acid – sodium hydroxide titration using pH-meter.
8. (a) To find the cell constant of conductivity cell.
   (b) Determine the strength of hydrochloric acid solution by titrating it against standard sodium hydroxide solution conductometrically
9. Determination of Dissolved oxygen in the given water sample.
10. To determine the total residual chlorine in water.
11. Determination of amount of oxalic acid and H_2SO_4 in 1 L of solution using N/10 NaOH and N/10 $KMnO_4$ solution.
12. Determination of viscosity of given oil by means of Redwood viscometer I.
13. To determine flash point and fire point of an oil by Pensky Martin's Apparatus
14. To determine the Iodine value of the oil.

Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

Course Name	Course Code	LTP	Credit	Semester
ELEMENT OF MECHANICAL ENGINEERING LAB	BME 124	0:0:1	1	1

ELEMENT OF MECHANICAL ENGINEERING LAB

Course Code: BME 124 **Credit Units: 01**

List of Experiments:

1. Welding

   (a) Arc Welding
   - Butt Joint
   - Lap Joint
   - T Joint

   (b) Gas Welding
   - Butt Joint
   - Lap Joint
   - Brazing of Broken pieces

2. Foundry
   - Sand mould casting by single piece pattern& Split pattern bracket with cores

3. Sheet Metal
   - Dust Bin
   - Mug
   - Funnel
   - Cylindrical Mug with handle-Rectangular

4. Fitting Shop
   - Male – Female Joint
   - Rectangular piece
   - Filing the job

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

Course Name	Course Code	LTP	Credit	Semester
PROGRAMMING IN C LAB	BCS 125	0:0:1	1	1

Software Required: Turbo C

Course Contents:

1. C program involving problems like finding the nth value of cosine series, Fibonacci series. Etc.
2. C programs including user defined function calls
3. C programs involving pointers, & solving various problems with the help of those.
4. File handling

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

Course Name	Course Code	LTP	Credit	Semester
INTRODUCTION TO COMPUTERS & PROGRAMMING IN C LAB	BCS 124	0:0:1	1	1

Software Required: Turbo C

List of Experiments:

5. C program involving problems like finding the nth value of cosine series, Fibonacci series. Etc.
6. C programs including user defined function calls
7. C programs involving pointers and solving various problems with the help of those.
8. File handling

Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

Course Name	Course Code	LTP	Credit	Semester
BASIC ELECTRICAL ENGINEERING LAB	BEE 126	0:0:1	1	1

List of Experiments:

1. To verify KVL & KCL in the given network.
2. To verify Superposition Theorem.
3. To verify Maximum Power Transfer Theorem.
4. To verify Reciprocity Theorem.
5. To determine and verify R_{Th}, V_{Th}, R_N, I_N in a given network.
6. To perform open circuit & short circuit test on a single-phase transformer.
7. To study transient response of a given RLC Circuit.
8. To perform regulation, ratio & polarity test on a single-phase transformer.
9. To measure power & power factor in a three phase circuit by two wattmeter method.
10. To measure power & power factor in a three phase load using three ammeter & three voltmeter method.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

Course Name	Course Code	LTP	Credit	Semester
ENGLISH	BCS 101	1:0:0	1	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Identify the basic elements of grammar required for good and effective communication.
CLO 2	Interpret and discuss key ideas of grammar, diction and communication.
CLO 3	Develop Creative & Literary Sensitivity in all communication.
CLO 4	Design and create texts for a variety of purposes and audiences, evaluating and assessing the effectiveness of grammatical aspects.

Course Objective:

The course is intended to give a foundation of English Language. The literary texts are indented to help students to inculcate creative & aesthetic sensitivity and critical faculty through comprehension, appreciation and analysis of the prescribed literary texts. It will also help them to respond form different perspectives.

Course Contents:

Module I: Vocabulary
Use of Dictionary
Use of Words: Diminutives, Homonyms & Homophones

Module II: Essentials of Grammar - I
Articles
Parts of Speech
Tenses

Module III: Essentials of Grammar - II
Sentence Structure
Subject -Verb agreement
Punctuation

Module IV: Communication
The process and importance
Principles & benefits of Effective Communication

Module V: Spoken English Communication
Speech Drills
Pronunciation and accent
Stress and Intonation

Module VI: Communication Skills - I
Developing listening skills
Developing speaking skills

Module VII: Communication Skills - II
Developing Reading Skills
Developing writing Skills

Module VIII: Written English communication
Progression of Thought/ideas
Structure of Paragraph
Structure of Essays

Module IX: Short Stories
Of Studies, by Francis Bacon
Dream Children, by Charles Lamb
The Necklace, by Guy de Maupassant

A Shadow, by R.K.Narayan
Glory at Twilight, Bhabani Bhattacharya

Module X: Poems

All the Worlds a Stage	Shakespeare
To Autumn	Keats
O! Captain, My Captain.	Walt Whitman
Where the Mind is Without Fear	Rabindranath Tagore
Psalm of Life	H.W. Longfellow

Examination Scheme:

Components	A	CT	HA	EE
Weightage (%)	05	15	10	70

Text & References:

Text

- Madhulika Jha, Echoes, Orient Long Man
- Ramon & Prakash, Business Communication, Oxford.

Reference

Sydney Greenbaum Oxford English Grammar, Oxford.

- Successful Communications, Malra Treece (Allyn and Bacon)
- Effective Technical Communication, M. Ashraf Rizvi.

Course Name	Course Code	LTP	Credit	Semester
BEHAVIOURAL SCIENCE - I (UNDERSTANDING SELF FOR EFFECTIVENESS)	BSS 104	1:0:0	1	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Demonstrate awareness of self and the process of self-exploration.
CLO 2	Demonstrate knowledge of strategies for developing a healthy self-esteem.
CLO 3	Recognize the importance of attitudes and its effect on personality.
CLO 4	Identify the difference between healthy and unhealthy expression of emotions and develop emotional competence necessary for personal and professional life.

Course Objective:

This course aims at imparting:

- Understanding self & process of self exploration
- Learning strategies for development of a healthy self esteem
- Importance of attitudes and its effective on personality
- Building Emotional Competence

Course Contents:

Module I: Self: Core Competency
Understanding of Self
Components of Self – Self identity
Self concept
Self confidence
Self image

Module II: Techniques of Self Awareness
Exploration through Johari Window
Mapping the key characteristics of self
Framing a charter for self
Stages – self awareness, self acceptance and self realization

Module III: Self Esteem & Effectiveness
Meaning and Importance
Components of self esteem
High and low self esteem
Measuring your self esteem

Module IV: Building Positive Attitude
Meaning and nature of attitude
Components and Types of attitude
Importance and relevance of attitude

Module V: Building Emotional Competence
Emotional Intelligence – Meaning, components, Importance and Relevance
Positive and Negative emotions
Healthy and Unhealthy expression of emotions

Module VI: End-of-Semester Appraisal
Viva based on personal journal

Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

Text

- Organizational Behaviour, Davis, K.
- Hoover, Judhith D. Effective Small Group and Team Communication, 2002,Harcourt College Publishers
- Dick, Mc Cann & Margerison, Charles: Team Management, 1992 Edition, viva books
- Bates, A. P. and Julian, J.: Sociology - Understanding Social Behaviour
- Dressler, David and Cans, Donald: The Study of Human Interaction
- Lapiere, Richard. T – Social Change

Reference

- Lindzey, G. and Borgatta, E: Sociometric Measurement in the Handbook of Social Psychology, Addison – Welsley, US.
- Rose, G.: Oxford Textbook of Public Health, Vol.4, 1985.
- LaFasto and Larson: When Teams Work Best, 2001, Response Books (Sage), New Delhi
- J William Pfeiffer (ed.) Theories and Models in Applied Behavioural Science, Vol 2, Group (1996); Pfeiffer & Company
- Smither Robert D.; The Psychology of Work and Human Performance, 1994, Harper Collins College Publishers

Course Name	Course Code	LTP	Credit	Semester
FRENCH	FLT 101	2:0:0	2	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone Basic language skills such as reading, writing, speaking, listening & interactive in the language
CLO 2	Students will be able to read and interpret small texts
CLO 3	Students will be able to communicate in small sentences in writing, self-introduction, family description etc.
CLO 4	Students will be able to communicate in small sentences in oral, self-introduction, family description etc.

Course Objective:

To familiarize the students with the French language

- with the phonetic system
- with the syntax
- with the manners
- with the cultural aspects

Course Contents:

Module A: pp. 01 to 37: Unités 1, 2, Unité 3 Objectif 1, 2
Only grammar of Unité 3: objectif 3, 4 and 5

Contenu lexical: Unité 1 : Découvrir la langue française : (oral et écrit)

1. se présenter, présenter quelqu'un, faire la connaissance des autres, formules de politesse, rencontres
2. dire/interroger si on comprend
3. Nommer les choses

Unité 2: Faire connaissance

1. donner/demander des informations sur une personne, premiers contacts, exprimer ses goûts et ses préférences
2. Parler de soi: parler du travail, de ses activités, de son pays, de sa ville.

Unité 3: Organiser son temps

1. dire la date et l'heure

Contenu grammatical:

1. organisation générale de la grammaire
2. article indéfini, défini, contracté
3. nom, adjectif, masculin, féminin, singulier et pluriel
4. négation avec « de », "moi aussi", "moi non plus"
5. interrogation : Inversion, est-ce que, qui, que, quoi, qu'est-ce que, où, quand, comment, quel(s), quelle(s)
   Interro-négatif : réponses : oui, si, non
6. pronom tonique/disjoint- pour insister après une préposition
7. futur proche

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- le livre à suivre : Campus: Tome 1

Course Name	Course Code	LTP	Credit	Semester
GERMAN	FLG 101	2:0:0	2	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone Basic language skills such as reading, writing, speaking, listening & interactive in the language
CLO 2	Students will be able to read and interpret small texts
CLO 3	Students will be able to communicate in small sentences in writing, self-introduction, family description etc.
CLO 4	Students will be able to communicate in small sentences in oral, self-introduction, family description etc.

Course Objective:

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.
To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany

Course Contents:

Module I: Introduction
Self introduction: heissen, kommen, wohnwn, lernen, arbeiten, trinken, etc.
All personal pronouns in relation to the verbs taught so far.
Greetings: Guten Morgen!, Guten Tag!, Guten Abend!, Gute Nacht!, Danke sehr!, Danke!, Vielen Dank!, (es tut mir Leid!),
Hallo, wie geht's?: Danke gut!, sehr gut!, prima!, ausgezeichnet!,
Es geht!, nicht so gut!, so la la!, miserabel!

Module II: Interviewspiel
To assimilate the vocabulary learnt so far and to apply the words and phrases in short dialogues in an interview – game for self introduction.

Module III: Phonetics
Sound system of the language with special stress on Dipthongs

Module IV: Countries, nationalities and their languages
To make the students acquainted with the most widely used country names, their nationalitie and the language spoken in that country.

Module V: Articles
The definite and indefinite articles in masculine, feminine and neuter gender. All Vegetables, Fruits, Animals, Furniture, Eatables, modes of Transport

Module VI: Professions
To acquaint the students with professions in both the genders with the help of the verb "sein".

Module VII: Pronouns
Simple possessive pronouns, the use of my, your, etc.
The family members, family Tree with the help of the verb "to have"

Module VIII: Colours
All the color and color related vocabulary – colored, colorful, colorless, pale, light, dark, etc.

Module IX: Numbers and calculations – verb "kosten"
The counting, plural structures and simple calculation like addition, subtraction, multiplication and division to

test the knowledge of numbers.
“Wie viel kostet das?”

Module X: Revision list of Question pronouns
W – Questions like who, what, where, when, which, how, how many, how much, etc.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

Text
- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer

Reference
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

Course Name	Course Code	LTP	Credit	Semester
SPANISH	FLS 101	2:0:0	2	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone Basic language skills such as reading, writing, speaking, listening & interactive in the language
CLO 2	Students will be able to read and interpret small texts
CLO 3	Students will be able to communicate in small sentences in writing, self introduction, family description etc.
CLO 4	Students will be able to communicate in small sentences in oral, self introduction, family description etc.

Course Objective:

To enable students acquire the relevance of the Spanish language in today's global context, how to greet each other. How to present / introduce each other using basic verbs and vocabulary

Course Contents:

Module I
A brief history of Spain, Latin America, the language, the culture…and the relevance of Spanish language in today's global context.
Introduction to alphabets

Module II
Introduction to '*Saludos*' (How to greet each other. How to present / introduce each other).
Goodbyes (despedidas)
The verb *llamarse* and practice of it.

Module III
Concept of Gender and Number
Months of the years, days of the week, seasons. Introduction to numbers 1-100, Colors, Revision of numbers and introduction to ordinal numbers.

Module IV
Introduction to *SER* and *ESTAR* (both of which mean To Be).Revision of '*Saludos*' and '*Llamarse*'. Some adjectives, nationalities, professions, physical/geographical location, the fact that spanish adjectives have to agree with gender and number of their nouns. Exercises highlighting usage of *Ser* and *Estar.*

Module V
Time, demonstrative pronoun (Este/esta, Aquel/aquella etc)

Module VI
Introduction to some key AR /ER/IR ending regular verbs.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

Text

- Español, En Directo I A

Reference
- Español Sin Fronteras

Course Name	Course Code	LTP	Credit	Semester
CHINESE	FLC 101	2:0:0	2	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone Basic language skills such as reading, writing, speaking, listening & interactive in the language
CLO 2	Students will be able to read and interpret small texts
CLO 3	Students will be able to communicate in small sentences in writing, self introduction, family description etc.
CLO 4	Students will be able to communicate in small sentences in oral, self introduction, family description etc.

Course Objective:

There are many dialects spoken in China, but the language which will help you through wherever you go is Mandarin, or Putonghua, as it is called in Chinese. The most widely spoken forms of Chinese are Mandarin, Cantonese, Gan, Hakka, Min, Wu and Xiang. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I
Show pictures, dialogue and retell.
Getting to know each other.
Practicing chart with Initials and Finals. (CHART – The Chinese Phonetic Alphabet Called "Hanyu Pinyin" in Mandarin Chinese.)
Practicing of Tones as it is a tonal language.
Changes in 3rd tone and Neutral Tone.

Module II
Greetings
Let me Introduce
The modal particle "ne".
Use of Please 'qing" – sit, have tea …….. etc.
A brief self introduction – Ni hao ma? Zaijian!
Use of "bu" negative.

Module III
Attributives showing possession
How is your Health? Thank you
Where are you from?
A few Professions like – Engineer, Businessman, Doctor, Teacher, Worker.
Are you busy with your work?
May I know your name?

Module IV
Use of "How many" – People in your family?
Use of "zhe" and "na".
Use of interrogative particle "shenme", "shui", "ma" and "nar".
How to make interrogative sentences ending with "ma".
Structural particle "de".
Use of "Nin" when and where to use and with whom. Use of guixing.
Use of verb "zuo" and how to make sentences with it.

Module V
Family structure and Relations.
Use of "you" – "mei you".
Measure words
Days and Weekdays.
Numbers.
Maps, different languages and Countries.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- "Elementary Chinese Reader Part I" Lesson 1-10

Course Name	Course Code	LTP	Credit	Semester
Anandam	AND001	0:0:0	2	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Awareness and empathy regarding community issues
CLO 2	Interaction with the community and impact on society
CLO 3	Interaction with mentor and development of Student teacher relationship
CLO 4	Interaction among students, enlarge social network
CLO 5	Cooperative and Communication skills and leadership qualities
CLO 6	Critical thinking, Confidence and Efficiency

Course Objectives:

After the completion of this course, students will be able to:

- apply their knowledge and skills to solve specific community problem
- learn to plan, lead, and organize community events have a sense of belonging to their college campus and community and find something they are interested in doing during their free time
- make new friends, expand social network, and boost social skills and mental health.
- be useful to society as it will protect them against stress, frustration, and depression

Course Contents:

The project report should be guided by the mentor and shall contain:

- **Synopsis**: clearly stating objectives and activities to be undertaken. Problem identifying and problem-solving projects to be taken up.
- Details of the **Mentor and the Participants are to** be given (name of mentor, name of participants, phone number/mobile no, email, and address)
- Location / community where the work was carried out
- Details of Activities performed are to be given with date
- Number of beneficiaries and impact on the society (the object should be to empower the community and make them self-reliant)
- Photographs taken for documentation of work should be submitted
- Media coverage of the projects should be attached if any
- The Group Community Service Project Report will be submitted by the Student group leader under the guidance of the mentor to the Director/HoIs of the Department.
- The Director/HoIs should get the best report (more than one if required) of the Group Community Service Project uploaded on the HTE website and on the University page
- The Director/HoIs will forward the best report of the department to the Nodal Officer of the University.
- University will forward the report to the state level committee.

GUIDELINES FOR GCSP (Group Community Service Project)
ASSIGNMENT OF ANANDAM FOR SOCIAL AWARENESS (for students)

1. Each member of the group shall write one blog about the decided topic of 500 words (minimum) along with any relevant photos/diagrams/statistical data (with reference).
2. The group member shall write his/her name at the end of the blog.
3. The blog shall be posted on Instagram and Facebook (apart from these any other website wherever the group seems necessary).
4. Print out of the blog where date of when the content is posted, number of followers, comments, name of the writer shall be visible will be taken and file will be maintained for the same.
5. In the cover page of the project mention heading **"Group Community Service Project"**, and the filled format of final project report given by Anandam Scheme.
6. For the topic chosen by the group, students are recommended to cover the following points:
    a) Current scenario (Regional, national and international level as applicable)
    b) Future predictions
    c) Duty of the government
    d) Government policies (related to the topic), if any
    e) Duty of public
    f) Conclusion

Evaluation Scheme:

Project Participation: 2 hours X 8 days (per month) X 4 months = 64 hours

- **C grade =32 hrs (Below 20 marks)**
- **B grade >32 hrs to <=44hrs (20-30 marks)**
- **A grade >44 hrs to<=54hrs (30-40 marks)**
- **O grade >54 hrs to<=64hrs (40-50 marks)**

Evaluation Criteria:

Respective Departmental Anandam mentors are requested to evaluate the project (out of 50) as per the following criteria:

1. Position and exceptions, if any, are clearly stated. The organization of the blog is completely and clearly outlined and implemented.
2. The body of the blog is coherently organized, original and the logic is easy to follow. There is no spelling or grammatical errors and terminology is clearly defined. Writing is clear, concise, and persuasive.
3. Conclusion is clearly stated. The underlying logic is explicit.

Course Name	Course Code	LTP	Credit	Semester
APPLIED MATHEMATICS – II	AM 201	4:0:0	4	2

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Solve system of linear equations; be familiar with the definition and properties of matrix; find the eigenvalues and eigenvectors of a square matrix.
CLO 2	Investigate the convergence of infinite series using different tests.
CLO 3	Calculate the measure of central tendency, moments, skewness and kurtosis.
CLO 4	Develop knowledge of basic discrete and continuous distributions (Binomial, Poisson, Normal) and how to work with them.
CLO 5	Apply the method to use complex variable and complex valued functions and able to perform their differentiation and integration

Course Objective:

The knowledge of Mathematics is necessary for a better understanding of almost all the Engineering and Science subjects. Here our intention is to make the students acquainted with the concept of basic topics from Mathematics, which they need to pursue their Engineering degree in different disciplines.

Course Contents:

Module I: Linear Algebra

Hermitian and Skew Hermitian Matrix, Unitary Matrix, Orthogonal Matrix, Elementary Row Transformation, Reduction of a Matrix to Row Echelon Form, Rank of a Matrix, Consistency of Linear Simultaneous Equations, Gauss Elimination Method, Gauss-Jordan Method, Eigen Values and Eigen Vectors of a Matrix, Caley-Hamilton Theorem, Diagonalization of a Matrix, Vector Space, Linear Independence and Dependence of Vectors, Linear Transformations.

Module II: Infinite Series

Definition of Sequence, Bounded Sequence, Limit of a Sequence, Series, Finite and Infinite Series, Convergence and Divergence of Infinite series, Cauchy's Principle of Convergence, Positive Term Infinite Series, Comparison test, D'Alembert's Ratio test. Raabe's Test, Cauchy's nth root Test. Logarithmic Test, Alternating Series, Leibnitz's Test, Absolute and conditioinal convergence, Uniform Convergence, Power Series and its Interval of Convergence.

Module III: Complex Analysis

De Moivre's Theorem and Roots of Complex Numbers, Logarithmic Functions, Circular, Hyperbolic Functions and their Inverses.

Functions of a Complex Variables, Limits, Continuity and Derivatives, Analytic Function, Cauchy-Riemann Equations (without proof), Harmonic Function, Harmonic Conjugates, Conformal Mapping, Bilinear Transformations, Complex Line Integral, Cauchy Integral Theorem, Cauchy Integral Formula, Derivative of Analytic Function, Power Series, Taylor Series, Laurent Series, Zeroes and Singularities, Residues, Residue Theorem, Evaluation of Real Integrals of the Form $\int_0^{2\pi} F(\cos\theta, \sin\theta)\, d\theta$ and $\int_{-\infty}^{\infty} \frac{f(x)}{F(x)}\, dx$.

Module IV: Statistics and Probability

Moments, Skewness, Kurtosis, Random Variables and Probability Distribution, Mean and Variance of a Probability Distribution, Binomial Distribution, Poisson Distribution and Normal Distribution.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

Text & References:

Text

- Engineering Mathematics by Erwin Kreyszig.
- Engineering Mathematics by R.K. Jain and S.R.K. Iyengar.
- Higher Engineering Mathematics by H.K. Dass.

Reference

- Engineering Mathematics by B.S. Grewal.
- Differential Calculus by Shanti Narain.
- Integral Calculus by Shanti Narain.
- Linear Algebra- Schaum Outline Series.

Course Name	Course Code	LTP	Credit	Semester
APPLIED PHYSICS - II - MODERN PHYSICS	AP 202	3:0:0	3	2

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Define and understand space and time and the variations in other related fundamental quantities such as mass, velocity and force.
CLO 2	Solve simple problems relating to the above concepts.
CLO 3	Explain by extending the understanding as laid down in Quantum theory to other phenomenon as observed in sub-atomic Physics and also to solve simple problems in Quantum Theory
CLO 4	Appreciate and understand the various spectra as observed during electronic transitions
CLO 5	Understand the way nature has endowed properties to materials.

Course Objective:

Aim of this course is to introduce the students to fundamentals of graduate level physics which form the basis of all applied science and engineering

Course Contents:

Module I: Special Theory of Relativity
Michelson-Morley experiment, Importance of negative result, Inertial & non-inertial frames of reference, Einstein's postulates of Special theory of Relativity, Space-time coordinate system, Relativistic Space Time transformation (Lorentz transformation equation), Transformation of velocity, Addition of velocities, Length contraction and Time dilation, Mass-energy equivalence (Einstein's energy mass relation) & Derivation of Variation of mass with velocity,

Module II: Wave Mechanics
Wave particle duality, De-Broglie matter waves, phase and group velocity, Heisenberg uncertainty principle, wave function and its physical interpretation, Operators, expectation values. Time dependent & time independent Schrödinger wave equation for free & bound states, square well potential (rigid wall), Step potential.

Module III: Atomic Physics
Vector atom model, LS and j-j coupling, Zeceman effect (normal & anomalous), Paschen-Bach effect, X-ray spectra and energy level diagram, Moseleys Law, Lasers – Einstein coefficients, conditions for light amplification, population inversion, optical pumping, three level and four level lasers, He-Ne and Ruby laser, Properties and applications of lasers.

Module IV: Solid State Physics
Sommerfield's free electron theory of metals, Fermi energy, Introduction to periodic potential & Kronig-Penny model (Qualitative) Band Theory of Solids, Semi-conductors: Intrinsics and Extrinsic Semiconductors, photoconductivity and photovotaics, Basic aspects of Superconductivity, Meissner effect.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text

- Concept of Modern Physics, A. Beiser
- Applied Physics II, Agarawal & Goel

Reference

- Solid State Physics, S. O. Pallai
- Physics of Atom, Wehr & Richards

Course Name	Course Code	LTP	Credit	Semester
OBJECT ORIENTED PROGRAMMING USING C++	BCS 203	3:0:0	3	2

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Interpret the characteristics of an object-oriented programming language in a program and advanced features of the C++ programming language as a continuation of the previous course.
CLO 2	Define classes and objects using C++ language to solve real world problems
CLO 3	Apply inheritance and polymorphism through programming
CLO 4	Conclude methods of handling files and strings using C++ and apply exception handling in real world applications.

Course Objective:

The objective of this module is to introduce object oriented programming. To explore and implement the various features of OOP such as inheritance, polymorphism, Exceptional handling using programming language C++. After completing this course student can easily identify the basic difference between the programming approaches like procedural and object oriented.

Course Contents:

Module I: Introduction

Review of C, Difference between C and C++, Procedure Oriented and Object Oriented Approach. Basic Concepts: Objects, classes, Principals like Abstraction, Encapsulation, Inheritance and Polymorphism. Dynamic Binding, Message Passing. Characteristics of Object-Oriented Languages. Introduction to Object-Oriented Modeling techniques (Object, Functional and Dynamic Modeling).

Module II: Classes and Objects

Abstract data types, Object & classes, attributes, methods, C++ class declaration, Local Class and Global Class, State identity and behaviour of an object, Local Object and Global Object, Scope resolution operator, Friend Functions, Inline functions, Constructors and destructors, instantiation of objects, Types of Constructors, Static Class Data, Array of Objects, Constant member functions and Objects, Memory management Operators.

Module III: Inheritance

Inheritance, Types of Inheritance, access modes – public, private & protected, Abstract Classes, Ambiguity resolution using scope resolution operator and Virtual base class, Aggregation, composition vs classification hiérarchies, Overriding inheritance methods, Constructors in derived classes, Nesting of Classes.

Module IV: Polymorphism

Polymorphism, Type of Polymorphism – Compile time and runtime, Function Overloading, Operator Overloading (Unary and Binary) Polymorphism by parameter, Pointer to objects, this pointer, Virtual Functions, pure virtual functions.

Module V: Strings, Files and Exception Handling

Manipulating strings, Streams and files handling, formatted and Unformatted Input output. Exception handling, Generic Programming – function template, class Template Standard Template Library: Standard Template Library, Overview of Standard Template Library, Containers, Algorithms, Iterators, Other STL Elements, The Container Classes, General Theory of Operation, Vectors.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text:

- A.R. Venugopal, Rajkumar, T. Ravishanker "Mastering C++", TMH, 1997
- R. Lafore, "Object Oriented Programming using C++", BPB Publications, 2004.
- "Object Oriented Programming with C++" By E. Balagurusamy.
- Schildt Herbert, "C++: The Complete Reference", Wiley DreamTech, 2005.

References:

- Parasons, "Object Oriented Programming with C++", BPB Publication, 1999.
- Steven C. Lawlor, "The Art of Programming Computer Science with C++", Vikas Publication, 2002.
- Yashwant Kanethkar, "Object Oriented Programming using C++", BPB, 2004

Course Name	Course Code	LTP	Credit	Semester
ENGINEERING MECHANICS	BME 204	3:0:0	3	2

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Able to analyse the force system and its effects.
CLO 2	Explain the nature of forces acting upon a system.
CLO 3	Evaluate the static and dynamic system's problem

Course Objective:

Objective of this course is to provide fundamental knowledge of force system and its effect on the behaviour of the bodies that may be in dynamic or in static state. It includes the equilibrium of different structures like beams, frames, truss etc and the force transfer mechanism in the different components of a body under given loading condition.

Course Contents:

Module I: Force system & Structure
Free body diagram, Equilibrium equations and applications. Plane truss, perfect and imperfect truss, assumption in the truss analysis, analysis of perfect plane trusses by the method of joints, method of section.

Module II: Friction
Static and Kinetic friction, laws of dry friction, co-efficient of friction, angle of friction, angle of repose, cone of friction, friction lock, efficiency of screw jack, transmission of power through belt

Module III: Distributed Force
Determination of center of gravity, center of mass and centroid by direct integration and by the method of composite bodies, mass moment of inertia and area moment of inertia by direct integration and composite bodies method, radius of gyration, parallel axis theorem, Pappus theorems and its application, polar moment of inertia.

Module IV: Work -Energy
Work energy equation, conservation of energy, Virtual work, impulse, momentum conservation, impact of bodies, co-efficient of restitution, loss of energy during impact, D'alembert principle

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text
- S.S. Bhavikatti, Engineering Mechanics, New Age International Ltd
- Timoshenko, Engineering Mechanics, McGraw Hill

Reference
- R. S. Khurmi, Engineering Mechanics, S. Chand Publication
- I. H. Shames & G. K. M. Rao, Engineering Mechanics, Pearson Education, 2006

Course Name	Course Code	LTP	Credit	Semester
ENGINEERING GRAPHICS	BME 205	1:0:0	1	2

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Describe the theory of scales, engineering curves, different Projection used in engineering drawing.
CLO 2	Draw the different engineering curves, maps and projection of planes and solid accurately.
CLO 3	Identify different geometrical shape and their application used in engineering application.

Course Contents:

Module 1:
Scales & Curves:Representative factor, Plain Scales, Diagonal Scales, Comperative Scales and Scale of chords. Construction of ellipse, Parabola, Hyperbola, Cycloid, Epicycloid, Hypocycloid, Involutes and Spirals by various methods.

Module 2:
Projection of Points & Straight lines:Projection of points, Projection of straight lines. True inclinations and true length of straight lines.

Module 3:
Projection of planes and solids:Projection of circle, triangle, polygons, polyhedrons, pyramids, cylinders and cones in different positions.

Module 1:
Section of solids and Isometric projections:Section of right solids by normal and inclined planes, Orthographic projection, first angle & third angle projection. Isometric scale, Isometric axes, Isometric projection from orthographic drawing.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text

- Engineering Graphics – Basant Agrawal and Dr. C. M. Agrawal, Tata McGraw-Hill Publishing Company Ltd.
- Engineering Drawing – by N. D. Bhatt

Reference

- Engineering Drawing and Graphics – by Veenugopal
- Engineering Drawing – by T. Jeyopoovan

Course Name	Course Code	LTP	Credit	Semester
DOMAIN WORKSHOP	BME 206	1:0:0	1	2

Course Objective:

The subject aims at imparting knowledge and skill components in the field of basic workshop technology. It deals with different hand and machine tools required for manufacturing simple metal components and articles.

Course Contents:

Module 1: Layout of workshop

Workshop layout, Importance of various sections/shops of workshop, Types of jobs done in each shop, General safety rules and work procedure in workshop.

Module 2: Fitting Shop

Demonstration of various fitting operations such as chipping, filing, scraping, grinding, sawing, marking, drilling, tapping. Preparation of simple and male- female joints.

Module 3: Welding Shop

Shielded metal arc welding, Metal Arc welding, tungsten inert arc welding , gas welding.

Module 4: Moulding Shop

Types of moulds, Step involved in making a mould, Moulding boxes, hand tools used for mould making, Moluding processes: Bench moulding, floor moulding, pit moulding and machine moulding, Moulding machines squeeze machine, jolt squeeze machine and sand slinger.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

1. Workshop Technology by BS Raghuvanshi : Dhanpat Rai and Sons Delhi
2. Elements of Workshop Technology by SK Choudhry and Hajra : Asia Publishing House
3. Welding Engineering by RL Aggarwal and T Manghnani; Khanna Publishers, Delhi
4. A Text Book of Production Engineering by PC Sharma; S Chand and Company Ltd. Delhi
5. Foundry Technology by KP Sinha and DB Goel; Roorkee Publishng House, Roorkee.
6. A Text Book of Manufacturing Science and Technology by A Manna, Prentice Hall of India, Delhi.

Course Name	Course Code	LTP	Credit	Semester
APPLIED PHYSICS LAB – II- MODERN PHYSICS LAB	AP 222	0:0:1	1	2

List of Experiments:

1. To determine the wavelength of prominent lines of mercury spectrum using plane transmission grating.
2. To determine the thickness of a given wire by Wedge method.
3. To determine the wavelength of He-Ne laser light using single slit.
4. To determine the frequency of an electrically maintained tunning fork by Melde's method.
5. To study the variation of magnetic field along the axis of Helmholtz coil and to find out reduction factor.
6. To draw the V – I characteristics of a forward and reverse bias PN junction diode.
7. To determine the frequency of AC mains using sonometer.
8. To determine the energy band-gap of Germanium crystal using four probes method.
9. To draw V – I characteristics of a photocell and to verify the inverse square law of radiation.
10. To determine the acceleration due to gravity ('g') using Keter's reversible pendulum.
11. To study the characteristics of photo voltaic cell (solar cell).

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

Course Name	Course Code	LTP	Credit	Semester
OBJECT ORIENTED PROGRAMMING USING C++ LAB	BCS 223	0:0:1	1	2

List of Experiments:

- Creation of objects in programs and solving problems through them.
- Different use of private, public member variables and functions and friend functions.
- Use of constructors and destructors.
- Operator overloading
- Use of inheritance in and accessing objects of different derived classes.
- Polymorphism and virtual functions (using pointers).
- File handling.

Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

Course Name	Course Code	LTP	Credit	Semester
ENGINEERING MECHANICS LAB	BME 224	0:0:1	1	2

List of Experiments:

- To verify the law of Force Polygon
- To verify the law of Moments using Parallel Force apparatus. (Simply supported type)
- To determine the co-efficient of friction between wood and various surface (like
- Leather, Wood, Aluminum) on an inclined plane.
- To find the forces in the members of Jib Crane.
- To determine the mechanical advantage, Velocity ratio and efficiency of a screw jack.
- To determine the mechanical advantage, Velocity ratio and Mechanical efficiency of the Wheel and Axle
- To determine the MA, VR, η of Worm Wheel (2-start)
- Verification of force transmitted by members of given truss.
- To verify the law of moments using Bell crank lever
- To find CG and moment of Inertia of an irregular body using Computation method

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

Course Name	Course Code	LTP	Credit	Semester
ENGINEERING GRAPHICS LAB	BME 225	0:0:1	1	2

List of Experiments:

- Sketching and drawing of scale & Curve.
- Sketching and drawing of Cycloidal Curve.
- Sketching and drawing of Involute & Spirals.
- Sketching and drawing of points & line.
- Sketching and drawing of projection of planes.
- Sketching and drawing of projection of solids.
- Sketching and drawing of intersection of surfaces.
- Sketching and drawing of development of surfaces.
- Sketching and drawing of orthographic and isometric projection.

Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

Course Name	Course Code	LTP	Credit	Semester
ENGLISH	BCS 201	1:0:0	1	2

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Participate in conversation and in small- and whole-group discussion
CLO 2	Explore and use English as medium of communication in real life situation
CLO 3	Discuss topics and themes of a reading, using the vocabulary and grammar of the lesson
CLO 4	Identify features of a reading textbook and utilize them as needed
CLO 5	Prepare and deliver organized presentations in small groups and to whole class
CLO 6	Apply sentence mechanics and master spelling of high frequency words

Course Objective:

The course is intended to give a foundation of English Language. The literary texts are indented to help students to inculcate creative & aesthetic sensitivity and critical faculty through comprehension, appreciation and analysis of the prescribed literary texts. It will also help them to respond form different perspectives.

Course Contents:

Module I: Vocabulary
Use of Dictionary
Use of Words: Diminutives, Homonyms & Homophones

Module II: Essentials of Grammar - I
Articles
Parts of Speech
Tenses

Module III: Essentials of Grammar - II
Sentence Structure
Subject -Verb agreement
Punctuation

Module IV: Communication
The process and importance
Principles & benefits of Effective Communication

Module V: Spoken English Communication
Speech Drills
Pronunciation and accent
Stress and Intonation

Module VI: Communication Skills - I
Developing listening skills
Developing speaking skills

Module VII: Communication Skills - II
Developing Reading Skills
Developing writing Skills

Module VIII: Written English communication
Progression of Thought/ideas
Structure of Paragraph
Structure of Essays

Module IX: Short Stories
Of Studies, by Francis Bacon
Dream Children, by Charles Lamb
The Necklace, by Guy de Maupassant
A Shadow, by R.K.Narayan
Glory at Twilight, Bhabani Bhattacharya

Module X: Poems

All the Worlds a Stage	Shakespeare
To Autumn	Keats
O! Captain, My Captain.	Walt Whitman
Where the Mind is Without Fear	Rabindranath Tagore
Psalm of Life	H.W. Longfellow

Examination Scheme:

Components	A	CT	HA	EE
Weightage (%)	05	15	10	70

Text & References:

Text
- Madhulika Jha, Echoes, Orient Long Man
- Ramon & Prakash, Business Communication, Oxford.

Reference
- Sydney Greenbaum Oxford English Grammar, Oxford.
- Successful Communications, Malra Treece (Allyn and Bacon)
- Effective Technical Communication, M. Ashraf Rizvi.

Course Name	Course Code	LTP	Credit	Semester
BEHAVIOURAL SCIENCE - II (PROBLEM SOLVING AND CREATIVE THINKING)	BSS 204	1:0:0	1	2

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Recognize the relation critical thinking with various mental processes.
CLO 2	Identify hindrance to problem solving processes.
CLO 3	Analyze the steps in problem-solving process.Create plan of action applying creative thinkings

Course Objective:

To enable the students:

- Understand the process of problem solving and creative thinking.
- Facilitation and enhancement of skills required for decision-making.

Course Contents:

Module I: Thinking as a tool for Problem Solving
What is thinking: The Mind/Brain/Behaviour
Critical Thinking and Learning:
Making Predictions and Reasoning
Memory and Critical Thinking
Emotions and Critical Thinking
Thinking skills

Module II: Hindrances to Problem Solving Process
Perception
Expression
Emotion
Intellect
Work environment

Module III: Problem Solving
Recognizing and Defining a problem
Analyzing the problem (potential causes)
Developing possible alternatives
Evaluating Solutions
Resolution of problem
Implementation
Barriers to problem solving:
Perception
Expression
Emotion
Intellect
Work environment

Module IV: Plan of Action
Construction of POA
Monitoring
Reviewing and analyzing the outcome

Module V: Creative Thinking
Definition and meaning of creativity
The nature of creative thinking
Convergent and Divergent thinking
Idea generation and evaluation (Brain Storming)

Image generation and evaluation
Debating
The six-phase model of Creative Thinking: ICEDIP model

Module VI: End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

Text

- Michael Steven: How to be a better problem solver, Kogan Page, New Delhi, 1999
- Geoff Petty: How to be better at creativity; Kogan Page, New Delhi, 1999
- Richard Y. Chang and P. Keith, Kelly: Wheeler Publishing, New Delhi, 1998.
- Phil Lowe Koge Page: Creativity and Problem Solving, New Delhi, 1996

Reference

- J William Pfeiffer (ed.) Theories and Models in Applied Behavioural Science, Vol 3, Management (1996); Pfeiffer & Company
- Bensley, Alan D.: Critical Thinking in Psychology – A Unified Skills Approach, (1998), Brooks/Cole Publishing Company.

Course Name	Course Code	LTP	Credit	Semester
FRENCH	FLF 201	2:0:0	2	2

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone Basic language skills such as reading, writing, speaking, listening & interactive in the language
CLO 2	Students will be able to read and interpret small texts .
CLO 3	Students will be able to communicate in small sentences in writing, self introduction, family description etc.
CLO 4	Students will be able to communicate in small sentences in oral, self introduction, family description etc

Course Objective:

To enable the students to overcome the fear of speaking a foreign language and take position as a foreigner speaking French.

To make them learn the basic rules of French Grammar.

Course Contents:

Module A: pp.38 – 47: Unité 3 : Objectif 3, 4, 5. 6

Module B: pp. 47 to 75 Unité 4, 5

Contenu lexical:

Unité 3: Organiser son temps

1. donner/demander des informations sur un emploi du temps, un horaire SNCF – Imaginer un dialogue
2. rédiger un message/ une lettre pour …
   i) prendre un rendez-vous/ accepter et confirmer/ annuler
   ii) inviter/accepter/refuser
3. Faire un programme d'activités
   imaginer une conversation téléphonique/un dialogue
   Propositions- interroger, répondre

Unité 4: Découvrir son environnement

1. situer un lieu
2. s'orienter, s'informer sur un itinéraire.
3. Chercher, décrire un logement
4. connaître les rythmes de la vie

Unité 5 : s'informer

1. demander/donner des informations sur un emploi du temps passé.
2. donner une explication, exprimer le doute ou la certitude.
3. découvrir les relations entre les mots
4. savoir s'informer

Contenu grammatical:

1. Adjectifs démonstratifs
2. Adjectifs possessifs/exprimer la possession à l'aide de :
   i. « de » ii. A+nom/pronom disjoint
3. Conjugaison pronominale – négative, interrogative - construction à l'infinitif
4. Impératif/exprimer l'obligation/l'interdiction à l'aide de « il faut…. »/ «il ne faut pas… »
5. passé composé
6. Questions directes/indirectes

Examination Scheme:

Components	CT1	CT2	C	I	V	A

Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- le livre à suivre : Campus: Tome 1

Course Name	Course Code	LTP	Credit	Semester
GERMAN	FLG 201	2:0:0	2	2

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone Basic language skills such as reading, writing, speaking, listening & interactive in the language
CLO 2	Students will be able to read and interpret small texts
CLO 3	Students will be able to communicate in small sentences in writing, self introduction, family description etc.
CLO 4	Students will be able to communicate in small sentences in oral, self introduction, family description etc.

Course Objective:

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.
To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany. Introduction to Grammar to consolidate the language base learnt in Semester I

Course Contents:

Module I: Everything about Time and Time periods
Time and times of the day.
Weekdays, months, seasons.
Adverbs of time and time related prepositions

Module II: Irregular verbs
Introduction to irregular verbs like to be, and others, to learn the conjugations of the same, (fahren, essen, lessen, schlafen, sprechen und ähnliche).

Module III: Separable verbs
To comprehend the change in meaning that the verbs undergo when used as such
Treatment of such verbs with separable prefixes

Module IV: Reading and comprehension
Reading and deciphering railway schedules/school time table
Usage of separable verbs in the above context

Module V: Accusative case
Accusative case with the relevant articles
Introduction to 2 different kinds of sentences – Nominative and Accusative

Module VI: Accusative personal pronouns
Nominative and accusative in comparison
Emphasizing on the universal applicability of the pronouns to both persons and objects

Module VII: Accusative prepositions
Accusative propositions with their use
Both theoretical and figurative use

Module VIII: Dialogues
Dialogue reading: 'In the market place'
'At the Hotel'

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

Course Name	Course Code	LTP	Credit	Semester
SPANISH	FLS 201	2:0:0	2	2

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone Basic language skills such as reading, writing, speaking, listening & interactive in the language
CLO 2	Students will be able to read and interpret small texts
CLO 3	Students will be able to communicate in small sentences in writing, self introduction, family description etc.
CLO 4	Students will be able to communicate in small sentences in oral, self introduction, family description etc.

Course Objective:

To enable students acquire more vocabulary, grammar, Verbal Phrases to understand simple texts and start describing any person or object in Simple Present Tense.

Course Contents:

Module I
Revision of earlier modules.

Module II
Some more AR/ER/IR verbs. Introduction to root changing and irregular AR/ER/IR ending verbs

Module III
More verbal phrases (eg, Dios Mio, Que lastima etc), adverbs *(bueno/malo, muy, mucho, bastante, poco).*
Simple texts based on grammar and vocabulary done in earlier modules.

Module IV
Possessive pronouns

Module V
Writing/speaking essays like my friend, my house, my school/institution, myself….descriptions of people, objects etc, computer/internet related vocabulary

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español, En Directo I A
- Español Sin Fronteras

Course Name	Course Code	LTP	Credit	Semester
CHINESE	FLC 201	2:0:0	2	2

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone Basic language skills such as reading, writing, speaking, listening & interactive in the language
CLO 2	Students will be able to read and interpret small texts
CLO 3	Students will be able to communicate in small sentences in writing, self introduction, family description etc.
CLO 4	Students will be able to communicate in small sentences in oral, self introduction, family description etc.

Course Objective:

Chinese is a tonal language where each syllable in isolation has its definite tone (flat, falling, rising and rising/falling), and same syllables with different tones mean different things. When you say, "ma" with a third tone, it mean horse and "ma" with the first tone is Mother. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I
Drills
Practice reading aloud
Observe Picture and answer the question.
Tone practice.
Practice using the language both by speaking and by taking notes.
Introduction of basic sentence patterns.
Measure words.
Glad to meet you.

Module II
Where do you live?
Learning different colors.
Tones of "bu"
Buying things and how muchit costs?
Dialogue on change of Money.
More sentence patterns on Days and Weekdays.
How to tell time. Saying the units of time in Chinese. Learning to say useful phrases like – 8:00, 11:25, 10:30 P.M. everyday, afternoon, evening, night, morning 3:58, one hour, to begin, to end ….. etc.
Morning, Afternoon, Evening, Night.

Module III
Use of words of location like-li, wais hang, xia
Furniture – table, chair, bed, bookshelf,.. etc.
Description of room, house or hostel room.. eg what is placed where and how many things are there in it?
Review Lessons – Preview Lessons.
Expression 'yao", "xiang" and "yaoshi" (if).
Days of week, months in a year etc.
I am learning Chinese. Is Chinese difficult?

Module IV
Counting from 1-1000
Use of "chang-chang".
Making an Inquiry – What time is it now? Where is the Post Office?

Days of the week. Months in a year.
Use of Preposition – “zai”, “gen”.
Use of interrogative pronoun – “duoshao” and “ji”.
“Whose”??? Sweater etc is it?
Different Games and going out for exercise in the morning.

Module V
The verb “qu”
- Going to the library issuing a book from the library
- Going to the cinema hall, buying tickets
- Going to the post office, buying stamps
- Going to the market to buy things.. etc
- Going to the buy clothes …. Etc.

Hobby. I also like swimming.
Comprehension and answer questions based on it.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- “Elementary Chinese Reader Part I” Lesson 11-20

Course Name	Course Code	LTP	Credit	Semester
ENVIRONMENTAL STUDIES	EVS 001	4:0:0	4	2

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students able to understand the term environment is used to describe, in the aggregate, all the external forces, influences and conditions, which affect the life, nature, behaviour and the growth, development and maturity of living organisms. At present a great number of environment issues, have grown in size and complexity day by day, threatening the survival of mankind on earth.
CLO 2	Students able to understand environmental studies is to enlighten the masses about the importance of the protection and conservation of our environment and control of human activities which has an adverse effect on the environment.
CLO 3	Students able to study of environmental studies is quite essential in all types of environmental sciences, environmental engineering and industrial management.

Course Objective:

Course Contents:

Module I: The multidisciplinary nature of environmental studies
Definition, scope and importance
Need for public awareness

Module II: Natural Resources
Renewable and non-renewable resources:
Natural resources and associated problems
Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.
Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, case studies.
Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

- Role of an individual in conservation of natural resources.
- Equitable use of resources for sustainable lifestyles.

Module III: Ecosystems
Concept of an ecosystem
Structure and function of an ecosystem
Producers, consumers and decomposers
Energy flow in the ecosystem
Ecological succession
Food chains, food webs and ecological pyramids
Introduction, types, characteristic features, structure and function of the following ecosystem:

a. Forest ecosystem
b. Grassland ecosystem
c. Desert ecosystem
d. Aquatic ecosystems (ponds, streams, lakes, rivers, ocean estuaries)

Module IV: Biodiversity and its conservation
Introduction – Definition: genetic, species and ecosystem diversity

Biogeographical classification of India
Value of biodiversity: consumptive use, productive use, social, ethical aesthetic and option values
Biodiversity at global, national and local levels
India as a mega-diversity nation
Hot-spots of biodiversity
Threats to biodiversity: habitat loss, poaching of wildlife, man wildlife conflicts
Endangered and endemic species of India
Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity

Module V: Environmental Pollution
Definition
Causes, effects and control measures of:

a. Air pollution
b. Water pollution
c. Soil pollution
d. Marine pollution
e. Noise pollution
f. Thermal pollution
g. Nuclear pollution

Solid waste management: Causes, effects and control measures of urban and industrial wastes.
Role of an individual in prevention of pollution.
Pollution case studies.
Disaster management: floods, earthquake, cyclone and landslides.

Module VI: Social Issues and the Environment
From unsustainable to sustainable development
Urban problems and related to energy
Water conservation, rain water harvesting, watershed management
Resettlement and rehabilitation of people; its problems and concerns. Case studies.
Environmental ethics: Issues and possible solutions
Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.
Wasteland reclamation
Consumerism and waste products
Environmental Protection Act
Air (Prevention and Control of Pollution) Act
Water (Prevention and control of Pollution) Act
Wildlife Protection Act
Forest Conservation Act
Issues involved in enforcement of environmental legislation
Public awareness

Module VII: Human Population and the Environment
Population growth, variation among nations
Population explosion – Family Welfare Programmes
Environment and human health
Human Rights
Value Education
HIV / AIDS
Women and Child Welfare
Role of Information Technology in Environment and Human Health
Case Studies

Module VIII: Field Work
Visit to a local area to document environmental assets-river / forest/ grassland/ hill/ mountain.
Visit to a local polluted site – Urban / Rural / Industrial / Agricultural
Study of common plants, insects, birds
Study of simple ecosystems-pond, river, hill slopes, etc (Field work equal to 5 lecture hours)

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text

- Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
- Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad 380 013, India
- Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p
- Clark R.S., Marine Pollution, Clanderson Press Oxford (TB)
- Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Publ. House, Mumabai, 1196p
- De A.K., Environmental Chemistry, Wiley Eastern Ltd.
- Down to Earth, Centre for Science and Environment (R)
- Gleick, H.P. 1993. Water in Crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute Oxford Univ. Press. 473p
- Hawkins R.E., Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay (R)
- Heywood, V.H & Waston, R.T. 1995. Global Biodiversity Assessment. Cambridge Univ. Press 1140p.
- Jadhav, H & Bhosale, V.M. 1995. Environmental Protection and Laws. Himalaya Pub. House, Delhi 284 p.
- Mckinney, M.L. & School, R.M. 1996. Environmental Science Systems & Solutions, Web enhanced edition. 639p.

Reference

- Mhaskar A.K., Matter Hazardous, Techno-Science Publication (TB)
- Miller T.G. Jr. Environmental Science, Wadsworth Publishing Co. (TB)
- Odum, E.P. 1971. Fundamentals of Ecology. W.B. Saunders Co. USA, 574p
- Rao M N. & Datta, A.K. 1987. Waste Water treatment. Oxford & IBH Publ. Co. Pvt. Ltd. 345p.
- Sharma B.K., 2001. Environmental Chemistry. Geol Publ. House, Meerut
- Survey of the Environment, The Hindu (M)
- Townsend C., Harper J, and Michael Begon, Essentials of Ecology, Blackwell Science
- Trivedi R.K., Handbook of Environmental Laws, Rules Guidelines, Compliances and Standards, Vol I and II, Enviro Media (R)
- Trivedi R. K. and P.K. Goel, Introduction to air pollution, Techno-Science Publication (TB)
- Wanger K.D., 1998 Environnemental Management. W.B. Saunders Co. Philadelphia, USA 499p

Course Name	Course Code	LTP	Credit	Semester
Anandam	AND002	0:0:0	2	2

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Awareness and empathy regarding community issues
CLO 2	Interaction with the community and impact on society
CLO 3	Interaction with mentor and development of Student teacher relationship
CLO 4	Interaction among students, enlarge social network
CLO 5	Cooperative and Communication skills and leadership qualities
CLO 6	Critical thinking, Confidence and Efficiency

Course Objectives:

After the completion of this course, students will be able to:

- apply their knowledge and skills to solve specific community problem
- learn to plan, lead, and organize community events have a sense of belonging to their college campus and community and find something they are interested in doing during their free time
- make new friends, expand social network, and boost social skills and mental health.
- be useful to society as it will protect them against stress, frustration, and depression

Course Contents:

The project report should be guided by the mentor and shall contain:

- **Synopsis**: clearly stating objectives and activities to be undertaken. Problem identifying and problem-solving projects to be taken up.
- Details of the **Mentor and the Participants are to** be given (name of mentor, name of participants, phone number/mobile no, email, and address)
- Location / community where the work was carried out
- Details of Activities performed are to be given with date
- Number of beneficiaries and impact on the society (the object should be to empower the community and make them self-reliant)
- Photographs taken for documentation of work should be submitted
- Media coverage of the projects should be attached if any
- The Group Community Service Project Report will be submitted by the Student group leader under the guidance of the mentor to the Director/HoIs of the Department.

- The Director/HoIs should get the best report (more than one if required) of the Group Community Service Project uploaded on the HTE website and on the University page
- The Director/HoIs will forward the best report of the department to the Nodal Officer of the University.
- University will forward the report to the state level committee.

GUIDELINES FOR GCSP (Group Community Service Project) ASSIGNMENT OF ANANDAM FOR SOCIAL AWARENESS (for students)

1. Each member of the group shall write one blog about the decided topic of 500 words (minimum) along with any relevant photos/diagrams/statistical data (with reference).
2. The group member shall write his/her name at the end of the blog.
3. The blog shall be posted on Instagram and Facebook (apart from these any other website wherever the group seems necessary).
4. Print out of the blog where date of when the content is posted, number of followers, comments, name of the writer shall be visible will be taken and file will be maintained for the same.
5. In the cover page of the project mention heading **"Group Community Service Project"**, and the filled format of final project report given by Anandam Scheme.
6. For the topic chosen by the group, students are recommended to cover the following points:
    a) Current scenario (Regional, national and international level as applicable)
    b) Future predictions
    c) Duty of the government
    d) Government policies (related to the topic), if any
    e) Duty of public
    f) Conclusion

Evaluation Scheme:

Project Participation: 2 hours X 8 days (per month) X 4 months = 64 hours

- **C grade =32 hrs (Below 20 marks)**
- **B grade >32 hrs to <=44hrs (20-30 marks)**
- **A grade >44 hrs to<=54hrs (30-40 marks)**
- **O grade >54 hrs to<=64hrs (40-50 marks)**

Evaluation Criteria:

Respective Departmental Anandam mentors are requested to evaluate the project (out of 50) as per the following criteria:

1. Position and exceptions, if any, are clearly stated. The organization of the blog is completely and clearly outlined and implemented.
2. The body of the blog is coherently organized, original and the logic is easy to follow. There is no spelling or grammatical errors and terminology is clearly defined. Writing is clear, concise, and persuasive.
3. Conclusion is clearly stated. The underlying logic is explicit.

Course Name	Course Code	LTP	Credit	Semester
APPLIED MATHEMATICS – III	AM 301	3:0:0	3	3

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Investigate the basic concept about partial differential equations.
CLO 2	Create an interest in finding the solution by Fourier Series and Fourier Transforms.
CLO 3	Apply basic concepts of Laplace Transformation.
CLO 4	Develop the physical problems using optimization techniques.

Course Objective:

The knowledge of Mathematics is necessary for a better understanding of almost all the Engineering and Science subjects. Here our intention is to make the students acquainted with the concept of basic topics from Mathematics, which they need to pursue their Engineering degree in different disciplines.

Course Contents:

Module I: Partial Differential Equations

Formation of PDE, Equations solvable by direct integration, Linear equations of the first order, Non-linear equations of the first order, Charpit's method, Homogeneous linear equations with constant coefficients, Non homogeneous linear equations.

Module II: Fourier Series

Periodic Functions, Fourier Series, Functions having points of discontinuity, Even or Odd Functions, Change of Interval, Half-range series, Parseval's Formula, Complex form of Fourier series, Practical Harmonic Analysis, Fourier Transforms, Sine and Cosine Transforms.

Module III: Laplace Transformation

Definition, Transforms of elementary functions, Properties of Laplace transforms, Existence conditions, Transforms of derivatives, Transforms of integrals, Evaluation of integrals by Laplace transform, Inverse transforms, Other methods of finding inverse transforms, Convolution theorem, Application to differential equations, Simultaneous linear equations with constant coefficients, Unit step functions, Periodic functions.

Module IV: Linear Programming

Formulation of the problem, Graphical method, Canonical and Standard forms of L.P.P. Simplex Method, Artificial variable Techniques-M-method, Two phase method, Degeneracy, Dual simplex method.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;

Att: Attendance.

Text & References:

Text:

- Differential Calculus by Shanti Narain
- Integral Calculus by Shanti Narain
- Higher Engineering Mathematics by B.S. Grewal

Reference:

- Differential Equations by A.R. Forsyth
- Higher Engineering Mathematics by H.K. Dass
- Partial Differential Equations by I.N. Snedon

Course Name	Course Code	LTP	Credit	Semester
ANALOG ELECTRONICS – I	BEC 302	4:0:0	4	3

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Understand the current voltage characteristics of semiconductor devices..
CLO 2	Analyze dc circuits and relate ac models of semiconductor devices with their physical Operation.
CLO 3	Design and analyze of electronic circuits.
CLO 4	Evaluate frequency response to understand behaviour of Electronics circuits.
CLO 5	Students will develop some minor projects based on the concepts of Analog Electronics.

Course Objective:

This course builds from basic knowledge of Semiconductor Physics to an understanding of basic devices and their models. This course builds a foundation for courses on VLSI design and analog CMOS IC Design.

Course Contents:

Module I: Semiconductor Diode and Diode Circuits

Different types of diodes: Zener, Schottky, LED. Zener as voltage regulator, Diffusion capacitance, Drift capacitance, the load line concept, half wave, full wave rectifiers, clipping and clamping circuits.

Module II: Bipolar Junction Transistor

Bipolar junction transistor: Introduction, Transistor, construction, transistor operations, BJT characteristics, load line, operating point, leakage currents, saturation and cut off mode of operations. Bias stabilization: Need for stabilization, fixed Bias, emitter bias, self bias, bias stability with respect to variations in $I_{co,}$ V_{BE} & β, Stabilization factors, thermal stability.

Module III: Small signal Analysis of transistor and Multistage Amplifier

Hybrid model for transistors at low frequencies, Analysis of transistor amplifier using h parameters, emitter follower, Miller's theorem, THE CE amplifier with an emitter resistance, Hybrid π model, Hybrid π Conducatnces and Capacitances, CE short circuit current gain, CE short circuit current gain with R_L Multistage amplifier: Cascading of Amplifiers, Coupling schemes(RC coupling and Transformer coupling)

Module IV: Field Effect Transistors

Field effect transistor (JFET, MOSFET): volt-ampere characteristics, small signal model –common drain, common source, common gate, operating point, MOSFET, enhancement and -depletion mode, Common source amplifier, Source follower

Module V: Feedback Amplifiers

Feedback concept, Classification of Feedback amplifiers, Properties of negative Feedback amplifiers, Impedance considerations in different Configurations, Examples of analysis of feedback Amplifiers.

Module VI: Power amplifiers
Power dissipation in transistors, difference with voltage amplifiers, Amplifier classification (Class A, Class B, Class C, Class AB) class AB push pull amplifier, collector efficiency of each, cross over distortion.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text

- Robert F. Pierret: Semiconductor Device Fundamentals, Pearson Education.

Reference

- Millman and Halkias: Electronic Devices and circuits, Tata McGraw.
- Boylestad: Electronic Devices and Circuits, Pearson Education.

Course Name	Course Code	LTP	Credit	Semester
CIRCUITS AND SYSTEMS	BEC 303	4:0:0	4	3

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Do the time-domain and S- domain analysis of circuits
CLO 2	Obtain transfer functions of circuits and analysis of stability using poles of the transfer function.
CLO 3	Analyze the frequency response of circuits and to obtain the correlation between time domain and frequency domain response specifications
CLO 4	Obtain steady state solutions for nonsinusoidal inputs using fourier series and to analyze the effect of harmonics in circuits
CLO 5	Understand the features of two port networks and to obtain their equivalent circuits

Course Objective:

The course intends to make the students proficient in analyzing circuits. At the completion of the course, the student should be able to construct and interpret block diagrams and signal flow graphs of control systems and to use basic methods of determining their stability.

Course Contents:

Module I: Graph Theory and Network equations

Graph of a network, Trees, Co-trees and loops, Cut set matrix, Tie set matrix, number of possible trees of a graph, duality, Loop Analysis and Node Analysis.

Module II: Analysis of circuits using classical Method

Time and Frequency domain analysis of RL, RC and RLC circuits, Linear constant coefficient differential equation.

Module III: Signals and Laplace Transforms

Unit step signal, Ramp signal, impulse signal, Laplace transformations and its properties, Gate function, Inverse Laplace transformations, Application of Laplace Transforms in circuit analysis.

Module IV: Network Theorems

Reciprocity theorem, Superposition theorem, Thevenin's and Norton's theorems, Millman's theorem, Maximum power transfer theorem, Compensation theorem, Tellegan's theorem.

Module V: Two port Network & Network Functions
Introduction, two port z-, y-, T-, h-parameters, Inter-relations among parameters, Condition for reciprocity and symmetry, Interconnections of two port networks, Driving point and transfer functions, Poles, Zeros and necessary condition for driving point and transfer function,.

Module VI: Network Synthesis
Hurwitz polynomial, Positive real functions, synthesis of LC, RC, RL immittance functions.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text:

- M.E. Valkenburg, "Network analysis", PHI.
- D. R. Choudhary, "Networks and Systems", New Age International.
- K.M. Soni, 2009, "Circuits and Systems", VIII Edition, S.K. Kataria & Sons Delhi.

References:

- Bhise, Chadda, Kulshreshtha, "Engineering network analysis and filter design", Umesh Publication.
- F.F. Kuo, "Network Analysis and Synthesis", Wiley India Pvt. Ltd.

Course Name	Course Code	LTP	Credit	Semester
SIGNALS AND SYSTEMS	BEC 304	3:0:0	3	3

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Learn & understand about the of signal & systems
CLO 2	Understand the different types of transformation on signal and their need
CLO 3	Learn to fundamental functioning of time to frequency domain analysis and implementation
CLO 4	Understand the various industrial applications in of signal and systems

Course Objective:

The objective of the course is to provide knowledge of Signals and Systems to students of ECE. This Course includes good insight of types of signals and types of systems, various operations performed on them through the use of Fourier series, Fourier transform, z transform.

Course Contents:

Module I: Signals and Systems
Introduction of signals and systems; classification of signal, continuous time and discrete time signals, operations performed on them, even and odd signals, periodic and non periodic signals, deterministic and random signals, energy signals, power signals, elementary signals: impulse, step, ramp and exponentials, classification of systems.

Module II: LTI system
Response of LTI system for continuous and discrete time systems, Impulse response, Step response, properties of continuous LTI and discrete LTI systems, LTI systems described by differential and difference equation, analysis of LTI Systems, interconnection of systems.

Module III: Fourier series
Representation of continuous time periodic signal, properties of continuous time Fourier series, representation of discrete time periodic signals, convergence of the Fourier series, properties of discrete time Fourier series, Fourier series and LTI systems.

Module IV: Fourier Transform
Continuous time Fourier transform, properties of continuous time Fourier transform, discrete time Fourier transform, properties of discrete time Fourier transform; applications; Bandwidth determination of signals and systems.

Module V: z-Transform
Definition of z-transform, region of convergence, properties of z-transform, first order system, second order system, inverse z-transform, analysis of LTI system using z-transform.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance.

Text & References

Text:

- Alan.V Oppenheim, Signals and Systems, 4th Edition 2007, Pearson Prentice Hall Publication.
- K.M. Soni, Signals and Systems; 3rd Edition, S.K. Kataria & Sons Publication.
- P.Ramesh Babu, Signal and Systems, 3rd Edition, Scitech Publications (INDIA) Pvt. Ltd.

References:

- Simon Haykin, Signals and Systems, 2nd Edition, Willy Publications.
- B.P.Lathi, Linear Systems & Signals, 2nd Edition, Oxford Publication.
- Roberts, Fundamentals of Signals and Systems, TMH Publication.

Course Name	Course Code	LTP	Credit	Semester
JAVA PROGRAMMING	BEC 305	3:0:0	3	3

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Define object oriented terminology and JAVA programming concepts
CLO 2	Illustrate the role of inheritance, packages and interface to solve programming problems
CLO 3	Apply Exception handling for avoiding the run time errors
CLO 4	Apply the concept of multithreading to increase the execution speed of an application
CLO 5	Differentiate between C++ and java programming language
CLO 6	Create projects using Java programming

Course Objective:

The objective is to impart programming skills used in this object oriented language java.
The course explores all the basic concepts of core java programming. The students are expected to learn it enough so that they can develop the web solutions like creating applets etc.

Course Contents:

Module I

Concepts of OOP, Features of Java, How Java is different from C++, Data types, Control Statements, identifiers, arrays, operators. Inheritance: Multilevel hierarchy, method overriding, Abstract classes, Final classes, String Class.

Module II

Defining, Implementing, Applying Packages and Interfaces, Importing Packages. Fundamentals, Types, Uncaught Exceptions, Multiple catch Clauses, Java's Built-in Exception.

Module III

Creating, Implementing and Extending thread, thread priorities, synchronization suspending, resuming and stopping Threads, Constructors, Various Types of String Operations. Exploring Various Basic Packages of Java: Java. lang, Java. util, Java.i.o

Module IV

Event handling Mechanism, Event Model, Event Classes, Sources of Events, Event Listener Interfaces
AWT: Working with Windows, AWT Controls, Layout Managers

Module V
Applet Class, Architecture, Skeleton, Display Methods.
Swings: Japplet, Icons, labels, Text Fields, Buttons, Combo Boxes.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text:

- JAVA The Complete Reference by PATRICK NAUGHTON & HERBERT SCHILD, TMH
- Introduction to JAVA Programming a primar, Balaguruswamy.

References:

- "Introduction to JAVA Programming" Daniel/Young PHI
- Jeff Frentzen and Sobotka, "Java Script", Tata McGraw Hill,1999

Course Name	Course Code	LTP	Credit	Semester
ELECTROMAGNETIC PROPERTIES OF MATERIALS	BEC 306	3:0:0	3	3

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	It introduce the behavior of materials in external electric and magnetic field to the students.
CLO 2	Illustrate the role of ELECTROMAGNETIC PROPERTIES OF MATERIALS
CLO 3	**Student able to enhance the properties of EM**

Module I: Introduction:
Interaction of free electrons with lattice, Brillouin zones, Nearly free electron model, Tight binding and other electronic structure models.

Module II:Conducting Materials:
Electrical resistivity of metals and alloys, Mattheissen rule, Nordheims Rule, Kondo effect, Ionic and superionic conductors, Properties and their applications.

Module III:Dielectric and Insulating Materials:
Polarization, ClausiusMosotti equation, Dielectric permittivity and loss, Dielectric break down in materials, High K dielectric materials, Non-linear dielectrics, Ferroelectricity, Piezoelectricity, Pyroelectricity, Actuators and Smart materials.

Module IV : **Magnetic Materials:**
Classification, Ferromagnetism and Exchange interactions, Ferromagnetic domains, Magnetic anisotropy, Magnetic behaviour of polycrystalline materials, Hard and soft magnetic metallic and Intermetallic materials and their characteristics, Their properties and applications, Magnetism and superconductivity, Magnetostriction.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References

Text:

1. Kittel, C, Introduction to Solid State Physics, John Wiley & Sons, Inc., (1996).

2. Ashcroft, N.W., and Mermin, N.D., Solid State Physics, Thomson, (2007).

References:

1. L. Solymar and Walsh, Lectures on Electrical Properties of Materials, Oxford University Press, (2004)
2. Hummel, R.E., Electronic Properties of Materials, Springer Verlag, (2004).

Course Name	Course Code	LTP	Credit	Semester
MEASUREMENTS & INSTRUMENTATION	BEC 307	3:0:0	3	3

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Know the importance of measurement systems in industries.
CLO 2	Select and calibrate the appropriate sensors, calculate sensibility, errors, and repeatability
CLO 3	Design and use of amplifiers with measurement systems in order to facilitate the reading of output signal Noise filtering to decrease reading errors
CLO 4	Convert analog signal into digital signal in order to be saved into a computer

Course Objective:

This course deals with the systematic study of the electrical and electronics measurements, their basic features and types. This also describe the basic fundamental for characterizing all possible types of electrical and electronics measurements.

Module I : Basics of Measurement Systems:
General concepts and terminology of measurement systems, Basic characteristics of measuring devices, standards and calibration, Accuracy, Precision, Sensitivity, Resolution, Linearity & Errors in measurement.

Module II : PMMC Instruments:
PMMC meters- construction, torque equation, ammeter shunts, multirange ammeter, voltmeter multiplier, sensitivity, ohmmeters, multimeters; Construction & general equation of moving iron, electrodynamometer, hot wire instruments,

Module III: Measurement of Resistance, Inductance and Capacitance:
D.C. Bridges: Wheatstone's bridge, Sensitivity & Limitations; Carey Foster Bridge; Kelvin double bridge; Megaohm Bridge. A.C. Bridges: Maxwell's inductance Capacitance Bridge; Andersons Bridge; De Sauty's Bridge; Schering Bridge.

Module IV: Component Measuring Instruments:
Q meter, Vector Impedance meter, RF Power & Voltage Measurements, Introduction to shielding & grounding & Noise problem.

Module V: Cathode Ray Oscillioscope:
CRT Construction, Basic CRO circuits, CRO Probes, Basic functioning, Techniques of Measurement of Voltage, Current, Phase Angle and Frequency, , Multibeam, multi trace, storage & sampling Oscilloscopes.

EXAMINATION SCHEME:

Components	**A**	**CT**	**S/V/Q**	**HA**	**EE**
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & Reference books:

Text:

- A Course In Electrical & Electronic Measurement & Instrumentation, A.K.Sawhney, Dhanpat Rai

Reference

- Introduction To Measurements And Instrumentation, Arun K. Ghosh, PHI
- Electronic Measurements & Instrumentation, Bernard Oliver, John Cage, TMH
- Elements Of Electronic Instrumentation And Measurement, Carr, Pearson
- Electronic Instrumentation, H S Kalsi, TMH

Course Name	Course Code	LTP	Credit	Semester
ANALOG ELECTRONICS LAB - I	BEC 322	0:0:1	1	3

List of Experiments:

1. To study and plot the characteristics of a junction diode.
2. To study Zener diode I-V characteristics.
3. To study diode based clipping and clamping circuits.
4. To study half wave, full wave and bridge rectifier with filters.
5. To study the input and output characteristics of a transistor in its various configurations (CE and CB).
6. To study and plot the characteristics of a JFET in its various configurations.
7. To study and plot the characteristics of a MOSFET in its various configurations.
8. To study various types of Bias Stabilization for a transistor.
9. To study the gain and plot the frequency response of a single stage transistor amplifier.
10. To measure gain and plot the frequency response of double stage RC coupled amplifier.

Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

Course Name	Course Code	LTP	Credit	Semester
CIRCUITS AND SYSTEMS LAB	BEC 323	0:0:1	1	3

List of Experiments:

1. To verify Thevenin's theorem in a given network.
2. To verify reciprocity theorem in a given network.
3. To verify maximum power transfer theorem in a given network.
4. To verify Tellegen's theorem in a given network.
5. To determine the Z- and Y- parameters of a resistive two-port network.
6. To determine the T- (ABCD) parameters of a resistive two-port network.
7. To determine the h- parameters of a resistive two-port network.
8. To design series-series connection of 2 two-port networks and determine its Z- parameters.
9. To design parallel-parallel connection of 2 two-port networks and determine its Y- parameters.
10. To design a cascade connection of 2 two-port networks and determine its T- (ABCD) parameters.

Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

Course Name	Course Code	LTP	Credit	Semester
JAVA PROGRAMMING LAB	BEC 325	0:0:1	1	3

List of Experiments:

- Java programs using classes & objects and various control constructs such as loops etc, and data structures such as arrays, structures and functions
- Java programs for creating Applets for display of images and texts.
- Programs related to Interfaces & Packages.
- Input/Output and random files programs in Java.
- Java programs using Event driven concept.
- Programs related to network programming.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

Course Name	Course Code	LTP	Credit	Semester
COMMUNICATION SKILLS - I	BCS 301	1:0:0	1	3

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Inculcating creative thinking skills
CLO 2	Construct and showcase their communication skills in a creative manner.
CLO 3	Comprehending and demonstrating ways of self-introduction
CLO 4	Outlining and illustrating presentation Skills

Course Objective:

To form written communication strategies necessary in the workplace

Course Contents:

Module I: Introduction to Writing Skills
Effective Writing Skills
Avoiding Common Errors
Paragraph Writing
Note Taking
Writing Assignments

Module II: Letter Writing
Types
Formats

Module III
Memo
Agenda and Minutes
Notice and Circulars

Module IV: Report Writing
Purpose and Scope of a Report
Fundamental Principles of Report Writing
Project Report Writing
Summer Internship Reports

Examination Scheme:

Components	CT1	CT2	CAF	V	GD	GP	A
Weightage (%)	20	20	25	10	10	10	5

CAF – Communication Assessment File
GD – Group Discussion
GP – Group Presentation

Text & References:

Text

- Business Communication, Raman – Prakash, Oxford
- Creative English for Communication, Krishnaswamy N, Macmillan
- Textbook of Business Communication, Ramaswami S, Macmillan
- Working in English, Jones, Cambridge

Reference

- A Writer's Workbook Fourth edition, Smoke, Cambridge
- Effective Writing, Withrow, Cambridge

- Writing Skills, Coe/Rycroft/Ernest, Cambridge
- Welcome!, Jones, Cambridge

Course Name	Course Code	LTP	Credit	Semester
BEHAVIOURAL SCIENCE - III (INTERPERSONAL COMMUNICATION)	BSS 304	1:0:0	1	3

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Demonstrate knowledge of strategies for developing a healthy interpersonal communication .
CLO 2	Recognize the importance of transactional analysis, script analysis .
CLO 3	Identify the difference between healthy and unhealthy expression of emotions and develop emotional competence necessary for conflict resolution and impression management.
CLO 4	Enhance personal effectiveness and performance through effective interpersonal communication .

Course Objective:

This course provides practical guidance on

- Enhancing personal effectiveness and performance through effective interpersonal communication
- Enhancing their conflict management and negotiation skills

Course Contents:

Module I: Interpersonal Communication: An Introduction
Importance of Interpersonal Communication
Types – Self and Other Oriented
Rapport Building – NLP, Communication Mode
Steps to improve Interpersonal Communication

Module II: Behavioural Communication
Meaning and Nature of behavioiural communication
Persuasion, Influence, Listening and Questioning
Guidelines for developing Human Communication skills
Relevance of Behavioural Communication for personal and professional development

Module III: Interpersonal Styles
Transactional Analysis
Life Position/Script Analysis
Games Analysis
Interactional and Transactional Styles

Module IV: Conflict Management
Meaning and nature of conflicts
Styles and techniques of conflict management
Conflict management and interpersonal communication

Module V: Negotiation Skills
Meaning and Negotiation approaches (Traditional and Contemporary)
Process and strategies of negotiations
Negotiation and interpersonal communication

Module VI: End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term	VIVA	Journal for

			Test (CT)		Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

Text

- Vangelist L. Anita, Mark N. Knapp, Inter Personal Communication and Human Relationships: Third Edition, Allyn and Bacon
- Julia T. Wood. Interpersonal Communication everyday encounter
- Simons, Christine, Naylor, Belinda: Effective Communication for Managers, 1997 1st Edition Cassel
- Goddard, Ken: Informative Writing, 1995 1st Edition, Cassell

Reference

- Harvard Business School, Effective Communication: United States of America
- Foster John, Effective Writing Skills: Volume-7, First Edition 2000, Institute of Public Relations (IPR)
- Beebe, Beebe and Redmond; Interpersonal Communication, 1996; Allyn and Bacon Publishers.

Course Name	Course Code	LTP	Credit	Semester
FRENCH	FLT 301	2:0:0	2	3

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone Basic language skills such as reading, writing, speaking, listening & interactive in the language
CLO 2	Students will be able to read and interpret small texts
CLO 3	Students will be able to communicate in small sentences in writing, self introduction, family description etc.
CLO 4	Students will be able to communicate in small sentences in oral, self introduction, family description etc

Course Objective:

To provide the students with the know-how

- To master the current social communication skills in oral and in written.
- To enrich the formulations, the linguistic tools and vary the sentence construction without repetition.

Course Contents:

Module B: pp. 76 – 88 Unité 6

Module C: pp. 89 to103 Unité 7

Contenu lexical:

Unité 6: se faire plaisir

1. acheter : exprimer ses choix, décrire un objet (forme, dimension, poids et matières) payer
2. parler de la nourriture, deux façons d'exprimer la quantité, commander un repas au restaurant
3. parler des différentes occasions de faire la fête

Unité 7: Cultiver ses relations

1. maîtriser les actes de la communication sociale courante (Salutations, présentations, invitations, remerciements)
2. annoncer un événement, exprimer un souhait, remercier, s'excuser par écrit.
3. caractériser une personne (aspect physique et caractère)

Contenu grammatical:

1. accord des adjectifs qualificatifs
2. articles partitifs
3. Négations avec de, ne…rien/personne/plus
4. Questions avec combien, quel…
5. expressions de la quantité
6. ne…plus/toujours - encore
7. pronoms compléments directs et indirects
8. accord du participe passé (auxiliaire « avoir ») avec l'objet direct
9. Impératif avec un pronom complément direct ou indirect
10. construction avec « que » - Je crois que/ Je pense que/ Je sais que

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- le livre à suivre : Campus: Tome 1

Course Name	Course Code	LTP	Credit	Semester
GERMAN	FLG 301	2:0:0	2	3

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone Basic language skills such as reading, writing, speaking, listening & interactive in the language
CLO 2	Students will be able to read and interpret small texts
CLO 3	Students will be able to communicate in small sentences in writing, self introduction, family description etc.
CLO 4	Students will be able to communicate in small sentences in oral, self introduction, family description etc.

Course Objective:

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.
To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany

Course Contents:

Module I: Modal verbs
Modal verbs with conjugations and usage
Imparting the finer nuances of the language

Module II: Information about Germany (ongoing)
Information about Germany in the form of presentations or "Referat"– neighbors, states and capitals, important cities and towns and characteristic features of the same, and also a few other topics related to Germany.

Module III: Dative case
Dative case, comparison with accusative case
Dative case with the relevant articles
Introduction to 3 different kinds of sentences – nominative, accusative and dative

Module IV: Dative personal pronouns
Nominative, accusative and dative pronouns in comparison

Module V: Dative prepositions
Dative preposition with their usage both theoretical and figurative use

Module VI: Dialogues
In the Restaurant,
At the Tourist Information Office,
A telephone conversation

Module VII: Directions
Names of the directions
Asking and telling the directions with the help of a roadmap

Module VIII: Conjunctions
To assimilate the knowledge of the conjunctions learnt indirectly so far

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

Text

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3

Reference

- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

Course Name	Course Code	LTP	Credit	Semester
SPANISH	FLS 301	2:0:0	2	3

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone Basic language skills such as reading, writing, speaking, listening & interactive in the language
CLO 2	Students will be able to read and interpret small texts
CLO 3	Students will be able to communicate in small sentences in writing, self introduction, family description etc.
CLO 4	Students will be able to communicate in small sentences in oral, self introduction, family description etc.

Course Objective:

To enable students acquire knowledge of the Set/definite expressions (idiomatic expressions) in Spanish language and to handle some Spanish situations with ease.

Course Contents:

Module I
Revision of earlier semester modules
Set expressions (idiomatic expressions) with the verb *Tener, Poner, Ir….*
Weather

Module II
Introduction to *Gustar*…and all its forms. Revision of *Gustar* and usage of it

Module III
Translation of Spanish-English; English-Spanish. Practice sentences.
How to ask for directions (using estar)
Introduction to IR + A + INFINITIVE FORM OF A VERB

Module IV
Simple conversation with help of texts and vocabulary
En el restaurante
En el instituto
En el aeropuerto

Module V
Reflexives

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

Text

- Español, En Directo I A

Reference

- Español Sin Fronteras -Nivel Elemental

Course Name	Course Code	LTP	Credit	Semester
CHINESE	FLC 301	2:0:0	2	3

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone Basic language skills such as reading, writing, speaking, listening & interactive in the language
CLO 2	Students will be able to read and interpret small texts
CLO 3	Students will be able to communicate in small sentences in writing, self introduction, family description etc.
CLO 4	Students will be able to communicate in small sentences in oral, self introduction, family description etc.

Course Objective:

Foreign words are usually imported by translating the concept into Chinese, the emphasis is on the meaning rather than the sound. But the system runs into a problem because the underlying name of personal name is often obscure so they are almost always transcribed according to their pronciation alone. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I
Drills
Dialogue practice
Observe picture and answer the question.
Introduction of written characters.
Practice reading aloud
Practice using the language both by speaking and by taking notes.
Character writing and stroke order

Module II
Measure words
Position words e.g. inside, outside, middle, in front, behind, top, bottom, side, left, right, straight.
Directional words – beibian, xibian, nanbian, dongbian, zhongjian.
Our school and its different building locations.
What game do you like?
Difference between “hii” and “neng”, “keyi”.

Module III
Changing affirmative sentences to negative ones and vice versa
Human body parts.
Not feeling well words e.g.; fever, cold, stomach ache, head ache.
Use of the modal particle “le”
Making a telephone call
Use of “jiu” and “cal” (Grammar portion)
Automobiles e.g. Bus, train, boat, car, bike etc.
Traveling, by train, by airplane, by bus, on the bike, by boat.. etc.

Module IV
The ordinal number “di”
“Mei” the demonstrative pronoun e.g. mei tian, mei nian etc.
use of to enter to exit
Structural particle “de” (Compliment of degree).
Going to the Park.
Description about class schedule during a week in school.
Grammar use of “li” and “cong”.

Comprehension reading followed by questions.

Module V
Persuasion-Please don't smoke.
Please speak slowly
Praise – This pictorial is very beautiful
Opposites e.g. Clean-Dirty, Little-More, Old-New, Young-Old, Easy-Difficult, Boy-Girl, Black-White, Big-Small, Slow-Fast … etc.
Talking about studies and classmates
Use of "it doesn't matter"
Enquiring about a student, description about study method.
Grammar: Negation of a sentence with a verbal predicate.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- "Elementary Chinese Reader Part I, Part-2" Lesson 21-30

Course Name	Course Code	LTP	Credit	Semester
Anandam	AND003	0:0:0	2	3

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Awareness and empathy regarding community issues
CLO 2	Interaction with the community and impact on society
CLO 3	Interaction with mentor and development of Student teacher relationship
CLO 4	Interaction among students, enlarge social network
CLO 5	Cooperative and Communication skills and leadership qualities
CLO 6	Critical thinking, Confidence and Efficiency

Course Objectives:

After the completion of this course, students will be able to:

- apply their knowledge and skills to solve specific community problem
- learn to plan, lead, and organize community events have a sense of belonging to their college campus and community and find something they are interested in doing during their free time
- make new friends, expand social network, and boost social skills and mental health.
- be useful to society as it will protect them against stress, frustration, and depression

Course Contents:

The project report should be guided by the mentor and shall contain:

- **Synopsis**: clearly stating objectives and activities to be undertaken. Problem identifying and problem-solving projects to be taken up.
- Details of the **Mentor and the Participants are to** be given (name of mentor, name of participants, phone number/mobile no, email, and address)
- Location / community where the work was carried out
- Details of Activities performed are to be given with date
- Number of beneficiaries and impact on the society (the object should be to empower the community and make them self-reliant)
- Photographs taken for documentation of work should be submitted
- Media coverage of the projects should be attached if any
- The Group Community Service Project Report will be submitted by the Student group leader under the guidance of the mentor to the Director/HoIs of the Department.
- The Director/HoIs should get the best report (more than one if required) of the Group Community Service Project uploaded on the HTE website and on the University page
- The Director/HoIs will forward the best report of the department to the Nodal Officer of the University.
- University will forward the report to the state level committee.

GUIDELINES FOR GCSP (Group Community Service Project)
ASSIGNMENT OF ANANDAM FOR SOCIAL AWARENESS (for students)

1. Each member of the group shall write one blog about the decided topic of 500 words (minimum) along with any relevant photos/diagrams/statistical data (with reference).

2. The group member shall write his/her name at the end of the blog.
3. The blog shall be posted on Instagram and Facebook (apart from these any other website wherever the group seems necessary).
4. Print out of the blog where date of when the content is posted, number of followers, comments, name of the writer shall be visible will be taken and file will be maintained for the same.
5. In the cover page of the project mention heading **"Group Community Service Project"**, and the filled format of final project report given by Anandam Scheme.
6. For the topic chosen by the group, students are recommended to cover the following points:
    a) Current scenario (Regional, national and international level as applicable)
    b) Future predictions
    c) Duty of the government
    d) Government policies (related to the topic), if any
    e) Duty of public
    f) Conclusion

Evaluation Scheme:

Project Participation: 2 hours X 8 days (per month) X 4 months = 64 hours

- **C grade =32 hrs (Below 20 marks)**
- **B grade >32 hrs to <=44hrs (20-30 marks)**
- **A grade >44 hrs to<=54hrs (30-40 marks)**
- **O grade >54 hrs to<=64hrs (40-50 marks)**

Evaluation Criteria:

Respective Departmental Anandam mentors are requested to evaluate the project (out of 50) as per the following criteria:

1. Position and exceptions, if any, are clearly stated. The organization of the blog is completely and clearly outlined and implemented.
2. The body of the blog is coherently organized, original and the logic is easy to follow. There is no spelling or grammatical errors and terminology is clearly defined. Writing is clear, concise, and persuasive.
3. Conclusion is clearly stated. The underlying logic is explicit.

Course Name	Course Code	LTP	Credit	Semester
DIGITAL CIRCUITS AND SYSTEMS – I	BEC 401	3:0:0	3	4

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Understand the Fundamentals of Computers and Digital Electronics.
CLO 2	Analyse Various Logic Gates and implementation of Boolean expressions.
CLO 3	Design and analyse of Digital Electronic circuits
CLO 4	Evaluate various parameters to understand behaviour of Digital Electronics circuits.
CLO 5	Students will develop some minor projects based on the concepts of Digital Electronics.

Course Objective:

This course is an introduction to the basic principles of digital electronics. At the conclusion of this course, the student will be able to quantitatively identify the fundamentals of computers, including number systems, logic gates, logic and arithmetic subsystems, and integrated circuits. They will gain the practical skills necessary to work with digital circuits through problem solving and hands on laboratory experience with logic gates, encoders, flip-flops, counters, shift registers, adders, etc. The student will be able to analyze and design simple logic circuits using tools such as Boolean Algebra and Karnaugh Mapping, and will be able to draw logic diagrams.

Course Contents:

Module I: Boolean Functions:
Analog & digital signals, AND, OR, NOT, NAND, NOR, XOR & XNOR gates, Boolean algebra, DeMorgan's theorems, Implementation of logical function using only NAND/NOR gates, 1`s complement and 2`s complement, BCD to Gray and Gray to BCD code conversion, Standard representation of logical functions (SOP and POS forms), K-map representation and simplification of logical function up to five variables, don't care conditions, XOR & XNOR simplifications of K-maps, Tabulation method.

Module II: Combinational Circuits:
Adders, Subtractors, Implementation of full adder using half adder, full subtractor using half subtractor, Multiplexer, de-multiplexer, decoder & encoder, code converters, 1 & 2 bit comparators, BCD to seven segment decoder/encoder, Implementation of logic functions using multiplexer/de-multiplexer and decoder, Implementation of 16×1 MUX using 4×1 MUX, 4×16 decoder using 3×8 decoder etc., logic implementations using PROM, PLA & PAL.

Module III: Sequential Circuits:
Difference between combinational and sequential circuits, Latch, Flip-flops: SR, JK, D & T flip flops – Truth table, Excitation table, Conversion of flip-flops, set up and hold time, race around condition, Master Slave flip flop, Shift registers: SIPO, PISO, PIPO, SIPO, Bi-directional, 4-bit universal shift register; Counters: Asynchronous/ripple & synchronous counters – up/down, Ring counter, sequence detector.

Module IV: Logic families & data converters:
Logic families: Special characteristics (Fan out, Power dissipation, propagation delay, noise margin), working of RTL, DTL, TTL, ECL and CMOS families; Data converters: Special characteristics, ADC – successive approximation, linear ramp, dual slope; DAC – Binary Weighted, R-2R ladder type.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;

Att: Attendance.

Text & References:

Text

- Moris Mano : Digital Design, Pearson Education.
- R. P. Jain: Digital Electronics, Tata McGraw Hill.

Reference

- Thomas L. Floyd: Digital Fundamentals, Pearson Education.
- Malvino and Leech: Digital Principles & Applications, Tata McGraw Hill.

Course Name	Course Code	LTP	Credit	Semester

ANALOG ELECTRONICS – II	BEC 402	3:0:0	3	4

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Familiar with Operational Amplifier in terms of characteristics, operation, applications and limitations.
CLO 2	Know the foundation of advance courses on VLSI design and analog CMOS IC Design.
CLO 3	Determine the importance, necessity & use of operational Amplifier in electronic devices.

Course Objective:

The purpose of this course is to introduce the student to the application of semiconductor devices in linear analog circuits. To insure the usefulness of the course material to both computer engineers and electrical engineers, the course stresses circuit designs using the operational amplifier.

Course Contents:

Module I: Building Blocks of Analog ICs :
Differential amplifier, Op-amp Model, op-amp DC & AC parameters, virtual ground, Current mirrors, Active loads, Level shifters and output stages.

Module II: Operational amplifiers:
Introduction, open loop and closed loop configuration, op-amp parameters (input offset current, output offset current, i/p bias current, CMRR, PSRR, null adjustment range, etc,) Inverting and non-inverting configuration, voltage gain of inverting and non inverting configurations.

Module III: Linear & Non Linear Wave shaping:
Adders, Voltage to current, current to voltage Converter, Integrators, Differentiators, Voltage follower (voltage buffer), summer, subtractor, Comparators, log/antilog circuits using Op-amps, precision rectifiers

Module IV: Waveform Generations:
Damped and undamped oscillations, Barkhausen criterion for sustained oscillation. Tank circuit generator Astable multi Vibrators, OTA-C Oscillators, Crystal oscillator. Types of oscillators: LC-Hartley and Colpitts, RC-RC phase shift and Wien bridge oscillator, Basics of tuned Amplifiers, Voltage Controlled Oscillator.

Module V: Active RC Filters & Applications of Linear Circuits :
Idealistic & Realistic response of filters (LP, BP, and HP), Butter worth & Chebyshev approximation filter functions, LP,BP,HP and All pass, Notch Filter, Operational transconductance amplifier (OTA)-C filters.

Module VI: Applications of IC Analog Multiplier & Timer :IC phase locked loops, 555 Timer, IC voltage regulators-(fixed, variable) 78xx, 79xx series and adjustable.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text

- Richard C. Jaeger: Microelectronic Circuit Design
- Adel S. Sedra and K. C. Smith: Microelectronic Circuits
- Ramakant Gaekwad: Operational Amplifiers

Reference

- Rolf Schaumann and Mac E. Van Valkenburg: Design of Analog Filters
- D. Roy Choudhury and Shail B. Jain: Linear Integrated Circuits

Course Name	Course Code	LTP	Credit	Semester

COMMUNICATION SYSTEMS	BEC 403	3:0:0	3	4

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Accurately describe a communication system, define its parts and analyze its operation.
CLO 2	Perform a feasibility study for the design and implementation of a communications system.
CLO 3	Analyse, design, develop, implement, support and supervise the operations of all components of a communications system.
CLO 4	Design, organize, support and supervise the operation of the entire communications system.
CLO 5	Evaluate and make performance measurements of a communications system
CLO 6	Investigate, study, debug and solve problems during the operation of a communications system.

Course Objective:

The purpose of this course is to provide a thorough introduction to analog and digital communications with an in depth study of various modulation techniques, Random processes are discussed, and information theory is introduced.

Course Contents:

Module I: Introduction:
Communication Process, Source of Information, base-band and pass-band signals, Review of Fourier transforms, Random variables, different types of PDF, need of modulation process, analog versus digital communications

Module II: Amplitude Modulation:
Amplitude modulation with full carrier, suppressed carrier systems, single side band transmission, switching modulators, synchronous detection, envelope detection,Superheterodyne receiver, effect of frequency and phase errors in synchronous detection, comparison of various AM systems, vestigial side band transmission.

Module III: Angle Modulation:
Narrow and wide band FM, BW calculations using Carson rule, Direct & Indirect FM generations, phase modulation, Demodulation of FM signals, noise reduction using pre & de-emphasis.

Module IV: Pulse Modulation:
Pulse amplitude, width & position modulation, generation & detection of PAM, PWM & PPM, Comparison of frequency division and time division multiplexed systems.
Basics of Digital Communications: ASK, PSK, FSK, QPSK basics & waveform with brief mathematical introduction

Module V: Noise :
Different types of noise, noise calculations, equivalent noise band width, noise figures, effective noise temperature, noise figure.

Module VI: Introduction to Information Theory:
Measurement of Information, mutual, Shannon's theorem, Source coding, channel coding and channel capacity theorem, Huffman code

Examination Scheme:

Components	**A**	**CT**	**S/V/Q**	**HA**	**EE**
Weightage (%)	5	15	5	5	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att:

Attendance

Text & References:

Text

- B. P. Lathi: “Modern analog & digital communication”, OXFORD Publications
- Wayne Tomasi: ”Electronic Communication systems”, Pearson Education, 5th edition

Reference

- Simon Haykin, “Communication Systems”, John Wiley & Sons, 1999, Third Edition.
- Taub and schilling, “Principles of Communication Systems” TMH

Course Name	Course Code	LTP	Credit	Semester
CONTROL SYSTEM	BEE 404	3:0:0	3	4

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Study the control system component behavior by transfer function methods.
CLO 2	Ability to design a suitable compensator Lead, Lag and Lead – lag compensator using frequency domain method or time domain method
CLO 3	Understand mathematical models of linear discrete-time control systems using transfer functions and state-space models.
CLO 4	Analyze and determine whether performance of linear discrete-time control systems meet specified design criteria.

Course Objective:

The basic objective of this course is to provide the students the core knowledge of control systems, in which time & frequency domain analysis, concept of stability.

Course Contents:

Module I: Input / Output Relationship
Introduction of open loop and closed loop control systems, mathematical modeling and representation of physical systems (Electrical Mechanical and Thermal), derivation of transfer function for different types of systems, block diagram & signal flow graph, Reduction Technique, Mason's Gain Formula.

Module II: Time – Domain Analysis
Time domain performance criteria, transient response of first, second & higher order systems, steady state errors and static error constants in unity feedback control systems, error criteria, generalized error constants, performance indices, response with P, PI and PID Controllers.

Module III: Frequency Domain Analysis
Polar and inverse polar plots, frequency domain specifications, Logarithmic plots (Bode Plots),gain and phase margins, relative stability, Correlation with time domain, constant close loop frequency responses, from open loop response, Nyquist Plot.

Module IV: Concept of Stability
Asymptotic stability and conditional stability, Routh – Hurwitz criterion, Root Locus plots and their applications. Compensation Techniques: Concept of compensation, Lag, Lead and Lag-Lead networks, design of closed loop systems using compensation techniques. P, PI, PID controllers.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text:

- Dr. N.K Jain, 2005,"Automatic Control System Engineering", Dhanpat Rai Publication.
- J. Nagrath & M. Gopal, 2000, "Control System Engineering", New Age International.

References:

- M, K. Ogata, 2002, "Modern Control Engineering, PHI.
- B. C. Kuo, 2001, "Automatic Control system, Prentice Hall of India.

Course Name	Course Code	LTP	Credit	Semester
COMPUTER ORIENTED	BEC 405	3:0:0	3	4

NUMERICAL METHODS				

Course Objective:

The objective of this course is to provide conceptual understanding of various numerical methods, in particular, with reference to numerical solution of non linear equations and system of linear equations, interpolation, numerical differentiation and integration and numerical solution of ordinary differential equations. Important theorems and different formulae for various numerical methods to be covered with an aim of helping the students to understand the fundamentals, concepts and practical use of these methods in the field of computer sciences and applications.

Course Contents:

Module I: Numeric Computation and Numerical Solutions of Algebraic and Transcendental Equations:
Computer Arithmatic- Floating point numbers-operations, Normalization and their Consequences, Absolute, Relative and Percent Error. Solution of Algebraic and Transcendental Equations using Iterative Methods- Zeros of a single Transacendental equations and Zeros of Polynomial Equations using Bisection ,False Position, Newton-Raphson Methods, Convergence of Solution.

Module II: Solutions of system of Simultaneous Linear Equations:
Solution of Simultaneous Linear Equations. Direct Methods:- Gauss elimination method, Pivoting variable, Gauss-Jordan Method. Eigen values and Eigen vectors.
Iterative methods:-Jacobi's Methods, Gauss-Seidal Method.

Module III: Polynomial Interpolation:
Newtons divided difference, Forward and backward difference Formulae, Difference Tables, Lagrange's Method.

Module IV: Numerical Differentiation and Integration:
Formula for first and second order derivatives using newton's- Forward and Backward formula. Numerical Integration, Newton- Trapizoidal rule, Simpson's $1/3^{rd}$ rule ,Simpson's $3/8^{th}$ rule, Cotes Formula

Module V: Numerical Solution of Differential Equations:
Basic Terminology of Differential Equations, Picard's Method, Euler's method, Taylor's Series method, Runge-Kutta Methods, Predictor –Connector Method.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text:

- Jain M.K, Jain R.K and Iyenger, Numerical Methods for Scientific and Engineering Applications.

References:

- Rajaraman V, Computer Oriented Numerical Methods.
- Krishnamuty, E.V., Sen, S.K, Computer Based Numerical Algorithms.
- Stoer, Bullrich, Computer Oriented Numerical Methods.

Course Name	Course Code	LTP	Credit	Semester

ELECTROMAGNETIC FIELD THEORY	BEC 406	3:0:0	3	4

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Investigate the various types of coordinate systems, along with electromagnetic field concepts.
CLO 2	Create awareness of all existing governing equations and theorems for mathematical description (such as Gauss', Faraday', Ampere's laws and Poisson, Laplacian, Maxwell equations).
CLO 3	Apply the distributed circuit concepts needed at EM, specifically to match impedances and design HF components
CLO 4	Develop and recognise fundamental properties of waveguide modes.

Course Objective:

This course provides a general introduction to the important physical concepts and mathematical methods used in treating all types of wave phenomena, but stresses electromagnetic signal propagation and issues of central importance in electrical engineering. As a core course in the Electrical Computer and Systems Engineering option of the Engineering Sciences concentration, it provides essential background and basic preparation for more advanced work in device physics, microwave and ultra-fast circuitry, antenna design, optics, optical communication and optoelectronics.

Course Contents:

Module I: Mathematical Basics and Electrostatics:
Coordinate Systems: Spherical and Cylindrical coordinates, Dirac delta function, Coulomb's law, Gauss's law, Poisson's Equation, Laplace's Equation, Electrostatic Boundary conditions, Work and Energy in Electrostatics, Conductors, Surface charge and force on conductors

Module II: Magnetostatics and Magnetic Fields in matter:
Magnetic induction and Faraday's law, Magnetic Flux density, Magnetic Field Intensity, Biot Savart Law, steady currents, Ampere's law, Magnetostatic Boundary conditions, magnetic field inside matter, magnetic susceptibility and permeability, ferromagnetism, energy stored in a Magnetic field, Magnetic Vector Potential

Module III: **Electrodynamics:**
Faraday's laws, Maxwell's equations, Maxwell's modification of Ampere's law, continuity equation and Poynting theorem.

Module IV: Electrodynamic Waves:
Wave propagation in unbounded media, Boundary conditions, reflection and transmission, polarization, E.M. waves in vacuum, E. M. waves in matter: reflection and transmission of plane waves.

Module V: Introduction to Transmission Lines:
Transmission Line, Line Parameters, Characteristic Impedance, Image Impedance, HVDC and HVAC Common faults in transmission lines. Skin Effect, Ferranti Effect and Corona. Standing wave ratio, input impedance and smith chart.Applications

Examination Scheme:

Components	**A**	**CT**	**S/V/Q**	**HA**	**EE**
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text

- Griffiths: Introduction to Electrodynamics
- Fawwaz T. Ulaby: Fundamentals of Applied Electromagnetics

Reference

- Hayt, William H., Buck, John A. Hayt, William H., Buck, John A., Engineering Electromagnetics

Course Name	Course Code	LTP	Credit	Semester

DIGITAL CIRCUITS AND SYSTEMS LAB – I	BEC 421	0:0:1	1	4

List of Experiments:

1. To verify the truth tables of NOT, OR, AND, NOR, NAND, XOR, XNOR gates.
2. To obtain half adder, full adder using gates and verify their truth tables.
3. To obtain half subtractor, full subtractor using gates and verify their truth tables.
4. To implement control circuit using multiplexer.
5. To convert BCD code into excess 3 code and verify the truth table.
6. To verify the truth tables of RS, D, JK and T flip- flops.
7. To implement and verify 3-bit bi-directional shift register.
8. To design and study asynchronous/ripple counter.
9. To design and study synchronous counter.
10. To design and study a sequence detector.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

ANALOG ELECTRONICS LAB – II	BEC 422	0:0:1	1	4

List of Experiments:

1. To study the op amp as an inverting and non inverting amplifier.
2. To use the op amp as an adder, subtractor, integrator and differentiator.
3. To design a ramp and a square wave generator.
4. To study the IC-555 timer as stable and bistable multivibrator.
5. To design low pass, high pass and band pass filters using op- amp. and plot their frequency response.
6. To design and study class a power amplifier.
7. To design and study a class B push pull amplifier.
8. To study various feedbacks such as voltage series feedback.
9. To design RC phase shift and Wein bridge oscillators using op amplifier.
10. To design and study Colpitt and Hartley oscillators.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

Course Name	Course Code	LTP	Credit	Semester
COMMUNICATION SYSTEMS LAB	BEC 423	0:0:1	1	4

List of Experiments:

1. To study the sampling and reconstruction of a given signal.
2. To study amplitude modulation and demodulation.
3. To study frequency modulation and demodulation.
4. To study time division multiplexing.
5. To study pulse amplitude modulation.
6. To study delta and adaptive delta modulation and demodulation.
7. To study carrier modulation techniques using amplitude shift keying and Frequency shift keying.
8. To study carrier modulation techniques using binary phase shift keying and differential shift keying.
9. To study pulse code modulation & differential pulse code modulation as well as relevant demodulations.
10. To study quadrature phase shift keying & quadrature amplitude modulation.

Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

Course Name	Course Code	LTP	Credit	Semester

CONTROL SYSTEM LAB	BEE 424	0:0:1	1	4

List of Experiments:

1. Study and draw
   a) Step response of open Loop system (linear 1st order, 2nd order
   b) Step response of closed loop systems (1st order)
2. Study and draw temperature control system the open loop response and closed loop response with different values of gains
3. Study of operations and characteristics of a stepper motor
4. To Study a D.C. motor speed control system.
5. Performance evaluation and design of PID controller.
6. Study of microprocessor control of a simulated linear system.
7. To design a suitable cascade compensator for the given system and verify the resulting improvement.
8. Note: three experiments in MATLAB have to be performed in the slot of MATLAB.
   Using MATLAB obtain the unit-step response and unit impulse response of the following system:

$$\frac{C(s)}{R(s)} = \frac{16}{s^2 + 1.6s + 16}$$

9. For a 2nd order transfer function using MATLAB
   a) Bode Plot
   b)Root locus plot
   c)Nyquist plot.

Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

Course Name	Course Code	LTP	Credit	Semester

COMMUNICATION SKILLS - II	BCS 401	1:0:0	1	4

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Identify steps to professional communication
CLO 2	Identify the key components of meeting, agendas and meeting minutes
CLO 3	Understand the key skills and behaviors required to facilitate a group discussion/presentation
CLO 4	Polish current affairs & rapport building

Course Objective:

To teach the participants strategies for improving academic reading and writing.
Emphasis is placed on increasing fluency, deepening vocabulary, and refining academic language proficiency.

Course Contents:

Module I: Social Communication Skills
Small Talk
Conversational English
Appropriateness
Building rapport

Module II: Context Based Speaking
In general situations
In specific professional situations
Discussion and associated vocabulary
Simulations/Role Play

Module III: Professional Skills
Presentations
Negotiations
Meetings
Telephony Skills

Examination Scheme:

Components	**CT1**	**CT2**	**CAF**	**V**	**GD**	**GP**	**A**
Weightage (%)	20	20	25	10	10	10	5

CAF – Communication Assessment File
GD – Group Discussion
GP – Group Presentation

Text & References:

Text

- Essential Telephoning in English, Garside/Garside, Cambridge
- Working in English, Jones, Cambridge
- Business Communication, Raman – Prakash, Oxford

Reference

- Speaking Personally, Porter-Ladousse, Cambridge
- Speaking Effectively, Jermy Comfort, et.al, Cambridge
- Business Communication, Raman – Prakash, Oxford

Course Name	Course Code	LTP	Credit	Semester
BEHAVIOURAL SCIENCE - IV (RELATIONSHIP MANAGEMENT)	BSS 404	1:0:0	1	4

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Identify the basis of interpersonal relationship.
CLO 2	Describe the importance of interpersonal relationship and bridging individual differences.
CLO 3	Recognize the development and strategies for effective interpersonal relationship
CLO 4	Explain and apply the theories of relationship concepts of impression management

Course Objective:

To understand the basis of interpersonal relationship
To understand various communication style
To learn the strategies for effective interpersonal relationship

Course Contents:

Module I: Understanding Relationships
Importance of relationships
Role and relationships
Maintaining healthy relationships

Module II: Bridging Individual Differences
Understanding individual differences
Bridging differences in Interpersonal Relationship – TA
Communication Styles

Module III: Interpersonal Relationship Development
Importance of Interpersonal Relationships
Interpersonal Relationships Skills
Types of Interpersonal Relationships

Module IV: Theories of Interpersonal Relationships
Theories: Social Exchange, Uncertainty Reduction Theory
Factors Affecting Interpersonal Relationships
Improving Interpersonal Relationships

Module V: Impression Management
Meaning & Components of Impression Management
Impression Management Techniques (Influencing Skills)
Impression Management Training-Self help and Formal approaches

Module VI: End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

Text

- Vangelist L. Anita, Mark N. Knapp, Inter Personal Communication and Human Relationships: Third Edition, Allyn and Bacon
- Julia T. Wood. Interpersonal Communication everyday encounter
- Simons, Christine, Naylor, Belinda: Effective Communication for Managers, 1997 1st Edition Cassell
- Goddard, Ken: Informative Writing, 1995 1st Edition, Cassell

Reference

- Harvard Business School, Effective Communication: United States of America
- Foster John, Effective Writing Skills: Volume-7, First Edition 2000, Institute of Public Relations (IPR)
- Beebe, Beebe and Redmond; Interpersonal Communication, 1996; Allyn and Bacon Publishers.

Course Name	Course Code	LTP	Credit	Semester
FRENCH - IV	FLT 401	2:0:0	2	4

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone intermediate language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of intermediate level
CLO 3	Students will be able to communicate in small sentences in Simple Future and Past tenses.
CLO 4	Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.

Course Objective:

To enable students:

- To develop strategies of comprehension of texts of different origin
- To present facts, projects, plans with precision

Course Contents:

Module C: pp. 104 – 139: Unités 8, 9

Contenu lexical:

Unité 8: Découvrir le passé

1. parler du passé, des habitudes et des changements.
2. parler de la famille, raconter une suite d'événements/préciser leur date et leur durée.
3. connaître quelques moments de l'histoire

Unité 9: Entreprendre

1. faire un projet de la réalisation: (exprimer un besoin, préciser les étapes d'une réalisation)
2. parler d'une entreprise
3. parler du futur

Contenu grammatical:

1. Imparfait
2. Pronom « en »
3. Futur
4. Discours rapporté au présent
5. Passé récent
6. Présent progressif

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- le livre à suivre : Campus: Tome 1

Course Name	Course Code	LTP	Credit	Semester
GERMAN - IV	FLG 401	2:0:0	2	4

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone intermediate language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of intermediate level
CLO 3	Students will be able to communicate in small sentences in Simple Future and Past tenses.
CLO 4	Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.

Course Objective:

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.
To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany.
Introduction to Advanced Grammar Language and Professional Jargon

Course Contents:

Module I: Present perfect tense
Present perfect tense, usage and applicability
Usage of this tense to indicate near past
Universal applicability of this tense in German

Module II: Letter writing
To acquaint the students with the form of writing informal letters.

Module III: Interchanging prepositions
Usage of prepositions with both accusative and dative cases
Usage of verbs fixed with prepositions
Emphasizing on the action and position factor

Module IV: Past tense
Introduction to simple past tense
Learning the verb forms in past tense
Making a list of all verbs in the past tense and the participle forms

Module V: Reading a Fairy Tale
Comprehension and narration
- Rotkäppchen
- Froschprinzessin
- Die Fremdsprache

Module VI: Genitive case
Genitive case – Explain the concept of possession in genitive
Mentioning the structure of weak nouns

Module VII: Genitive prepositions
Discuss the genitive propositions and their usage: (während, wegen, statt, trotz)

Module VIII: Picture Description
Firstly recognize the persons or things in the picture and identify the situation depicted in the picture;
Secondly answer questions of general meaning in context to the picture and also talk about the personal experiences which come to your mind upon seeing the picture.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

Text

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3

Reference

- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

Course Name	Course Code	LTP	Credit	Semester
SPANISH - IV	FLS 401	2:0:0	2	4

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone intermediate language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of intermediate level
CLO 3	Students will be able to communicate in small sentences in Simple Future and Past tenses.
CLO 4	Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.

Course Objective:

To enable students acquire working knowledge of the language; to give them vocabulary, grammar, voice modulations/intonations to handle everyday Spanish situations with ease.

Course Contents:

Module I
Revision of earlier semester modules
Introduction to Present Continuous Tense (Gerunds)

Module II
Translation with Present Continuous Tense
Introduction to Gustar, Parecer, Apetecer, doler

Module III
Imperatives (positive and negative commands of regular verbs)

Module IV
Commercial/business vocabulary

Module V
Simple conversation with help of texts and vocabulary
En la recepcion del hotel
En el restaurante
En la agencia de viajes
En la tienda/supermercado

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español Sin Fronteras (Nivel – Elemental)

Course Name	Course Code	LTP	Credit	Semester
CHINESE – IV	FLC 401	2:0:0	2	4

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will learn intermediate language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of intermediate level
CLO 3	Students will be able to communicate in small sentences in Simple Future and Past tenses.
CLO 4	Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.

Course Objective:

How many characters are there? The early Qing dynasty dictionary included nearly 50,000 characters the vast majority of which were rare accumulated characters over the centuries. An educate person in China can probably recognize around 6000 characters. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I
Dialogue Practice
Observe picture and answer the question
Pronunciation and intonation
Character writing and stroke order.
Electronic items

Module II
Traveling – The Scenery is very beautiful
Weather and climate
Grammar question with – "bu shi …. Ma?"
The construction "yao … le" (Used to indicate that an action is going to take place)
Time words "yiqian", "yiwai" (Before and after).
The adverb "geng".

Module III
Going to a friend house for a visit meeting his family and talking about their customs.
Fallen sick and going to the Doctor, the doctor examines, takes temperature and writes prescription.
Aspect particle "guo" shows that an action has happened some time in the past.
Progressive aspect of an actin "zhengzai" Also the use if "zhe" with it.
To welcome someone and to see off someone …. I cant go the airport to see you off… etc.

Module IV
Shipment. Is this the place to checking luggage?
Basic dialogue on – Where do u work?
Basic dialogue on – This is my address
Basic dialogue on – I understand Chinese
Basic dialogue on – What job do u do?
Basic dialogue on – What time is it now?

Module V
Basic dialogue on – What day (date) is it today?
Basic dialogue on – What is the weather like here.

Basic dialogue on – Do u like Chinese food?
Basic dialogue on – I am planning to go to China.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- "Elementary Chinese Reader, Part-2" Lesson 31-38
-

Course Name	Course Code	LTP	Credit	Semester
Anandam	AND004	0:0:0	2	4

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Awareness and empathy regarding community issues
CLO 2	Interaction with the community and impact on society
CLO 3	Interaction with mentor and development of Student teacher relationship
CLO 4	Interaction among students, enlarge social network
CLO 5	Cooperative and Communication skills and leadership qualities
CLO 6	Critical thinking, Confidence and Efficiency

Course Objectives:

After the completion of this course, students will be able to:

- apply their knowledge and skills to solve specific community problem
- learn to plan, lead, and organize community events have a sense of belonging to their college campus and community and find something they are interested in doing during their free time
- make new friends, expand social network, and boost social skills and mental health.
- be useful to society as it will protect them against stress, frustration, and depression

Course Contents:

The project report should be guided by the mentor and shall contain:

- **Synopsis**: clearly stating objectives and activities to be undertaken. Problem identifying and problem-solving projects to be taken up.
- Details of the **Mentor and the Participants are to** be given (name of mentor, name of participants, phone number/mobile no, email, and address)
- Location / community where the work was carried out
- Details of Activities performed are to be given with date
- Number of beneficiaries and impact on the society (the object should be to empower the community and make them self-reliant)
- Photographs taken for documentation of work should be submitted
- Media coverage of the projects should be attached if any
- The Group Community Service Project Report will be submitted by the Student group leader under the guidance of the mentor to the Director/HoIs of the Department.
- The Director/HoIs should get the best report (more than one if required) of the Group Community Service Project uploaded on the HTE website and on the University page
- The Director/HoIs will forward the best report of the department to the Nodal Officer of the University.
- University will forward the report to the state level committee.

GUIDELINES FOR GCSP (Group Community Service Project)
ASSIGNMENT OF ANANDAM FOR SOCIAL AWARENESS (for students)

1. Each member of the group shall write one blog about the decided topic of 500 words (minimum) along with any relevant photos/diagrams/statistical data (with reference).
2. The group member shall write his/her name at the end of the blog.
3. The blog shall be posted on Instagram and Facebook (apart from these any other website wherever the group seems necessary).
4. Print out of the blog where date of when the content is posted, number of followers, comments, name of the writer shall be visible will be taken and file will be maintained for the same.
5. In the cover page of the project mention heading **"Group Community Service Project"**, and the filled format of final project report given by Anandam Scheme.
6. For the topic chosen by the group, students are recommended to cover the following points:
    a) Current scenario (Regional, national and international level as applicable)
    b) Future predictions
    c) Duty of the government
    d) Government policies (related to the topic), if any
    e) Duty of public
    f) Conclusion

Evaluation Scheme:

Project Participation: 2 hours X 8 days (per month) X 4 months = 64 hours

- **C grade =32 hrs (Below 20 marks)**
- **B grade >32 hrs to <=44hrs (20-30 marks)**
- **A grade >44 hrs to<=54hrs (30-40 marks)**
- **O grade >54 hrs to<=64hrs (40-50 marks)**

Evaluation Criteria:

Respective Departmental Anandam mentors are requested to evaluate the project (out of 50) as per the following criteria:

1. Position and exceptions, if any, are clearly stated. The organization of the blog is completely and clearly outlined and implemented.
2. The body of the blog is coherently organized, original and the logic is easy to follow. There is no spelling or grammatical errors and terminology is clearly defined. Writing is clear, concise, and persuasive.

Conclusion is clearly stated. The underlying logic is explicit

Course Name	Course Code	LTP	Credit	Semester

MICROPROCESSOR AND MICROCONTROLLER SYSTEMS	BEC 501	3:0:0	3	5

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Obtain basic development skills for microprocessor / microcontroller applications.
CLO 2	They can Gain a detailed understanding of any system for a specific application
CLO 3	Student are able to design a any hardware based on application
CLO 4	To familiarize the Architecture of 8085 and 8086microprocessor.
CLO 5	To classify the types and characteristics of buses in microprocessor.
CLO 6	To analyze the features, addressing mode and programming of Intel 8085 and 8086 microprocessor.

Course Objective:

This course deals with the systematic study of the Architecture and programming issues of 8085-microprocessor family. The aim of this course is to give the students basic knowledge of the above microprocessor needed to develop the systems using it.

Course Contents:

Module I: Introduction to Microcomputer Systems
Introduction to Microprocessors and microcomputers, Study of 8 bit Microprocessor, 8085 pin configuration, Internal Architecture and operations, interrupts, Stacks and subroutines, various data transfer schemes.

Module II: ALP and timing diagrams
Introduction to 8085 instruction set, advance 8085 programming, Addressing modes, Counters and time Delays, Instruction cycle, machine cycle, T-states, timing diagram for 8085 instruction.

Module III: Memory System Design & I/O Interfacing
Memory interfacing with 8085. Interfacing with input/output devices (memory mapped, peripheral I/O), Cache memory system. Study of following peripheral devices 8255, 8253, 8257, 8259, 8251.

Module IV: Architecture of 16-Bit Microprocessor
Difference between 8085 and 8086, Block diagram and architecture of 8086 family, pin configuration of 8086, minimum mode & maximum mode Operation, Bus Interface Unit, Register Organization, Instruction Pointer, Stack & Stack pointer, merits of memory segmentation, Execution Unit, Register Organization.

Module V: Pentium Processors
.Internal architecture of 8087, Operational overview of 8087, Introduction to 80186, 80286, 80386 & 80486 processors, Pentium processor (P-II, P-III, P-IV).advanced microprocessor

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text

- Ramesh. S. Gaonkar, "Microprocessor architecture Programming and Application with 8085" Penram International Publishing, 4th Edition
- B. Ram, "Fundamentals of microprocessors and microcomputer" Dhanpat Rai, 5th Edition.

Reference
- Douglas V Hall.
- M. Rafiquzzaman, "Microprocessor Theory and Application" PHI – 10th Indian Reprint.
- Naresh Grover, "Microprocessor comprehensive studies Architecture, Programming and Interfacing" Dhanpat Rai, 2003.
- Gosh," 0000 to 8085" PHI.

Course Name	Course Code	LTP	Credit	Semester
DIGITAL CIRCUITS AND SYSTEMS – II	BEC 502	3:0:0	3	5

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Identify and explain fundamental concepts of advance digital logic design including combinational and sequential circuits.
CLO 2	Analyse the digital circuit and can describe that circuit by using hardware description language.
CLO 3	Analyse small-scale combinational and sequential digital circuits and can implement on FPGA after writing the VHDL code of particular circuit
CLO 4	Implement finite state machine in VHDL language and other arithmetic operation

	can be done on FPGA using XILINX tool.

Course Objective:

This course builds on the course Digital Circuits and Systems - Hardware development language VHDL is introduced; the usage of the same to implement the systems is dealt in detail.

Course Contents:

Module I: Design of Sequential circuits

SR, JK, T and D flip flops and their timing diagrams with delay, characteristic table, characteristic equation and excitation tables. Design of Finite State Machines: Mealy and Moore type using next state tables, state diagrams, state minimization, state encoding: minimum bit change and hot one encodings. Comparative cost and delays of different implementations and their optimization and timing diagrams, Asynchronous and synchronous sequential circuits Static Timing Analysis –setup, hold time, clock skew, clock period
Data paths, FSMs with datapaths, ASM charts

Module II: Basics of VHDL

Introduction and Basic Design Units of VHDL, Writing Entities for Digital circuits like decoders, registers etc, Scalar Data types and Operations: Object types: constants, variables, signal and files. Data Types: scalar, integer, floating, physical, enumeration, type declarations, subtypes, expressions and operators for various types. Sequential statements: If, case, Null, Loop, Exit, Next statements, while loops, For loops, Assertion and report statements.Composite Arrays: arrays, Array aggregates, unconstrained array types, strings, Bit vectors, Standard Logic Arrays, array operations and records

Module III: VHDL Programming

Behavioral Modeling: process statements, variable and signal assignments, inertial and transport delay models, signal drivers, multiple and postponed processes,Dataflow Modeling: Concurrent signal assignment, multiple drivers, block statement,Structural Modeling: component declaration, component instantiation, resolving signal values, and configuration: basic configuration, configuration for structural modeling, mapping library entities.Generics, generic (AND, NAND, OR, NOR, XOR and XNOR) gates, functions and subprograms, packages and libraries .

Module IV: Synthesis: mapping statements to gates

Writing a test bench, converting real and integers to time, dumping and reading from text file ,Vhdl modeling of basic gates, half and full adder AOI, IOA, OAI, multiplexes, decoders (dataflow, behavioral and structural modeling), three state driver, parity checker, D, T, JK and SR flip flops, flip flops with preset and clear, modeling for multiplexer, priority encoder, ALU etc, modeling regular structures, delays, conditional operations, synchronous logic, state machine modeling, Moore and Mealy machines, generic priority encoder, clock divider, shift registers, pulse counter etc

Module V: Overview of the following

PLD devices, PROM, PAL, PLA, CPLD, EPLD GAL, FPGA, DRAM etc and their applications, FPGA programming, Design exercises ASIC design using CAD tools

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text

- Daniel Gajski: Principles of Digital Design
- Bhasker: A VHDL Primer 3/e

Reference

- Pedroni: Circuit Design with VHDL
- Perry: VHDL: Programming by examples K. Skahill, VHDL for programmable Logic

Course Name	Course Code	LTP	Credit	Semester
DIGITAL COMMUNICATIONS	BEC 503	3:0:0	3	5

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Develop a comparatively approach for analysis of various digital modulation schemes.
CLO 2	Able to calculate practical parameters for better signal reception of baseband signal
CLO 3	Able to analysis of various techniques to transmit analog samples along, signal reception and signalling schemes
CLO 4	Capable of analysis different digital modulations schemes and their comparison

CLO 5	To acquire the knowledge about the multiplexing techniques used worldwide

Course Objective:

The purpose of this course is to provide a thorough introduction to digital communications with an in depth study of various modulation techniques, receiver design & performance analysis are discussed.

Course Contents:

Module I: Digital Communication System Basics
Basic building blocks of Digital communications, analog versus digital communication, Advantages disadvantages of digital communications.

Module II: Digital Baseband Transmission
Pulse code modulation, Signal to quantization ratio, non-uniform quantization companding, BW calculations.

Module III: Transmission of Analog Samples & Signal Detection in Noise
Delta Modulation, Adaptive delta-modulation, DPCM, ADCM, ADPCM, Matched Filter Receiver, Derivation of Its Impulse Response and Peak Pulse Signal to Noise Ratio. Correlator receiver, Decision Threshold and Error Probability For, Unipolar (ON-OFF) Signaling, ISI, Nyquist Criterion For Zero ISI & Raised Cosine Spectrum

Module IV: Digital Modulation Technique
Gram-Schmidt Orthogonalization Procedure, Types of Digital Modulation, Wave forms for Amplitude, Frequency and Phase Shift Keying, Method of Generation and Detection of Coherent & Non-Coherent Binary ASK, FSK & PSK Differential Phase Shift Keying, Quadrature Modulation Techniques QPSK, Probability of Error and Comparison of Various Digital Modulation Techniques.

Module V: Digital Multiplexing
Fundamentals of Time Division Multiplexing, Electronic Commutator, Bit, Byte Interleaving T1 Carrier System, Synchronization and Signaling of T1, TDM, PCM Hierarchy, T1 to T4 PCM TDM System (DS1 to DS4 Signals)

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text

- Simon Haykin: "Digital Communication", John Wiley / 4th Ed.
- Bernard SKLAR: "Digital communication", Pearson education.

References:

- Lathi, B.P / "Modern Digital & Analog Communication Systems" / Oxford University Press /.
- Prokis J.J / "Digital Communications" / McGraw Hill /
- Wayne Tomasi: "Electronic Communication systems", Pearson Education,5th edition

Course Name	Course Code	LTP	Credit	Semester
WEB DEVELOPMENT	BCS 510	2:0:0	2	5

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	To design web base and context aware systems to acquire, organize process, share and use the knowledge of web sites.
CLO 2	This course is to provide a sound foundation to the students
CLO 3	on the concepts, percepts and practices in a field that is of immense concern to the industry and business.

.

Course Contents:

Module I: Overview of Internet
Introduction to Internet and WWW, Concept of Networking and Layers of OSI Model, Internet protocols like TCP/IP, http, telnet and ftp, URL, email, domain name, Web Browsers.

Module II: Principles of Web Design
Key issues to be considered in web site design. Structure of a Web Page: Introduction to HTML, Elements of HTML syntax, Head and Body sections, Building HTML documents, Inserting text, images, hyperlinks, Backgrounds and Color Control, HTML Editors & Tools: Use of different HTML editors and tools like Netscape Communicator and Microsoft Front Page etc

Module III: HTML Tags
Use of Different HTML tags in web pages. Table Handling: Table layout & presentation, constructing tables in a web page, developing a web page in a table. Ordered and unordered lists. Frames: Developing Web pages using frames. Advantages and disadvantages of frames. Creating forms, Role of Databases in web applications. Use of at least one graphical and animation tools like Adobe Fireworks, Abode Photoshop, Gif Animator, Gimp etc.

Module IV: Cascading style-sheet (CSS) in HTML
Introduction to Cascading Style Sheets (CSS), Types of Style Sheets (Inline, Internal and External), CSS for Website Layout and Print Layout.
Types of various CSS Selectors, CSS properties: Type Properties, Background Properties, Block Properties, Box Model Properties, List Properties, Border Properties, Positioning Propeties.

Module V: Introduction to Java Script

Role of java script in a web page, Script writing basics, Adding interactivity to a web page, creating dynamic web pages,
Similarities to java, embedding JavaScript code, embedding java applets in a web page**,** Form validation using java script

Projects:
Creating a discussion form, creating an online store, creating a job site**.**

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text:

- Ramesh Bangia, "Web Technology", Firewall media
- C. Xavier, "World Wide Web Design with HTML", Tata McGraw Hill.
- Unleashed ASP, Techmedia

References:

- Rick Dranell, "HTML4 unleashed", Techmedia Publication.
- Shelly Powers, "Dynamic Web Publishing Unleashed", Techmedia.
- Don Gosselin, "JavaScript", Vikas Publication
- Mark Swank & Drew Kittel, "World Wide Web Database", Sams net.

Course Name	Course Code	LTP	Credit	Semester
TELECOMMUNICATION NETWORKS	BEC 505	3:0:0	3	5

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Describe the basic principles of action with modern digital telecommunication devices, systems and networks.
CLO 2	Conduct experiments and measurements in the laboratory and on actual components, devices, equipment and systems in telecommunication. Be able to

	design some simple measurement systems using different sensors
CLO 3	Interpret the acquired multimedia systems measurements data.
CLO 4	Describe the development and application of digital telecommunications systems
CLO 5	examine the communications equipment for the technical functionality.

Course Objective:

To acquire basic knowledge of telecommunication, architecture & exchanges, Different type of switching, coding, traffic engineering, data communication in PSTN.

Course Contents:

Module I

Evolution of telecommunication network, Basic switching system, simple telephone communication, crossbar switching systems, Electronic switching-Space division switching, Stored Program control-Centralized SPC, Distributed SPC, Software Architecture.

Module II

Speech digitization, Quantization Noise, Companding, Differential coding, delta modulation, line coding, NRZ & RZ codes, Manchester coding, AMI coding, Walsh coding, TDM.

Module III

Time division switching-Time division space switching, Time division time switching, Time multiplexed space switching, Time multiplexed time switching.

Module IV

Traffic engineering parameters, Grade of service, blocking probability, delay systems, switching hierarchy and routing, transmission plan, Signaling techniques, Common channel signaling, SS7, Data rates in PSTN

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text

- V Thyagarajan: Telecommunication, Switching systems and networks
- Forouzon: “data communication’

References

- Tanenbaum : Computer Network
- M. Schwartz : Telecommunication networks

Course Name	Course Code	LTP	Credit	Semester
OPERATING SYSTEMS	BEC 506	3:0:0	3	5

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will be able to identify the role of Operating System. To understand the design of control unit.
CLO 2	Students will be able to analyse andunderstanding CPU Scheduling, Synchronization, Deadlock Handling and Comparing CPU Scheduling

	Algorithms. Solve Deadlock Detection Problems.
CLO 3	Students will be able to describe the role of paging, segmentation and virtual memory in operating systems.
CLO 4	Students will be able to understand description of protection and security and also the Comparison of UNIX and Windows based OS.
CLO 5	Students will be able to understand the concept of Defining I/O systems, Device Management Policies and Secondary Storage Structure and Evaluation of various Disk Scheduling Algorithms.

Course Objective:

Operating Systems serve as one of the most important courses for undergraduate students, since it provides the students with a new sight to envision every computerized systems especially general purpose computers. Therefore, the students are supposed to study, practice and discuss on the major fields discussed in the course to ensure the success of the education process. The outcome of this course implicitly and explicitly affects the abilities the students to understand, analyze and overcome the challenges they face with in the other courses and the real world.

Course Contents:

Module I: Introduction to operating system

Operating system and function, Evolution of operating system, Batch, Interactive, multiprogramming, Time Sharing and Real Time System, multiprocessor system, Distributed system, System protection. Operating System structure, Operating System Services, System Program and calls.

Module II: Process Management

Process concept, State model, process scheduling, job and process synchronization, structure of process management, Threads,Interprocess Communication and Synchronization:Principle of Concurrency, Producer Consumer Problem, Critical Section problem, Semaphores, Hardware Synchronization, Critical Regions, Conditional critical region, Monitor, Inter Process Communication.CPU Scheduling: Job scheduling functions, Process scheduling, Scheduling Algorithms, Non Preemptive and preemptive Strategies, Algorithm Evaluation, Multiprocessor Scheduling.Deadlock: System Deadlock Model, Deadlock Characterization, Methods for handling deadlock, Prevention strategies, Avoidance and Detection, Recovery from deadlock combined approach.

Module III: Memory Management

Single Contiguous Allocation: H/W support, S/W support, Advantages and disadvantages, Fragmentation, Paging, Segmentation, Virtual memory concept, Demand paging, Performance, Paged replaced algorithm, Allocation of frames, Thrashing, Cache memory, Swapping, Overlays

Module IV: Device management

Principles of I/O hardware, Device controller, Device Drivers, Memory mapped I/O, Direct Access Memory, Interrupts, Interrupt Handlers, Application I/O interface, I/O Scheduling, Buffering, Caching, Spooling,Disk organization, Disk space management, Disk allocation Method, Disk Scheduling, Disk storage.

Module V: File System and Protection and security

File Concept, File Organization and Access Mechanism, File Directories, Basic file system, File Sharing, Allocation method, Free space management.Policy Mechanism, Authentication, Internal excess Authorization.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text:

- Milenekovic, “Operating System Concepts”, McGraw Hill
- A. Silberschatz, P.B. Galvin “Operating System Concepts”, John Willey & son

References:

- Dietel, “An introduction to operating system”, Addision Wesley
- Tannenbaum, “Operating system design and implementation”, PHI
- Operating System, A Modern Perspection, Gary Nutt, Pearson Edu. 2000
- A. S Tanenbaum, Modern Operating System, 2nd Edition, PHI.
- Willam Stalling “ Operating system” Pearson Education

Course Name	Course Code	LTP	Credit	Semester
COMPUTER SYSTEM ARCHITECTUR	BEE 505	3:0:0	3	5

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Investigate the Operate logical components and relate them with the various components of computer.

CLO 2	Create the general organization of the central processing unit.
CLO 3	Apply various computer memories and system communication mechanisms
CLO 4	Develop various parallel processing architectures

Course Objective:

This course deals with computer architecture as well as computer organization and design. Computer architecture is concerned with the structure and behaviour of the various functional modules of the computer and how they interact to provide the processing needs of the user. Computer organization is concerned with the way the hardware components are connected together to form a computer system. Computer design is concerned with the development of the hardware for the computer taking into consideration a given set of specifications.

Course Contents:

Module I: Register Transfer Language
Register Transfer, Bus and Memory Transfers, Arithmetic Micro-operations, Logic Micro-operations, Shift Micro-operations, Arithmetic Logic shift Unit.

Module II: Basic Computer Organizations and Design
Instruction Codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory-Reference Instructions, Input-Output and Interrupt, Design of Accumulator Logic. Hardwired and Microprogrammed control: Control Memory, Address Sequencing, Design of Control Unit

Module III: Central Processing Unit
Introduction, General Register Organization, Stack Organization, Instruction representation, Instruction Formats, Instruction type, Addressing Modes, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer RISC and CISC
Computer Arithmetic: Introduction, Multiplication Algorithms, Division Algorithms, Floating-Point Arithmetic Operations

.

Module IV: Memory and Intrasystem Communication and Input output organisation
Memory: Memory types and organization Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory, Memory Management Hardware
Intrasystem communication and I/O: Peripheral Devices, Input-Output
Controller and I/O driver, IDE for hard disk, I/O port and Bus concept, Bus cycle, Synchronous and asynchronous transfer, Interrupt handling in PC, Parallel Port, RS – 232 interface, Serial port in PC, Serial I/O interface, Universal serial bus IEEE 1394, Bus Arbitration Techniques, Uni-bus and multi-bus architectures EISA Bus, VESA Bus.

Module V: Pipelining, Vector Processing and Multiprocessors
Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processors.
Multiprocessors: Characteristics of Multiprocessors, Interconnection Structures, Interprocessor Arbitration, Interprocessor Communication and Synchronization, Advanced computer architecture, Pentium and Pentinum – Pro, Power PC Architecture

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text:

- Morris Mano, Computer System Architecture, 3rd Edition – 1999, Prentice-Hall of India Private Limited.
- Harry & Jordan, Computer Systems Design & Architecture, Edition 2000, Addison Wesley, Delhi.

References:

- WIliam Stallings, Computer Organization and Architecture, 4th Edition-2000, Prentice-Hall of India Private Limited.

- Kai Hwang-McGraw-Hill, Advanced Computer Architecture.
- Kai Hwang & Faye A Briggs, McGrew Hill, inc., Computer Architecture & Parallel Processing.
- John D. Carpinelli, Computer system Organization & Architecture, Edition 2001, Addison Wesley, Delhi
- John P Hayes, McGraw-Hill Inc, Computer Architecture and Organization.
- M.Morris Mano and Charles, Logic and Computer Design Fundamentals, 2nd Edition Updated, Pearson Education, ASIA.
- Hamacher, "Computer Organization," McGraw hill.
- Tennenbaum," Structured Computer Organization," PHI
- B. Ram, "Computer Fundamentals architecture and organization," New age international Gear C. w., "Computer Organization and Programming, McGraw hill

Course Name	Course Code	LTP	Credit	Semester
PRACTICAL TRAINING - I (Evaluation)	BEC 550	6:0:0	6	5

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Develop a practical approach for the construction, characteristics, operation and application of electronics devices.

CLO 2	Able to solve problems relating to generated voltage, terminal voltage, currents, torque, speed, input and output power, efficiency, and voltage/speed regulation in ECE fields.
CLO 3	Capable of solving problems relating to analog, digital, control and instrumentation engineering.
CLO 4	To acquire the knowledge about the results of laboratory tests on various ECE under various conditions
CLO 5	Safely wire and operate electronics devices and their associated metering and starting equipment
CLO 6	Able to identify, formulate, and solve the electronics engineering related problems.

Methodology:

Practical training is based on the theoretical subjects studied by students. It can be arranged within the college or in any related industrial unit. The students are to learn various industrial, technical and administrative processes followed in the industry. In case of on-campus training the students will be given specific task of fabrication/assembly/testing/analysis. On completion of the practical training the students are to present a report covering various aspects learnt by them and give a presentation on same.

Examination Scheme:

Feedback from industry/work place	20
Training Report	40
Viva	15
Presentation	25
Total	**100**

Course Name	Course Code	LTP	Credit	Semester
MICROPROCESSOR AND MICRO CONTROLLER SYSTEMS LAB	BEC 521	0:0:1	1	5

MICROPROCESSOR AND MICRO CONTROLLER SYSTEMS LAB

Course Code: BEC 521 **Credit Units: 01**

List of Experiments:

1) Write at least three different programs for addition of two 8 bit numbers assuming carry may or may not be generated.
2) Write at least three different programs for subtraction of two 8 bit numbers assuming borrow may or may not be generated.
3) Write two different programs for 16 bit addition, one using instruction DAD and another without using instruction DAD.
4) Write assembly language program for 8 bit multiplication and division.
5) To study, understand, interface and two peripheral devices with 8085.
6) Any three programs using 8085 based on block of data.
7) Using 8086 write an ALP to add list of 10 given numbers.
8) Using 8086 write an ALP to sum the numbers from 1-100.
9) Using 8086 write an ALP to count negative numbers from a given list of 10 numbers.
10) Using 8086 write an ALP to check number of vowels in a given string.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

Course Name	Course Code	LTP	Credit	Semester
MATLAB THEORY AND PRACTICE	BEE 528	2:0:0	2	5

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Able to use Matlab for interactive computations.
CLO 2	Familiar with memory and file management in Matlab.

CLO 3	Able to generate plots and export this for use in reports and presentations.
CLO 4	Able to program scripts and functions using the Matlab development environment.
CLO 5	Able to use basic flow controls (if-else, for, while).
CLO 6	Familiar with strings and matrices and their use.

Course Objective:

To impart the knowledge on MATLAB software widely used for analysis in Control Systems.

Course Contents:

Module I

Introduction, MATLAB environment- Command, History, Directory, launch pad, Workspace, Array editor and Figure windows.

Module II

MATLAB features, variables, keywords, output formats, Help provisions, m-files.

Module III

Input of vectors and matrices, matrix functions, eigen values and eigen vectors, Transfer function and polynomial commands, symbolic math commands and toolbox features.

Module IV

MATLAB LTI viewer and Simulink LTI viewer, SISO design tool.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance.

Text & References:

- Chapman- "MATLAB programming for Engineers", Thomson Learning.
- Hanselman and Littlefield- "Mastering MATLAB", Prentice Hall.

Course Name	Course Code	LTP	Credit	Semester
DIGITAL CIRCUITS AND SYSTEMS – II LAB	BEC 522	0:0:1	1	5

List of Experiments

To implement VHDL code for

1. 2, 3, 4 inputs AND, OR, XOR and XNOR gates and testing their simulation with signals.
2. Half adder, full adder and full subtractor. Also trying out other simple combinatorial circuits like AOI, IOA, OAI.
3. D and T, flip-flops.
4. JK and SR flip-flops.

5. 2 to 4 and 3 to 8 decoders.
6. 2 to 1, 4 to 1 and 8 to 1 multiplexers.
7. 2 to 1, 4 to 2 and 8 to 3 priority encoders.
8. 8 bit tri state drivers.
9 9 input parity checker.
10 1 bit, 4 bit 8 bit comparators.
11 Adding and subtracting 8 bit integers of various types.
12. Clock divider
13. Shift register
14. Pulse counters.
15. VHDL Design examples of Moore machine, Mealy machine, generic gate inputs and delays.
16. VHDL code examples of structural modeling showing binding.

Experiments based Field Programmable Gate Array (FPGA) Programming

17. Implementation of all the above VHDL experiments using FPGA.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

Course Name	Course Code	LTP	Credit	Semester
WEB WEVELOPMENT LAB	BCS 530	0:0:1	1	5

List of Assignment:

1. Design a HTML page using all the basic tags.
2. Design a page containing your educational qualification in a table.
3. Design a page containing an ordered list/unordered list.
4. Design a HTML page for your resume.
5. Design a form in HTML to enter different attribute of student information.
6. Design a home page for ASE using Frame.
7. Design another page and connect these to the home page.

8. Write a function in Javascript for input validation.
9. Write a function in Javascript to calculate monthly installation of the loan.
10. Write an input form and save its data in a database using ASP.
11. Display the data stored in database in tabular form on the page.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

Course Name	Course Code	LTP	Credit	Semester
COMMUNICATION SKILLS - III	BCS 501	1:0:0	1	5

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Create right selection of words and ideas while also choosing the appropriate channelof formal communication.
CLO 2	Demonstrate the ability to analyse a problem and devise a solution in a group.
CLO 3	Demonstrate proficiency in the use of written communication.
CLO 4	Recognize the mannerisms and methodology of Interview and GD to become more expressive in their body language and verbal performance.

Course Objective:

To equip the participant with linguistic skills required in the field of science and technology while guiding them to excel in their academic field.

Course Contents:

Module I
Reading Comprehension
Summarising
Paraphrasing

Module II
Essay Writing
Dialogue Report

Module III
Writing Emails
Brochure
Leaflets

Module IV: Introduction to Phonetics
Vowels
Consonants
Accent and Rhythm
Accent Neutralization
Spoken English and Listening Practice

Examination Scheme:

Components	CT1	CT2	CAF	V	GD	GP	A
Weightage (%)	20	20	25	10	10	10	5

CAF – Communication Assessment File
GD – Group Discussion
GP – Group Presentation

Text & References:

Text
- Effective English for Engineering Students, B Cauveri, Macmillan India
- Creative English for Communication, Krishnaswamy N, Macmillan

Reference
- A Textbook of English Phonetics, Balasubramanian T, Macmillan

Course Name	Course Code	LTP	Credit	Semester
BEHAVIOURAL SCIENCE - V (UNDERSTANDING SELF FOR EFFECTIVENESS)	BSS 504	1:0:0	1	5

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Recognize their personality and individual differences and identify its importance of diversity at workplace and ways to enhance it.
CLO 2	Recognize effective socialization strategies and importance of patriotism and taking accountability of integrity.
CLO 3	Recognize different types of human rights and its importance.
CLO 4	Identify Indian values taught by different religions.
CLO 5	Identify long term goals and recognize their talent, strengths and styles to achieve them

Course Objective:

To inculcate in the students an elementary level of understanding of group/team functions
To develop team spirit and to know the importance of working in teams

Course Contents:

Module I: Group formation
Definition and Characteristics
Importance of groups
Classification of groups
Stages of group formation
Benefits of group formation

Module II: Group Functions
External Conditions affecting group functioning: Authority, Structure, Org. Resources, Organizational policies etc.
Internal conditions affecting group functioning: Roles, Norms, Conformity, Status, Cohesiveness, Size, Inter group conflict.
Group Cohesiveness and Group Conflict
Adjustment in Groups

Module III: Teams
Meaning and nature of teams
External and internal factors effecting team
Building Effective Teams
Consensus Building
Collaboration

Module IV: Leadership
Meaning, Nature and Functions
Self leadership
Leadership styles in organization
Leadership in Teams

Module V: Power to empower: Individual and Teams
Meaning and Nature
Types of power
Relevance in organization and Society

Module VI: End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

Text

- Organizational Behaviour, Davis, K.
- Hoover, Judhith D. Effective Small Group and Team Communication, 2002,Harcourt College Publishers
- Dick, Mc Cann & Margerison, Charles: Team Management, 1992 Edition, viva books
- Bates, A. P. and Julian, J.: Sociology - Understanding Social Behaviour
- Dressers, David and Cans, Donald: The Study of Human Interaction

Reference

- Lapiere, Richard. T – Social Change
- Lindzey, G. and Borgatta, E: Sociometric Measurement in the Handbook of Social Psychology, Addison – Welsley, US.
- Rose, G.: Oxford Textbook of Public Health, Vol.4, 1985.
- LaFasto and Larson: When Teams Work Best, 2001, Response Books (Sage), New Delhi
- J William Pfeiffer (ed.) Theories and Models in Applied Behavioural Science, Vol 2, Group (1996); Pfeiffer & Company
- Smither Robert D.; The Psychology of Work and Human Performance, 1994, Harper Collins College Publishers

Course Name	Course Code	LTP	Credit	Semester
FRENCH - V	FLT 501	2:0:0	2	5

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone intermediate language skills such as reading, writing, speaking, listening & interactive) in the language.
CLO 2	Students will be able to read and interpret small texts of intermediate level.
CLO 3	Students will be able to communicate in small sentences in Simple Future and Past tenses .
CLO 4	Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.

Course Objective:

To furnish some basic knowledge of French culture and civilization for understanding an authentic document and information relating to political and administrative life

Course Contents:

Module D: pp. 131 – 156 Unités 10, 11

Contenu lexical:

Unité 10: Prendre des décisions

1. Faire des comparaisons
2. décrire un lieu, le temps, les gens, l'ambiance
3. rédiger une carte postale

Unité 11: faire face aux problèmes

1. Exposer un problème.
2. parler de la santé, de la maladie
3. interdire/demander/donner une autorisation
4. connaître la vie politique française

Contenu grammatical:

1. comparatif - comparer des qualités/ quantités/actions
2. supposition : Si + présent, futur
3. adverbe - caractériser une action
4. pronom "Y"

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- le livre à suivre : Campus: Tome 1

Course Name	Course Code	LTP	Credit	Semester
GERMAN - V	FLG 501	2:0:0	2	5

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone intermediate language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of intermediate level
CLO 3	Students will be able to communicate in small sentences in Simple Future and Past tenses.
CLO 4	Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.

Course Objective:

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.
To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany
Introduction to Advanced Grammar and Business Language and Professional Jargon

Course Contents:

Module I: Genitive case
Genitive case – Explain the concept of possession in genitive
Mentioning the structure of weak nouns

Module II: Genitive prepositions
Discuss the genitive propositions and their usage: (während, wegen, statt, trotz)

Module III: Reflexive verbs
Verbs with accusative case
Verbs with dative case
Difference in usage in the two cases

Module IV: Verbs with fixed prepositions
Verbs with accusative case
Verbs with dative case
Difference in the usage of the two cases

Module V: Texts
A poem 'Maxi'
A text Rocko

Module VI: Picture Description
Firstly recognize the persons or things in the picture and identify the situation depicted in the picture;
Secondly answer questions of general meaning in context to the picture and also talk about the personal experiences which come to your mind upon seeing the picture.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

Text

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer

Reference

- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

Course Name	Course Code	LTP	Credit	Semester
SPANISH - V	FLS 501	2:0:0	2	5

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone intermediate language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of intermediate level
CLO 3	Students will be able to communicate in small sentences in Simple Future and Past tenses.
CLO 4	Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.

Course Objective:

To enable students acquire working knowledge of the language; to give them vocabulary, grammar, voice modulations/intonations to handle everyday Spanish situations with ease.

Course Contents:

Module I
Revision of earlier semester modules

Module II
Future Tense

Module III
Presentations in English on
Spanish speaking countries'
Culture
Sports
Food
People
Politics
Society
Geography

Module IV
Situations:
En el hospital
En la comisaria
En la estacion de autobus/tren
En el banco/cambio

Module V
General revision of Spanish language learnt so far.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español Sin Fronteras, Greenfield

Course Name	Course Code	LTP	Credit	Semester
CHINESE – V	**FLC 501**	2:0:0	2	5

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone intermediate language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of intermediate level
CLO 3	Students will be able to communicate in small sentences in Simple Future and Past tenses.
CLO 4	Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.

Course Objective:

What English words come from Chinese? Some of the more common English words with Chinese roots areginseng, silk, dim sum, fengshui, typhoon, yin and yang, T'al chi, kung-fu. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I
Drills
Dialogue practice
Observe picture and answer the question.
Pronunciation and intonation.
Character writing and stroke order

Module II
Intonation
Chinese foods and tastes – tofu, chowmian, noodle, Beijing duck, rice, sweet, sour….etc. Learning to say phrases like – Chinese food, Western food, delicious, hot and spicy, sour, salty, tasteless, tender, nutritious, god for health, fish, shrimps, vegetables, cholesterol is not high, pizza, milk, vitamins, to be able to cook, to be used to, cook well, once a week, once a month, once a year, twice a week……
Repetition of the grammar and verbs taught in the previous module and making dialogues usingit.
Compliment of degree "de".

Module III
Grammar the complex sentence "suiran … danshi…."
Comparison – It is colder today than it was yesterday…..etc.
The Expression "chule….yiwai". (Besides)
Names of different animals.
Talking about Great Wall of China
Short stories

Module IV
Use of "huozhe" and "haishi"
Is he/she married?
Going for a film with a friend.
Having a meal at the restaurant and ordering a meal.

Module V
Shopping – Talking abut a thing you have bought, how much money you spent on it? How many kinds were there? What did you think of others?
Talking about a day in your life using compliment of degree "de". When you get up? When do you go for class? Do you sleep early or late? How is Chinese? Do you enjoy your life in the hostel?
Making up a dialogue by asking question on the year, month, day and the days of the week and answer them.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

"Elementary Chinese Reader " Part-II Lesson 39-46

Course Name	Course Code	LTP	Credit	Semester
Anandam	AND005	0:0:0	2	5

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Awareness and empathy regarding community issues
CLO 2	Interaction with the community and impact on society
CLO 3	Interaction with mentor and development of Student teacher relationship
CLO 4	Interaction among students, enlarge social network
CLO 5	Cooperative and Communication skills and leadership qualities
CLO 6	Critical thinking, Confidence and Efficiency

Course Objectives:

After the completion of this course, students will be able to:

- apply their knowledge and skills to solve specific community problem
- learn to plan, lead, and organize community events have a sense of belonging to their college campus and community and find something they are interested in doing during their free time
- make new friends, expand social network, and boost social skills and mental health.
- be useful to society as it will protect them against stress, frustration, and depression

Course Contents:

The project report should be guided by the mentor and shall contain:

- **Synopsis**: clearly stating objectives and activities to be undertaken. Problem identifying and problem-solving projects to be taken up.
- Details of the **Mentor and the Participants are to** be given (name of mentor, name of participants, phone number/mobile no, email, and address)
- Location / community where the work was carried out
- Details of Activities performed are to be given with date
- Number of beneficiaries and impact on the society (the object should be to empower the community and make them self-reliant)
- Photographs taken for documentation of work should be submitted
- Media coverage of the projects should be attached if any
- The Group Community Service Project Report will be submitted by the Student group leader under the guidance of the mentor to the Director/HoIs of the Department.
- The Director/HoIs should get the best report (more than one if required) of the Group Community Service Project uploaded on the HTE website and on the University page
- The Director/HoIs will forward the best report of the department to the Nodal Officer of the University.
- University will forward the report to the state level committee.

GUIDELINES FOR GCSP (Group Community Service Project)
ASSIGNMENT OF ANANDAM FOR SOCIAL AWARENESS (for students)

1. Each member of the group shall write one blog about the decided topic of 500 words (minimum) along with any relevant photos/diagrams/statistical data (with reference).
2. The group member shall write his/her name at the end of the blog.
3. The blog shall be posted on Instagram and Facebook (apart from these any other website wherever the group seems necessary).
4. Print out of the blog where date of when the content is posted, number of followers, comments, name of the writer shall be visible will be taken and file will be maintained for the same.
5. In the cover page of the project mention heading **"Group Community Service Project"**, and the filled format of final project report given by Anandam Scheme.
6. For the topic chosen by the group, students are recommended to cover the following points:
    a) Current scenario (Regional, national and international level as applicable)
    b) Future predictions
    c) Duty of the government
    d) Government policies (related to the topic), if any
    e) Duty of public
    f) Conclusion

Evaluation Scheme:

Project Participation: 2 hours X 8 days (per month) X 4 months = 64 hours

- **C grade =32 hrs (Below 20 marks)**
- **B grade >32 hrs to <=44hrs (20-30 marks)**
- **A grade >44 hrs to<=54hrs (30-40 marks)**
- **O grade >54 hrs to<=64hrs (40-50 marks)**

Evaluation Criteria:

Respective Departmental Anandam mentors are requested to evaluate the project (out of 50) as per the following criteria:

1. Position and exceptions, if any, are clearly stated. The organization of the blog is completely and clearly outlined and implemented.
2. The body of the blog is coherently organized, original and the logic is easy to follow. There is no spelling or grammatical errors and terminology is clearly defined. Writing is clear, concise, and persuasive.
3. Conclusion is clearly stated. The underlying logic is explicit.

Course Name	Course Code	LTP	Credit	Semester
VLSI DESIGN	BEC 601	3:0:0	3	6

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Analyze the application of electronic components.
CLO 2	Understand the concept of MOSFET.
CLO 3	Analyse the applications of MOSFET
CLO 4	Understand the industrial application of CMOS
CLO 5	Analyze the operation of CMOS and their applications.

Course Objective:

In the recent years, IC manufacturing technology has gone through dramatic evolution and changes, continuously scaling to ever smatter dimensions. This scaling has a double impact on the design of ICs. First, the complexity of the designs that can be put on a single die has increased dramatically which led to new design methodologies. At the same time, this plunge into deep submicron space causes devices to behave differently and brings challenging issues to forefront. This course along with the course of Digital Circuits and Systems II and Analog CMOS IC design will give you many of the basic essentials to work in the area of Circuit Design. Since this course takes the latest trends in the industry into account, you will find yourself at a definite edge.

Course Contents:

Module I: Devices and the wire

Diode, Dynamic and transient behavior of Diode, Diffusion capacitance, SPICE Diode model, MOSFET basic, depletion and enhancement device.MOSFET static behavior, Threshold voltage and its dependence on V_{SB} MOSFET Operation in resistive and saturation region, channel length modulation, Velocity saturation and its impact on sub micron devices, sub threshold conduction, Model for manual analysis, Equivalent resistance for MOSFET in (velocity) saturated region, comparison of equations for PMOS and NMOS.DYNAMIC behavior, Channel capacitance in different regions of operation, junction capacitance, Level 1 SPICE models for MOS transistors. The Wire, Interconnect parameters: resistance, capacitance and Inductance, Lumped RC model, Elmore Delay

Module II: CMOS Inverter

VTC of an ideal inverter, Switching Model of the CMOS inverter: NMOS /PMOS discharge and charge, VTC of CMOS inverter : PMOS and NMOS operation in various regions including velocity saturation, Switching threshold, (W/L)p/(W/L)n ratio for setting desired V_M with and without velocity saturation, Noise Margins, buffer.Ratioed logic: Pseudo NMOS inverter and PMOS to NMOS ratio for performance, tri-state inverter, Resistive load inverter.Load Capacitance calculations: fan out capacitance, self capacitance calculations: Miller effect, wire capacitance; Improving delay calculation with input slope, Propagation delay: first order analysis, analysis from a design perspective, sizing a chain of inverters for minimum delay, choosing optimum number of stages, Power, Energy and Energy Delay: Dynamic power consumption, Static power, Glitches and power dissipation due to direct path currents, power and delay trade off, Transistor sizing for energy minimization

Module III: Combinational circuits

CMOS LOGIC: Good 0 and Poor 0, series and parallel N and P switches, Two and Higher input NAND and NOR gates, Functions of the type (AB+C(D+E)) and their complements, XOR and XNOR gates, 2 input Multiplexer, Full Adder; Transistor sizing in CMOS logic for optimal delay, Pseudo NMOS NAND NOR and other gates and the transistor sizing, Introduction to DSVCL logic, CPL AND/NAND, OR/NOR, XOR/XNOR gates, Logical effort, Electrical Effort, Branching effort, Examples of sizing Combinational logic chains for minimum delay, Pass-transistor logic, pass gate configurations for NMOS and PMOS, 2 input and 4 input MUX, XOR, XNOR and implementation of general functions like AB+AB*C+A*C*, Robust and Efficient PTL Design, Delay of Transmission Gate chain.Dynamic CMOS design: Pre-charge and Evaluation, charge leakage, bootstrapping, charge sharing, Cascading Dynamic Gates, DOMINO Logic, Optimization of Domino Logic Gates, simple example circuit implementations of DOMINO logic.

Module IV: Sequential Logic circuits

Principle of Bistability, NAND and NOR based SR latch, and clocked SR Latch, JK latch, example of master slave flip flop, CMOS D latch, MUX based Latches, master slave edge triggered register, Static timing, Analysis setup, hold time, clock skew, clock period, non ideal clocks, clock overlap, C2MOS register, TSPCR Register, Schmitt Trigger, Pipelining and NORA CMOS

Module V: Layout Design Rules
Introduction to CMOS Process technology, Latch up and its prevention Layout of CMOS inverter, CMOS NAND and NOR gates, Concept of Euler path, and stick diagrams for functions like (AB+E+CD)*,

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text
- Jan M Rabaey: Digital Integrated Circuits
- David Hodges et al: Analysis and Design of Digital ICs
- Kang: CMOS Digital ICs

Reference
- Weste and Harris: CMOS VLSI design
- Weste and Eshragian: Principles of CMOS VLSI Design

Course Name	Course Code	LTP	Credit	Semester
DIGITAL SIGNAL PROCESSING	BEC 602	3:0:0	3	6

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Learn the analysis of signal & systems
CLO 2	Understand the different types of transformation and their need.
CLO 3	Learn to fundamental functioning of different types of digital filter.

CLO 4	Understand the various industrial applications in of signal and systems.
CLO 5	Learn MATLAB tools for processing a signal

Course Objective:

The objective of the course in Digital signal processing is to provide the student with significant skills in general as well as advanced theories and methods for modification, analysis, detection and classification of analog and digital signals. Furthermore the objective is to give the student a broad knowledge of central issues regarding design, realisation and test of analog and in particular digital signal processing systems consisting of hardware and/or software components. The specialization in signal processing makes it possible to study practical or theoretic fields, ranging from mathematics/signal theory over algorithmic design to development of instruments based on hardware and/or software for real time signal

Course Contents:

Module I: Discrete time signals and systems in time domain
Classification of signal, signal processing operations, classification of systems, discrete time systems, examples of types of signal, sampling process, time domain characterization of LTI discrete- time systems, state space representation of LTI discrete time systems.

Module II: Discrete time signals in transform domain
DTFT, properties, applications, inverse DTFT, DFT, properties, applications, inverse DFT, Z-transform, properties, applications, inverse Z-transform, frequency response, transfer function, Fast Fourier transform algorithms: DIT algorithm, DIF algorithm.

Module III
Discrete time processing of continuous time signals: sampling, analog filter design, antiliasing filter design.

Module IV: Discrete time processing of discrete- time signals
Digital filters: Digital filter structure: FIR filter structure, IIR filter structure,Digital filter design: Impulse invariance method, bilinear transform method of IIR filter design, FIR filter design.

Examination Scheme:

Components	**A**	**CT**	**S/V/Q**	**HA**	**EE**
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text
- Prokis, Manolakis: Digital signal processing
- Oppenheim & Schaffer : Digital Signal Processing

Reference
- Fafael C. Gonzalez, Richrd E. Woods: Digital Image Processing
- Anil Kumar Jain Fundamentals of Digital Image Processing

Course Name	Course Code	LTP	Credit	Semester
MICROWAVE ENGINEERING	BEC 603	3:0:0	3	6

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Explain the microwave frequency region for various communication and applications of microwave.

CLO 2	Differentiate various microwave media and modes by the wave can propagate in space
CLO 3	Categories various component and devices of microwave and their applications
CLO 4	Compare conventional microwave tubes with solid state devices.

Course Objective:

This course deals with the microwaves. Microwaves are important when we are going to the high frequency regime. By studying this course students will be able to know about the microwave components and devices, microwave generators and their characteristics, microwave applications and measurement. Also they will be familier about the rectangular and circular waveguides, their equations and the modes existing in these waveguides.

Course Contents:

Module I: Introduction
Microwave frequencies, standard frequency bands, behaviour of circuits at conventional and microwave frequencies, microwave application.

Module II: Waveguide
Overview of guided waves, TE, TM and TEM modes, rectangular and cylindrical wave guide resonators, choice of the type of waveguide, waveguide problems.

Module III: Microwave Components and Devices
Scattering matrix and its properties, coupling probes, coupling loops, windows, waveguide tuners, termination, E-plane Tee, H-plane Tee, Magic Tee, Phase-Shifter, attenuators, Directional Coupler, Gunn diode, Resonator and circulators, IMPATT devices, TRAPATT.

Module IV: Microwave tubes
Transit-time effect, limitations of conventional tubes, Two-cavity and multi-cavity Klystrons, Reflex Klystron, TWT and Magnetrons.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text

- Microwave Devices and Circuits, Liao
- Microwave Principles, Herbert J Reich
- Microwaves, K.C. Gupta

Reference

- Microwave Techniques, D C Agrawal
- Elements of Microwave Engg, Chatterjee

Course Name	Course Code	LTP	Credit	Semester
POWER ELECTRONICS	BEE 601	3:0:0	3	6

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Accurately analyse and select the power semiconductor switching devices for a given power converter.

CLO 2	Understand the constructional details and principle of operation of triggering devices to control the power devices.
CLO 3	Design an appropriate triggering and protection scheme for power semiconductor devices.
CLO 4	Understand the working of various types of converters, choppers and inverter circuits.
CLO 5	Analyse and evaluate the performance of controlled converters, choppers and inverter circuits.
CLO 6	Recognize the applications of the power electronics based system to full fill the industry requirement.

Course Objective:

The course aims to introduce them to the theory of operation, analytical and circuit models and basic design concepts of Electric Power components and systems.

Course Contents:

Module I: Triggering Devices
Triggering devices, Unijunction Transistor, Characteristics and applications of UJT, Programmable Unijunction Transistor, DIAC, Silicon Controlled Switch, Silicon Unilateral Switch, silicon Silicon bilateral Switch, Shockley diode, GTO, MOSFET, Power diodes.

Module II: Thyristor Firing Circuits, Turn on systems
Two transistor model of Thyristor, Method of Triggering a thyristor, Thyristor Types, Requirement for triggering circuits, Thyristor Firing Circuits, Fullwave control of Ac with one thryristor, Light activated SCrs (LASCR), Control Circuit, dv/dt and di/dt protection of Thyristor, Pulse Transformer triggering, Firing SCR by UJT, TRIAC firing circuit, Phase control of SCR by pedestal and Ramp.

Module III: Controlled Rectifiers
Types of Converters, effect of inductive load, Commutating diode or freewheeling diode, controlled rectifiers, Bi phase half wave, single phase full wave phase controlled converter using bridge principle, harmonics.

Module IV: Inverters
Types of Inverters, Bridge Inverters, Voltage Source Inverters, Pulse Width Modulation Inverters, Current source Inverters.

Module V: AC Voltage Controllers
Types of AC voltage Controllers, AC Phase Voltage controllers, single Phase Voltage Controller with RL load, harmonic analysis of single phase full wave controller with RL load.

Module VI: DC to DC Converters
DC choppers, Chopper classification, two quadrant chopper, Four quadrant chopper.

Module VII: Industrial Applications
One shot Thyristor trigger Circuit, over voltage protection, simple battery charger, battery charging regulator, AC static switches, DC static switch

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text:

- J. Michael: Power Electronics: Principles and Applications
- M. H. Rashid: Power Electronics circuits

References*:*

- H. C. Rai, “Power Electronics Devices, Circuits, Systems and Application”, Galgotia, 3rd Ed.
- P. S. Bimbhara, “Electrical Machinery, Theory Performance and Applications” Khanna Publications, 7th

Course Name	Course Code	LTP	Credit	Semester
PROGRAMMING WITH PYTHON	BCS 610	2:0:0	2	6

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the

	cultural, societal, and environmental considerations.
CLO 2	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
CLO 3	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Course Objective:

Objective: Python is next generation multi-purpose programming language that allows different users to create applications of various domains. Students will be able to learn primary fundamentals of python programming and potential of python is to achieve modern computing requirements

Course Outcomes: After completion of this course, student will be able to

- To learn basics of Python.
- To develop console application in python.
- To develop database application in python.
- To develop basic machine learning application.

Pre-requisite of course: Object oriented concepts, Programming fundamentals

Course Contents:

Module I: Basic of Python Programming

The concept of data types; variables, assignments; immutable variables; numerical types; arithmetic operators and expressions; comments in the program; understanding error messages.

Module II: Conditioning and looping in python

Conditions, Boolean logic, logical operators; ranges; Control statements: if-else, loops (for, while); lambda function in python.

Module III: String, List, Tuple, Set, Dictionary data structure

String manipulations: subscript operator, indexing, slicing a string; strings and number system: converting strings to numbers and vice versa. Lists, tuples, and dictionaries; basic list operators, replacing, inserting, removing an element; searching and sorting lists; dictionary literals, adding and removing keys, accessing and replacing values, traversing dictionaries.

Module IV: Function

Design with functions: hiding redundancy, complexity; arguments and return values; formal vs actual arguments, named arguments. Program structure and design. Recursive functions.

Module V: Basic Python Libraries

Pandas: creation of dataframe, Manipulation of dataframe, generation of series, iloc and loc function etc. NumPy: creation of arrays (1-D, 2-D and n-D array), random matrix, one's matrix, zero's matrix and all other operation over arrays, matplotlib: plotting of line graph, pi chart and box plot etc.

Projects:

Creating a discussion form, creating an online store, creating a job site.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text:

- Ramesh Bangia, "Web Technology", Firewall media
- C. Xavier, "World Wide Web Design with HTML", Tata McGraw Hill.
- Unleashed ASP, Techmedia

References:

- Rick Dranell, "HTML4 unleashed", Techmedia Publication.
- Shelly Powers, "Dynamic Web Publishing Unleashed", Techmedia.
- Don Gosselin, "JavaScript", Vikas Publication
- Mark Swank & Drew Kittel, "World Wide Web Database", Sams net.

Course Name	Course Code	LTP	Credit	Semester
MEASURMENT AND MEASURING INSTRUMENTS	BEC 605	3:0:0	3	6

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Describe the use of various electrical/electronic instruments, their block diagram, applications, and principles of operation, standards errors and units of

	measurements.
CLO 2	Develop basic skills in the design of electronic equipments.
CLO 3	Analyse: different electrical/electronic parameters using state of equipments of measuring instruments which is require to all types of industries.
CLO 4	Solve :Identify electronics/ electrical instruments, understanding associated with the instruments
CLO 5	Explain: use of transducers in different types of field applications

Course Objective:

The objective of the course is to provide a brief knowledge of measurements and measuring instruments related to engineering. The basic idea of this course is to give the sufficient information of measurements in any kind of industry viz. electrical, electronics, mechanical etc.

Course Contents:

Module I: Basics of Measurement Systems
Elements of Generalized Measurement System; Static & Dynamic Characteristics of Instruments; Errors in Measurements – Sources and Types of Errors; Statistical Treatment of Data – Mean, Measures of Dispersion, Rejection of data based on confidence interval

Module II: Transducers
Classification; Selection of Transducers; Resistive Transducers – Potentiometer, Strain gauge, Rosettes, Thermistors and RTD; Capacitive Transducers – Measurement of Liquid level by change in variation of dielectric constant; Variable Inductance Transducers – self-generating type and passive type; Piezoelectric Transducers; Photoelectric Transducers; Digital Transducer

Module III: Measurement of Resistance, Inductance and Capacitance
D.C. Bridges: Wheatstone's bridge, Sensitivity & Limitations; Carey Foster Bridge; Kelvin double bridge; Megaohm Bridge.A.C. Bridges: Maxwell's Inductance Capacitance Bridge; Andersons Bridge; De Sauty's Bridge; Schering Bridge;

Module IV: Analog and Digital Meters
Analog meters : PMMC meters- construction, torque equation, ammeter shunts, multirange ammeter, voltmeter multiplier, sensitivity, ohmmeters, multimeters; Construction & general equation of moving iron, electrodynamometer, hot wire instruments.Digital meters: Digital voltmeter – ramp type, integrating type, potentiometer type, Applications

Module V: Display Devices and Recorders
LED, LCD, Cold Cathode displays, Incandescent Displays, Fluorescent Displays, LVD, VDU,Cathode Ray Oscillioscope : Basic functioning, Measurement of Voltage, Current, Phase and Frequency.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text:

- Electronic Instrumentation Technology by MMS Anand, PHI Pvt. Ltd., New Delhi Ed. 2005.
- Electronics Instrumentation by H.S. Kalsi TMH Ed. 2004.

References:

- Electronics Instrumentation & Measurement Techniques by W.D. Cooper & A.D. Helfrick, PHI 3rd Ed.
- Electronics Measurement & Instrumentation by Oliver & Cage Mc-Graw Hill.

Course Name	Course Code	LTP	Credit	Semester
DATA STRUCTURE AND IT	BEC 606	3:0:0	3	6

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Understanding of fundamental Data Structures including linked-lists, trees, binary search trees, AVL trees, stacks, queues, priority queues, and

	hash-tables and skiplists.
CLO 2	Understanding of fundamental abstract data types which can include: Maps, Sets and Vectors.
CLO 3	Ability to program data structures and use them in implementations of abstract data types.
CLO 4	Ability to devise novel solutions to small scale programming challenges involving data structures and and recursion
CLO 5	Understanding of basic algorithmic complexity

Course Objective:
The objective is to acquaint the students with the basics of networking. A structured approach to explain how networks work from the inside out is being covered. Data structure deals with organizing large amount of data in order to reduce space complexity and time requirement. This course gives knowledge of algorithms, different types of data structures and the estimation space and time complexity.

Course Contents:

Module I: Introduction :
Introduction to computer networks, evolution of computer networks and its uses, reference models, example networks,The physical layer: Theoretical basis for data communication, transmission media

Module II: The data link layer and medium access layer:
Data link layer design issues, error detection and correction, data link protocols, Channel allocation problem, multiple access protocols, ALOHA, CSMA/CD

Module III: The network layer and transport layer:
Network layer concepts, design issues, static and dynamic routing algorithms, flooding, distance vector routing, link state routing, distance vector routing, Ipv4,The transport services, elements of transport protocols, TCP and UDP, application layer: Brief introduction to presentation and session layer, DNS**,** E-mail

Module IV: Introduction to Data structures :Data structures:
Definition, Types. Algorithm design, Complexity, Time-Space Trade offs. Use of pointers in data structures.,Array Definition and Analysis, Representation of Linear Arrays in Memory, Traversing of Linear Arrays, Insertion And Deletion, Single Dimensional Arrays, Two Dimensional Arrays, Multidimensional Arrays, Function Associated with Arrays, Character String in C, Character String Operations, Arrays as parameters, Implementing One Dimensional Array, Sparse matrix.

Module V: Introduction to Stacks and queue
Stack: Definition, Array representation of stacks, Operations Associated with Stacks- Push & Pop, Polish expressions, Conversion of infix to postfix, infix to prefix (and vice versa),Application of stacks recursion, polish expression and their compilation ,conversion of infix expression to prefix and postfix expression, Tower of Hanoi problem.Queue: Definition, Representation of Queues, Operations of queues- QInsert, QDelete, Priority Queues, Circular Queue, Deque.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text:

- Computer networks: Tanenbaum, Andrew S, Prentice Hall
- Horowitz and Sahani, "Fundamentals of Data structures", Galgotia publications
- R.L. Kruse, B.P. Leary, C.L. Tondo, "Data structure and program design in C" PHI

References:
- Computer network protocol standard and interface: Uyless, Black
- Computer Networking: A Top-Down Approach Featuring the Internet (3rd Edition) by James F. Kurose
- J. P. Tremblay and P. G. Sorenson, Introduction to Data Structures with Applications, McGraw – Hill Computer Science Series, Mc-Graw – Hill New York, 1984
- Algorithms by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Published by Prentice-Hall India (1999).
- Data Structures Using C and C++ second edition by Yeddidyah Langsam, Moshe J.Augenstein, Aaron M. Tenen Baum, Published by Prentice-Hall India

Course Name	Course Code	LTP	Credit	Semester
INFORMATION THEORY AND CODING	BEC 607	3:0:0	3	6

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Investigate the fundamentals concepts of Information Theory & Coding

CLO 2	Create the the different codes like: Shannon's, Fano's, Huffman Coding techniques
CLO 3	Apply different codes like linear, block codes, BSC, BEC in communication systems
CLO 4	Develop Binary Fields, Finite Fields, and Galois field used in communication systems

Course Objective:

This course introduces what is information and how to deal with information. Role of coding in communication and what type of different codes are used in communication system. It also introduces different entropies, channel capacity and purpose of encoding. It also deals with the basic algebra required for coding the information.

Course Contents:

Module I: Fundamental Limits in Information Theory
Measure of Information, Data Compaction, Discrete Memory less Channels, Relationship among different Entropies, Mutual information, Channel Capacity, Capacity of channel with symmetric noise structure BSC and BEC. Channel Coding Theorem, Differential Entropy and Mutual Information for Continuous Ensembles, Information Capacity Theorem.

Module II: Coding techniques
Source Coding: Instantaneous Codes, Source Coding Theorem, The Kraft Inequality and McMillan's Theorem, Shannon's Noiseless Coding Theorem, Shannon Fanon Coding, Huffman Coding, Arithmetic Coding, Lempel Ziv coding.Channel Coding: Code Rate, Decoding Rules, Hamming Distance, Bounds on M, Maximal Codes and Perfect Codes, Error Probabilities.

Module III: Introduction to Algebra for Information theory systems
Groups, Ring, Vector space and Fields, Linear Spaces, Linear Spaces over Binary Fields, Construction of Galois field GF (2m), Basic Properties of Galois Field GF (2m), Codes Derived from Hadamard Matrices.

Module IV: Error Correcting Codes
Linear Block Codes: Syndrome and Error detection, Minimum distance of block code, error detecting and Error correcting capability a block code.Cyclic Codes: Rings of Polynomials, Description of Cyclic codes, Encoding and Decoding of Cyclic Codes and its Circuits, Hamming Codes.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text

- F.M. Reza: Information Theory, McGraw Hill
- ShuLin & J Costeib: Error Control Coding, (PHI)

Reference

- Dass, Mullick & Chatterjee : Digital Communication, John Wiley, Ed. 1992

Course Name	Course Code	LTP	Credit	Semester
VLSI DESIGN LAB	BEC 621	0:0:1	1	6

List of Experiments:

1. MOSFET characteristics with varying V_{GS} for both pmos and nmos.
2. Effect on VTC of CMOS inverter with variation of W and L.
3. Transient analysis of CMOS inverter with varying capacitive load, W and L.
4. Rise time, Fall time power dissipation, propagation delay calculation of CMOS inverter with the variation ofcapacitive load, W and L.
5. NOR and NAND gate - Transient analysis

6. XOR/XNOR gate - Transient analysis
7. 2:1 MUX and XOR gate with P.T.L.- Transient analysis
8. D type latch and flip flop - Transient analysis
9. 3 input NAND gate implementation with DOMINO (precharge and evaluation)
10. 4 inverter chain to derive capacitive load

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

Course Name	Course Code	LTP	Credit	Semester
DIGITAL SIGNAL PROCESSING LAB	BEC 622	0:0:1	1	6

List of Experiments:

1. To generate unit step sequence, exponential sequence and sinusoidal sequence
2. To determine convolution of two given sequences.
3. To plot the frequency response of an FIR system
4. To compute DFT and IDFT of a given sequence
5. To determine the circular convolution of two given sequences

6. To design various analog filters
7. To design FIR filter using Hamming window
8. To convert Analog filter into Digital Filter using bilinear transformation
9. To determine z and inverse z transform of a given sequence
10. To verify 8 points FFT algorithm in decimation in time (DIT) & decimation in frequency (DIF).
11. To determine the filter coefficient using Ramez exchange algorithm.
12. To design an IIR digital filter and its parallel realization.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

Course Name	Course Code	LTP	Credit	Semester
MICROWAVE ENGINEERING LAB	BEC 623	0:0:1	1	6

List of Experiments:

1. To study the characteristics of reflex klystron.
2. To study the characteristic of Gunn diode.
3. To measure frequency and guided wavelength of a microwave signal.
4. To measure the impedance of a given load.
5. To measure the dielectric constant of the given sample.
6. To measure various parameters of a directional coupler.
7. To study the characteristic and functions of an isolator.

8. To study the characteristic and functions of a circulator.
9. To study the characteristic and functions of various tees.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

Course Name	Course Code	LTP	Credit	Semester
POWER ELECTRONICS LAB	BEE 621	0:0:1	1	6

Course Objective:

The course aims to introduce them to the theory of operation, analytical and circuit models and basic design concepts of Electric Power components and systems.

List of Experiments:

1. Study of VI Characteristics of SCR at different gate currents.
2. Study of VI characteristics of DIAC.

3. Static characteristics of IGBT and MOSFET

4. RC and UJT triggering of SCR.

5. Different types of commutation..

6. Single phase half and full controlled wave converter.

7. Step up and step down choppers.

8. a. Single phase series inverter.

b. Single phase parallel inverter.

9. Speed control of universal motor.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

Reference/Suggested Books

1. O. P. Arora: Power Electronics Laboratory-Experiments and Organization, Narosa Pub.
2. P. B. Zbar: Industrial Electronics- A Text-Lab Manual, MGH.

Course Name	Course Code	LTP	Credit	Semester
PROGRAMMING WITH PYTHON LAB	BCS 630	0:0:1	1	6

List of Assignment:

1. Write a program to demonstrate basic data type in python.
2. Write a program to compute distance between two points taking input from the user.
3. Write a program add.py that takes 2 numbers as command line arguments and prints its sum.
4. Write a Program for checking whether the given number is an even number or not. Using a for loop, write a program that prints out the decimal equivalents of1/2, 1/3, 1/4, . . . , 1/10.
5. Write a Program to demonstrate list and tuple in python.
6. Write a program using for loop that loops over a sequence.
7. Write a program using a while loop that asks the user for a number, and print countdown from that number to zero
8. WAP to find the sum of the even-valued terms.

9. Write a program to count the numbers of characters in the string and store them in a dictionary data structure.
10. Write a program to use split and join methods in the string and trace a birthday of a person with a dictionary data structure.
11. Write a program to print each line of a file in reverse order.
12. Write a program to compute the number of characters, words and lines in a file.
13. Write a function nearly equal to test whether two strings are nearly equal. Two strings a and b are nearly equal when a can be generated by a single mutation.
14. Write function to compute gcd, lcm of two numbers. Each function shouldn'texceed one line

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

Course Name	Course Code	LTP	Credit	Semester
COMMUNICATION SKILLS - IV	BCS 601	1:0:0	1	6

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Demonstrate professional attitude needed for interview preparedness, power dressing, and respectful self orientation.
CLO 2	Showcase their leadership skills with effective team work.
CLO 3	Outline the basic etiquettes in expressing their personality individually and in group.

Course Objective:

To enhance the skills needed to work in an English-speaking global business environment.

Course Contents:

Module I: Business/Technical Language Development
Advanced Grammar: Syntax, Tenses, Voices
Advanced Vocabulary skills: Jargons, Terminology, Colloquialism
Individualised pronunciation practice

Module II: Social Communication
Building relationships through Communication
Communication, Culture and Context
Entertainment and Communication
Informal business/ Technical Communication

Module III: Business Communication

Reading Business/ Technical press
Listening to Business/ Technical reports (TV, radio)
Researching for Business /Technology

Module IV: Presentations
Planning and getting started
Design and layout of presentation
Information Packaging
Making the Presentation

Examination Scheme:

Components	CT1	CT2	CAF	V	GD	GP	A
Weightage (%)	20	20	25	10	10	10	5

CAF – Communication Assessment File,GD – Group Discussion,GP – Group Presentation

Text & References:

Text
- Business Vocabulary in Use: Advanced Mascull, Cambridge
- Business Communication, Raman – Prakash, Oxford
- Business Communications, Rodgers, Cambridge

Reference
- Working in English, Jones, Cambridge
- New International Business English, Jones/Alexander, Cambridge

Course Name	Course Code	LTP	Credit	Semester
BEHAVIOURAL SCIENCE - VI (STRESS AND COPING STRATEGIES)	BSS 604	1:0:0	1	6

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Identify stress and that an individual come across.
CLO 2	Recognize the causes of stress in their lives
CLO 3	Analyze symptoms and how they are affecting lives.
CLO 4	Create ways to effectively cope with it.

Course Objective:
To develop an understanding the concept of stress its causes, symptoms and consequences.
To develop an understanding the consequences of the stress on one's wellness, health, and work performance.

Course Contents:

Module I: Stress
Meaning & Nature
Characteristics
Types of stress

Module II: Stages and Models of Stress
Stages of stress
The physiology of stress
Stimulus-oriented approach.
Response-oriented approach.
The transactional and interact ional model.

Pressure – environment fit model of stress.

Module III: Causes and symptoms of stress
Personal
Organizational
Environmental

Module IV: Consequences of stress
Effect of stress on performance
Individual and Organizational consequences with special focus on health

Module V: Strategies for stress management
Importance of stress management
Healthy and Unhealthy strategies
Peer group and social support
Happiness and well-being

Module VI: End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

Text
- Blonna, Richard; Coping with Stress in a Changing World: Second edition
- Pestonjee, D.M, Pareek, Udai, Agarwal Rita; Studies in Stress And its Management

Reference
- Pestonjee, D.M.; Stress and Coping: The Indian Experience
- Clegg, Brian; Instant Stress Management – Bring calm to your life now

Course Name	Course Code	LTP	Credit	Semester
FRENCH - VI	FLT 601	2:0:0	2	6

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone intermediate language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of intermediate level.
CLO 3	Students will be able to communicate in small sentences in Simple Future and Past tenses .
CLO 4	Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.

Course Objective:

To strengthen the language of the students both in oral and written so that they can:
i) express their sentiments, emotions and opinions, reacting to information, situations;
ii) narrate incidents, events;
iii) perform certain simple communicative tasks.

Course Contents:

Module D: pp. 157 – 168 – Unité 12

Unité 12: s'évader

1. présenter, caractériser, définir
2. parler de livres, de lectures
3. préparer et organiser un voyage
4. exprimer des sentiments et des opinions
5. téléphoner
6. faire une réservation

Contenu grammatical:

1. proposition relative avec pronom relatif "qui", "que", "où" - pour caractériser
2. faire + verbe

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- le livre à suivre : Campus: Tome 1

Course Name	Course Code	LTP	Credit	Semester
GERMAN - VI	FLG 601	2:0:0	2	6

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone intermediate language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of intermediate level
CLO 3	Students will be able to communicate in small sentences in Simple Future and Past tenses.
CLO 4	Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.

Course Objective:

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.
To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany
Introduction to Advanced Grammar and Business Language and Professional Jargon

Course Contents:

Module I: Adjective endings
Adjective endings in all the four cases discussed so far
Definite and indefinite articles
Cases without article

Module II: Comparative adverbs
Comparative adverbs as and like

Module III: Compound words
To learn the structure of compound words and the correct article which they take
Exploring the possibility of compound words in German

Module IV: Infinitive sentence
Special usage of 'to' sentences called zu+ infinitive sentences

Module V: Texts
A Dialogue: 'Ein schwieriger Gast'
A text: 'Abgeschlossene Vergangenheit'

Module VI: Comprehension texts
Reading and comprehending various texts to consolidate the usage of the constructions learnt so far in this semester.

Module VII: Picture Description
Firstly recognize the persons or things in the picture and identify the situation depicted in the picture;
Secondly answer questions of general meaning in context to the picture and also talk about the personal experiences which come to your mind upon seeing the picture.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

Text

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3

Reference

- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

Course Name	Course Code	LTP	Credit	Semester
SPANISH – VI	FLS 601	2:0:0	2	6

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone intermediate language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of intermediate level
CLO 3	Students will be able to communicate in small sentences in Simple Future and Past tenses.
CLO 4	Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.

Course Objective:

To enable students acquire working knowledge of the language; to give them vocabulary, grammar, voice modulations/intonations to handle everyday Spanish situations in Present as well as in Present Perfect Tense with ease.

Course Contents:

Module I
Revision of the earlier modules

Module II
Present Perfect Tense

Module III
Commands of irregular verbs

Module IV
Expressions with **Tener que** and **Hay que**

Module V
En la embajada
Emergency situations like fire, illness, accident, theft

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español, En Directo I A
- Español Sin Fronteras

Course Name	Course Code	LTP	Credit	Semester
CHINESE – VI	FLC 601	2:0:0	2	6

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone intermediate language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of intermediate level
CLO 3	Students will be able to communicate in small sentences in Simple Future and Past tenses.
CLO 4	Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.

Course Objective:

Chinese emperor Qin Shi Huang – Ti who built the great wall of China also built a network of 270 palaces, linked by tunnels, and was so afraid of assassination that he slept in a different palace each night. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I

Drills
Dialogue practice
Observe picture and answer the question.
Pronunciation and intonation.
Character writing and stroke order.

Module II

Going out to see a science exhibition
Going to the theatre.
Train or Plane is behind schedule.
Indian Economy-Chinese Economy
Talking about different Seasons of the Year and Weather conditions. Learning to say phrases like-spring, summer, fall, winter, fairly hot, very cold, very humid, very stuffy, neither hot nor cold, most comfortable, pleasant …. etc.

Module III

Temperature – how to say – What is the temperature in May here?

- How is the weather in summer in your area?
- Around 30 degrees
- Heating, air-conditioning
- Is winter is Shanghai very cold?

Talking about birthdays and where you were born?
The verb "shuo" (speak) saying useful phrases like speak very well, do not speak very well, if speak slowly then understand if speak fast then don't understand, difficult to speak, difficult to write, speak too fast, speak too slow, listen and can understand, listen and cannot understand … etc.
Tell the following in Chinese – My name is …. I was born in … (year). My birthday is …… Today is … (date and day of the week). I go to work (school) everyday. I usually leave home at . (O'clock). In the evening, I usually ……. (do what)? At week end, I ……. On Sundays I usually …… It is today….. It will soon be my younger sisters birthday. She was born in ….. (year). She lives in ……. (where). She is working (or studying)…… where… She lives in …….. (where.)

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Elementary Chinese Reader Part-2, 3; Lesson 47-54

Course Name	Course Code	LTP	Credit	Semester
Anandam	AND006	0:0:0	2	6

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Awareness and empathy regarding community issues
CLO 2	Interaction with the community and impact on society
CLO 3	Interaction with mentor and development of Student teacher relationship
CLO 4	Interaction among students, enlarge social network
CLO 5	Cooperative and Communication skills and leadership qualities
CLO 6	Critical thinking, Confidence and Efficiency

Course Objectives:

After the completion of this course, students will be able to:

- apply their knowledge and skills to solve specific community problem
- learn to plan, lead, and organize community events have a sense of belonging to their college campus and community and find something they are interested in doing during their free time
- make new friends, expand social network, and boost social skills and mental health.
- be useful to society as it will protect them against stress, frustration, and depression

Course Contents:

The project report should be guided by the mentor and shall contain:

- **Synopsis**: clearly stating objectives and activities to be undertaken. Problem identifying and problem-solving projects to be taken up.
- Details of the **Mentor and the Participants are to** be given (name of mentor, name of participants, phone number/mobile no, email, and address)
- Location / community where the work was carried out
- Details of Activities performed are to be given with date
- Number of beneficiaries and impact on the society (the object should be to empower the community and make them self-reliant)
- Photographs taken for documentation of work should be submitted
- Media coverage of the projects should be attached if any
- The Group Community Service Project Report will be submitted by the Student group leader under the guidance of the mentor to the Director/HoIs of the Department.
- The Director/HoIs should get the best report (more than one if required) of the Group Community Service Project uploaded on the HTE website and on the University page
- The Director/HoIs will forward the best report of the department to the Nodal Officer of the University.
- University will forward the report to the state level committee.

GUIDELINES FOR GCSP (Group Community Service Project)
ASSIGNMENT OF ANANDAM FOR SOCIAL AWARENESS (for students)

1. Each member of the group shall write one blog about the decided topic of 500 words (minimum) along with any relevant photos/diagrams/statistical data (with reference).
2. The group member shall write his/her name at the end of the blog.
3. The blog shall be posted on Instagram and Facebook (apart from these any other website wherever the group seems necessary).
4. Print out of the blog where date of when the content is posted, number of followers, comments, name of the writer shall be visible will be taken and file will be maintained for the same.
5. In the cover page of the project mention heading **"Group Community Service Project"**, and the filled format of final project report given by Anandam Scheme.
6. For the topic chosen by the group, students are recommended to cover the following points:
    a) Current scenario (Regional, national and international level as applicable)
    b) Future predictions
    c) Duty of the government
    d) Government policies (related to the topic), if any
    e) Duty of public
    f) Conclusion

Evaluation Scheme:

Project Participation: 2 hours X 8 days (per month) X 4 months = 64 hours

- **C grade =32 hrs (Below 20 marks)**
- **B grade >32 hrs to <=44hrs (20-30 marks)**
- **A grade >44 hrs to<=54hrs (30-40 marks)**
- **O grade >54 hrs to<=64hrs (40-50 marks)**

Evaluation Criteria:

Respective Departmental Anandam mentors are requested to evaluate the project (out of 50) as per the following criteria:

1. Position and exceptions, if any, are clearly stated. The organization of the blog is completely and clearly outlined and implemented.
2. The body of the blog is coherently organized, original and the logic is easy to follow. There is no spelling or grammatical errors and terminology is clearly defined. Writing is clear, concise, and persuasive.
3. Conclusion is clearly stated. The underlying logic is explicit.

Course Name	Course Code	LTP	Credit	Semester

RADAR AND SATELLITE COMMUNICATIONS	BEC 701	3:0:0	3	7

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Understand the basic concepts in modern surveillance radar and satellite telecommunication systems including the radar ambiguity function, modulation, signal detection, link budgets, spread spectrum, and system design
CLO 2	Understand design and system performance tradeoffs for such systems
CLO 3	Communicate design and analysis concepts
CLO 4	Do Research on practical systems
CLO 5	Write original reports about practical radar and satellite systems

Course Objective:

This course builds basic knowledge of different types of Radar systems and satellite communication along with link designing & application. It also covers different modulation schemes & channels used.

Course Contents:

Module I: Introduction to Radar
Principle of detection and ranging, Radar frequencies and bands. Applications, Radar block diagram and operation. Radar Range Equation : Range prediction, Minimum detectable signal, Receiver noise SNR, Integration of radar pulses, Radar cross section of targets, Transmitter Power, PRF and system losses & Propagation effects.

Module II: CW FM Radar
Doppler effect, CW Radar, Frequency-modulated CW Radar, Multiple-frequency CW Radar. MTI and Pulse Doppler Radar: MTI delay lines, Delay line Cancellers, Coherent and Non-Coherent MTI, Pulse Doppler Radar.

Module III: Introduction to Satellite
Communication satellites, Orbiting satellites, Frequencies and bands, Satellite multiple access formats. Satellite Channel: Power flow, Polarization, Atmospheric losses, Receiver noise, CNR, Satellite link analysis for uplinks and downlinks. Overview of Coaxial cable system and optical Network (SONET); Overview of WLL (Wireless loop)

Module IV: Satellite Transponder
Transponder model, Satellite signal processing RF-RF translation, IF demodulation.,application

Module V: Multiple-Access
FDMA; amplification with multiple FDMA carriers, AM/FM Conversion with FDMA, Switched FDMA, Synchronization, SS-TDMA; CDMA; DS CDMA, Frequency- hopped, CDMA. Carrier recovery & bit timing. Satellite link budget analysis

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text

- Introduction to Radar Systems - M.I. Skolnik

- Radar Fundamentals - G.J. Wheeler.
- Radar Engineering - D.G. Rink
- Satellite Communication - R.M. Gagliardi

Reference
- Satellite Communication - T. Pratt & C.W. Boston
- Satellite Communication System Design Principles - M. Richharia

Course Name	Course Code	LTP	Credit	Semester

DIGITAL IMAGE PROCESSING	BEC 702	3:0:0	3	7

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Investigate the fundamental concepts of a digital image processing system.
CLO 2	Create the spatial domain and frequency domain image enhancement techniques.
CLO 3	Apply which tools of image processing should be applied in order to solve the real problems
CLO 4	Develop Matlab algorithms for digital image processing operations such as histogram equalization, image enhancement, image restoration, image analysis, image compression, morphology, representation and description, filtering and denoising.

Course Objective:

The syllabus is divided into four parts, the first one deal with introduction and fundamental concepts of digital image processing and image enhancement in spatial domain. Second module of the syllabus deals with image processing operations like image enhancement in frequency domain, image restoration respectively. Third and fourth module deals with applications like Image Compression and Object recognition respectively The syllabus helps a student perfect image processing fundamentals. Apart from it image processing application are discussed in detail.

Course Contents:

Module I: Introduction and Digital Image Fundamentals

The origins of Digital Image Processing, Examples of Fields that Use Digital Image Processing, Fundamentals Steps in Image Processing, Elements of Digital Image Processing Systems, Image Sampling and Quantization, Some basic relationships like Neighbors, Connectivity, Distance Measures between pixels, Linear and Non Linear Operations. Image Enhancement in the Spatial Domain**:** Some basic Gray Level Transformations, Histogram Processing, Enhancement Using Arithmetic and Logic operations, Basics of Spatial Filters, Smoothening and Sharpening Spatial Filters, Combining Spatial Enhancement Methods.

Module II: Image Enhancement in the Frequency Domain

Introduction to Fourier Transform and the frequency Domain, Smoothing and Sharpening Frequency Domain Filters, Homomorphic Filtering. Image Restoration: A model of The Image Degradation / Restoration Process, Noise Models, Restoration in the presence of Noise Only Spatial Filtering, Pereodic Noise Reduction by Frequency Domain Filtering, Linear Position-Invarient Dedradations, Estimation of Degradation Function, Inverse filtering, Wiener filtering, Constrained Least Square Filtering, Geometric Mean Filter, Geometric Transformations.

Module III: Image Compression

Coding, Interpixel and Psychovisual Redundancy, Image Compression models, Elements of Information Theory, Error free comparison, Lossy compression, Image compression standards.Image Segmentation*:* Detection of Discontinuities, Edge linking and boundary detection, Thresholding, Region Oriented Segmentation, Motion based segmentation

Module IV: Representation and Description

Representation, Boundary Descriptors, Regional Descriptors, Use of Principal Components for Description, Introduction to Morphology, Some basic Morphological Algorithms. Object Recoginition**:** Patterns and Pattern Classes, Decision-Theoretic Methods, Structural Methods.

Examination Scheme:

Components	**A**	**CT**	**S/V/Q**	**HA**	**EE**
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text:

- Rafael C. Conzalez & Richard E. Woods, 2002, "Digital Image Processing", 2nd edition, Pearson Education.
- A.K. Jain, 1989, "Fundamental of Digital Image Processing", PHI.

References:

- Bernd Jahne, 2002, "Digital Image Processing", 5th Ed., Springer.
- William K Pratt, 2001, "Digital Image Processing: Piks Inside", John Wiley & Sons.

Course Name	Course Code	LTP	Credit	Semester

ANALOG CMOS IC DESIGN	BEC 703	3:0:0	3	7

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Identify the fundamentals of MOSFET and their applications in industry.
CLO 2	Analyze and design different operational amplifier and their uses
CLO 3	Analyze the effects of various noises on MOSFET circuits.
CLO 4	Analyze and design different kind of amplifiers and their frequency response.

Course Objective:

In the VLSI design course, the student was initiated in the world of circuit design from a digital perspective. In this course, transistor modeling is emphasized from a purely analog point of view. Some of the world's highest paid jobs in Electronics based industry are in Analog Circuit Design. This course will serve as an introduction to what Analog Design is like. Since CMOS is the technology being used most of the time, only CMOS technology is being included here. A serious learner is recommended to study BJT based circuits as well.

Course Contents:

Module I: MOSFET Basics

MOSFET channel length modulation, small signal model, transconductance, T model, biasing a MOSFET at DC, four resistor biasing, modeling body effect, body transconductance, short channel effects, Coupling and Bypass capacitors, AC equivalent circuit

Module II: Single Stage Amplifiers, Differential Amplifier and Current Mirrors

Common source, common gate, source follower: input resistance, output resistance and voltage gain, high frequency model, MOSFET Unity Gain,High and Low Frequency response of CS Amplifier, Active loads, CS source with resistive load, diode connected load, current source load, MOSFET current source, Open circuit Time constants, Miller theorem, Cascode amplifier, Results for CS, CD, CB configurations taking r_0 into account,Current mirror, Cascode Current mirror, Active Current Mirrors: Large and small signal Analysis,Differential Pair: Common mode and Differential input voltage**,** Large signal Operation and Small signal Operation, effect of r_0, CMRR, effect of R_D mismatch and g_m mismatch, Input Offset Voltage of MOS pair, Frequency response of resistively loaded and actively loaded MOS Differential pair

Module III: Operational Amplifiers

Ideal Op Amp, Compensation of Op Amp, One stage Op Amp, Two stage CMOS Op Amp, Folded Cascode Op Amp: voltage gain, Frequency response and slew rate, Noise in Op Amps, power Supply Rejection Ratio

Module IV: Noise, Stability and Frequency Compensation

Statistical Characteristics of Noise, Types of Noise, Noise in single stage amplifiers, Noise in Differential pair Feedback review, Loop Gain, Transfer Function of feedback amplifier, effect of feedback on Amplifier poles, Miller Compensation and Pole Splitting, multipole system, frequency compensation, compensation of two stage op amp

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text

- Sedra and Smith: Microelectronic Circuits
- Razavi Design of Analog CMOS Integrated Circuits

Reference

- Gray, Hurst, Lewis and Meyer: Analysis and design of Analog Ics
- Allen and Holberg: CMOS Analog Design

Course Name	Course Code	LTP	Credit	Semester
ADVANCED PROGRAMMING WITH PYTHON	BCS 710	2:0:0	2	7

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Interpret the basic principles of Python programming language.
CLO 2	Articulate the Object-Oriented Programming concepts such as encapsulation, inheritance and polymorphism as used in Python.
CLO 3	Identify the commonly used operations involving file systems and regular expressions.
CLO 4	Implement Machine Learning algorithms.

Course Objective:
The course should enable the students:

- Describe the semantics of Python programming language and illustrate the process of structuring the data using lists, dictionaries, tuples, strings and sets.
- Illustrate the Object-oriented Programming concepts in Python.
- Demonstrate the basic database design for storing data as part of a multi-step data gathering, analysis, and processing.
- Familiarize the basics of machine learning using an approachable, and also understand the advantage of using Python libraries for implementing Machine Learning models Course Outcomes: After completion of this course, student will be able to:

Course Outcomes:

- Interpret the basic principles of Python programming language.
- Articulate the Object-Oriented Programming concepts such as encapsulation, inheritance and polymorphism as used in Python.
- Identify the commonly used operations involving file systems and regular expressions.
- Implement Machine Learning algorithms.

Course Contents:

Module-I:
Introduction to Python, use IDLE to develop programs, Basic coding skills, working with data types and variables, working with numeric data, working with string data, Python functions, Boolean expressions, selection structure, iteration structure, working with lists, work with a list of lists, work with tuples, work with dates and times, get started with dictionaries

Learning Outcome:
At the end of this Unit the student will be able to

- Solve, test and debug basic problems using python script.
- Manipulate python programs by using the python data structures like lists, dictionaries, tuples, strings and sets.

Module -II
Classes in Python: OOPS Concepts,Classes and objects ,Classes in Python, Constructors, Datahiding, Creating Classes, Instance Methods, Special Methods, Class Variables, Inheritance, Polymorphism, Type Identification, Custom Exception Classes, Iterators, generators and decorators.

Learning Outcome:At the end of this Unit the student will be able to

- Design object-oriented programs with Python classes.
- Usage of inheritance and polymorphism for reusability.

Module -III

I/O and Error Handling In Python :Introduction, Data Streams, Creating Your Own Data Streams, Access Modes, Writing Data to a File, Reading Data From a File, Additional File Methods, Handling IO Exceptions, Errors, Run Time Errors, The Exception Model, Exception Hierarchy, Handling Multiple Exceptions, Working with Directories.

Learning Outcome: At the end of this Unit the student will be able to

- Identify the commonly used operation involved in files for I/O processing.
- Familiarize the handling of I/O Exception sand usage of Directories.

Module -IV

Implement Machine Learning algorthims:Usage of Numpy for numerical Data,Usage of Pandas for Data Analysis, Matplotlib for Python plotting, Seaborn for Statically plots, interactive Dynamic visualizations, SciKit for Machine learning.

Learning Outcome: At the end of this Unit the student will be able to
Understand the advantage of using Python libraries for implementing Machine Learning models.

Projects:

Creating a discussion form, creating an online store, creating a job site.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

1. Michael Urban and Joel Murach, Python Programming, Shroff/Murach, 2016.
2. Haltermanpython.
3. Mark Lutz, Programming Python, O`Reilly, 4th Edition, 2010ONLINE

Course Name	Course Code	LTP	Credit	Semester
RADAR AND SATELLITE COMMUNICATIONS LAB	BEC 721	0:0:1	1	7

List of Experiments:

1. To study AM transmitter and receiver.

2. To study FM transmitter and receiver.

3. To implement the following circuits.
   - AM Transmitter
   - FM Transmitter
   - AM Receiver
   - FM Receiver
   - Remote Control
   - Wireless Mic System

4. To study RF portion of satellite receiver.
   - Study of dish antenna and section N.B section
   - Study of tuner
   - Study of R.F modulator section

5. To study the base-band portion of satellite receiver
   - study of video section
   - study of sound section
   - study of signal indictor
   - study of power supply section

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

Course Name	Course Code	LTP	Credit	Semester
DIGITAL IMAGE PROCESSING LAB	BEC 722	0:0:1	1	7

List of Experiments:

Note: Simulate all the programs using MATLAB

1. To study about the basic image processing tools.
2. To write program for Histogram processing.
3. To write program for lossy compression.
4. To write program for lossless compression.
5. To write algorithm for different morphology operations and generate programs.
6. To write program for inverse filtering.
7. To write program for least square filtering.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

Course Name	Course Code	LTP	Credit	Semester
ANALOG CMOS IC DESIGN LAB	BEC 723	0:0:1	1	7

List of Experiments:

1. Plot the IV characteristics of Id vs Vds for varying Vgs
2. Design and simulate single stage amplifiers
3. Repeat experiment 1 including body effect.
4. Design and simulate current mirror
5. Design and simulate voltage source and voltage sink amplifier
6. Design and simulate Differential amplifier
7. Design and simulate Darlington pair
8. Design and simulate an OP amp
9. Simulate the operation of a CMOS op-amp with SPICE and find its frequency response.
10. Simulate and plot the frequency response of a switched capacitor filter circuit using SPICE.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

Course Name	Course Code	LTP	Credit	Semester
ADVANCED PROGRAMMING WITH PYTHON LAB	BCS 730	0:0:1	1	7

List of Assignment:

- Practice Assignment based on string data, Python functions, and Boolean expressions.
- Practical based on iteration, working with lists, tuples and dictionaries.
- Practical based on class, objects, constructor, method in side class.
- Practical questions based on Inheritance, Polymorphism, Type Identification, Custom Exception Classes.
- Handling Errors using Python.
- Practical Assignment based on Usage of Numpy for numerical Data,
- Practical Assignment based on Usage of Usage of Pandas for Data Analysis.
- Practical Assignment based on Usage of Matplotlib for Python plotting.

- Practical Assignment based on Usage of Seaborn for Statically plots.
- Practical Assignment based on Usage of Interactive Dynamic visualizations.
- Practical Assignment based on Usage of SciKit for Machine learning.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

Course Name	Course Code	LTP	Credit	Semester
INDUSTRIAL TRAINING (Evaluation)	BEC 750	3:0:0	3	7

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Develop a practical approach for the construction, characteristics, operation and application of electronics devices.
CLO 2	Able to solve problems relating to generated voltage, terminal voltage, currents, torque, speed, input and output power, efficiency, and voltage/speed regulation in ece fields.
CLO 3	Capable of solving problems relating to analog, digital, control and instrumentation engineering.
CLO 4	To acquire the knowledge about the results of laboratory tests on various ece under various conditions.

CLO 5	Safely wire and operate electronics devices and their associated metering and starting equipment.
CLO 6	Able to identify, formulate, and solve the electronics engineering related problems.

Methodology:

Practical training is based on the theoretical subjects studied by students. It can be arranged within the college or in any related industrial unit. The students are to learn various industrial, technical and administrative processes followed in the industry. In case of on-campus training the students will be given specific task of fabrication/assembly/testing/analysis. On completion of the practical training the students are to present a report covering various aspects learnt by them and give a presentation on same.

Examination Scheme:

Feedback from industry/work place	20
Training Report	40
Viva	15
Presentation	25
Total	**100**

Course Name	Course Code	LTP	Credit	Semester
SEMINAR	BEC 760	3:0:0	3	7

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	**To provide students with a comprehensive experience for applying the knowledge gained so far by studying various courses.**
CLO 2	**To develop good expressions power and presentation abilities in students.**
CLO 3	To adapt students for latest developments and to handle independently new situations.

Methodology:

The objectives of the course 'seminar' are:

- To provide students with a comprehensive experience for applying the knowledge gained so far by studying various courses.
- To develop an inquiring aptitude and build confidence among students by working on solutions of small

industrial problems.

- To give students an opportunity to do something creative and to assimilate real life work situation in institution.
- To adapt students for latest developments and to handle independently new situations.
- To develop good expressions power and presentation abilities in students.
- The focus of the 'seminar' is on preparing a working system or some design or understanding of a complex system using system analysis tools and submit it the same in the form of a write-up i.e. detail seminar report.
- The student should select some real-life problems for their seminar and maintain proper documentation of different stages of seminar such as need analysis, market analysis, concept evaluation, requirement specification, objectives, work plan, analysis, design, implementation and test plan.
- Each student is required to prepare a seminar report and present the same with a demonstration of the working system (if any).
- The faculty and student should work according to following schedule: i) Each student undertakes substantial and individual project/Topic in an approved area of the subject and supervised by a member of staff. ii) The student must submit outline and action plan for the project execution (time schedule) and the same be approved by the concerned faculty. iii) At all the steps of the seminar, students must submit a written report of the same.

Examination Scheme:

Feedback from industry/workplace	20
Training Report	40
Viva	15
Presentation	25
Total	**100**

Course Name	Course Code	LTP	Credit	Semester
COMMUNICATION SKILLS - V	BCS 701	1:0:0	1	7

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Investigate their personal strengths and insights to be revealed in a Formal Setup of Communication.
CLO 2	Create right selection of words and ideas while choosing the appropriate channel of formal communication
CLO 3	Apply acquired knowledge with the appropriate selection of channel of formal communication.
CLO 4	Develop and empower self with the ease of using appropriate medium of communication.

Course Objective:

To facilitate the learner with Academic Language Proficiency and make them effective users of functional

language to excel in their profession.

Course Contents:

Module I
Introduction to Public Speaking
Business Conversation
Effective Public Speaking
Art of Persuasion

Module II: Speaking for Employment
Types of Interview
Styles of Interview
Facing Interviews-Fundamentals and Practice Session
Conducting Interviews- Fundamentals and Practice Session
Question Answer on Various Dimensions

Module III
Resume Writing
Covering Letters
Interview Follow Up Letters

Module IV: Basic Telephony Skills
Guidelines for Making a Call
Guidelines for Answering a Call

Module V: Work Place Speaking
Negotiations
Participation in Meetings
Keynote Speeches

Examination Scheme:

Components	CT1	CT2	CAF	V	GD	GP	A
Weightage (%)	20	20	25	10	10	10	5

CAF – Communication Assessment File
GD – Group Discussion
GP – Group Presentation

Text & References:

Text

- Jermy Comfort, Speaking Effectively, et.al, Cambridge
- Krishnaswamy, N, Creative English for Communication, Macmillan
  \

Reference

- Raman Prakash, Business Communication, Oxford.
- Taylor, Conversation in Practice

Course Name	Course Code	LTP	Credit	Semester
BEHAVIOURAL SCIENCE - VII (INDIVIDUAL, SOCIETY AND NATION)	BSS 704	1:0:0	1	7

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Recognize their personality and individual differences and identify its importance of diversity at workplace and ways to enhance it.
CLO 2	Recognize effective socialization strategies and importance of patriotism and taking accountability of integrity.
CLO 3	Recognize different types of human rights and its importance
CLO 4	Identify Indian values taught by different religions.
CLO 5	Identify long term goals and recognize their talent, strengths and styles to achieve them

Course Objective:

This course aims at enabling students towards:Understand the importance of individual differences..Better understanding of self in relation to society and nation,Facilitation for a meaningful existence and adjustment in society,Inculcating patriotism and national pride

Course Contents:

Module I: Individual differences & Personality
Personality: Definition& Relevance
Importance of nature & nurture in Personality Development
Importance and Recognition of Individual differences in Personality
Accepting and Managing Individual differences (adjustment mechanisms)
Intuition, Judgment, Perception & Sensation (MBTI)
BIG5 Factors

Module II: Managing Diversity
Defining Diversity
Affirmation Action and Managing Diversity
Increasing Diversity in Work Force
Barriers and Challenges in Managing Diversity

Module III: Socialization
Nature of Socialization
Social Interaction
Interaction of Socialization Process
Contributions to Society and Nation

Module IV: Patriotism and National Pride
Sense of pride and patriotism
Importance of discipline and hard work
Integrity and accountability

Module V: Human Rights, Values and Ethics
Meaning and Importance of human rights
Human rights awareness
Values and Ethics- Learning based on project work on Scriptures like- Ramayana, Mahabharata, Gita etc.

Module VI: End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

Text

- Davis, K. Organizational Behaviour,
- Bates, A. P. and Julian, J.: Sociology - Understanding Social Behaviour
- Dressler, David and Cans, Donald: The Study of Human Interaction
- Lapiere, Richard. T – Social Change

Reference

- Lindzey, G. and Borgatta, E: Sociometric Measurement in the Handbook of Social Psychology, Addison – Welsley, US.
- Rose, G.: Oxford Textbook of Public Health, Vol.4, 1985.
- Robbins O.B.Stephen;. Organizational Behaviour

Course Name	Course Code	LTP	Credit	Semester
FRENCH – VII	FLT 701	2:0:0	2	7

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of advance level.
CLO 3	Students will be able to communicate with complex sentences.

Course Objective:
Revise the portion covered in the first volume, give proper orientation in communication and culture.

Course Contents:

Module A: Unités 1 – 3: pp. 06 - 46

Contenu lexical:

Unité 1: Rédiger et présenter son curriculum vitae
Exprimer une opinion
Caractériser, mettre en valeur
Parler des rencontres, des lieux, des gens

Unité 2: Imaginer - Faire des projets
Proposer - conseiller
Parler des qualités et des défauts
Faire une demande écrite
Raconter une anecdote
Améliorer son image

Unité 3: Exprimer la volonté et l'obligation
Formuler des souhaits
Exprimer un manque/un besoin
Parler de l'environnement, des animaux, des catastrophes naturelles

Contenu grammatical:

1. Le passé : passé composé/imparfait
2. Pronoms compléments directs/indirects, y/en (idées/choses)
3. Propositons relatives introduites par qui, que, où
4. Comparatif et superlatif
5. Le conditionnel présent
6. Situer dans le temps
7. Féminin des adjectifs
8. La prise de paroles : expressions
9. Le subjonctif : volonté, obligation

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- le livre à suivre : Campus: Tome 2

Course Name	Course Code	LTP	Credit	Semester
GERMAN - VII	FLG 701	2:0:0	2	7

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of advance level.
CLO 3	Students will be able to communicate with complex sentences.

Course Objective:

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.
To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany
Introduction to Advanced Grammar and Business Language and Professional Jargon

Course Contents:

Module I: Dass- Sätze
Explain the use of the conjunction "-that", where verb comes at the end of the sentence

Module II: Indirekte Fragesätze
To explain the usage of the "Question Pronoun" as the Relative Pronoun in a Relative Sentence, where again the verb falls in the last place in that sentence.

Module III: Wenn- Sätze
Equivalent to the conditional "If-" sentence in English. Explain that the verb comes at the end of the sentence.

Module IV: Weil- Sätze
Explain the use of the conjunction "because-" and also tell that the verb falls in the last place in the sentence.

Module V: Comprehension texts
Reading and comprehending various texts to consolidate the usage of the constructions learnt so far in this semester.

Module VI: Picture Description
Firstly recognize the persons or things in the picture and identify the situation depicted in the picture;
Secondly answer questions of general meaning in context to the picture and also talk about the personal experiences which come to your mind upon seeing the picture.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

Text

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant - 1, 2 & 3

Reference

- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

Course Name	Course Code	LTP	Credit	Semester
SPANISH - VII	FLS 701	2:0:0	2	7

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of advance level.
CLO 3	Students will be able to communicate with complex sentences.

Course Objective:

To enable students acquire working knowledge of the language; to give them vocabulary, grammar, expressions used on telephonic conversation and other situations to handle everyday Spanish situations with ease.

Course Contents:

Module I
Revision of earlier semester modules

Module II
Zodiac signs. More adjectives…to describe situations, state of minds, surroundings, people and places.

Module III
Various expressions used on telephonic conversation (formal and informal)

Module IV
Being able to read newspaper headlines and extracts (Material to be provided by teacher)

Module V
Negative commands (AR ending verbs)

Module VI
Revision of earlier sessions and introduction to negative ER ending commands, introduction to negative IR ending verbs

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

Text
- Español En Directo I A, 1B
- Español Sin Fronteras

Reference
- Material provided by the teacher from various sources

Course Name	Course Code	LTP	Credit	Semester
CHINESE – VII	FLC 701	2:0:0	2	7

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of advance level.
CLO 3	Students will be able to communicate with complex sentences.

Course Objective:

The story of Cinderella first appears in a Chinese book written between 850 and 860 A.D. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I
Drills
Dialogue practice
Observe picture and answer the question.
About china part –I Lesson 1, 2.

Module II
Pronunciation and intonation
Character Writing and stroke order.

Module III
Ask someone what he/she usually does on weekends?
Visiting people, Party, Meeting, After work….etc.

Module IV
Conversation practice
Translation from English to Chinese and vise-versa.
Short fables.

Module V
A brief summary of grammar.
The optative verb "yuanyi".
The pronoun "ziji".

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- "Kan tu shuo hua" Part-I Lesson 1-7

Course Name	Course Code	LTP	Credit	Semester
Anandam	AND007	0:0:0	2	7

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Awareness and empathy regarding community issues
CLO 2	Interaction with the community and impact on society
CLO 3	Interaction with mentor and development of Student teacher relationship
CLO 4	Interaction among students, enlarge social network
CLO 5	Cooperative and Communication skills and leadership qualities
CLO 6	Critical thinking, Confidence and Efficiency

Course Objectives:

After the completion of this course, students will be able to:

- apply their knowledge and skills to solve specific community problem
- learn to plan, lead, and organize community events have a sense of belonging to their college campus and community and find something they are interested in doing during their free time
- make new friends, expand social network, and boost social skills and mental health.
- be useful to society as it will protect them against stress, frustration, and depression

Course Contents:

The project report should be guided by the mentor and shall contain:

- **Synopsis**: clearly stating objectives and activities to be undertaken. Problem identifying and problem-solving projects to be taken up.
- Details of the **Mentor and the Participants are to** be given (name of mentor, name of participants, phone number/mobile no, email, and address)
- Location / community where the work was carried out
- Details of Activities performed are to be given with date
- Number of beneficiaries and impact on the society (the object should be to empower the community and make them self-reliant)
- Photographs taken for documentation of work should be submitted
- Media coverage of the projects should be attached if any
- The Group Community Service Project Report will be submitted by the Student group leader under the guidance of the mentor to the Director/HoIs of the Department.
- The Director/HoIs should get the best report (more than one if required) of the Group Community Service Project uploaded on the HTE website and on the University page
- The Director/HoIs will forward the best report of the department to the Nodal Officer of the University.
- University will forward the report to the state level committee.

GUIDELINES FOR GCSP (Group Community Service Project)
ASSIGNMENT OF ANANDAM FOR SOCIAL AWARENESS (for students)

1. Each member of the group shall write one blog about the decided topic of 500 words (minimum) along with any relevant photos/diagrams/statistical data (with reference).

2. The group member shall write his/her name at the end of the blog.
3. The blog shall be posted on Instagram and Facebook (apart from these any other website wherever the group seems necessary).
4. Print out of the blog where date of when the content is posted, number of followers, comments, name of the writer shall be visible will be taken and file will be maintained for the same.
5. In the cover page of the project mention heading **"Group Community Service Project"**, and the filled format of final project report given by Anandam Scheme.
6. For the topic chosen by the group, students are recommended to cover the following points:
    a) Current scenario (Regional, national and international level as applicable)
    b) Future predictions
    c) Duty of the government
    d) Government policies (related to the topic), if any
    e) Duty of public
    f) Conclusion

Evaluation Scheme:

Project Participation: 2 hours X 8 days (per month) X 4 months = 64 hours

- **C grade =32 hrs (Below 20 marks)**
- **B grade >32 hrs to <=44hrs (20-30 marks)**
- **A grade >44 hrs to<=54hrs (30-40 marks)**
- **O grade >54 hrs to<=64hrs (40-50 marks)**

Evaluation Criteria:

Respective Departmental Anandam mentors are requested to evaluate the project (out of 50) as per the following criteria:

1. Position and exceptions, if any, are clearly stated. The organization of the blog is completely and clearly outlined and implemented.
2. The body of the blog is coherently organized, original and the logic is easy to follow. There is no spelling or grammatical errors and terminology is clearly defined. Writing is clear, concise, and persuasive.
3. Conclusion is clearly stated. The underlying logic is explicit.

Course Name	Course Code	LTP	Credit	Semester
ANTENNA AND WAVE PROPOGATION	BEC 801	3:0:0	3	8

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Explain how an antenna radiates and capture radio wave energy from the concepts of radiation by dynamic currents and charges, and retarded potentials.
CLO 2	Distinguish the properties and parameters of antenna such as radiation pattern, radiation impedance, directivity, antenna gain, effective
CLO 3	Design an antenna system, including the shape of the antenna, feed property, the requirement on the arrangement of the radiating elements in an array, given the radiation parameters such as radiation pattern, gain, operating frequency, and transmit/receive power.
CLO 4	Identify the mechanism of the atmospheric effects on radio wave propagation.
CLO 5	Measure the metrics for comparison of different antennas

Course Objective:

The purpose of this course is to provide a thorough introduction to antenna systems with an in depth study of various types & performance parameters for antenna.

Course Contents:

Module I: Antenna
Antenna Principles: Potential Functions & Electromagnetic Field, Current Elements, Radiation from Monopole & Half Wave Dipole, power radiated by current element, radiation resistance. Network Theorems, Directional Properties of Dipole Antenna. Antenna Gain, Effective Area, Antenna Terminal Impedance, Practical Antennas and Methods of Excitation, Antenna Temperature and Signal to Noise Ratio.

Module II: Antenna Arrays
Antennas Arrays: Two Element Array, Horizontal Patterns in Broadcast Arrays, Linear Arrays, Multiplication of patterns, effect of the earth on vertical patterns, Binomial array

Module III: Wave Propagation
Modes of Propagation, Plane Earth Reflection, Space wave and Surface Wave, Reflection and refraction waves by the Ionosphere Tropospheric Wave. Ionosphere Wave Propagation in the Ionosphere, Virtual Height, MUF Critical frequency, Skip Distance, Duct Propagation, Space wave

Module IV: Practical Antennas
VLF and LF transmitting antennas, effect of antenna height, Field of short dipole, electric field of small loop antenna, Directivity of circular loop antenna with uniform current, Yagi-Uda array: Square corner yagi-uda hybrid, circular polarization Rhombic Antenna: Weight and Leg length Parabolic Reflectors: Properties, Comparison with corner reflectors Horn Antenna: Length and Aperture. Introduction to Turstile Antenna Effect of ground on antenna performance.Broadband Antenna: Frequency independent concept, RUMSEY's Principle, Frequency independent planar log spiral antenna, Frequency independent conical spiral Antenna.

Module V: Antenna Measurements
Radiation Pattern measurement, Distance requirement for uniform phase, uniform field amplitude requirement, Introduction to phase measurement; Gain Measurement: Comparison method, Near field method, Introduction to current distribution measurement, Measurement of antenna efficiency, measurement of Noise figure and noise temperature of an antenna polarization measurement.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text:
1. Jordan Edwards C. and Balmain Keith G.S “Electromagnetic Waves and Radiating Systems”/ Prentice Hall (India)
2. Kraus, John D. & Mashefka, Ronald J. / “Antennas: For All Applications” / Tata McGraw Hill, 3rd Ed.

References:
1. Prasad, K.D./ “Antennas and Wave Propagation”/ Khanna Publications
2. Collin, R. / “Antennas and Radiowave Propagation” / Tata McGraw-Hill
3. Hayt Jr. William H./ “Engineering Electromagnetic “/ Tata McGraw-Hill
4. Das, Annaparna & Das, Sisir K. / “Microwave Engineering”/ Tata McGraw Hill.
5. Roy, Sitesh Kumar & Mitra, Monojit / “Microwave Semiconductor Devices” / Prentice Hall (India).

Course Name	Course Code	LTP	Credit	Semester
EMBEDDED SYSTEM DESIGN AND DEVICE DRIVER DEVELOPMENT	BEC 802	3:0:0	3	8

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students are able to identify basic concepts of designing a system using interfacing device.
CLO 2	They can Gain a detailed understanding of any system for a specific application
CLO 3	Student are able to design a any hardware based on application.

Course Objective:

The syllabus is divided into two parts, the first one deals with the basic embedded system and it's design and in second part deals with device driver development .The syllabus makes student perfect in assembly language programming, addressing modes etc apart from it input-output programming is discussed in detail.

Course Contents:

Module I:An introduction to embedded systems:
An Embedded system, processor in the system, other hardware units, software embedded into a system, exemplary embedded systems, embedded system – on – chip (SOC) and in VLSI circuit.

Module II: Processor and memory organization :
Structural Units in a Processor, Processor selection for an embedded system, memory devices, memory selection for an embedded systems, allocation of memory to program cache and memory management links, segments and blocks and memory map of a system, DMA, interfacing processors, memories and Input Output Devices.

Module III: Devices and buses for device networks:
I/O devices, timer and counting devices, serial communication using the "I2 C" CAN, profibus foundation field bus. and advanced I/O buses between the network multiple devices, host systems or computer parallel communication between the networked I/O multiple devices using the ISA, PCI, PCI-X and advanced buses.

Module IV: Device drivers and interrupts servicing mechanism :
Device drivers, parallel port and serial port device drivers in a system, device drivers for internal programmable timing devices, interrupt servicing mechanism.

Module V: Hardware:
software co-design in an embedded system, embedded system project management, embedded system design and co-design issues in system development process, design cycle in the development phase for an embedded system, use of target systems, use of software tools for development of an embedded system, use of scopes and logic analysis for system, hardware tests. Issues in embedded system design.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text

- M.A. Mazidi and J. G. Mazidi, 2004 "The 8051 Microcontroller and Embedded Systems", PHI.
- Dr. Prasad, 2004, "Embedded Real Time System", Wiley Dreamtech.
- P.Raghavan , "Embedded linux system design and development", auerbach publication.

Reference

- Michael barr, "Programming embedded system" oreilly publication.
- Raj Kamal, 2004, "Embedded Systems", TMH.
- Embedded systems design: Real world design be Steve Heath; Butter worth Heinenann, Newton mass USA 2002

Course Name	Course Code	LTP	Credit	Semester
INSTRUMENTATION	BEC 803	3:0:0	3	8

CLO 1	To provide the students the core knowledge of industrial instrumentation so that they learn how to implement instrumentation techniques in industry.

CLO 2	**To Introduce the Measurement & Instrumentation for circuit analysis**
CLO 3	**To Introduce the sensors, Transducer and miscellaneous intruments**

Course Contents:

Module I: Introduction to Measurement & Instrumentation
Classification, Characteristics of measuring instruments: accuracy, precision, error, linearity, hysteresis, resolution & sensitivity, generalized instrumentation systems, primary sensing elements-definition & examples, transducers: definition & Classification; measurement of pressure- diaphragms, capsules, bourdon tubes, strain-gauge transducers, LVDT type, Temperature Measurement (RTD, Thermocouple, thermistor, optical pyrometer); Measurement of force:-load cell(column type, proving ring, shear type), Measurement of flow classification flow meters, head type flow meters-Venturi tube, flow nozzle, pitot tube

Module II: A. C. Instruments
A.C. Voltmeter using rectifier; True RMS responding Voltmeter; Electronics Multimeter; Digital Voltmeter; spectrum analyzer, harmonic distortion analyzer, CRO-introduction, construction of conventional CRO. Digital storage oscilloscope.

Module III: Telemetry
Telemetry-introduction & different types of telemetry system, data acquisitions-signal conditioning, single channel & multichannel data acquisition system.

Module IV: Miscellaneous Instruments
Computer controlled test systems-introduction, testing of audio amplifier, Testing of Radio Receiver; Instruments used in computer controlled instrumentation, IEEE 488 electrical interface, Fiber optic Instrumentation.

Examination Scheme:

Components	**A**	**CT**	**S/V/Q**	**HA**	**EE**
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text:
- A. K. Sawhney, 2005, "Measurement & Instrumentation" Dhanpat Rai Publications.
- Rangan, Sarma, Mani, "Instrumentation- devices & systems", TMH
- Helfrick, Cooper, "Modern Electronic Instrumentation & Measurement Techniques", PHI – 4th Reprint.

References:
- Johnson, "Process Control Instrumentation" PHI – 7th Edition

Course Name	Course Code	LTP	Credit	Semester
NANOSCIENCE AND NANOTECHNOLOGY	BEC 804	3:0:0	3	8

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	This course to equipping the students with the basic concepts and principles revolving around nanotechnology.
CLO 2	Student will learn the Background to Nanotechnology and Scientific revolution-

CLO 3	Learn about the background on Nanoscience
CLO 4	Understand the synthesis of nanomaterials and their application and the impact of nanomaterials on environment
CLO 5	Apply their learned knowledge to develop Nanomaterial's

Course Contents:

Module1: Background to Nanotechnology

Scientific revolution- Atomic structures-Molecular and atomic size-Bohr radius – Emergence of Nanotechnology – Challenges in Nanotechnology - Carbon age–New form of carbon (from Graphene sheet to CNT).

Module 2: Nucleation

Influence of nucleation rate on the size of the crystals- macroscopic to microscopic crystals and nanocrystals - large surface to volume ratio, top-down and bottom-up approaches-self assembly process-grain boundary volume in nanocrystals-defects in nanocrystals-surface effects on the properties.

Module 3: Types of Nanostructures

Definition of a Nano system - Types of Nanocrystals-One Dimensional (1D)-Two Dimensional (2D) -Three Dimensional (3D) nanostructure materials - Quantum dots - Quantum wire Core/Shell structures.

Module 4: Nanomaterials and properties

Carbon Nanotubes (CNT) - Metals (Au, Ag) - Metal oxides (TiO2, CeO2, ZnO) - Semiconductors (Si, Ge, CdS, ZnSe) - Ceramics and Composites - Dilute magnetic semiconductor- Biological system - DNA and RNA - Lipids - Size dependent properties - Mechanical, Physical and Chemical properties.

Module 4: Applications of Nanomaterials

Molecular electronics and nanoelectronics – Quantum electronic devices - CNT based transistor and Field Emission Display - Biological applications - Biochemical sensor - Membrane based water purification .

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text:

- M. Wilson, K. Kannangara, G Smith, M. Simmons, B. Raguse, Nanotechnology: Basic science and Emerging technologies, Overseas Press India Pvt Ltd, New Delhi, First Edition, 2005.
- . C.N.R.Rao, A.Muller, A.K.Cheetham (Eds), The chemistry of nanomaterials: Synthesis, properties and applications, Wiley VCH Verlag Gmbh&Co, Weinheim, 2004.
- Kenneth J. Klabunde (Eds), Nanoscale Materials Science, John Wiley & Sons, InC, 2001.

References:

- C.S.S.R.Kumar, J.Hormes, C.Leuschner, Nanofabrication towards biomedical applications, Wiley –VCH Verlag GmbH & Co, Weinheim, 2004.
- .W. Rainer, Nano Electronics and information Technology, Wiley, 2003.
- K.E.Drexler, Nano systems, Wiley, 1992.
- G.Cao, Naostructures and Nanomaterials: Synthesis, properties and applications, Imperical College Press, 2004.

Course Name	Course Code	LTP	Credit	Semester
ROBOTICS AND AUTOMATION	BEC 805	3:0:0	3	8

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	explain the fundamentals of robotics and its components
CLO 2	illustrate the Kinematics and Dynamics of robotics
CLO 3	elucidate the need and implementation of related Instrumentation & control in robotics

CLO 4	illustrate the movement of robotic joints with computers/microcontrollers
CLO 5	Explain sensors and instrumentation in robotics

Course Objective:

To study the various parts of robots and fields of robotics. It also studies the various kinematics and inverse kinematics of robots. Futher to explore the Euler, Lagrangian formulation of Robot dynamics. To study the trajectory planning for robot and study the control of robots for some specific applications

Course Contents:

Module I: Introduction

Definition and origin of robotics ,different types of robotics ,various generations of robots ,degrees of freedom Asimov's laws of robotics , dynamic stabilization of robots.

Module II: Power sources and sensors

Hydraulic, pneumatic and electric drives – determination of HP of motor and gearing ratio – variable speed arrangements – path determination – micro machines in robotics – machine vision – ranging – laser – acoustic – magnetic, fiber optic and tactile sensors.

Module III: Manipulators, actuators and grippers

Construction of manipulators – manipulator dynamics and force control – electronic and pneumatic manipulator control circuits – end effectors – U various types of grippers – design considerations.

Module IV: Kinematics and path planning

Solution of inverse kinematics problem ,multiple solution jacobian work envelop , hill Climbing Techniques robot programming languages

Module V: Case studies

Mutiple robots, machine interface , robots in manufacturing and non- manufacturing applications ,robot cell design ,selection of robot.Industrial application

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text

- Mikell P. Weiss G.M., Nagel R.N., Odraj N.G., "Industrial Robotics", Mc Graw-Hill Singapore, 1996.
- Ghosh, Control in Robotics and Automation: Sensor Based Integration, Allied Publishers, Chennai, 1998.

References:

- Deb. S.R.,"Robotics Technology and flexible Automation", John Wiley, USA 1992.
- Klafter R.D., Chimielewski T.A., Negin M., "Robotic Engineering – An integrated approach", Prentice Hall of India, New Delhi, 1994.
- Mc Kerrow P.J. "Introduction to Robotics", Addison Wesley, USA, 1991.
- Issac Asimov "Robot", Ballantine Books, New York, 1986.
- Barry Leatham – Jones, "Elements of industrial Robotics" PITMAN Publishing, 1987.
- Mikell P.Groover, Mitchell Weiss, Roger N.Nagel Nicholas G.Odrey, "Industrial Robotics Technology, Programming and Applications ", McGraw Hill Book Company 1986.
- Fu K.S. Gonzaleaz R.C. and Lee C.S.G., "Robotics Control Sensing, Vision and Intelligence" McGraw Hill International Editions, 1987.

Course Name	Course Code	LTP	Credit	Semester
EMBEDDED SYSTEM DESIGN AND DEVICE DRIVER DEVELOPMENT LAB	BEC 822	0:0:1	1	8

List of Experiments

1. Write C language program to …

a) Read data from port P2 and P3. Add data and display result on port P0.Glow LED connected at port pinP1.1 if carry flag set after addition.

b) Read data from port P2 and P3. Multiply data and display result on port P0 and P1

c) Write program to read switch connected at port pin P1.0,toggle it and send to port pin P1.1

2. Write a program to generate square wave of 50% duty cycle having frequency 5 KHz at port pin P1.0 using timer 1 in mode 2. Modify program to generate pulse waveform of 70% duty cycle using timer on the same pin.
3. Interface LCD with the microcontroller. Display your name on the LCD..
4. WAP to interface the 4x4 keypad with microcontroller and display the respective digit on LCD.
5. WAP to interface the DC motor with 8051.
a) If sw=0, DC motor rotate clockwise b)If sw=1, DC motor rotate anticlockwise
6. Interface stepper motor with port P0 of the microcontroller. Write a program to rotate motor in clockwise and anticlockwise direction in half step and full step mode
7. Interface 8 bit DAC chip with 89C51 microcontroller. Write a program to generate sine wave using look up table.
8. Interface ADC0808 with 89C51 microcontroller. Write program to read analog voltage applied at the input of ADC. Display it on LCD.
9. Write a program to receive bytes of data serially and display it on port P0. Use 8 bit UART mode with baud rate 4800.
10. Write a program to transmit letter "E" continuously using serial port with 4800 baud rate. Modify program to transmit text "YES". Use 8 bit UART mode with baud rate 19,200.
11. Interface seven segment displays with Port P2. Write program to display number 0 to 9 on the seven segment display at the interval of 1 second.
12. Generate external interrupt INT0 and INT1 by connecting push button switch. Glow LEDs connected at port 1 one by one when interrupt INT0 occurs. LEDs should flash when interrupt INT1 occurs

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

Course Name	Course Code	LTP	Credit	Semester
ANTENNA & WAVE PROPAGATION LAB	BEC821	0:0:1	1	8

Course Contents:

1. Installation and introduction to Computer Simulation Technology Software (CST)
2. Design & Simulation of Dipole Antenna at 1 GHz using CST.
3. Design & Simulation of LOOP Antennas using CST.
4. Design & Simulation of Horn Antenna using CST.
5. Design & Simulation of Dipole Antenna Array using CST.
6. Design & Simulation of Conical Horn Antenna using CST
7. Design of Micro strip Patch antenna and measurement of line impedance using CST.
8. Design & Simulation of Inset Feed Micro strip Square Patch antenna operating at 2.45 GHz using CST.
9. Design & Simulation of Inset Feed Micro strip Square Patch antenna operating at specified frequency using CST.
10. Design & Simulation of 2 elements array of Inset Feed Micro strip Square Patch antenna operating at 2.45 GHz using CST.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

Course Name	Course Code	LTP	Credit	Semester
PROJECT	BEC 861	12:0:0	12	8

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Demonstrate a sound technical knowledge of their selected project topic.
CLO 2	. Undertake problem identification, formulation and solution.
CLO 3	Design engineering solutions to complex problems utilizing a systems approach
CLO 4	Conduct an engineering project.
CLO 5	Communicate with engineers and the community at large in written an oral forms
CLO 6	Demonstrate the knowledge, skills and attitudes of a professional engineer.

Methodology:

Topics of project are to be based on the latest trends, verifying engineering concepts /principals and should involve elementary research work. The projects may involve design, fabrications, testing, computer modeling, and analysis of any engineering problem. On completion of the practical training the students are to present a report covering various aspects learnt by them and give a presentation on same.

Examination Scheme:

Literature study/ Fabrication/ Experimentation	40
Written Report	20
Viva	15
Presentation	25
Total	**100**

AMITY UNIVERSITY
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AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY (ASET)

Bachelor of Technology

(Computer Science & Engineering)

Programme Code: BCS

Duration – 4 Years Full Time

(Programme Structure)

Choice Based Credit System (CBCS)

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Program Learning Outcomes – PLO

1. Students will be able to demonstrate role of Computer Science in the following core knowledge areas
   - Algorithms, Data Structures and Databases
   - Programming Languages and Compilers
   - Software Engineering and Development
   - Computer Hardware and Architecture
   - Data Communication and Computer Networks
2. Students will be able to analyze role of computer science and information technology, with mainstay in mathematics, basic sciences and engineering fundamentals.
3. Students will apply problem solving strategies to a range of modern computing paradigms related to computer programming, data intensive technologies, distributed and cloud computing, computational techniques.
4. Students will gain experiential learning on developing techno-commercially feasible and socially acceptable computing solutions to real world engineering problems thorough internship and projects, in industry.
5. Students will recognize the role of technological advances impacting society and the social, legal, ethical, cultural and communicative implications of computer technology and their usage.

Credits Summary

Semester	Core Courses (CC)	Domain Electives (DE)	Value Added Courses (VA)	Non-Teaching Credit Courses (NTCC)	Open Electives(OE)	Anandam	Total
1	22	-	04	00	-	02	28
2	24	-	04	01	03	02	34
3	15	04	04	00	03	02	28
4	14	04	04	00	03	02	27
5	12	04	04	05	03	02	30
6	14	04	04	00	03	02	27
7	07	04	04	04	03	02	24
8	11	-	-	15	-		26
Total	119	20	28	25	18	14	224

Total Credit=119+20+28+25+18+14=224
CC= Core Course, DE=Domain Elective, OE= Open Elective, VA=Value Added Course, NTCC=Non-Teaching Credit Courses

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AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY (ASET)

Program Name: B.Tech.(CSE)

FIRST SEMESTER

Code	Course	Category	L	T	P/FW	Credit Units
Core Courses						
AM101	Applied Mathematics – I	CC	3	1	-	4
AP 102	Applied Physics - I – Fields & Waves	CC	2	1	-	3
BME 103	Engineering Mechanics	CC	2	1	-	3
BCS 104	Introduction to Computers & Programming in C	CC	2	1	-	3
BEE 105	Basic Electrical Engineering	CC	2	1	-	3
BME 106	Engineering Graphics	CC	1	-	-	1
Practical Courses						
AP 122	Applied Physics - I lab	CC	-	-	2	1
BME 123	Engineering Mechanics Lab	CC	-	-	2	1
BCS 124	Programming in C Lab	CC	-	-	2	1
BEE 125	Basic Electrical Engineering Lab	CC	-	-	2	1
BME 126	Engineering Graphics Lab	CC	-	-	2	1
Value Added Courses						
BCS 101	English	VA	1	-	-	1
BSS 104	Behavioral Science-I(Understanding Self for Effectiveness)	VA	1	-	-	1
FLT 101 FLG 101 FLS 101 FLC 101	Foreign Language – I French German Spanish Chinese	VA	2	-	-	2
Non-Teaching Credit Course (NTCC)						
AND001	Anandam-I	NTCC	-	-	-	2
Total						**28**

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AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY (ASET)

Program Name: B.Tech.(CSE)

SECOND SEMESTER

Code	Course	Category	L	T	P/FW	Credit Units
Core Courses						
AM 201	Applied Mathematics – II	CC	3	1	-	4
AP 202	Applied Physics - II – Modern Physics	CC	2	1	-	3
AC 203	Applied Chemistry	CC	2	1	-	3
BCS 204	Data Structures Using C	CC	2	1	-	3
BME 205	Elements of Mechanical Engineering	CC	2	1	-	3
BCS 206	Domain Workshop/Seminar	NTCC	-	-	-	1
EVS 001	Environmental Studies	CC	4	-	-	4
Practical Courses						
AP 222	Applied Physics – II Lab	CC	-	-	2	1
AC 223	Applied Chemistry Lab	CC	-	-	2	1
BCS 224	Data Structures Using C Lab	CC	-	-	2	1
BME 225	Elements of Mechanical Engineering Lab	CC	-	-	2	1
Open Elective						
	OPEN ELECTIVE- 1	**OE**	**3**	**-**	**-**	**3**
Value Added Courses						
BCS 201	English	VA	1	-	-	1
BSS 204	Behavioural Science – II (Problem solving and Creative Thinking)	VA	1	-	-	1
FLT 201 FLG 201 FLS 201 FLC 201	Foreign Language – II French German Spanish Chinese	VA	2	-	-	2
Non-Teaching Credit Course (NTCC)						
AND002	Anandam-II	NTCC	-	-	-	2
Total						**34**

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Program Name: B.Tech.(CSE)

THIRD SEMESTER

Code	Course	Category	L	T	P/FW	Credit Units
Core Courses						
AM 301	Applied Mathematics – III	CC	2	1	-	3
BCS 302	Database Management Systems	CC	2	1	-	3
BCS 303	Operating Systems with Unix	CC	2	1	-	3
BCS 304	Object Oriented Programming using C++	CC	2	1	-	3
Practical Courses						
BCS 322	Database Management Systems lab	CC	-	-	2	1
BCS 323	Operating Systems with Unix lab	CC	-	-	2	1
BCS 324	Object Oriented Programming using C++ lab	CC	-	-	2	1
Domain Elective-I : Choose any ONE from the following courses along with corresponding labs						
BCS 305	Digital Electronics	DE	2	1	-	3
BCS 306	Website Design	DE				
BCS 325	Digital Electronics lab	DE	-	-	2	1
BCS 326	Website Design Lab	DE				
Open Elective Course						
	OPEN ELECTIVE- 2	**OE**	**3**	**-**	**-**	**3**
Value Added Courses						
BCS 301	Communication Skills – I	VA	1	-	-	1
BSS 304	Behavioral Science – III (Interpersonal Communication)	VA	1	-	-	1
FLT 301 FLG 301 FLS 301 FLC 301	Foreign Language – III French German Spanish Chinese	VA	2	-	-	2
Non-Teaching Credit Course (NTCC)						
AND003	Anandam-III	NTCC	-	-	-	2
Total						**28**

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AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY (ASET)

Program Name: B.Tech.(CSE)

FOURTH SEMESTER

Code	Course	Category	L	T	P/FW	Credit Units
Core Courses						
BCS 402	Theory of Automata & Computation	CC	3		-	3
BCS 403	Discrete Mathematics	CC	2	1	-	3
BCS 404	Computer Graphics	CC	2	1	-	3
BCS 405	Data Communication & Computer Networks	CC	2	1	-	3
Practical Courses						
BCS 424	Computer Graphics Lab	CC	-	-	2	1
BCS 425	Data Communication & Computer Networks Lab	CC	-	-	2	1
Domain Elective-II : Choose any one from the following courses						
BCS 406	Hypertext Preprocessor (PHP)	DE	2	1	-	3
BCS 407	E-Commerce and ERP	DE	4	-	-	4
BCS 426	PHP Lab	DE	-	-	2	1
Open Elective Courses						
	OPEN ELECTIVE- 3	**OE**	**3**	**-**	**-**	**3**
Value Added Courses						
BCS 401	Communication Skills – II	VA	1	-	-	1
BSS 404	Behavioural Science – IV (Relationship Management)	VA	1	-	-	1
FLT 401 FLG 401 FLS 401 FLC 401	Foreign Language – IV French German Spanish Chinese	VA	2	-	-	2
Non-Teaching Credit Course (NTCC)						
AND004	Anandam-IV	NTCC	-	-	-	2
Total						**27**

PRACTICAL TRAINING – I: 6 – 8 WEEKS

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Program Name: B.Tech.(CSE)

FIFTH SEMESTER

Code	Course	Category	L	T	P/FW	Credit Units
Core Courses						
BCS 502	Software Engineering	CC	2	1	-	3
BCS 503	Computer Architecture	CC	2	1	-	3
BCS 504	Java Programming	CC	3	-	-	3
BCS 550	Internship - I (Evaluation)	NTCC	-	-	-	5
Practical Courses						
BCS 522	Software Engineering Lab	CC	-	-	2	1
BCS 523	Computer Architecture Lab	CC	-	-	2	1
BCS 524	Java Programming Lab	CC	-	-	2	1
Domain Elective-III : Choose any ONE from the following courses along with their corresponding labs						
BCS 505	Python Programming	DE	2	1	-	3
BCS 506	Advance Networking	DE	2	1	-	3
BCS 525	Python Programming Lab	DE	-	-	2	1
BCS 526	Advance Networking Lab	DE	-	-	2	1
Open Elective Courses						
	OPEN ELECTIVE- 4	OE	3	-	-	3
Value Added Courses						
BCS 501	Communication Skills – III	VA	1	-	-	1
BSS 504	Behavioural Science –V (Group Dynamics and Team Building)	VA	1	-	-	1
FLT 501 FLG 501 FLS 501 FLC 501	Foreign Language – V French German Spanish Chinese	VA	2	-	-	2
Non-Teaching Credit Course (NTCC)						
AND005	Anandam-V	NTCC	-	-	-	2
Total						**30**

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AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY (ASET)

Program Name: B.Tech.(CSE)

SIXTH SEMESTER

Code	Course	Category	L	T	P/FW	Credit Units
Core Courses						
BCS 602	Software Testing & Quality Assurance	CC	3	-	-	3
BCS 603	Analysis and Design of Algorithm	CC	2	1	-	3
BCS 604	Microprocessor	CC	2	1	-	3
BCS 605	System Programming	CC	2	1	-	3
Practical Courses						
BCS 622	Software Testing and Quality Assurance Lab	CC	-	-	2	1
BCS 624	Microprocessor Lab	CC	-	-	2	1
Domain Elective-IV : Choose any ONE from the following courses along with their corresponding labs						
BCS 606	Advanced Java Programming	DE	2	1	-	3
BCS 607	Software Project Management	DE	2	1	-	3
BCS 608	Cloud Computing	DE	2	1	-	3
BCS 626	Advanced Java Programming Lab	DE	-	-	2	1
BCS 627	Software Project Management Lab	DE				
BCS 628	Cloud Computing Lab	DE	-	-	2	1
Open Elective Course						
	OPEN ELECTIVE- 5	OE	3	-	-	3
Value Added Courses						
BCS 601	Communication Skills – IV	VA	1	-	-	1
BSS 604	Behavioral Science – VI (Stress and Coping Strategies)	VA	1	-	-	1
FLT 601 FLG 601 FLS 601 FLC 601	Foreign Language – VI French German Spanish Chinese	VA	2	-	-	2
Non-Teaching Credit Course (NTCC)						
AND006	Anandam-VI	NTCC	-	-	-	2
Total						**27**

PRACTICAL TRAINING – II: 6 – 8 WEEKS

AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY (ASET)

Program Name: B.Tech.(CSE)

SEVENTH SEMESTER

Code	Course	Category	L	T	P/FW	Credit Units
Core Courses						
BCS 702	Artificial Intelligence	CC	2	1	-	3
BCS 703	Information Storage & Management (EMC^2)	CC	3	-	-	3
BCS 750	Internship – II(Evaluation)	NTCC	-	-	-	4
Practical Courses						
BCS 722	Artificial Intelligence Lab	CC	-	-	2	1
Domain Elective-V : Choose any ONE from the following courses along with their corresponding labs						
BCS 704	Compiler Construction	DE	2	1	-	3
BCS 705	Programming with ASP.Net	DE	2	1	-	3
BCS 706	Mobile Computing	DE	3	1	-	4
BCS 707	Data Warehousing& Data Mining	DE	2	1	-	3
BCS 724	Compiler Construction Lab	DE	-	-	2	1
BCS 725	Programming with ASP.Net Lab	DE	-	-	2	1
BCS 727	Data Warehousing & Data Mining Lab	DE	-	-	2	1
Open Elective Course						
	OPEN ELECTIVE- 6	OE	3	-	-	3
Value Added Courses						
BCS 701	Communication Skills – V	VA	1	-	-	1
BSS 704	Behavioural Science – VII (Individual, Society and Nation)	VA	1	-	-	1
FLT 701 FLG 701 FLS 701 FLC 701	Foreign Language – VII French German Spanish Chinese	VA	2	-	-	2
Non-Teaching Credit Course (NTCC)						
AND007	Anandam-VII	NTCC	-	-	-	2
Total						**24**

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AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY (ASET)

Program Name: B.Tech.(CSE)

EIGHTH SEMESTER

SEMESTER VIII

Code	Course	Category	L	T	P/FW	Credit Units
Core Courses						
BCS 801	Soft Computing	CC	2	1	-	3
BCS 802	Cryptography & Network Security	CC	2	1	-	3
BCS 803	Digital Image Processing	CC	2	1	-	3
BCS 860	Project	NTCC	-	-	-	15
Practical Courses						
BCS 821	Soft Computing in MATLAB Lab	CC	-	-	2	1
BCS 823	Digital Image Processing Lab	CC	-	-	2	1
Total						**26**

Note:-

CC - Core Course,
VA - Value Added Course,
OE - Open Elective,
DE - Domain Elective,
FW - Field Work

APPLIED MATHEMATICS - I

Course Code: AM 101 **CreditUnits: 04**

2.1 Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Investigate the basic concept and applications of differential and integral Calculus.
2. Apply Leibnitz's theorem, Taylor's theorem and mean value theorems.
3. Calculate asymptotes, curvature, tangents & normals, maxima & minima, partialderivatives and approximate calculation of a function.
4. Find the length, area, volumes and solid of revolution using integration
5. Create an interest in finding the solution of problem, length, area, volume etc of the curveand application of Vector calculus.
6. Recognize and solve the ordinary differential equations.

Course Contents:

Module I: Differential Calculus
Successive differentiation, Leibnitz's theorem (without proof), Mean value theorem, Taylor's theorem (proof), Remainder terms, Asymptote & Curvature, Partial derivatives, Chain rule, Differentiation of Implicit functions, Exact differentials, Tangents and Normals, Maxima, Approximations, Differentiation under integral sign, Jacobians and transformations of coordinates.

Module II: Integral Calculus
Fundamental theorems, Reduction formulae, Properties of definite integrals, Applications to length, area, volume, surface of revolution, improper integrals, Multiple Integrals-Double integrals, Applications to areas, volumes.

Module III: Ordinary Differential Equations
Formation of ODEs, Definition of order, degree & solutions, ODE of first order: Method of separation of variables, homogeneous and non homogeneous equations, Exactness & integrating factors, Linear equations & Bernoulli equations, General linear ODE of n^{th} order, Solution of homogeneous equations, Operator method, Method of undetermined coefficients, Solution of simple simultaneous ODE.

Module IV: Vector Calculus
Scalar and Vector Field, Derivative of a Vector, Gradient, Directional Derivative, Divergence and Curl and their Physical Significance, Arc Length, Tangent, Directional Derivative, Evaluation of Line Integral, Green's Theorem in Plane (without proof), Representation of Surfaces, Tangent Plane and Surface Normal, Surface Integral, Stoke's Theorem (without proof), Gauss Divergence Theorem (without proof).

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- Differential Calculus by Shanti Narain
- Integral Calculus by Shanti Narain

References:

- Differential Equation by A.R. Forsyth
- Higher Engineering Mathematics by H.K. Dass

APPLIED PHYSICS - I - FIELDS AND WAVES

Course Code: **AP 102** **CreditUnits: 03**

Course Learning Outcomes:

By the end of the session students should be able to:

1) Define the various terms and principles involved in SHM

2) Explain plane progressive and ultrasonic waves

3) Explain and interpret the wave nature of light

4) Apply the various concepts of vector analysis to situations of practical interest

5) Calculate the value of electric field and magnetic field component by using the Maxwell's equations.

Course Contents:

Module I: Oscillations & Waves

Oscillations: Introduction to S.H.M. Damped Oscillations: Differential Equation and its solution, logarithmic decrement, Quality Factor, Different conditions of damping of harmonic oscillations. Forced oscillations: Amplitude and Frequency Response, Resonance, Sharpness of Resonance

Plane Progressive Waves: Differential Equation and Solution, Superposition of Progressive Waves stationary waves.

Ultrasonics: Generation and application of ultrasonicwaves.

Module II: Wave Nature of Light

Interference: Coherent Sources, Conditions of interference, Interference due to division of wavefront, Fresnels biprism Interference due to division of amplitude, Newton's rings, Interference due to thin films, .

Diffraction: Fresnel and Fraunhofer diffraction, Fraunhofer diffraction at a single slit, double slit, N Slits, Transmission grating, Rayleigh criterion and Resolving power of grating.

Polarization: Birefringence, Nicol prism, Production and analysis of plane, circularly and elliptically polarized light, Half and quarter wave plates, Optical rotation, Polarimeter.

Module III: Electromagnetics

Scalar and vector fields, gradient of a scalar field, physical significance of gradient, equipotential surface. Line, surface and volume integrals, Divergence and curl of vector field and mathematical analysis physical significance, Electric flux, Gauss' law, Proof and Applications, Gauss divergence and Stokes theorems.

Differential form of Gauss' Law, Amperes' Law, Displacement current, Faradays Law, Maxwell equations in free space & isotropic media (Integral form & differential form), EM wave propagation in free space, Poynting vector.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

- Waves & oscillation, A. P. French
- Physics of waves, W. C. Elmore & M. A. Heald
- Introduction to Electrodynamics, D. J. Griffith
- Electrodynamics, Gupta, Kumar & Singh
- Optics, A. K. Ghatak
- Engineering Physics, Satya Prakash

ENGINEERING MECHANICS

Course Code: **BME 103** **CreditUnits: 03**

Course learning outcomes (CLO)

CLO1: Able to analyse the force system and its effects.

CLO 2: Explain the nature of forces acting upon a system.

CLO 2: Evaluate the static and dynamic system's problem

Course Contents:

Module I: Force system & Structure
Free body diagram, Equilibrium equations and applications. Plane truss, perfect and imperfect truss, assumption in the truss analysis, analysis of perfect plane trusses by the method of joints, method of section.

Module II:Friction
Static and Kinetic friction, laws of dry friction, co-efficient of friction, angle of friction, angle of repose, cone of friction, friction lock, efficiency of screw jack, transmission of power through belt

Module III: Distributed Force
Determination of center of gravity, center of mass and centroid by direct integration and by the method of composite bodies, mass moment of inertia and area moment of inertia by direct integration and composite bodies method, radius of gyration, parallel axis theorem, Pappus theorems and its application, polar moment of inertia.

Module IV: Work -Energy
Work energy equation, conservation of energy, Virtual work, impulse, momentum conservation, impact of bodies, co-efficient of restitution, loss of energy during impact, D'alembert principle

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

- S.S. Bhavikatti, Engineering Mechanics, New Age International Ltd
- Timoshenko, Engineering Mechanics, McGraw Hill
- R. S. Khurmi, Engineering Mechanics, S. Chand Publication
- H. Shames & G. K. M. Rao, Engineering Mechanics, Pearson Education, 2006

INTRODUCTION TO COMPUTERS AND PROGRAMMING IN C

Course Code: BCS 104 **CreditUnits: 03**

Course learning outcomes (CLO)

It is expected that by the end of the course, students will be comfortable in -

1. Attempting algorithmic solutions to problems
2. Designing and coding moderate sized programs running to the order of a few hundred lines of code, and
3. Reading, understanding and modifying code written by others.

Course Contents:

Module I: Introduction
Introduction to computer, history, von-Neumann architecture, memory system (hierarchy, characteristics and types), H/W concepts (I/O Devices), S/W concepts (System S/W & Application S/W, utilities). Data Representation: Number systems, character representation codes, Binary, octal, hexadecimal and their interconversions. Binary arithmetic, floating point arithmetic, signed and unsigned numbers, Memory storage unit.

Module II: Programming in C
History of C, Introduction of C, Basic structure of C program, Concept of variables, constants and data types in C, Operators and expressions: Introduction, arithmetic, relational, Logical, Assignment, Increment and decrement operator, Conditional, bitwise operators, Expressions, Operator precedence and associativity. Managing Input and output Operation, formatting I/O.

Module III: Fundamental Features in C
C Statements, conditional executing using if, else, nesting of if, switch and break Concepts of loops, example of loops in C using for, while and do-while, continue and break. Storage types (automatic, register etc.), predefined processor, Command Line Argument.

Module IV: Arrays and Functions
One dimensional arrays and example of iterative programs using arrays, 2-D arrays Use in matrix computations. Concept of Sub-programming, functions Example of user defined functions. Function prototype, Return values and their types, calling function, function argument, function with variable number of argument, recursion.

Module V: Advanced features in C
Pointers, relationship between arrays and pointers Argument passing using pointers, Array of pointers. Passing arrays as arguments.
Strings and C string library.
Structure and Union. Defining C structures, Giving values to members, Array of structure, Nested structure, passing strings as arguments.
File Handling.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- "ANSI C" by E Balagurusamy
- Yashwant Kanetkar, "Let us C", BPB Publications, 2nd Edition, 2001.

- Herbert Schildt, "C: The complete reference", Osbourne Mcgraw Hill, 4th Edition, 2002.
- V. Raja Raman, "Computer Programming in C", Prentice Hall of India, 1995.

***References*:**

- **Kernighan & Ritchie, "C Programming Language", The (Ansi C Version), PHI, 2nd Edition.**
- **J. B Dixit, "Fundamentals of Computers and Programming in 'C'.**
- P.K. Sinha and Priti Sinha, "Computer Fundamentals", BPB publication.

BASIC ELECTRICAL ENGINEERING

Course Code: BEE 105 **Credit Units: 03**

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Develop a practical approach for analysis of resistive circuits and solution of resistive circuits with independent sources.
2. Able to apply two terminal element relationships for inductors and capacitors in an electrical network.
3. Capable of analysis of single phase AC circuits, the representation of alternating quantities and determining the power in these circuits.
4. To acquire the knowledge about the constructional concepts & working principles for the applications of DC machines, AC machines & measuring instruments.
5. Able to identify, formulate, and solve the electrical engineering problems.

Course Contents:

Module I: Basic Electrical Quantities
Basic Electrical definitions-Energy, Power, Charge, Current, Voltage, Electric Field Strength, Magnetic Flux Density, etc., Resistance, Inductance and Capacitance. Ideal Source, Independent Source and Controlled Source

Module II: Network Analysis Techniques & Theorems
Circuit Principles: Ohm's Law, Kirchoff's Current Law, Kirchoff's Voltage Law Network Reduction: Star–Delta Transformation, Source Transformation, Nodal Analysis, Loop analysis. Superposition theorem, Thevenin's Theorem, Norton's theorem and Reciprocity theorem.practical application

Module III: Alternating Current Circuits
Peak, Average and RMS values for alternating currents, Power calculation:
reactive power, active power, Complex power, power factor, impedance, reactance, conductance, susceptance Resonance: series Resonance, parallel resonance, basic definition of Q factor & Band-width.

Module IV: Transformers
Basic Transformer Operation principle, Construction, Voltage relations, current relations, Linear circuit models, open circuit test, short circuit test, Transformer Efficiency.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

- R.J. Smith, R.C. Dorf: Circuits, devices and Systems
- B.L. Thareja: Electrical Technology: Part -1 & 2
- V. Deltoro: Electrical Engineering fundamentals
- Schaum's Series: Electrical Circuits

APPLIED PHYSICS - I LAB

Course Code: AP 122 **Credit Units: 01**

List of Experiments:

1. To determine the wavelength of sodium light by Newton's rings method.
2. To determine the dispersive power of the material of prism with the help of a spectrometer.
3. To determine the specific rotation of sugar by Bi-quartz or Laurent half shade polarimeter.
4. To determine the speed of ultrasonic waves in liquid by diffraction method.
5. To determine the width of a narrow slit using diffraction phenomena.
6. To determine the temperature coefficient of platinum wire, using a platinum resistance thermometer and a Callender&Griffth's bridge.
7. To determine the value of specific charge (ratio of e/m) of an electron by Thomson method.
8. To determine the internal resistance of Leclanche cell with the help of Potentiometer.
9. To determine the resistance per unit length of a Carey Foster's bridge wire and also to find out the specific resistance of a given wire.
10. To plot graph showing the variation of magnetic field with distance along the aixs of a circular coil carrying current, and hence estimate the radius of the coil.
11. To determine the value of acceleration due to gravity ('g') in the laboratory using bar pendulum.
12. To determine the moment of inertia of a flywheel about its own axis of rotation.
13. To determine the density of material of the given wire with the help of sonometer.

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

ENGINEERING MECHANICS LAB

Course Code: BME 123 **CreditUnits: 01**

Engineering Mechanics:

1. To verify the law of Force Polygon
2. To verify the law of Moments using Parallel Force apparatus. (Simply supported type)
3. To determine the co-efficient of friction between wood and various surface (like
4. Leather, Wood, Aluminum) on an inclined plane.
5. To find the forces in the members of Jib Crane.
6. To determine the mechanical advantage, Velocity ratio and efficiency of a screw jack.
7. To determine the mechanical advantage, Velocity ratio and Mechanical efficiency of the
8. Wheel and Axle
9. To determine the MA, VR, η of Worm Wheel (2-start)
10. Verification of force transmitted by members of given truss.
11. To verify the law of moments using Bell crank lever
12. To find CG and moment of Inertia of an irregular body using Computation method

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

PROGRAMMING IN C LAB

Course Code: **BCS 124** **CreditUnits: 01**

Software Required: Turbo C

Course Contents:

- C program involving problems like finding the nth value of cosine series, Fibonacci series. Etc.
- C programs including user defined function calls
- C programs involving pointers, and solving various problems with the help of those.
- File handling

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

Basic Electrical Engineering Lab

Course Code: BEE 125 **CreditUnits: 01**

List of Experiments:

1. To verify KVL & KCL in the given network.
2. To verify Superposition Theorem.
3. To verify Maximum Power Transfer Theorem.
4. To verify Reciprocity Theorem.
5. To determine and verify RTh, VTh, RN, IN in a given network.
6. To perform open circuit & short circuit test on a single-phase transformer.
7. To study transient response of a given RLC Circuit.
8. To perform regulation, ratio & polarity test on a single-phase transformer.
9. To measure power & power factor in a three phase circuit by two wattmeter method.
10. To measure power & power factor in a three phase load using three ammeter & three voltmeter method.

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

ENGINEERING GRAPHICS LAB

Course Code: BME 125 **CreditUnits: 01**

Course Objective:

This course will provide students concepts on the drawings of different curves like straight line, parabola, ellipse etc. After completion of this course, students will be able to draw different figures manually and will be capable of using various instruments involved in drawings.

Course Contents:

Module I: General
Importance, Significance and scope of engineering drawing, Lettering, Dimensioning, Scales, Sense of proportioning, Different types of projections, Orthographic Projection, B.I.S. Specifications.

Module II: Projections of Point and Lines
Introduction of planes of projection, Reference and auxiliary planes, projections of points and Lines in different quadrants, traces, inclinations, and true lengths of the lines, projections on Auxiliary planes, shortest distance, intersecting and non-intersecting lines.

Module III: Planes other than the Reference Planes
Introduction of other planes (perpendicular and oblique), their traces, inclinations etc., Projections of points and lines lying in the planes, conversion of oblique plane into auxiliary Plane and solution of related problems.

Module IV: Projections of Plane Figures
Different cases of plane figures (of different shapes) making different angles with one or both reference planes and lines lying in the plane figures making different given angles (with one of both reference planes). Obtaining true shape of the plane figure by projection.

Module V: Projection of Solids
Simple cases when solid is placed in different positions, Axis faces and lines lying in the faces of the solid making given angles.

Module VI:Development of Surface
Development of simple objects with and without sectioning. Isometric Projection

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

Text & References:

- M.B. Shah & B.C. Rana, Engineering Drawing, Pearson Education, 2007
- PS Gill, Engineering Drawing, Kataria Publication
- ND Bhatt, Engineering Drawing, Charotar publications
- N Sidheshwar, Engineering Drawing, Tata McGraw Hill
- CL Tanta, Mechanical Drawing, “Dhanpat Rai”

ENGLISH

Course Code: **BCS 101** **CreditUnits: 01**

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Participate in conversation and in small- and whole-group discussion
2. Explore and use English as medium of communication in real life situation
3. Discuss topics and themes of a reading, using the vocabulary and grammar of the lesson
4. Identify features of a reading textbook and utilize them as needed
5. Prepare and deliver organized presentations in small groups and to whole class
6. Apply sentence mechanics and master spelling of high frequency words

Course Contents:

Module I: Vocabulary
Use of Dictionary
Use of Words: Diminutives, Homonyms & Homophones

Module II: Essentials of Grammar - I
Articles
Parts of Speech
Tenses

Module III: Essentials of Grammar - II
Sentence Structure, Subject -Verb agreement
Punctuation
Module IV: Communication
The process and importance, Principles & benefits of Effective Communication
Module V: Spoken English Communication
Speech Drills, Pronunciation and accent, Stress and Intonation

Module VI: Communication Skills-I
Developing listening skills, Developing speaking skills
Module VII: Communication Skills-II
Developing Reading Skills
Developing writing Skills

Module VIII: Written English communication
Progression of Thought/ideas, Structure of Paragraph, Structure of Essays

Module IX: Short Stories
Of Studies, by Francis Bacon
Dream Children, by Charles Lamb
The Necklace, by Guy de Maupassant
A Shadow, by R.K.Narayan
Glory at Twilight, Bhabani Bhattacharya

Module X: Poems

All the Worlds a Stage	Shakespeare
To Autumn	Keats
O! Captain, My Captain.	Walt Whitman
Where the Mind is Without Fear	Rabindranath Tagore
Psalm of Life	H.W. Longfellow

Examination Scheme:

Components	A	CT	HA	EE
Weightage (%)	05	15	10	70

Text & References:

- Madhulika Jha, Echoes, Orient Long Man
- Ramon & Prakash, Business Communication, Oxford.
- Sydney Greenbaum Oxford English Grammar, Oxford.
- Successful Communications, MalraTreece (Allyn and Bacon)
- Effective Technical Communication, M. Ashraf Rizvi.

* 30 hrsProgramme to be continued for Full year

BEHAVIOURAL SCIENCE - I
(UNDERSTANDING SELF FOR EFFECTIVENESS)

Course Code: **BSS 104** **CreditUnits: 01**

Course learning outcomes (CLO)

It is expected that by the end of the course, students will be comfortable in -

4. Attempting algorithmic solutions to problems
5. Designing and coding moderate sized programs running to the order of a few hundred lines of code, and
6. Reading, understanding and modifying code written by others.

Course Contents:

Module I: Self: Core Competency
Understanding of Self
Components of Self – Self identity
Self concept
Self confidence
Self image

Module II: Techniques of Self Awareness
Exploration through Johari Window
Mapping the key characteristics of self
Framing a charter for self
Stages – self awareness, self acceptance and self realization

Module III: Self Esteem & Effectiveness
Meaning and Importance
Components of self esteem
High and low self esteem
Measuring your self esteem

Module IV: Building Positive Attitude
Meaning and nature of attitude
Components and Types of attitude
Importance and relevance of attitude

Module V: Building Emotional Competence
Emotional Intelligence – Meaning, components, Importance and Relevance
Positive and Negative emotions
Healthy and Unhealthy expression of emotions

Module VI:End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

- Organizational Behaviour, Davis, K.
- Hoover, Judhith D. Effective Small Group and Team Communication, 2002,Harcourt College Publishers
- Dick, Mc Cann&Margerison, Charles: Team Management, 1992 Edition, viva books
- Bates, A. P. and Julian, J.: Sociology - Understanding Social Behaviour
- Dressler, David and Cans, Donald: The Study of Human Interaction
- Lapiere, Richard. T – Social Change
- Lindzey, G. and Borgatta, E: Sociometric Measurement in the Handbook of Social Psychology, Addison – Welsley, US.
- Rose, G.: Oxford Textbook of Public Health, Vol.4, 1985.
- LaFasto and Larson: When Teams Work Best, 2001, Response Books (Sage), New Delhi

- J William Pfeiffer (ed.) Theories and Models in Applied Behavioural Science, Vol 2, Group (1996); Pfeiffer & Company
- Smither Robert D.; The Psychology of Work and Human Performance, 1994, Harper Collins College Publishers

FRENCH - I

Course Code: **FLT 101** **CreditUnits: 02**

Course learning outcomes (CLO)

At the successful completion of this course the students would be able to:

Perform communicative tasks (oral and written) like:

1. Identify and express in French vocabulary and grammar norms
2. Interpret different types of texts as well as cultural ideas and themes.
3. Demonstrate comprehension of nuance between script and sound in French
4. Narrate clearly ideas, themes in simple standard French

Course Contents:

Module A: pp. 01 to 37: Unités 1, 2, Unité 3 Object if 1, 2
Only grammar of Unité 3: object if 3, 4 and 5

Contenu lexical :Unité 1 : Découvrir la langue française : (oral et écrit)

1. se présenter, présenter quelqu'un, faire la connaissance des autres, formules de politesse, rencontres
2. dire/interroger si on comprend
3. Nommer les choses

Unité 2: Faire connaissance

1. donner/demander des informations sur une personne, premiers contacts, exprimer ses goûts et ses préférences
2. Parler de soi: parler du travail, de ses activités, de son pays, de sa ville.

Unité 3:Organiser son temps

1. dire la date et l'heure

Contenu grammatical :

1. organisation générale de la grammaire
2. article indéfini, défini, contracté
3. nom, adjectif, masculin, féminin, singulier et pluriel
4. négation avec « de », "moi aussi", "moi non plus"
5. interrogation : Inversion, est-ce que, qui, que, quoi, qu'est-ce que, où, quand, comment, quel(s), quelle(s)

Interro-négatif : réponses : oui, si, non

6. pronom tonique/disjoint- pour insister après une préposition
7. futurproche

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- le livre à suivre: Campus: Tome 1

GERMAN - I

Course Code: **FLG 101** **CreditUnits: 02**

Course learning outcomes (CLO)

At the successful completion of this course you should be able to:

1. **Identify** and **express** in German vocabulary and grammar norms
2. **Interpret** different types of texts as well as cultural ideas and themes.
3. **Demonstrate** comprehension of nuance between script and sound in German
4. **Narrate** clearly ideas, themes in simple standard German

Course Contents:

Module I: Introduction
Selfintroduction: heissen, kommen, wohnwn, lernen, arbeiten, trinken, etc.
All personal pronouns in relation to the verbs taught so far.
Greetings: Guten Morgen!, Guten Tag!, Guten Abend!, Gute Nacht!, Danke sehr!, Danke!, Vielen Dank!, (es tut mir Leid!),
Hallo, wie geht's?: Danke gut!, sehr gut!, prima!, ausgezeichnet!,
Es geht!, nicht so gut!, so la la!, miserabel!

Module II: Interviewspiel
To assimilate the vocabulary learnt so far and to apply the words and phrases in short dialogues in an interview – game for self introduction.

Module III: Phonetics
Sound system of the language with special stress on Dipthongs

Module IV: Countries, nationalities and their languages
To make the students acquainted with the most widely used country names, their nationalitie and the language spoken in that country.

Module V: Articles
The definite and indefinite articles in masculine, feminine and neuter gender. All Vegetables, Fruits, Animals, Furniture, Eatables, modes of Transport

Module VI: Professions
To acquaint the students with professions in both the genders with the help of the verb "sein".

Module VII: Pronouns
Simple possessive pronouns, the use of my, your, etc.
The family members, family Tree with the help of the verb "to have"

Module VIII: Colours
All the color and color related vocabulary – colored, colorful, colorless, pale, light, dark, etc.

Module IX: Numbers and calculations – verb "kosten"
The counting, plural structures and simple calculation like addition, subtraction, multiplication and division to test the knowledge of numbers.
"Wie vielkostet das?"

Module X: Revision list of Question pronouns
W – Questions like who, what, where, when, which, how, how many, how much, etc.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch

- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, TangramAktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

SPANISH – I

Course Code: FLS 101 **CreditUnits: 02**

Course Learning Outcomes:

After successful completion of the course, students will be able to perform verbally and in writing certain social functions. Students will develop five language skills: reading, writing, listening, speaking & interacting with the Spanish & the Spanish speakers whom they come across in their daily or professional life in respect of

Students will be able to perform communicative tasks (oral and written) like:

-Self introduction

-Possessions.

-Family/friend description with verbs like SER/ESTAR/TENER/HAY

- Regular AR/ER/IR ending verbs conjugations

-Interrogative words

Course Contents:

Module I
A brief history of Spain, Latin America, the language, the culture…and the relevance of Spanish language in today's global context.
Introduction to alphabets

Module II
Introduction to '*Saludos*' (How to greet each other. How to present / introduce each other).
Goodbyes (despedidas)
The verb *llamarse*and practice of it.

Module III
Concept of Gender and Number
Months of the years, days of the week, seasons. Introduction to numbers 1-100, Colors, Revision of numbers and introduction to ordinal numbers.

Module IV
Introduction to *SER* and *ESTAR* (both of which mean To Be).Revision of '*Saludos*' and '*Llamarse*'. Some adjectives, nationalities, professions, physical/geographical location, the fact that spanish adjectives have to agree with gender and number of their nouns. Exercises highlighting usage of *Ser* and *Estar*.

Module V
Time, demonstrativepronoun (Este/esta, Aquel/aquellaetc)

Module VI
Introduction to some key AR /ER/IR ending regular verbs.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español, EnDirecto I A
- Español Sin Fronteras

CHINESE – I

Course Code: **FLC 101** **Credit Units: 02**

Course learning outcomes (CLO)

At the successful completion of this course the students would be able to:

Perform communicative tasks (oral and written) like:

1. Identify and express in French vocabulary and grammar norms
2. Interpret different types of texts as well as cultural ideas and themes.
3. Demonstrate comprehension of nuance between script and sound in French
4. Narrate clearly ideas, themes in simple standard French

Course Contents:

Module I
Show pictures, dialogue and retell.
Getting to know each other.
Practicing chart with Initials and Finals. (CHART – The Chinese Phonetic Alphabet Called "Hanyu Pinyin" in Mandarin Chinese.)
Practicing of Tones as it is a tonal language.
Changes in 3rd tone and Neutral Tone.

Module II
Greetings
Let me Introduce
The modal particle "ne".
Use of Please 'qing" – sit, have tea …….. etc.
A brief self introduction – Ni hao ma? Zaijian!
Use of "bu" negative.

Module III
Attributives showing possession
How is your Health? Thank you
Where are you from?
A few Professions like – Engineer, Businessman, Doctor, Teacher, Worker.
Are you busy with your work?
May I know your name?

Module IV
Use of "How many" – People in your family?
Use of "zhe" and "na".
Use of interrogative particle "shenme", "shui", "ma" and "nar".
How to make interrogative sentences ending with "ma".
Structural particle "de".
Use of "Nin" when and where to use and with whom. Use of guixing.
Use of verb "zuo" and how to make sentences with it.

Module V
Family structure and Relations.
Use of "you" – "mei you".
Measure words
Days and Weekdays.
Numbers.
Maps, different languages and Countries.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

"Elementary Chinese Reader Part I" Lesson 1-10

APPLIED MATHEMATICS - II

Course Code: AM 201 **Credit Units: 04**

Course learning outcomes (CLO)

List the course learning outcomes (CLO) that prescribe the knowledge, attitudes, skills and practices that students are expected to acquire and demonstrate in completing this course.

At the successful completion of this course you (the student) should be able to:

1. Investigate the basic concept about Linear Algebra and Probability.
2. Create an interest in finding the solution of Linear equations and Probability.
3. Apply basic concepts of Linear Algebra to define the consistent and inconsistent system, andProbability operations to solving problems.

Develop the formulation of linear equation their existence, eigen value and eigen vector etc.as well as about basic discrete and continuous distributions and their applications

Course Contents:

Module I: Linear Algebra
Hermitian and Skew Hermitian Matrix, Unitary Matrix, Orthogonal Matrix, Elementary Row Transformation, Reduction of a Matrix to Row Echelon Form, Rank of a Matrix, Consistency of Linear Simultaneous Equations, Gauss Elimination Method, Gauss-Jordan Method, Eigen Values and Eigen Vectors of a Matrix, Caley-Hamilton Theorem, Diagonalization of a Matrix, Vector Space, Linear Independence and Dependence of Vectors, Linear Transformations.

Module II: Infinite Series
Definition of Sequence, Bounded Sequence, Limit of a Sequence, Series, Finite and Infinite Series, Convergence and Divergence of Infinite series, Cauchy's Principle of Convergence, Positive Term Infinite Series, Comparison test, D'Alembert's Ratio test. Raabe's Test, Cauchy's nth root Test. Logarithmic Test, Alternating Series, Leibnitz's Test, Absolute and conditioinal convergence, Uniform Convergence, Power Series and its Interval of Convergence.

Module III: Complex Analysis
De Moivre's Theorem and Roots of Complex Numbers, Logarithmic Functions, Circular, Hyperbolic Functions and their Inverses.
Functions of a Complex Variables, Limits, Continuity and Derivatives, Analytic Function, Cauchy-Riemann Equations (without proof), Harmonic Function, Harmonic Conjugates, Conformal Mapping, Bilinear Transformations, Complex Line Integral, Cauchy Integral Theorem, Cauchy Integral Formula, Derivative of Analytic Function, Power Series, Taylor Series, Laurent Series, Zeroes and Singularities, Residues, Residue Theorem, Evaluation of Real Integrals of the Form and $\int_{-\infty}^{\infty} \frac{f(x)}{F(x)}\,dx$.

Module IV: Statistics and Probability
Moments, Skewness, Kurtosis, Random Variables and Probability Distribution, Mean and Variance of a Probability Distribution, Binomial Distribution, Poisson Distribution and Normal Distribution.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

- Engineering Mathematics by Erwin Kreyszig.
- Engineering Mathematics by R.K. Jain and S.R.K. Iyengar.
- Higher Engineering Mathematics by H.K. Dass.
- Engineering Mathematics by B.S. Grewal.
- Differential Calculus by Shanti Narain.
- Integral Calculus by Shanti Narain.
- Linear Algebra- Schaum Outline Series.

APPLIED PHYSICS - II - MODERN PHYSICS

Course Code: **AP 202** **CreditUnits: 03**

1.1 Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

Define and understand space and time and the variations in other related fundamentalquantities such as mass, velocity and force.

1) Solve simple problems relating to the above concepts.

2) Explain by extending the understanding as laid down in Quantum theory to other phenomenon as observed in sub-atomic Physics and also to solve simple problems in Quantum Theory

3) Appreciate and understand the various spectra as observed during electronic transitions

4) Understand the way nature has endowed properties to materials.

Course Contents:

Module I: Special Theory of Relativity
Michelson-Morley experiment, Importance of negative result, Inertial & non-inertial frames of reference, Einstein's postulates of Special theory of Relativity, Space-time coordinate system, Relativistic Space Time transformation (Lorentz transformation equation), Transformation of velocity, Addition of velocities, Length contraction and Time dilation, Mass-energy equivalence (Einstein's energy mass relation) & Derivation of Variation of mass with velocity,

Module II: Wave Mechanics
Wave particle duality, De-Broglie matter waves, phase and group velocity, Heisenberg uncertainty principle, wave function and its physical interpretation, Operators, expectation values. Time dependent & time independent Schrödinger wave equation for free & bound states, square well potential (rigid wall), Step potential.

Module III: Atomic Physics
Vector atom model, LS and j-j coupling, Zeceman effect (normal & anomalous), Paschen-Bach effect, X-ray spectra and energy level diagram, Moseleys Law, Lasers – Einstein coefficients, conditions for light amplification, population inversion, optical pumping, three level and four level lasers, He-Ne and Ruby laser, Properties and applications of lasers.

Module IV: Solid State Physics
Sommerfield's free electron theory of metals, Fermi energy, Introduction to periodic potential &Kronig-Penny model (Qualitative) Band Theory of Solids, Semi-conductors: Intrinsics and Extrinsic Semiconductors, photoconductivity and photovotaics, Basic aspects of Superconductivity, Meissner effect.

Examination Scheme:

Components	CA	A	CT	EE

Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

- Concept of Modern Physics, A. Beiser
- Applied Physics II, Agarawal& Goel
- Solid State Physics, S. O. Pallai
- Physics of Atom, Wehr& Richards

APPLIED CHEMISTRY

Course Code: **AC 203** **Credit Units: 03**

Course learning outcomes (CLO).

At the successful completion of this course you (the student) should be able to:

1. Understand the structure and chemical transformations of molecules.
2. Understand the application of chemical process in industries.
3. Basic idea about water treatment, lubrication, corrosion, fuel, spectroscopy etc.

Course Contents:

Module I: Water Technology
Introduction and specifications of water,
Hardness and its determination (EDTA method only),
Alkalinity,
Boiler feed water, boiler problems – scale, sludge, priming & foaming: causes & prevention, Boiler problems – caustic embrittlement & corrosion: causes & prevention,
Carbonate & phosphate conditioning, colloidal conditioning &calgon treatment
Water softening processes: Lime – soda process, Ion exchange method,
Water for domestic use.

Module II: Fuels
Classification, calorific value of fuel, (gross and net),
Determination of calorific value of fuels, bomb calorimeter,
Solid fuels - Proximate and ultimate analysis,
Octane & Cetane No. and its significance.
Numericals on combustion

Module III: Instrumental Methods of analysis
Introduction; Principles of spectroscopy; Laws of absorbance
IR: Principle, Instrumentation, Application
UV: Principle, Instrumentation, Application
NMR: Principle, Instrumentation, Application

Module III: Lubricants
Introduction; Mechanism of Lubrication;
Types of Lubricants; Chemical structure related to Lubrication;
Properties of lubricants; Viscosity and Viscosity Index; Iodine Value; Aniline Point; Emulsion number; Flash Point; Fire Point; Drop Point; Cloud Point; Pour Point.
Selection of Lubricants.

Module VI: Corrosion
Introduction, Mechanism of dry and wet corrosion,
Types of corrosion-Galvanic, Concentration cell, soil, pitting, intergranular, waterline. Passivity.
Factors influencing corrosion.
Corrosion control.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- Engineering Chemistry- Jain and Jain
- Engineering Chemistry- Sunita Rattan
- Engineering Chemistry-Shashi Chawla

References:

- Engineering Chemistry –Dara and Dara

- Spectroscopy- Y.R Sharma
- Corrosion Engineering – Fontenna and Greene

DATA STRUCTURES USING C

Course Code: **BCS 204** **CreditUnits: 03**

Course learning outcomes (CLO)

Upon successful completion of this course, students should be able to-:

1. Explain the systematic methods of efficiently organizing and accessing data in data structures and algorithms.
2. Identify the properties and structural patterns in data structures.
3. Apply abstract data types to the design of data structures.
4. Analyse algorithms using a mathematical notation and experimental studies.
5. Perform comparative analysis of the typical data structures and algorithms.
6. Design and Analyse recursive algorithms in data structures.
7. Write code in pseudocode and high-level programming languages for the implementation of various data structures and algorithms.

Course Contents:

Module I: Introduction to Data structures
Data structures: Definition, Types. Algorithm design, Complexity, Time-Space Trade offs. Use of pointers in data structures. Array Definition and Analysis, Representation of Linear Arrays in Memory, Traversing of Linear Arrays, Insertion And Deletion, Single Dimensional Arrays, Two Dimensional Arrays, Multidimensional Arrays, Function Associated with Arrays, Character String in C, Character String Operations, Arrays as parameters, Implementing One Dimensional Array, Sparse matrix.

Module II: Introduction to Stacks and queue
Stack: Definition, Array representation of stacks, Operations Associated with Stacks- Push & Pop, Polish expressions, Conversion of infix to postfix, infix to prefix (and vice versa),Application of stacks recursion, polish expression and their compilation, conversion of infix expression to prefix and postfix expression, Tower of Hanoi problem.
Queue: Definition, Representation of Queues, Operations of queues- QInsert, QDelete, Priority Queues, Circular Queue, Deque.

Module III: Dynamic Data Structure
Linked list: Introduction to Singly linked lists: Representation of linked lists in memory, Traversing, Searching, Insertion into, Deletion from linked list, doubly linked list, circular linked list, generalized list. Applications of Linked List-Polynomial representation using linked list and basic operation. Stack and queue implementation using linked list.

Module IV: Trees and Graphs
Trees: Basic Terminology, Binary Trees and their representation, expression evaluation, Complete Binary trees, extended binary trees, Traversing binary trees, Searching, Insertion and Deletion in binary search trees, General trees, AVL trees, Threaded trees, B trees.
Graphs: Terminology and Representations, Graphs & Multigraphs, Directed Graphs, Sequential representation of graphs, Adjacency matrices, Transversal Connected Component and Spanning trees.

Module V: Sorting and Searching and file structures
Sorting: Insertion Sort, Bubble sort, Selection sort, Quick sort, two-way Merge sort, Heap sort, Partition exchange sort, Shell sort, Sorting on different keys, External sorting.
Searching: Linear search, Binary search
File structures: Physical storage media, File Organization, Linked organization of file, Inverted file, Organization records into blocks, Sequential blocks, Hash function, Indexing & Hashing, Multilevel indexing, Tree Index, Random file, Primary Indices, Secondary Indices, B tree index files.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- Horowitz and Sahani, "Fundamentals of Data structures", Galgotia publications
- Tannenbaum, "Data Structures", PHI
- R.L. Kruse, B.P. Leary, C.L. Tondo, "Data structure and program design in C" PHI
- "Data structures and algorithms" – Schaum Series.
- File Structures An object-Oriented Approach with C++ by Michael J. Folk, Bill Zoellick, BregRiccardi, Published by Addison Wesley (1st ISE Reprint,1999).

References:

- J. P. Tremblay and P. G. Sorenson, Introduction to Data Structures with Applications, McGraw – Hill Computer Science Series, Mc-Graw – Hill New York, 1984
- Algorithms by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Published by Prentice-Hall India (1999).
- Data Structures Using C and C++ second edition by YeddidyahLangsam, Moshe J.Augenstein, Aaron M. Tenen Baum, Published by Prentice-Hall India
- Data Structures and Algorithm analysis in C++ by Mark Allen Weiss, Published by Addison Wesley (3rd Indian Reprint 2000).
- "Data Structures" – R. S. Salaria

ENVIRONMENTAL STUDIES

Course Code: EVS 001 **Credit Units: 04**

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Understand the importance, need and scope of the subject.
2. Evaluate local, regional and global environmental topics related to resource use and management.
3. Measure environmental variables and interpret results.
4. Interpret the results of scientific studies of environmental problems and propose solutions to these.
5. Implement "Sustainable development", in day to day activities.

Course Contents:

Module I: The multidisciplinary nature of environmental studies
Definition, scope and importance
Need for public awareness

Module II: Natural Resources
Renewable and non-renewable resources:
Natural resources and associated problems
Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.
Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, case studies.
Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

- Role of an individual in conservation of natural resources.
- Equitable use of resources for sustainable lifestyles.

Module III: Ecosystems
Concept of an ecosystem
Structure and function of an ecosystem
Producers, consumers and decomposers
Energy flow in the ecosystem
Ecological succession
Food chains, food webs and ecological pyramids
Introduction, types, characteristic features, structure and function of the following ecosystem:

a. Forest ecosystem
b. Grassland ecosystem
c. Desert ecosystem
d. Aquatic ecosystems (ponds, streams, lakes, rivers, ocean estuaries)

Module IV: Biodiversity and its conservation
Introduction – Definition: genetic, species and ecosystem diversity
Biogeographical classification of India
Value of biodiversity: consumptive use, productive use, social, ethical aesthetic and option values
Biodiversity at global, national and local levels
India as a mega-diversity nation

Hot-spots of biodiversity
Threats to biodiversity: habitat loss, poaching of wildlife, man wildlife conflicts
Endangered and endemic species of India
Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity

Module V: Environmental Pollution
Definition
Causes, effects and control measures of:
a. Air pollution
b. Water pollution
c. Soil pollution
d. Marine pollution
e. Noise pollution
f. Thermal pollution
g. Nuclear pollution

Solid waste management: Causes, effects and control measures of urban and industrial wastes.
Role of an individual in prevention of pollution.
Pollution case studies.
Disaster management: floods, earthquake, cyclone and landslides.

Module VI: Social Issues and the Environment
From unsustainable to sustainable development
Urban problems and related to energy
Water conservation, rain water harvesting, watershed management
Resettlement and rehabilitation of people; its problems and concerns. Case studies.
Environmental ethics: Issues and possible solutions
Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.
Wasteland reclamation
Consumerism and waste products
Environmental Protection Act
Air (Prevention and Control of Pollution) Act
Water (Prevention and control of Pollution) Act
Wildlife Protection Act
Forest Conservation Act
Issues involved in enforcement of environmental legislation
Public awareness

Module VII: Human Population and the Environment
Population growth, variation among nations
Population explosion – Family Welfare Programmes
Environment and human health
Human Rights
Value Education
HIV / AIDS
Women and Child Welfare
Role of Information Technology in Environment and Human Health
Case Studies

Module VIII: Field Work
Visit to a local area to document environmental assets-river / forest/ grassland/ hill/ mountain.
Visit to a local polluted site – Urban / Rural / Industrial / Agricultural
Study of common plants, insects, birds
Study of simple ecosystems-pond, river, hill slopes, etc (Field work equal to 5 lecture hours)

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text &References:

- Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
- BharuchaErach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad 380 013, India, Email:mapin@icenet.net (R)

- Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p
- Clark R.S., Marine Pollution, Clanderson Press Oxford (TB)
- Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Publ. House, Mumabai, 1196p
- De A.K., Environmental Chemistry, Wiley Eastern Ltd.
- Down to Earth, Centre for Science and Environment (R)
- Gleick, H.P. 1993. Water in Crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute Oxford Univ. Press. 473p
- Hawkins R.E., Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay (R)
- Heywood, V.H &Waston, R.T. 1995. Global Biodiversity Assessment. Cambridge Univ. Press 1140p.
- Jadhav, H & Bhosale, V.M. 1995. Environmental Protection and Laws. Himalaya Pub. House, Delhi 284 p.
- Mckinney, M.L. & School, R.M. 1996. Environmental Science Systems & Solutions, Web enhanced edition. 639p.
- Mhaskar A.K., Matter Hazardous, Techno-Science Publication (TB)
- Miller T.G. Jr. Environmental Science, Wadsworth Publishing Co. (TB)
- Odum, E.P. 1971. Fundamentals of Ecology. W.B. Saunders Co. USA, 574p
- Rao M N. &Datta, A.K. 1987. Waste Water treatment. Oxford & IBH Publ. Co. Pvt. Ltd. 345p.
- Sharma B.K., 2001. Environmental Chemistry. Geol Publ. House, Meerut
- Survey of the Environment, The Hindu (M)
- Townsend C., Harper J, and Michael Begon, Essentials of Ecology, Blackwell Science
- Trivedi R.K., Handbook of Environmental Laws, Rules Guidelines, Compliances and Standards, Vol I and II, Enviro Media (R)
- Trivedi R. K. and P.K. Goel, Introduction to air pollution, Techno-Science Publication (TB)
- Wanger K.D., 1998 Environnemental Management. W.B. Saunders Co. Philadelphia, USA 499p

ELEMENTS OF MECHANICAL ENGINEERING

Course Code: BME 205 **Credit Units: 03**

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Investigate – Basic machines used in the field of mechanical engineering
2. Create – Mathematical models of fundamental physical phenomenon and apply them to predict the behaviour of engineering systems
3. Apply – this knowledge to analyse the working of IC Engines, Steam Turbines, Lathe machines etc.
4. Develop – Ability to perform and conduct basic experiments and evaluate the results of the same.

Course Contents:

Module I:Fundamental Concepts
Definition of thermodynamics, system, surrounding and universe, phase, concept of continuum, macroscopic & microscopic point of view, Thermodynamic equilibrium, property, state, path, process, cyclic process, Zeroth, first and second law of thermodynamics, Carnot Cycle, Introduction to I.C. Engines-two & four stoke S.I. and C.I. engines. Otto cycle. Diesel cycle.

Module II: Stress And Strain Analysis
Simple stress and strain: introduction, normal shear, and stresses-strain diagrams for ductile and brittle materials. Elastic constants, one-dimensional loadings of members of varying cross-section, Strain Energy, Properties of material-strength, elasticity, stiffness, malleability, ductility, brittleness, hardness and plasticity etc; Concept of stress and strain stress strain diagram, tensile test, impact test and hardness test.

Module III:Casting& Forging
Introduction of casting, pattern, mould making procedures, sand mould casting, casting defects, allowances of pattern. Forging-introduction, upsetting & drawing out, drop forging, press forging & m/c forging

Module IV: Welding& Sheet metal working:
Introduction of welding processes, classification, gas welding, arc welding, resistance welding. Introduction to sheet metal shop, Shearing, trimming, blanking, piercing, shaving, notching, stretch forming, nibbling coining, embossing and drawing.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

- Engineering thermodynamics, by P.K. Nag, Tata McGraw Hill.
- Thermal Engineering, by D.S. Kumar. S.K. Kataria and Sons.
- Thermal Engineering by PL Ballaney; Khanna Publishers, Delhi.
- Engineering Thermodynamics: Work and Heat Transfer, by Rogers and Mayhew, ELBS Publications
- Heine, R.W. C.R. Loper and P.C. Rosenthal, Principles of metal casting McGraw Hill
- Welding Technology by R.S. Parmar, Khanna Publishers.
- Thermodynamics and Heat Engines Volume-I, by R. Yadav: Central Publications.

- Ganesan, V. *Internal Combustion Engine*, Tata McGraw-Hill.

APPLIED PHYSICS – II LAB

Course Code: **AP 222** **Credit Units: 01**

List of Experiments:

1. To determine the wavelength of sodium light by Newton's rings method.
2. To determine the dispersive power of the material of prism with the help of a spectrometer.
3. To determine the specific rotation of sugar by Bi-quartz or Laurent half shade polarimeter.
4. To determine the speed of ultrasonic waves in liquid by diffraction method.
5. To determine the width of a narrow slit using diffraction phenomena.
6. To determine the temperature coefficient of platinum wire, using a platinum resistance thermometer and a Callender&Griffth's bridge.
7. To determine the value of specific charge (ratio of e/m) of an electron by Thomson method.
8. To determine the internal resistance of Leclanche cell with the help of Potentiometer.
9. To determine the resistance per unit length of a Carey Foster's bridge wire and also to find out the specific resistance of a given wire.
10. To plot graph showing the variation of magnetic field with distance along the aixs of a circular coil carrying current, and hence estimate the radius of the coil.
11. To determine the value of acceleration due to gravity ('g') in the laboratory using bar pendulum.
12. To determine the moment of inertia of a flywheel about its own axis of rotation.
13. To determine the density of material of the given wire with the help of sonometer.

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

APPLIED CHEMISTRY LAB

Course Code: AC 223 **Credit Units: 01**

Course Contents:

List of Experiments:

(Any 10 Experiments)

1. To determine the ion exchange capacity of a given cation exchanger.

2. To determine the temporary, permanent and total hardness of a sample of water by complexometric titration method.

3. To determine the type and extent of alkalinity of given water sample.

4. To determine the number of water molecules of crystallization in Mohr's salt (ferrous ammonium sulphate) provided standard potassium dichromate solution (0.1N) using diphenylamine as internal indicator.

5. To determine the ferrous content in the supplied sample of iron ore by titrimetric analysis against standard $K_2Cr_2O_7$ solution using potassium ferricyanide $[K_3Fe(CN)_6]$ as external indicator.

6. (a) To determine the surface tension of a given liquid by drop number method.
(b) To determine the composition of a liquid mixture A and B (acetic acid and water) by surface tension method.

7. To prepare and describe a titration curve for phosphoric acid – sodium hydroxide titration using pH-meter.

8. (a) To find the cell constant of conductivity cell.
(b) Determine the strength of hydrochloric acid solution by titrating it against standard sodium hydroxide solution conductometrically
9. Determination of Dissolved oxygen in the given water sample.

10 To determine the total residual chlorine in water.

11 Determination of amount of oxalic acid and H_2SO_4 in 1 L of solution using N/10 NaOH and N/10 $KMnO_4$ solution.

12 Determination of viscosity of given oil by means of Redwood viscometer I.

13 To determine flash point and fire point of an oil by Pensky Martin's Apparatus

14 To determine the Iodine value of the oil.

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

DATA STRUCTURES USING C LAB

Course Code: **BCS 224** **Credit Units: 01**

Software Required: Turbo C++

Assignment will be provided for following:

- Practical application of sorting and searching algorithm.
- Practical application of various data structure like linked list, queue, stack, tree

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

ELEMENTS OF MECHANICAL ENGINEERING - LAB (EEM)

Course Code: BME 225 **CreditUnits: 01**

Course Contents:

1. Welding

   (a) Arc Welding
   - Butt Joint
   - Lap Joint
   - T Joint

   (b) Gas Welding
   - Butt Joint
   - Lap Joint
   - Brazing of Broken pieces

2. Foundry
   - Sand mould casting by single piece pattern& Split pattern bracket with cores

3. Sheet Metal
   - Dust Bin
   - Mug
   - Funnel
   - Cylindrical Mug with handle-Rectangular

4. Fitting Shop
   - Male – Female Joint
   - Rectangular piece
   - Filing the job

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

ENGLISH

Course Code: BCS 201 **Credit Units: 01**

Course Objective:

The course is intended to give a foundation of English Language. The literary texts are indented to help students to inculcate creative & aesthetic sensitivity and critical faculty through comprehension, appreciation and analysis of the prescribed literary texts. It will also help them to respond form different perspectives.

Course Contents:

Module I: Vocabulary

Use of Dictionary
Use of Words: Diminutives, Homonyms & Homophones

Module II: Essentials of Grammar - I
Articles
Parts of Speech
Tenses

Module III: Essentials of Grammar - II
Sentence Structure
Subject -Verb agreement
Punctuation

Module IV: Communication
The process and importance
Principles & benefits of Effective Communication

Module V: Spoken English Communication
Speech Drills
Pronunciation and accent
Stress and Intonation

Module VI: Communication Skills-I
Developing listening skills
Developing speaking skills

Module VII: Communication Skills-II
Developing Reading Skills
Developing writing Skills

Module VIII: Written English communication
Progression of Thought/ideas
Structure of Paragraph
Structure of Essays

Module IX: Short Stories
Of Studies, by Francis Bacon
Dream Children, by Charles Lamb
The Necklace, by Guy de Maupassant
A Shadow, by R.K.Narayan
Glory at Twilight, Bhabani Bhattacharya

Module X: Poems

All the Worlds a Stage	Shakespeare
To Autumn	Keats
O! Captain, My Captain.	Walt Whitman
Where the Mind is Without Fear	Rabindranath Tagore
Psalm of Life	H.W. Longfellow

Examination Scheme:

Components	A	CT	HA	EE
Weightage (%)	05	15	10	70

Text & References:

- Madhulika Jha, Echoes, Orient Long Man

- Ramon & Prakash, Business Communication, Oxford.
- Sydney Greenbaum Oxford English Grammar, Oxford.
- Successful Communications, MalraTreece (Allyn and Bacon)
- Effective Technical Communication, M. Ashraf Rizvi.

BEHAVIOURAL SCIENCE - II
(PROBLEM SOLVING AND CREATIVE THINKING)

Course Code: BSS 204 **CreditUnits: 01**

Course Objective:

To enable the students:
Understand the process of problem solving and creative thinking.
Facilitation and enhancement of skills required for decision-making.

Course Contents:

Module I: Thinking as a tool for Problem Solving
What is thinking: The Mind/Brain/Behaviour
Critical Thinking and Learning:
Making Predictions and Reasoning
Memory and Critical Thinking
Emotions and Critical Thinking
Thinking skills

Module II: Hindrances to Problem Solving Process
Perception, Expression, Emotion, Intellect, Work environment

Module III: Problem Solving
Recognizing and Defining a problem, Analyzing the problem (potential causes), Developing possible alternatives, Evaluating Solutions, Resolution of problem, Implementation,
Barriers to problem solving:
Perception,
Expression
Emotion
Intellect
Work environment

Module IV: Plan of Action
Construction of POA, Monitoring, Reviewing and analyzing the outcome

Module V: Creative Thinking
Definition and meaning of creativity, The nature of creative thinking, Convergent and Divergent thinking, Idea generation and evaluation (Brain Storming), Image generation and evaluation, Debating, The six-phase model of Creative Thinking: ICEDIP model

Module VI:End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

- Michael Steven: How to be a better problem solver, Kogan Page, New Delhi, 1999
- Geoff Petty: How to be better at creativity; Kogan Page, New Delhi, 1999
- Richard Y. Chang and P. Keith, Kelly: Wheeler Publishing, New Delhi, 1998.
- Phil Lowe Koge Page: Creativity and Problem Solving, New Delhi, 1996
- J William Pfeiffer (ed.) Theories and Models in Applied Behavioural Science, Vol 3, Management (1996); Pfeiffer & Company

- Bensley, Alan D.: Critical Thinking in Psychology – A Unified Skills Approach, (1998), Brooks/Cole Publishing Company.

FRENCH - II

Course Code: FLT 201 Credit Units: 02

Course Objective:

To enable the students to overcome the fear of speaking a foreign language and take position as a foreigner speaking French.

To make them learn the basic rules of French Grammar.

Course Contents:

Module A : pp.38 – 47 : Unité 3: Objectif 3, 4, 5, 6

Module B: pp. 47 to 75 Unité 4, 5

Contenu lexical: **Unité 3 : Organiser son temps**

1. donner/demander des informations sur un emploi du temps, un horaire SNCF – Imaginer un dialogue
2. rédiger un message/ une lettre pour …
   i) prendre un rendez-vous/ accepter et confirmer/ annuler
   ii) inviter/accepter/refuser
3. Faire un programmed'activités
   imaginer une conversation téléphonique/un dialogue
   Propositions- interroger, répondre

Unité 4: **Découvrir son environnement**

1. situer un lieu
2. s'orienter, s'informer sur un itinéraire.
3. Chercher, décrire un logement
4. connaître les rythmes de la vie

Unité 5: s'informer

1. demander/donner des informations sur un emploi du temps passé.
2. donner une explication, exprimer le doute ou la certitude.
3. découvrir les relations entre les mots
4. savoir s'informer

Contenu grammatical:

1. Adjectifsdémonstratifs
2. Adjectifs possessifs/exprimer la possession à l'aide de :
   i. « de » ii. A+nom/pronom disjoint
3. Conjugaison pronominale – négative, interrogative - construction à l'infinitif
4. Impératif/exprimer l'obligation/l'interdiction à l'aide de « il faut…. »/ «il ne faut pas… »
5. passé composé
6. Questions directes/indirectes

ExaminationScheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- **le livre à suivre: Campus: Tome 1**

GERMAN – II

Course Code: FLG 201 **Credit Units: 02**

Course Objective:

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.
To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany
Introduction to Grammar to consolidate the language base learnt in Semester I

Course Contents:

Module I: Everything about Time and Time periods
Time and times of the day.
Weekdays, months, seasons.
Adverbs of time and time related prepositions

Module II: Irregular verbs
Introduction to irregular verbs like to be, and others, to learn the conjugations of the same, (fahren, essen, lessen, schlafen, sprechen und ähnliche).

Module III: Separable verbs
To comprehend the change in meaning that the verbs undergo when used as such
Treatment of such verbs with separable prefixes

Module IV: Reading and comprehension
Reading and deciphering railway schedules/school time table
Usage of separable verbs in the above context

Module V: Accusative case
Accusative case with the relevant articles
Introduction to 2 different kinds of sentences – Nominative and Accusative

Module VI: Accusative personal pronouns
Nominative and accusative in comparison
Emphasizing on the universal applicability of the pronouns to both persons and objects

Module VII: Accusative prepositions
Accusative propositions with their use
Both theoretical and figurative use

Module VIII: Dialogues
Dialogue reading: 'In the market place'
'At the Hotel'

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, TangramAktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

SPANISH – II

Course Code: FLS 201 **Credit Units: 02**

Course Objective:

To enable students acquire more vocabulary, grammar, Verbal Phrases to understand simple texts and start describing any person or object in Simple Present Tense.

Course Contents:

Module I
Revision of earlier modules.

Module II
Some more AR/ER/IR verbs. Introduction to root changing and irregular AR/ER/IR ending verbs

Module III
More verbal phrases (eg, Dios Mio, Que lastima etc), adverbs*(bueno/malo, muy, mucho, bastante, poco).*
Simple texts based on grammar and vocabulary done in earlier modules.

Module IV
Possessive pronouns

Module V
Writing/speaking essays like my friend, my house, my school/institution, myself….descriptions of people, objects etc, computer/internet related vocabulary

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español, EnDirecto I A
- Español Sin Fronteras

CHINESE – II

Course Code: FLC 201 Credit Units: 02

Course Objective:

Chinese is a tonal language where each syllable in isolation has its definite tone (flat, falling, rising and rising/falling), and same syllables with different tones mean different things. When you say, "ma" with a third tone, it mean horse and "ma" with the first tone is Mother. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I

Drills

Practice reading aloud, Observe Picture and answer the question., Tone practice., Practice using the language, both by speaking and by taking notes.

Introduction of basic sentence patterns.Measure words., Glad to meet you.

Module II

Where do you live?

Learning different colors.Tones of "bu", Buying things and how muchit costs?

Dialogue on change of Money.

More sentence patterns on Days and Weekdays.

How to tell time. Saying the units of time in Chinese. Learning to say useful phrases like – 8:00, 11:25, 10:30 P.M. everyday, afternoon, evening, night, morning 3:58, one hour, to begin, to end ….. etc.

Morning, Afternoon, Evening, Night.

Module III

Use of words of location like-li, wais hang, xia

Furniture – table, chair, bed, bookshelf,.. etc.

Description of room, house or hostel room..eg what is placed where and how many things are there in it?

Review Lessons – Preview Lessons.

Expression 'yao", "xiang" and "yaoshi" (if).

Days of week, months in a year etc.

I am learning Chinese. Is Chinese difficult?

Module IV

Counting from 1-1000, Use of "chang-chang", Making an Inquiry – What time is it now? Where is the Post Office?,Days of the week. Months in a year, Use of Preposition – "zai", "gen", Use of interrogative pronoun – "duoshao" and "ji", "Whose"??? Sweater etc is it?

Different Games and going out for exercise in the morning.

Module V

The verb "qu"

- Going to the library issuing a book from the library
- Going to the cinema hall, buying tickets
- Going to the post office, buying stamps
- Going to the market to buy things..etc
- Going to the buy clothes …. Etc.

Hobby. I also like swimming.

Comprehension and answer questions based on it.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

Text & References:

- "Elementary Chinese Reader Part I" Lesson 11-20

DATABASE MANAGEMENT SYSTEMS

Course Code: BCS 302 **Credit Units: 03**

Course Objective:

The objective of this course is to get students familiar with Databases and their use. They can identify different types of available database model, concurrency techniques and new applications of the DBMS.

Course Contents:

Module I: Introduction
Concept and goals of DBMS, Database Languages, Database Users, Database Abstraction.
Basic Concepts of ER Model, Relationship sets, Keys, Mapping, Design of ER Model

Module II: Hierarchical model &Network Model
Concepts, Data definition, Data manipulation and implementation.
Network Data Model, DBTG Set Constructs, and Implementation

Module III: Relational Model
Relational database, Relational Algebra, Relational & Tuple Calculus.

Module IV: Relational Database Design and Query Language
SQL, QUEL, QBE, Normalization using Functional Dependency, Multivalued dependency and Join dependency.

Module V: Concurrency Control and New Applications
Lock Based Protocols, Time Stamped Based Protocols, Deadlock Handling, Crash Recovery. Distributed Database, Objective Oriented Database, Multimedia Database, Data Mining, Digital Libraries.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- Korth, Silberschatz, "Database System Concepts", 4th Ed., TMH, 2000.
- Steve Bobrowski, "Oracle & Architecture", TMH, 2000

References:

- Date C. J., "An Introduction to Database Systems", 7th Ed., Narosa Publishing, 2004
- Elmsari and Navathe, "Fundamentals of Database Systems", 4th Ed., A. Wesley, 2004
- Ullman J. D., "Principles of Database Systems", 2nd Ed., Galgotia Publications, 1999.

OPERATING SYSTEMS WITH UNIX

Course Code: BCS 303 **Credit Units: 03**

Course learning outcomes (CLO)

CLO1: Students will be able to identify the role of Operating System. To understand the design of control unit.

CLO2: Students will be able to analyse andunderstanding CPU Scheduling, Synchronization, Deadlock Handling and Comparing CPU Scheduling Algorithms. Solve Deadlock Detection Problems.

CLO3: Students will be able to describe the role of paging, segmentation and virtual memory in operating systems.

CLO4: Students will be able to understand description of protection and security and also the Comparison of UNIX and Windows based OS.

CLO5: Students will be able to understand the concept of Defining I/O systems, Device Management Policies and Secondary Storage Structure and Evaluation of various Disk Scheduling Algorithms.

Course Contents:

Module I: Introduction to operating system

Operating system and function, Evolution of operating system, Batch, Interactive, multiprogramming, Time Sharing and Real Time System, multiprocessor system, Distributed system, System protection. Operating System structure, Operating System Services, System Program and calls.

Module II: Process Management

Process concept, State model, process scheduling, job and process synchronization, structure of process management, Threads.

Interprocess Communication and Synchronization**:**Principle of Concurrency, Producer Consumer Problem, Critical Section problem, Semaphores, Hardware Synchronization, Critical Regions, Conditional critical region, Monitor, Inter Process Communication.

CPU Scheduling**:** Job scheduling functions, Process scheduling, Scheduling Algorithms, Non Preemptive and preemptive Strategies, Algorithm Evaluation, Multiprocessor Scheduling.

Deadlock**:** System Deadlock Model, Deadlock Characterization, Methods for handling deadlock, Prevention strategies, Avoidance and Detection, Recovery from deadlock combined approach.

Module III: Memory Management

Single Contiguous Allocation: H/W support, S/W support, Advantages and disadvantages, Fragmentation, Paging, Segmentation, Virtual memory concept, Demand paging, Performance, Paged replaced algorithm, Allocation of frames, Thrashing, Cache memory, Swapping, Overlays

Module IV: Device management

Principles of I/O hardware, Device controller, Device Drivers, Memory mapped I/O, Direct Access Memory, Interrupts, Interrupt Handlers, Application I/O interface, I/O Scheduling, Buffering, Caching, Spooling,
Disk organization, Disk space management, Disk allocation Method, Disk Scheduling, Disk storage.

Module V: File System and Protection and security

File Concept, File Organization and Access Mechanism, File Directories, Basic file system, File Sharing, Allocation method, Free space management.

Policy Mechanism, Authentication, Internal excess Authorization.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- A. Silberschatz, P.B. Galvin “Operating System Concepts”, John Willey & son
- A. S Tanenbaum, Modern Operating System, 2nd Edition, PHI.

References:

- Milenekovic, “Operating System Concepts”, McGraw Hill
- Dietel, “An introduction to operating system”, Addision Wesley
- Tannenbaum, “Operating system design and implementation”, PHI
- B. W. Kernighan & R. Pike, “The UNIX Programming Environment” Prentice Hall of India, 2000
- Sumitabha Das “ Your UNIX The ultimate guide” Tata Mcgraw Hill
- “Design of UNIX Operating System “ The Bach Prentice – Hall of India

OBJECT ORIENTED PROGRAMMING USING C++

Course Code: BCS 304 **CreditUnits: 03**

Course learning outcomes (CLO)

It is expected that by the end of the course, students will be comfortable in –

1. Understand object-oriented programming and advanced C++ concepts.
    a. Be able to explain the difference between object-oriented programming and procedural programming.
    b. Be able to program using more advanced C++ features such as composition of objects, operator overloads, dynamic memory allocation, inheritance and polymorphism, file I/O, exception handling, etc.
    c. Be able to build C++ classes using appropriate encapsulation and design principles.
2. Improve your problem-solving skills
    a. Be able to apply object oriented or non-object-oriented techniques to solve bigger computing problems.
3. Goal: to make you a good programmer. Apply methods to analyse running time of essential data structures and estimate efficiency of the algorithms and implementations.

Course Contents:

Module I: Introduction

Review of C, Difference between C and C++, Procedure Oriented and Object Oriented Approach. Basic Concepts: Objects, classes, Principals like Abstraction, Encapsulation, Inheritance and Polymorphism. Dynamic Binding, Message Passing. Characteristics of Object-Oriented Languages. Introduction to Object-Oriented Modeling techniques (Object, Functional and Dynamic Modeling).

Module II: Classes and Objects

Abstract data types, Object & classes, attributes, methods, C++ class declaration, Local Class and Global Class, State identity and behaviour of an object, Local Object and Global Object, Scope resolution operator, Friend Functions, Inline functions, Constructors and destructors, instantiation of objects, Types of Constructors, Static Class Data, Array of Objects, Constant member functions and Objects, Memory management Operators.

Module III: Inheritance

Inheritance, Types of Inheritance, access modes – public, private & protected, Abstract Classes, Ambiguity resolution using scope resolution operator and Virtual base class, Aggregation, composition vs classification hiérarchies, Overriding inheritance methods, Constructors in derived classes, Nesting of Classes.

Module IV: Polymorphism

Polymorphism, Type of Polymorphism – Compile time and runtime, Function Overloading, Operator Overloading (Unary and Binary) Polymorphism by parameter, Pointer to objects, this pointer, Virtual Functions, pure virtual functions.

Module V: Strings, Files and Exception Handling

Manipulating strings, Streams and files handling, formatted and Unformatted Input output. Exception handling, Generic Programming – function template, class Template Standard Template Library: Standard Template Library, Overview of Standard Template Library, Containers, Algorithms, Iterators, Other STL Elements, The Container Classes, General Theory of Operation, Vectors.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- A.R. Venugopal, Rajkumar, T. Ravishanker"Mastering C++", TMH, 1997
- R. Lafore, "Object Oriented Programming using C++", BPB Publications, 2004.
- "Object Oriented Programming with C++" By E. Balagurusamy.
- Schildt Herbert, "C++: The Complete Reference", Wiley DreamTech, 2005.

References:

- Parasons, "Object Oriented Programming with C++", BPB Publication, 1999.
- Steven C. Lawlor, "The Art of Programming Computer Science with C++", Vikas Publication, 2002.
- Yashwant Kanethkar, "Object Oriented Programming using C++", BPB, 2004

APPLIED MATHEMATICS - III

Course Code: AM 301 **Credit Units: 03**

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Investigate the basic concept about partial differential equations. Create an interest in finding the solution by Fourier Series and
2. Fourier Transforms.
3. Apply basic concepts of Laplace Transformation.
4. Develop the physical problems using optimization techniques.

Course Contents:

Module I:Partial Differential Equations
Formation of PDE, Equations solvable by direct integration, Linear equations of the first order, Non-linear equations of the first order, Charpit's method, Homogeneous linear equations with constant coefficients, Non homogeneous linear equations.

Module II: Fourier Series
Periodic Functions, Fourier Series, Functions having points of discontinuity, Even or Odd Functions, Change of Interval, Half-range series, Parseval's Formula, Complex form of Fourier series, Practical Harmonic Analysis, Fourier Transforms, Sine and Cosine Transforms.

Module III: Laplace Transformation
Definition, Transforms of elementary functions, Properties of Laplace transforms, Existence conditions, Transforms of derivatives, Transforms of integrals, Evaluation of integrals by Laplace transform, Inverse transforms, Other methods of finding inverse transforms, Convolution theorem, Application to differential equations, Simultaneous linear equations with constant coefficients, Unit step functions, Periodic functions.

Module IV: Linear Programming
Formulation of the problem, Graphical method, Canonical and Standard forms of L.P.P. Simplex Method, Artificial variable Techniques-M-method, Two phase method, Degeneracy, Dual simplex method.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- Differential Calculus by Shanti Narain
- Integral Calculus by Shanti Narain
- Higher Engineering Mathematics by B.S. Grewal

References:

- Differential Equations by A.R. Forsyth
- Higher Engineering Mathematics by H.K. Dass
- Partial Differential Equations by I.N. Snedon

DIGITAL ELECTRONICS

Course Code: **BCS 305** **Credit Units: 03**

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Identify and explain fundamental concepts of digital logic design including basic and universal gates, number systems, binary coded systems, basic components of combinational and sequential circuits and concept of logic families.
2. Use the acquired knowledge to apply techniques related to the design and analysis of digital electronic circuits including Boolean algebra and multi-variable Karnaugh map methods.
3. Analyze small-scale combinational and sequential digital circuits.
4. Synthesize small-scale combinational and synchronous sequential digital circuit using Boolean algebra and K-maps.

Course Contents:

Module I: Boolean Functions
Analog & digital signals, AND, OR, NOT, NAND, NOR & XOR gates, Boolean algebra, Standard representation of logical functions, K-map representation and simplification of logical function, don't care conditions, XOR & XNOR simplifications of K-maps, Tabulation method.

Module II: Combinational Circuits
Adders, Subtractors, Multiplexer, de-multiplexer, decoder & encoder, code converters, Comparators, decoder / driver for display devices, Implementation of logic functions using multiplexer / de-multiplexer,

Module III: Sequential Circuits
Flip-flops: SR, JK, D & T flip flops – Truth table, Excitation table, Conversion of flip-flops, race around condition, Master Slave flip flop, shift registers: SIPO, PISO, PIPO, SIPO, Bi-directional; Counters: ripple & synchronous counters – up / down; Synchronous Sequential circuit: design procedure.

Module IV: Logic families
Logic families: RTL, DTL, TTL, ECL

Module V: Data Converters
Data converters: ADC – successive approximation, linear ramp, dual slope; DAC – Binary Weighted, R-2R ladder type

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

- Moris Mano: Digital Circuits Systems

- R. P. Jain: Digital Logic& Circuits
- Thomas L. Floyd: Digital Fundamentals
- Malvino and Leech: Digital Principles & Applications

DATABASE MANAGEMENT SYSTEMS LAB

Course Code: BCS 322 **Credit Units: 01**

Software Required: Oracle 9i

Topics covered in lab will include:

- Database Design
- Data Definition (SQL)
- Data Retrieval (SQL)
- Data Modification (SQL)
- Views
- Triggers and Procedures
- PL\SQL

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

OPERATING SYSTEM WITH UNIX LAB

Course Code: BCS 323 **Credit Units: 01**

Software Required:UNIX SCO

Assignments will be provided for the following

- Introduction to UNIX Commands
- Introduction to vi editor
- Programming in shell script
- Introduction to programming in C Shell

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

Text & References:

- "Unix Programming Environment" The Kernighan and Pike Prentice – Hall of India
- "Unix –Shell Programming" Kochar
- " Unix Concepts and application" Das Sumitabha Tata Mcgraw Hill

OBJECT ORIENTED PROGRAMMING USING C++ LAB

Course Code: BCS 324 **CreditUnits : 01**

Software Required: Turbo C++

Course Contents:

- Creation of objects in programs and solving problems through them.
- Different use of private, public member variables and functions and friend functions.
- Use of constructors and destructors.
- Operator overloading
- Use of inheritance in and accessing objects of different derived classes.
- Polymorphism and virtual functions (using pointers).
- File handling.

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

DIGITAL ELECTRONICS LAB

Course Code: **BCS 325** **Credit Units: 01**

List of Experiments:

1. To verify the truth tables of OR, AND, NOR, NAND, EX-OR, EX-NOR gates.
2. To obtain half adder, full adder and subtractor using gates and verify their truth tables.
3. To verify the truth tables of RS, JK and D flip- flops.
4. To design and study a binary counter.
5. To design and study synchronous counter.
6. To design and study ripple counter.
7. To convert BCD number into excess 3 form
8. To design and study a decade counter.
9. To design and study a sequence detector.
10. To implement control circuit using multiplexer.

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

COMMUNICATION SKILLS - I

Course Code: BCS 301 **Credit Units: 01**

Course learning outcomes (CLO)

At the successful completion of this course the student should be able to:

1. Inculcating creative thinking skills
2. Construct and showcase their communication skills in a creative manner.
3. Comprehending and demonstrating ways of self introduction
4. Outlining and illustrating presentation Skills

Course Contents:

Module I: Introduction to Writing Skills
Effective Writing Skills
Avoiding Common Errors
Paragraph Writing
Note Taking
Writing Assignments

Module II: Letter Writing
Types
Formats

Module III
Memo
Agenda and Minutes
Notice and Circulars

Module IV: Report Writing
Purpose and Scope of a Report
Fundamental Principles of Report Writing
Project Report Writing
Summer Internship Reports

Examination Scheme:

Components	CT1	CT2	CAF	V	GD	GP	A
Weightage (%)	20	20	25	10	10	10	5

CAF – Communication Assessment File
GD – Group Discussion
GP – Group Presentation

Text & References:

- Business Communication, Raman – Prakash, Oxford
- Creative English for Communication, Krishnaswamy N, Macmillan
- Textbook of Business Communication, Ramaswami S, Macmillan
- Working in English, Jones, Cambridge
- A Writer's Workbook Fourth edition, Smoke, Cambridge
- Effective Writing, Withrow, Cambridge
- Writing Skills, Coe/Rycroft/Ernest, Cambridge
- Welcome!, Jones, Cambridge

BEHAVIOURAL SCIENCE - III
(INTERPERSONAL COMMUNICATION)

Course Code: **BSS 304** **CreditUnits: 01**

Course learning outcomes (CLO)

It is expected that by the end of the course, students will be comfortable in –

1. Understand object-oriented programming and advanced C++ concepts.
    a. Be able to explain the difference between object-oriented programming and procedural programming.
    b. Be able to program using more advanced C++ features such as composition of objects, operator overloads, dynamic memory allocation, inheritance and polymorphism, file I/O, exception handling, etc.
    c. Be able to build C++ classes using appropriate encapsulation and design principles.
2. Improve your problem-solving skills
    a. Be able to apply object oriented or non-object-oriented techniques to solve bigger computing problems.
3. Goal: to make you a good programmer. Apply methods to analyse running time of essential data structures and estimate efficiency of the algorithms and implementations.

Course Contents:

Module I: Interpersonal Communication: An Introduction
Importance of Interpersonal Communication
Types – Self and Other Oriented
Rapport Building – NLP, Communication Mode
Steps to improve Interpersonal Communication

Module II: BehaviouralCommunication
Meaning and Nature of behavioural communication
Persuasion, Influence, Listening and Questioning
Guidelines for developing Human Communication skills
Relevance of Behavioural Communication for personal and professional development

Module III: Interpersonal Styles
Transactional Analysis
Life Position/Script Analysis
Games Analysis
Interactional and Transactional Styles

Module IV: Conflict Management
Meaning and nature of conflicts
Styles and techniques of conflict management
Conflict management and interpersonal communication

Module V: Negotiation Skills

Meaning and Negotiation approaches (Traditional and Contemporary)
Process and strategies of negotiations
Negotiation and interpersonal communication

Module VI:End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

- Vangelist L. Anita, Mark N. Knapp, Inter Personal Communication and Human Relationships: Third Edition, Allyn and Bacon
- Julia T. Wood. Interpersonal Communication everyday encounter
- Simons, Christine, Naylor, Belinda: Effective Communication for Managers, 1997 1st Edition Cassel
- Goddard, Ken: Informative Writing, 1995 1st Edition, Cassell
- Harvard Business School, Effective Communication: United States of America
- Foster John, Effective Writing Skills: Volume-7, First Edition 2000, Institute of Public Relations (IPR)
- Beebe, Beebe and Redmond; Interpersonal Communication, 1996; Allyn and Bacon Publishers.

FRENCH - III

Course Code: **FLT 301** **Credit Units: 02**

Course learning outcomes (CLO)

At the successful completion of this course you should be able to:

1. **Identify** and express in French vocabulary and grammar norms
2. **Interpret** different types of texts as well as cultural ideas and themes.
3. **Demonstrate comprehension** of nuance between script and sound in French
4. **Narrate clearly** ideas, themes in simple standard French

Course Contents:

Module B: pp. 76 – 88 Unité 6

Module C: pp. 89 to103 Unité 7

Contenu lexical: **Unité 6:se faire plaisir**

1. acheter : exprimer ses choix, décrire un objet (forme, dimension, poids et matières) payer
2. parler de la nourriture, deux façons d'exprimer la quantité, commander un repas au restaurant
3. parler des différentes occasions de faire la fête

Unité 7: Cultiverses relations

1. maîtriser les actes de la communication sociale courante (Salutations, présentations, invitations, remerciements)
2. annoncer un événement, exprimer un souhait, remercier, s'excuser par écrit.
3. caractériser une personne (aspect physique et caractère)

Contenu grammatical:

1. accord des adjectifs qualificatifs
2. articles partitifs
3. Négations avec de, ne…rien/personne/plus
4. Questions avec combien, quel…
5. expressions de la quantité
6. ne…plus/toujours - encore
7. pronoms compléments directs et indirects
8. accord du participe passé (auxiliaire « avoir ») avec l'objet direct
9. Impératif avec un pronom complément direct ou indirect
10. construction avec « que » - Je crois que/ Je pense que/ Je sais que

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- **le livre à suivre: Campus: Tome 1**

GERMAN - III

Course Code: **FLG 301** **Credit Units: 02**

Course learning outcomes (CLO)

After successful completion of the course, the students will be able perform orally and in writing certain social functions:

1. Students will be able to ask and tell time.
2. Students will be able to frame sentences using Separable verb.
3. Student will be able to write and speak sentences using modal verb.
4. Students will be able to frame sentences and speak using was/were/had.

Course Contents:

Module I: Modal verbs
Modal verbs with conjugations and usage
Imparting the finer nuances of the language

Module II: Information about Germany (ongoing)
Information about Germany in the form of presentations or "Referat"– neighbors, states and capitals, important cities and towns and characteristic features of the same, and also a few other topics related to Germany.

Module III: Dative case
Dative case, comparison with accusative case
Dative case with the relevant articles
Introduction to 3 different kinds of sentences – nominative, accusative and dative

Module IV: Dative personal pronouns
Nominative, accusative and dative pronouns in comparison

Module V: Dative prepositions
Dative preposition with their usage both theoretical and figurative use

Module VI: Dialogues
In the Restaurant,
At the Tourist Information Office,
A telephone conversation

Module VII: Directions
Names of the directions
Asking and telling the directions with the help of a roadmap

Module VIII: Conjunctions
To assimilate the knowledge of the conjunctions learnt indirectly so far

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, TangramAktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

SPANISH – III

Course Code: FLS 301 Credit Units: 02

Course Learning Outcomes:

After successful completion of the course, students will be able to perform orally and in writing certain social functions:

Students will be able to perform communicative tasks (oral and written) with proficiencies in,

a) Introduction of stem changing irregular verbs
b) Introduction of prepositions (Cerca de/ lejos de/ encima de etc.)
c) Present continuous tense **(Estar+ gerundio)**
d) Introduction of third person verbs Gustar/Parecer/Encantar/ Doler (to like/ to seem like/ to enchant/ to hurt.) etc
e) Interrogatives – How much/ How many
f) Introduction of irregular verbs.
g) Immediate future plans (Ir a + verbo)

Course Contents:

Module I
Revision of earlier semester modules
Set expressions (idiomatic expressions) with the verb *Tener, Poner, Ir….*
Weather

Module II
Introduction to *Gustar*…and all its forms. Revision of *Gustar* and usage of it

Module III
Translation of Spanish-English; English-Spanish. Practice sentences.
How to ask for directions (using estar)
Introduction to IR + A + INFINITIVE FORM OF A VERB

Module IV
Simple conversation with help of texts and vocabulary
En el restaurante
En el instituto
En el aeropuerto

Module V
Reflexives

ExaminationScheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español, EnDirecto I A
- Español Sin Fronteras-Nivel Elemental

CHINESE – III

Course Code: FLC 301 **CreditUnits: 02**

Course Objective:

Foreign words are usually imported by translating the concept into Chinese, the emphasis is on the meaning rather than the sound. But the system runs into a problem because the underlying name of personal name is often obscure so they are almost always transcribed according to their pronciation alone. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I
Drills
Dialogue practice
Observe picture and answer the question.
Introduction of written characters.
Practice reading aloud
Practice using the language both by speaking and by taking notes.
Character writing and stroke order

Module II
Measure words
Position words e.g. inside, outside, middle, in front, behind, top, bottom, side, left, right, straight.
Directional words – beibian, xibian, nanbian, dongbian, zhongjian.
Our school and its different building locations.
What game do you like?
Difference between "hii" and "neng", "keyi".

Module III
Changing affirmative sentences to negative ones and vice versa
Human body parts, Not feeling well words e.g.; fever, cold, stomach ache, head ache.
Use of the modal particle "le", Making a telephone call, Use of "jiu" and "cal" (Grammar portion),
Automobiles e.g. Bus, train, boat, car, bike etc.
Traveling, by train, by airplane, by bus, on the bike, by boat..etc.

Module IV
The ordinal number "di", "Mei" the demonstrative pronoun e.g.mei tian, meinianetc.
Use of to enter to exit, Structural particle "de" (Compliment of degree).
Going to the Park, Description about class schedule during a week in school, Grammar use of "li" and "cong".
Comprehension reading followed by questions.

Module V
Persuasion-Please don't smoke, Please speak slowly, Praise – This pictorial is very beautiful, Opposites e.g. Clean-Dirty, Little-More, Old-New, Young-Old, Easy-Difficult, Boy-Girl, Black-White, Big-Small, Slow-Fast … etc.
Talking about studies and classmates, Use of "it doesn't matter", Enquiring about a student, description about study method.
Grammar: Negation of a sentence with a verbal predicate.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- "Elementary Chinese Reader Part I, Part-2" Lesson 21-30

THEORY OF AUTOMATA AND COMPUTATION

Course Code: **BCS 402** **CreditUnits: 03**

Course learning outcomes (CLO)

CLO6: Students will be able to understand the concept of computation and designing deterministic and nondeterministic finite automata.

CLO7: Students will be able to analyse the basic properties of formal languages and formal grammars using computation model.

CLO8: Students will be able to analyse and perform the basic properties of Push down automata & Context Free Grammars.

CLO9: Students will be able to apply and evaluate basic properties of Turing machines and computing with Turing machines & Linear Bounded Automaton.

CLO10: Students will be able to understand the concept of Recursive and recursively enumerable language and recursive functions.

Course Contents:

Module I: Introduction to Languages and Automata

Formal Grammars and Chomsky Hierarchy, Regular Expression Deterministic and Nondeterministic Finite Automata, Regular Expression, Two way Finite Automata, Finite Automata with output, Properties of regular sets, pumping lemma for regular sets, My-Hill-Nerode Theorem.

Module II: Context Free Grammars and Pushdown Automata

CFG: Formal Definition, Derivation and Syntax trees, Simplification Forms, Ambiguous Grammar, Properties of CFL, Normal Forms (CNF and GNF)

Pushdown Automata**:**Definitions, Relationship between PDA and context free language, Decision Algorithms

Module III: Turing Machine

The Turing Machine Model, Language acceptability of Turing Machine, Design of TM, Variation of TM, Universal TM, Church's Machine.

Recursive and recursively enumerable language, unrestricted grammars, Context Sensitive Language, Linear Bounded Automata (LBA).

Module IV: Undecidability

Turing machine halting Problem, undecidable problems for recursive enumerable language, Post correspondence problems (PCP) and Modified Post correspondence problems, Undecidable problems for CFL.

Module V*: Computability*

Partial and Total Functions, Primitive Recursive functions, Recursive functions.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- Hopcroft and Ullman, "Introduction to Automata Theory, languages and computation", Addision Wesley.
- "An introduction to formal languages and Automata (2nd ed)" by Peter Linz, D. C. Health and Company.

References:

- "Introduction to theory of computation (2nd Ed)" by Michael sipser.
- Mishra &Chandrashekharan, "Theory of Computer Sciences", PHI.
- ZaviKohavi, "Switching and finite Automata Theory "
- Kohan, "Theory of Computer Sciences".
- Korral, "Theory of Computer Sciences".

DISCRETE MATHEMATICS

Course Code: BCS 403 **Credit Units: 03**

Course learning outcomes (CLO)

After completing this course, students will be able to:

) Proof and logics
A) Set, relations.
B) Formulate Lattices as partially ordered sets, their properties
C) Join and meet irreducible elements of a lattice and introduction to Boolean algebra.
D) Understand some basic properties of Boolean algebra to solve problem by different method and definition of graphs.

Course Contents:

Module I:Formal Logic
Statement, Symbolic Representation and Tautologies, Quantifiers, Predicator and validity, Normal form. Propositional Logic, Predicate Logic, First Order Logic.

Module II: Proof & Relation
Techniques for theorem proving: Direct Proof, Proof by Contra position, Proof by exhausting cares and proof by contradiction, principle of mathematical induction, principle of complete induction. Recursive definitions, solution methods for linear, first-order recurrence relations with constant coefficients.

Module III: Sets and Combinations
Sets, Subtracts, power sets, binary and unary operations on a set, set operations/set identities, fundamental country principles, principle of inclusion, exclusion and pigeonhole principle, permutation and combination, Pascal's triangles, Comparing rates of growth: big theta, little oh, big oh and big omega.

Module IV: Relation/function and matrices
Relation/function and matrices: Relation, properties of binary relation, operation on binary relation, closures, partial ordering, equivalence relation, Function, properties of function, composition of function, inverse, binary and n-ary operations,
characteristic function, Permutation function, composition of cycles, Boolean matrices, Boolean matrices multiplication.

Module V: Lattices & Boolean Algebra
Lattices: definition, sub lattices, direct product, homomorphism Boolean algebra: definition, properties, isomorphic structures (in particulars, structures with binary operations) sub algebra, direct product and homo-morphism, Boolean function, Boolean expression, representation & minimization of Boolean function.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- J.P. Tremblay & R. Mamohan, "Discrete Mathematical Structure with Application to Computer Science," TMH, New Delhi (2000).
- Kolman, Busby & Ross "Discrete Mathematical Structures", PHI.
- Iyengar, Chandrasekaran and Venkatesh, "Discrete Mathematics", Vikas Publication.
- Peter Linz, "An Introduction to Formal Languages and Automata", Narosa Publishing House.

References:

- J. Truss, "Discrete Mathematics", Addison Wesley.

- C.L. Liu, “Elements of Discrete Mathematics”, McGraw Hill Book Company.
- M. Lipson &Lipshutz, “Discrete Mathematics”, Schaum’s Outline series.
- J. E. Hopcroft & J. D. Ullman, “Introduction to Automata Theory, Languages and Computation”, Addison Weliy.

COMPUTER GRAPHICS

Course Code: **BCS 404** **CreditUnits: 03**

Course learning outcomes (CLO)

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At the successful completion of this course you (the student) should be able to:

1. **Investigate the structure of modern computer graphics systems**
2. **Create key algorithms for rasterize, modelling and rendering graphical data**
3. **Apply experience in constructing interactive computer graphics programs**
4. **Develop design and problem-solving skills with application to computer graphics**

Course Contents:

Module I: Introduction to Graphics and Graphics Hardware System
Video display devices, CRT, LCD Display devices Raster scan displays, Random scan displays, Raster scan systems, Random scan Systems.
Input devices, keyboard, mouse, Trackball and spaceball, Joystick, Data glove, Digitizers, Image scanners, Touch panels, Light pens, Voice systems.
Hardcopy devices, Printers, Plotters.

Module II: Output Primitives and Clipping operations
Algorithms for drawing 2D Primitives lines (DDA and Bresenham’s line algorithm), circles (Bresenham’s and midpoint circle algorithm), ellipses (midpoint ellipse algorithm), other curves(conic sections, polynomials and spline curves).
Antialiasing and filtering techniques
Line clipping (cohen-sutherland algorithm), clip windows, circles, ellipses, polygon, clipping with Sutherland Hodgeman algorithm.

Module III: Geometric transformation
2D Transformation: Basic transformation, Translation, Rotation, scaling, Matrix Representations and Homogeneous coordinates, window to viewport transformation.
3D Concepts: Parallel projection and Perspective projection, 3 D Transformation.

Module IV: 3 D Object Representation, Colour models and rendering
Polygon meshes in 3 D, Spheres, Ellipsoid, Bezier curves and Bezier surfaces, Bspline curves and surfaces, solid modeling, sweep representation, constructive solid geometry methods. Achromatic and color models.
Shading, rendering techniques and visible surface detection method**:** Basic illumination, diffuse reflection, specular reflection, transparency, shadows**.** Polygon rendering method, Gouraud&Phong shading, Ray tracing method, recursive ray tracing, radio**-**sity method**.** Depth**-**buffer method,A**-**buffer method, Depth**-**sorting method**(**painter**’**s algorithm**)**, Oct**-**tres method**.**

Module V: Introduction to multimedia
File formats for BMP, GIF, TIFF, IPEG, MPEG-II, Animation techniques and languages. Design of animation sequences, Computer Animation languages, Elementary filtering techniques and elementary Image Processing techniques

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References*:*

Text:

- Foley et. al., "Computer Graphics Principles& practice", 2nd ed. AWL, 2000.
- D. Hearn and P. Baker, "Computer Graphics", Prentice Hall, 1986.
- R. Plastock and G. Kalley, "Theory and Problems of Computer Graphics", Schaum's Series, McGraw Hill, 1986

References:

- R.H. Bartels, J.C. Beatty and B.A. Barsky, "An Introduction to Splines for use in Computer Graphics and Geometric Modeling", Morgan Kaufmann Publishers Inc., 1987.
- C.E. Leiserson, T.H. Cormen and R.L. Rivest, "Introduction to Algorithms", McGraw-Hill Book Company, 1990.
- W. Newman and R. Sproul, "Principles of Interactive Computer Graphics, McGraw-Hill, 1973.
- F.P. Preparata and M.I. Shamos, "Computational Geometry: An Introduction", Springer-Verlag New York Inc., 1985.
- D. Rogers and J. Adams, "Mathematical Elements for Computer Graphics", MacGraw-Hill International Edition, 1989
- David F. Rogers, "Procedural Elements for Computer Graphics", McGraw Hill Book Company, 1985.
- Alan Watt and Mark Watt, "Advanced Animation and Rendering Techniques", Addison-Wesley, 1992

DATA COMMUNICATION AND COMPUTER NETWORKS

Course Code: BCS405 **Credit Units: 03**

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Evaluate storage architectures and key data center elements in classic, virtualized and cloud environments
2. Explain physical and logical components of a storage infrastructure including storage subsystems, RAID and intelligent storage systems
3. Describe storage networking technologies such as FCSAN, IP-SAN, FCoE, NAS and object-based, and unified storage
4. Understand and articulate business continuity solutions – backup and replications, along with archive for managing fixed content
5. Explain key characteristics, services, deployment models, and infrastructure components for a cloud computing
6. Describe information security requirements and solutions, and identify parameters for managing and monitoring storage infrastructure in classic, virtualized and cloud environments

Course Contents:

Module I: Introduction Introduction to computer networks, evolution of computer networks and its uses, reference models, example networksThe physical layer: Theoretical basis for data communication, transmission media, wireless transmission, telecom infrastructure, PSTN, communication satellites, mobile telephone system

Module II: The data link layer

Data link layer design issues, error detection and correction, data link protocols, sliding window protocols, example of data link protocols- HDLC, PPP Access

Module III: Medium access layer
Channel allocation problem, multiple access protocols, ALOHA, CSMA/CD, CSMA/CA, IEEE Standard 802 for LAN and MAN, Bridges, Wireless LANs. Introduction to wireless WANs: Cellular Telephone and Satellite Networks, SONETISDH, Virtual-Circuit Networks: Frame Relay and ATM.

Module V: The network layer

Network layer concepts, design issues, static and dynamic routing algorithms, shortest path routing, flooding, distance vector routing, link state routing, distance vector routing, multicast routing, congestion controland quality of service, internetworking, Ipv4

Module VI: The transport layer
The transport services, elements of transport protocols, TCP and UDP
The application layer: Brief introduction to presentation and session layer, DNS,E-mail**,** WWW

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	8	7	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

DATA COMMUNICATION ANDCOMPUTER NETWORKS LAB

Course Code: BCS425 CreditUnits: 01

Equipments Required:

Switch Network Cables, Patch Chord- Fiber optical and twisted pair cable, LAN cards, RJ-45 connectors etc.

Platforms required: Linux Server

Course Contents:

- Introduction and Installation of Linux
- Administrating Linux
- Setting up a Local Area Network
- Connecting to the Internet
- Setting up Print Server
- Setting up File Server
- Setting up Mail Server
- Setting up FTP Server
- Setting up Web Server
- Setting up MySQL Database Server

Examination Scheme:

IA				EE		
A	Practical (Mid-Term)	PR	V	LR	PR (End Term)	V
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

COMPUTER GRAPHICS LAB

Course Code: **BCS 424** **CreditUnits: 01**

Software Required: Turbo C++

Course Contents:

Assignments will be provided for the following:

- Geometrical shapes based on graphics algorithms
- 2D Geometric transformation translation, rotation, scaling, reflection.
- Clipping
- Animation

Examination Scheme:

IA				EE		
A	Practical (Mid-Term)	PR	V	LR	PR (End Term)	V
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

WEBSITE DESIGN

Course Code: **BCS 406** **CreditUnits: 03**

Course learning outcomes (CLO)

Program Outcome of this course (POs)

1. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

2. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

3. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Course Contents:

Module I: Overview of Internet
Introduction to Internet and WWW, Concept of Networking and Layers of OSI Model, Internet protocols like TCP/IP, http, telnet and ftp, URL, email, domain name, Web Browsers.

Module II: Principles of Web Design
Key issues to be considered in web site design. Structure of a Web Page: Introduction to HTML, Elements of HTML syntax, Head and Body sections, Building HTML documents, Inserting text, images, hyperlinks, Backgrounds and Color Control, HTML Editors & Tools: Use of different HTML editors and tools like Netscape Communicator and Microsoft Front Page etc

Module III: HTML Tags
Use of Different HTML tags in web pages. Table Handling: Table layout & presentation, constructing tables in a web page, developing a web page in a table. Ordered and unordered lists. Frames: Developing Web pages using frames. Advantages and disadvantages of frames. Creating forms, Role of Databases in web applications. Use of at least one graphical and animation tools like Adobe Fireworks, Abode Photoshop, Gif Animator, Gimpetc.

Module IV: Cascading style-sheet (CSS) in HTML
Introduction to Cascading Style Sheets (CSS), Types of Style Sheets (Inline, Internal and External), CSS for Website Layout and Print Layout.
Types of various CSS Selectors, CSS properties: Type Properties, Background Properties, Block Properties, Box Model Properties, List Properties, Border Properties, Positioning Propeties.

Module V: Introduction to Java Script

Role of java script in a web page, Script writing basics, Adding interactivity to a web page, creating dynamic web pages,
Similarities to java, embedding JavaScript code, embedding java applets in a web page**,** Form validation using java script

Projects:
Creating a discussion form, creating an online store, creating a job site**.**

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- Ramesh Bangia, "Web Technology", Firewall media
- C. Xavier, "World Wide Web Design with HTML", Tata McGraw Hill.
- Unleashed ASP, Techmedia

References:

- Rick Dranell, "HTML4 unleashed", Techmedia Publication.
- Shelly Powers, "Dynamic Web Publishing Unleashed", Techmedia.
- Don Gosselin, "JavaScript", Vikas Publication
- **Mark Swank & Drew Kittel, "World Wide Web Database", Sams net.**

WEBSITE DESIGN LAB

Course Code: **BCS 423** **Credit Units: 01**

Software Required: Java

List of Assignment:

1. Design a HTML page using all the basic tags.
2. Design a page containing your educational qualification in a table.
3. Design a page containing an ordered list/unordered list.
4. Design a HTML page for your resume.
5. Design a form in HTML to enter different attribute of student information.
6. Design a home page for ASE using Frame.
7. Design another page and connect these to the home page.
8. Write a function in Javascript for input validation.
9. Write a function in Javascript to calculate monthly installation of the loan.
10. Write an input form and save its data in a database using ASP.
11. Display the data stored in database in tabular form on the page.

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

Domain Elective-II :Choose any one from the following courses

E-COMMERCE AND ERP

Course Code: BCS407 Credit Units: 04

Course Objective:

This course examines the evolution of enterprise resource planning (ERP) systems - from internally focused client/server systems to externally focused e-business. This class studies the types of issues that managers will need to consider in implementing cross-functional integrated ERP systems. The objective of this course is to make students aware of the potential and limitations of ERP systems. This objective will be reached through hands-on experience, case studies, lectures, guest speakers and a group project. The course would equip students with the basics of E-Commerce, technologies involved with it and various issues associated with.

Course Contents:

Module I: Introduction and Concepts

Networks and commercial transactions - Internet and other novelties; Networks and electronic transactions today, Model for commercial transactions; Internet environment - internet advantage, world wide web and other internet sales venues; Online commerce solutions.

Security Technologies: Why is internet insecure? A brief introduction to Cryptography; Public key solution. Digital payment systems; First virtual internet payment system; cyber cash model Operational process of Digicash, Ecash Trail; Using Ecash; Smart cards; Electronic Data Interchange: Its basics; EDI versus Internet and EDI over Internet.

Module II: Introduction ERP

An Overview, Enterprise-An Overview, Benefits of ERP, ERP and Related Technologies, Business Process Reengineering (BPR), Data Warehousing, Data Mining, On-line Analytical Processing (OLAP), Supply Chain Management

Module III: ERP Implementation

To be or not to be, ERP Implementation Lifecycle, Implementation Methodology, Not all Packages are Created Equal!, ERP Implementation-The Hidden Costs, Organizing the Implementation, Vendors, Consultants and Users, Contracts with Vendors, Consultants and Employees, Project Management and Monitoring, After ERP Implementation.

Module IV: The Business Modules

Business Modules in an ERP Package, Finance, Manufacturing (Production), Human Resources, Plant Maintenance, Materials Management, Quality Management, Sales and Distribution

Module V: The ERP Market

ERP Market Place, SAP AG, PeopleSoft, Baan Company, JD Edwards World Solutions Company, Oracle Corporation, QAD, System Software Associates, Inc. (SSA)

ERP-Present and Future

Turbo Charge the ERP System, Enterprise Integration Applications (EIA), ERP and E-Commerce, ERP and Internet, Future Directions in ERP, Appendices"

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	8	7	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

Text:

- S. Sadagopan, "Enterprise Resource Planning", Tata McGraw Hill 2000
- Bajaj, Kamlesh K. and Nag, Debjani, E-Commerce: The Cutting Edge of Business, Tata McGraw-Hill Publishing Company

References:

- Alexis Leon, "Enterprise Resource Planning", Tata McGraw Hill 2001
- Loshin, Pete and Murphy, Paul, *Electronic Commerce*, Second edition, 1990, Jaico Publishing House, Mumbai.

HYPERTEXT PREPROCESSOR (PHP)

Course Code: BCS 406 CreditUnits: 03

Course learning outcomes (CLO)

Program Outcome of this course (POs)

4. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

6. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Course Contents:

Module I: PHP Introduction
Introduction, Installation, PHP Syntax, PHP Variables, Echo Statements, PHP Data Types, Strings Operation, Constants

Module II: Operators & Control Statements
PHP Operators, PHP If...Else...Elseif, Switch, Looping, PHP Functions, Arrays.

Module III: Form Handeling using PHP
Form Handling in PHP, Form Validation, GET/POST Method in HTML Forms, PHP Form URL.

Module IV: Advanced functions in PHP
PHP - Multidimensional Arrays, Date and Time,
PHP Include Files function,
PHP File Handling, File Open/Read, File Creation in PHP,
File Upload function.
PHP Cookies, PHP Sessions, Filters in PHP, PHP Error Handling, PHP Exception

Module V: MySQL Connectivity in PHP
Introduction to MySQL Database, MySQL Connectivity with PHP,
MySQL Functions:
Create Database,
Create Table,
Data Insertion,
Data fetching using Select Statements,
DeleteOpertaion,
Update Operation.

Note: All database related operation required to be performed on PhpMyAdmin tool.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- Beginning PHP, Apache, MySQL Web Development
- Michael K. Glass, Yann Le Scouarnec, Elizabeth Naramore, Gary Mailer, Jeremy Stolz, Jason Gerner

References:

- PHP Manual.

PHP LAB

Course Code: **BCS 426** **CreditUnits: 01**

Course Contents:

1. WAP to display the "Hello World" on Webpage using PHP
2. WAP to perform the logic of Control Statements.
3. WAP to perform the functinality of Looping Statements.
4. WAP to perform the funtionality of HTML Form submission in PHP
5. WAP to perform the funtionality of Database (MySql) Connectivity with PHP Applications
6. CASE Project: A News Board
7. CASE Project: Prepare Admin Panel for previous News Board Project
8. CASE Project: Student Information Management System (SIMS)
9. CASE Project: Prepare Admin Panel for previous SIMS

10-12. **Project:** An open ended project (based on PHP+MySql) which will be submitted by students (in group)

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

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COMMUNICATION SKILLS - II

Course Code: BCS 401 **Credit Units: 01**

Course Objective:

To teach the participants strategies for improving academic reading and writing.
Emphasis is placed on increasing fluency, deepening vocabulary, and refining academic language proficiency.

Course Contents:

Module I: Social Communication Skills
Small Talk
Conversational English
Appropriateness
Building rapport

Module II: Context Based Speaking
In general situations
In specific professional situations
Discussion and associated vocabulary
Simulations/Role Play

Module III: Professional Skills
Presentations
Negotiations
Meetings
Telephony Skills

Examination Scheme:

Components	CT1	CT2	CAF	V	GD	GP	A
Weightage (%)	20	20	25	10	10	10	5

CAF – Communication Assessment File
GD – Group Discussion
GP – Group Presentation

Text & References:

- Essential Telephoning in English, Garside/Garside, Cambridge
- Working in English, Jones, Cambridge
- Business Communication, Raman – Prakash, Oxford
- Speaking Personally, Porter-Ladousse, Cambridge
- Speaking Effectively, Jermy Comfort, et.al, Cambridge
- Business Communication, Raman – Prakash, Oxford

BEHAVIOURAL SCIENCE – IV
(RELATIONSHIP MANAGEMENT)

Course Code: **BSS 404** **CreditUnits: 01**

Course learning outcomes (CLO)

At the successful completion of this course you (the student) would be able to:

1. Identify the basis of interpersonal relationship.
2. Describe the importance of interpersonal relationship and bridging individual differences.
3. Recognize the development and strategies for effective interpersonal relationship.
4. Explain and apply the theories of relationship concepts of impression management.

Course Contents:

Module I: Understanding Relationships
Importance of relationships
Role and relationships
Maintaining healthy relationships

Module II: Bridging Individual Differences
Understanding individual differences
Bridging differences in Interpersonal Relationship – TA
Communication Styles

Module III: Interpersonal Relationship Development
Importance of Interpersonal Relationships
Interpersonal Relationships Skills
Types of Interpersonal Relationships

Module IV: Theories of Interpersonal Relationships
Theories: Social Exchange, Uncertainty Reduction Theory
Factors Affecting Interpersonal Relationships
Improving Interpersonal Relationships

Module V: Impression Management
Meaning & Components of Impression Management
Impression Management Techniques (Influencing Skills)
Impression Management Training-Self help and Formal approaches

Module VI:End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

- Vangelist L. Anita, Mark N. Knapp, Inter Personal Communication and Human Relationships: Third Edition, Allyn and Bacon
- Julia T. Wood. Interpersonal Communication everyday encounter

- Simons, Christine, Naylor, Belinda: Effective Communication for Managers, 1997 1st Edition Cassell
- Goddard, Ken: Informative Writing, 1995 1st Edition, Cassell
- Harvard Business School, Effective Communication: United States of America
- Foster John, Effective Writing Skills: Volume-7, First Edition 2000, Institute of Public Relations (IPR)
- Beebe, Beebe and Redmond; Interpersonal Communication, 1996; Allyn and Bacon Publishers.

FRENCH - IV

Course Code: FLT 401 **Credit Units: 02**

Course learning outcomes (CLO)

At the successful completion of this course the student should be able to:

- To buy their own food in a French supermarket
- To ask and express their needs
- To tell about their food habits
- To ask for a price
- To order food at a restaurant
- To give an appointment
- To invite someone to go out with
- Understand an announcement
- Know about Paris Metropolitan map
- Talk about his/her time-table
- Express a professional wish
- Formulate a project
- Read a board

Course Contents:

Module C: pp. 104 – 139 : Unités 8,9

Contenu lexical :Unité 8: Découvrir le passé

1. parler du passé, des habitudes et des changements.
2. parler de la famille, raconter une suite d'événements/préciser leur date et leur durée.
3. connaîtrequelques moments de l'histoire

Unité 9: Entreprendre

1. faire un projet de la réalisation: (exprimer un besoin, préciser les étapes d'une réalisation)

2. parlerd'uneentreprise
3. parler du futur

Contenu grammatical:

1. Imparfait
2. Pronom « en »
3. Futur
4. Discoursrapporté au présent
5. Passé récent
6. Présentprogressif

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- **le livre à suivre: Campus: Tome 1**

GERMAN - IV

Course Code: FLG 401 **Credit Units: 02**

Course learning outcomes (CLO)

After successful completion of the course, the students will be able to perform orally and in writing certain social functions:

3. understand and give instructions
4. understand and reply to a letter
5. speak about learning languages
6. find a particular information in a text
7. understand a conversation

Course Contents:

Module I: Present perfect tense
Present perfect tense, usage and applicability
Usage of this tense to indicate near past
Universal applicability of this tense in German

Module II: Letter writing
To acquaint the students with the form of writing informal letters.

Module III: Interchanging prepositions
Usage of prepositions with both accusative and dative cases
Usage of verbs fixed with prepositions
Emphasizing on the action and position factor

Module IV: Past tense
Introduction to simple past tense
Learning the verb forms in past tense
Making a list of all verbs in the past tense and the participle forms

Module V: Reading a Fairy Tale
Comprehension and narration
- Rotkäppchen
- Froschprinzessin
- Die Fremdsprache

Module VI: Genitive case
Genitive case – Explain the concept of possession in genitive
Mentioning the structure of weak nouns

Module VII: Genitive prepositions
Discuss the genitive propositions and their usage: (während, wegen, statt, trotz)

Module VIII: Picture Description
Firstly recognize the persons or things in the picture and identify the situation depicted in the picture;
Secondly answer questions of general meaning in context to the picture and also talk about the personal experiences which come to your mind upon seeing the picture.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer

- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, TangramAktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

SPANISH - IV

Course Code: **FLS 401** **Credit Units: 02**

Course learning outcomes (CLO)

At the successful completion of this course you should be able to:

3. **Identify** and **express** in Spanish vocabulary and grammar norms
4. **Interpret** different types of texts as well as cultural ideas and themes.
5. **Demonstrate** comprehension of nuance between script and sound in Spanish
6. **Narrate** clearly ideas, themes in simple standard Spanish

Course Contents:

Module I
Revision of earlier semester modules
Introduction to Present Continuous Tense (Gerunds)

Module II
Translation with Present Continuous Tense
Introduction to Gustar, Parecer, Apetecer, doler

Module III
Imperatives (positive and negative commands of regular verbs)

Module IV
Commercial/business vocabulary

Module V
Simple conversation with help of texts and vocabulary
En la recepciondelhotel
En el restaurante
En la agencia de viajes
En la tienda/supermercado

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español Sin Fronteras (Nivel – Elemental)

CHINESE – IV

Course Code: FLC 401 **CreditUnits: 02**

Course Objective:

How many characters are there? The early Qing dynasty dictionary included nearly 50,000 characters the vast majority of which were rare accumulated characters over the centuries. An educate person in China can probably recognize around 6000 characters. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I
Dialogue Practice
Observe picture and answer the question
Pronunciation and intonation
Character writing and stroke order.
Electronic items

Module II
Traveling – The Scenery is very beautiful
Weather and climate
Grammar question with – "bushi …. Ma?"
The construction "yao … le" (Used to indicate that an action is going to take place)
Time words "yiqian", "yiwai" (Before and after).
The adverb "geng".

Module III
Going to a friend house for a visit meeting his family and talking about their customs.
Fallen sick and going to the Doctor, the doctor examines, takes temperature and writes prescription.
Aspect particle "guo" shows that an action has happened some time in the past.
Progressive aspect of an actin "zhengzai" Also the use if "zhe" with it.
To welcome someone and to see off someone …. I cant go the airport to see you off… etc.

Module IV
Shipment. Is this the place to checking luggage?
Basic dialogue on – Where do u work?
Basic dialogue on – This is my address
Basic dialogue on – I understand Chinese
Basic dialogue on – What job do u do?
Basic dialogue on – What time is it now?

Module V
Basic dialogue on – What day (date) is it today?
Basic dialogue on – What is the weather like here.
Basic dialogue on – Do u like Chinese food?
Basic dialogue on – I am planning to go to China.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- "Elementary Chinese Reader, Part-2" Lesson 31-38

SOFTWARE ENGINEERING

Course Code: BCS 502 **Credit Units: 03**

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Apply their knowledge of mathematics, sciences, and computer science to the modelling, analysis, and measurement of software artefacts.
2. Analyze, specify and document software requirements for a software system.
3. Develop alternative design solutions to a given problem and recommend the best one within limitations of cost, time, knowledge, existing systems, and organizations.
4. Implement a given software design using s development practices.

Course Contents:

Module I: Introduction
Software life cycle models: Waterfall, Prototype, Evolutionary and Spiral models, Overview of Quality Standards like ISO 9001, SEI-CMM

Module II: Software Metrics and Project Planning
Size Metrics like LOC, Token Count, Function Count, Design Metrics, Data Structure Metrics, Information Flow Metrics. Cost estimation, static, Single and multivariate models, COCOMO model, Putnam Resource Allocation Model, Risk management.

Module III: Software Requirement Analysis, design and coding
Problem Analysis, Software Requirement and Specifications, Behavioural and non-behavioural requirements, Software Prototyping Cohesion & Coupling, Classification of Cohesiveness & Coupling, Function Oriented Design, Object Oriented Design, User Interface Design Top-down and bottom-up Structured programming, Information hiding,

Module IV: Software Reliability, Testing and Maintenance
Failure and Faults, Reliability Models: Basic Model, Logarithmic Poisson Model, Software process, Functional testing: Boundary value analysis, Equivalence class testing, Decision table testing, Cause effect graphing, Structural testing: path testing, Data flow and mutation testing, unit testing, integration and system testing, Debugging, Testing Tools, &Standards.Management of maintenance, Maintenance Process, Maintenance Models, Reverse Engineering, Software RE-engineering

Module V: UML
Introduction to UML,Use Case Diagrams, Class Diagram: State Diagram in UMLActivity Diagram in UMLSequence Diagram in UMLCollaboration Diagram in UML

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- K. K. Aggarwal & Yogesh Singh, "Software Engineering", 2nd Ed, New Age International, 2005.
- R. S. Pressman, "Software Engineering – A practitioner's approach", 5th Ed., McGraw Hill Int. Ed., 2001.

References:

- R. Fairley, "Software Engineering Concepts", Tata McGraw Hill, 1997.
- P. Jalote, "An Integrated approach to Software Engineering", Narosa, 1991.

- Stephen R. Schach, “Classical & Object Oriented Software Engineering”, IRWIN, 1996.
- James Peter, W. Pedrycz, “Software Engineering”, John Wiley & Sons.
- Sommerville, “Software Engineering”, Addison Wesley, 1999.

COMPUTER ARCHITECTURE

Course Code: BCS 503 **Credit Units: 03**

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Investigate the Operate logical components and relate them with the various components of computer.
2. Create the general organization of the central processing unit.
3. Apply various computer memories and system communication mechanisms.
4. Develop various parallel processing architectures.

Course Contents:

Module I: Register Transfer Language
Register Transfer, Bus and Memory Transfers, Arithmetic Micro-operations, Logic Micro-operations, Shift Micro-operations, Arithmetic Logic shift Unit.

Module II: Basic Computer Organizations and Design
Instruction Codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory-Reference Instructions, Input-Output and Interrupt, Design of Accumulator Logic. Hardwired and Microprogrammed control: Control Memory, Address Sequencing, Design of Control Unit

Module III: Central Processing Unit
Introduction, General Register Organization, Stack Organization, Instruction representation, Instruction Formats, Instruction type, Addressing Modes, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer RISC and CISC
Computer Arithmetic: Introduction, Multiplication Algorithms, Division Algorithms, Floating-Point Arithmetic Operations

Module IV: Memory and Intrasystem Communication and Input output organisation
Memory: Memory types and organization Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory, Memory Management Hardware
Intrasystem communication and I/O: Peripheral Devices, Input-Output
Controller and I/O driver, IDE for hard disk, I/O port and Bus concept, Bus cycle, Synchronous and asynchronous transfer, Interrupt handling in PC, Parallel Port, RS – 232 interface, Serial port in PC, Serial I/O interface, Universal serial bus IEEE 1394, Bus Arbitration Techniques, Uni-bus and multi-bus architectures EISA Bus, VESA Bus.

Module V: Pipelining, Vector Processing and Multiprocessors
Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processors.
Multiprocessors: Characteristics of Multiprocessors, Interconnection Structures, Interprocessor Arbitration, Interprocessor Communication and Synchronization, Advanced computer architecture, Pentium and Pentinum – Pro, Power PC Architecture

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- Morris Mano, Computer System Architecture, 3rd Edition – 1999, Prentice-Hall of India Private Limited.

- Harry & Jordan, Computer Systems Design & Architecture, Edition 2000, Addison Wesley, Delhi.

References:

- WIliam Stallings, Computer Organization and Architecture, 4th Edition-2000, Prentice-Hall of India Private Limited.
- Kai Hwang-McGraw-Hill, Advanced Computer Architecture.
- Kai Hwang & Faye a Briggs, McGrew Hill, inc., Computer Architecture & Parallel Processing.
- John D. Carpinelli, Computer system Organization & Architecture, Edition 2001, Addison Wesley, Delhi
- John P Hayes, McGraw-Hill Inc, Computer Architecture and Organization.
- M. Morris Mano and Charles, Logic and Computer Design Fundamentals, 2nd Edition Updated, Pearson Education, ASIA.
- Hamacher, "Computer Organization," McGraw hill.
- Tennenbaum," Structured Computer Organization," PHI
- B. Ram, "Computer Fundamentals architecture and organization," New age international Gear C. w., "Computer Organization and Programming, McGraw hill

JAVA PROGRAMMING

Course Code: **BCS 504** **Credit Units: 03**

Course learning outcomes (CLO)

At the successful completion of this course you should be able to:

1. Define object oriented terminology and JAVA programming concepts
2. Illustrate the role of inheritance, packages and interface to solve programming problems
3. Apply Exception handling for avoiding the run time errors
4. Apply the concept of multithreading to increase the execution speed of an application
5. Differentiate between C++ and java programming language
6. Create projects using Java programming.

Course Contents:

Module I
Concepts of OOP, Features of Java, How Java is different from C++, Data types, Control Statements, identifiers, arrays, operators. Inheritance: Multilevel hierarchy, method overriding, Abstract classes, Final classes, String Class.

Module II
Defining, Implementing, Applying Packages and Interfaces, Importing Packages. Fundamentals, Types, Uncaught Exceptions, Multiple catch Clauses, Java's Built-in Exception.

Module III
Creating, Implementing and Extending thread, thread priorities, synchronization suspending, resuming and stopping Threads, Constructors, Various Types of String Operations. Exploring Various Basic Packages of Java: Java. lang, Java. util, Java.i.o

Module IV
Event handling Mechanism, Event Model, Event Classes, Sources of Events, Event Listener Interfaces
AWT: Working with Windows, AWT Controls, Layout Managers

Module V
AppletClass, Architecture, Skeleton, Display Methods.
Swings: Japplet, Icons, labels, Text Fields, Buttons, Combo Boxes.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- JAVA The Complete Reference by Patrick Naughton & Herbert Schild, TMH
- Introduction to JAVA Programming a primar, Balaguruswamy.

References:

- "Introduction to JAVA Programming" Daniel/Young PHI
- Jeff Frentzen and Sobotka, "Java Script", Tata McGraw Hill,1999

SOFTWARE ENGINEERING LAB

Course Code: **BCS 522** **Credit Units: 01**

Software Required: Rational Rose

Assignments will be provided for the following:

- Use of Rational Rose for visual modeling.
- Creating various UML diagrams such as use case, sequence, collaboration, activity, state diagram, and class diagrams.

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

COMPUTER ARCHITECTURE LAB

Course Code: BCS 523 **Credit Units: 01**

Course Contents:

S. NO.	NAME OF EXPERIMENTS	EQUIPMENT REQUIRED
	Part – A	
1)	Design 4 bit combinational circuit shifter for left right and circular shift (using MUX).	Digital trainer kit with P/S
2)	To design a BCD adder (4 bit)	IC Name
3)	To design combinational circuit that performs following logic operations. AND, OR, XOR, NOT using MUX.	4 bit binary adder – 7483 Decoder (2 x 4) - 74139
4)	Design a 4 bit combinational circuit decrementer using 4 full adder circuit.	MUX (2 x 1) Quad – 74157
5)	Transfer of Data from different registers to a common by using MUX.	MUX (4 x 1) Dual – 74153
6)	Transfer of data from different registers to a common bus by using decoders and tristate buffers.	Register (4 bit) – 74195
7)	Verify arithmetic operations by using MUX and full adders	Bidirectional – 74194
8)	Transfer of data from one register to another register by using bus.	RAM – 7489
	Part – B **(Experiments based on PC trainer kit)**	
9)	Write a program to initialise CRT controlled and displays a pass message on screen.	AND, OR, NOT, XOR, GATE
10)	Write a program to transmit a character and display it on a video monitor.	AND – 7408 OR – 7432
11)	Write a program to initialisekey board and display a scan code of the key pressed in seven segment display.	NOT – 7404 XOR – 7486
12)	Write a program to generate beeps of different frequencies as generated at the time of reset.	NAND – 7400
13)	Write a program to initialise printer on a dual display cared at address O36C and print data from a specified address.	WIRE (SINGLE CORE THICK)
14)	Write a program to refresh dynamic memory of the PC and read back from the same memory.	LED'S (RED, GREEN, YELLOW) WIRE CUTTER PC TRAINER 48 channel logic state analyzer

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

JAVA PROGRAMMING LAB

Course Code: **BCS 524** **Credit Units: 01**

Software Required: JDK1.3

Assignments will be provided for the following:

- Java programs using classes & objects and various control constructs such as loops etc, and data structures such as arrays, structures and functions
- Java programs for creating Applets for display of images and texts.
- Programs related to Interfaces & Packages.
- Input/Output and random files programs in Java.
- Java programs using Event driven concept.
- Programs related to network programming.

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

INTERNSHIP - I

Course Code: **BCS 550** **Credit Units: 05**

Course Objective:

The objective of this course is to provide practical training on some live projects that will increase capability to work on actual problem in industry. This training may undergo in an industrial environment or may be an in house training on some latest software which is in high demand in market. This training will be designed such that it will useful for their future employment in industry.

Examination Scheme:

Feedback from industry/work place	20
Training Report	40
Viva	15
Presentation	25
Total	**100**

Domain Elective-III : Choose any ONE from the following courses along with their corresponding labs

ADVANCED NETWORKING

Course Code: **BCS506** **Credit Units: 03**

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Investigate various advanced TCP/IP protocols for computer network
2. Compare working of wired network and wireless networks.
3. Develop networking techniques to solve complex problems.
4. Create and maintain network for institute or small organizations.

Course Contents:

Module I: TCP/IP Protocol

Layered protocols, internet Addressing, mapping internet address to physical address, internet protocol, OSPF, RIP, RARP, BOOTP, DHCP, BGP, ARP, IP, Ipv6, ICMP, IGMP
Transport protocols: UDP, TCP and SNMP

Module II: Connection oriented networks

Frame relay, B-ISDN,ATM protocol stack, ATM switching, internetworking with ATM Networks, traffic management in ATM, ATM QoS

Module III: High Speed LAN
LAN Ethernet, fast Ethernet, gigabit Ethernet, FDDI, DSL, ADSL

Module IV: Wireless communication
Wireless networks, wireless channels, channel access, network architecture, IEEE 802.11, bluetooth

Module V: Network Analysis and Modeling

Queuing theory, modeling network as a graph, network management system and standard

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- High performance communication networks by: J. Walrand& Pravin Varaiya, Morgan Kaufman, 1999.

- Internetworking with TCP/IP Vol.1: Principles, Protocols, and Architecture (4th Edition) by Douglas E. Comer
- ATM networks: Concepts, Protocols, Applications by: Handel, AddisionWesseley.
- Cryptography & Networks Security Stallings, William 3rd edition

References:

- Computer networks: Tanenbaum, Andrew S, Prentice Hall
- Data communication & networking: Forouzan, B. A.
- Computer network protocol standard and interface Uyless, Black

ADVANCED NETWORKING LAB

Course Code: BCS526 **Credit Units: 01**

Equipments Required:

Switch, Network Cables, Patch Chord- Fiber optical and twisted pair cable, LAN cards, RJ-45 connectors Routers, Modem, etc.
Software required: TURBO C++
Operating System: Linux/Windows Server

Course Contents:

- Configuring Routers
- Introduction to Socket programming
- Implementation of Socket Programming
- Troubleshoot common network failures
- Gaining Access to the Routers and Switches

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

COMMUNICATION SKILLS - III

Course Code: BCS 501 **Credit Units: 01**

Course Objective:

To equip the participant with linguistic skills required in the field of science and technology while guiding them to excel in their academic field.

Course Contents:

Module I
Reading Comprehension
Summarizing
Paraphrasing

Module II
Essay Writing
Dialogue Report

Module III
Writing Emails
Brochure
Leaflets

Module IV: Introduction to Phonetics
Vowels
Consonants
Accent and Rhythm
Accent Neutralization
Spoken English and Listening Practice

Examination Scheme:

Components	CT1	CT2	CAF	V	GD	GP	A
Weightage (%)	20	20	25	10	10	10	5

CAF – Communication Assessment File
GD – Group Discussion
GP – Group Presentation

Text & References:

- Effective English for Engineering Students, B Cauveri, Macmillan India
- Creative English for Communication, Krishnaswamy N, Macmillan
- A Textbook of English Phonetics, Balasubramanian T, Macmillan

BEHAVIOURAL SCIENCE - V
(GROUP DYNAMICS AND TEAM BUILDING)

Course Code: **BSS 504** **CreditUnits: 01**

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Recognize their personality and individual differences and identify its importance of diversity at workplace and ways to enhance it.
2. Recognize effective socialization strategies and importance of patriotism and taking accountability of integrity.
3. Recognize different types of human rights and its importance.
4. Identify Indian values taught by different religions.
5. Identify long term goals and recognize their talent, strengths and styles to achieve them.

Course Contents:

Module I: Group formation
Definition and Characteristics
Importance of groups
Classification of groups
Stages of group formation
Benefits of group formation

Module II: Group Functions
External Conditions affecting group functioning: Authority, Structure, Org. Resources, Organizational policies etc.
Internal conditions affecting group functioning: Roles, Norms, Conformity, Status, Cohesiveness, Size, Inter group conflict.
Group Cohesiveness and Group Conflict
Adjustment in Groups

Module III: Teams
Meaning and nature of teams
External and internal factors effecting team
Building Effective Teams
Consensus Building
Collaboration

Module IV: Leadership
Meaning, Nature and Functions
Self leadership
Leadership styles in organization
Leadership in Teams

Module V: Power to empower: Individual and Teams
Meaning and Nature
Types of power
Relevance in organization and Society

Module VI:End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)

Weightage (%)	20	05	20	30	25

Text & References:

- Organizational Behaviour, Davis, K.
- Hoover, Judhith D. Effective Small Group and Team Communication, 2002,Harcourt College Publishers
- Dick, Mc Cann&Margerison, Charles: Team Management, 1992 Edition, viva books
- Bates, A. P. and Julian, J.: Sociology - Understanding Social Behaviour
- Dressers, David and Cans, Donald: The Study of Human Interaction
- Lapiere, Richard. T – Social Change
- Lindzey, G. and Borgatta, E: Sociometric Measurement in the Handbook of Social Psychology, Addison – Welsley, US.
- Rose, G.: Oxford Textbook of Public Health, Vol.4, 1985.
- LaFasto and Larson: When Teams Work Best, 2001, Response Books (Sage), New Delhi
- J William Pfeiffer (ed.) Theories and Models in Applied Behavioural Science, Vol 2, Group (1996); Pfeiffer & Company
- Smither Robert D.; The Psychology of Work and Human Performance, 1994, Harper Collins College Publishers

FRENCH - V

Course Code: **FLT 501** **Credit Units: 02**

Course learning outcomes (CLO)

At the successful completion of this course the students would be able to:

Perform communicative tasks (oral and written) like:
1. Identify and express in basic French vocabulary and grammar norms. 2. Interpret different types of texts, cultural ideas and themes.
3. Demonstrate comprehension of nuance between script and sound in French 4. Express clearly ideas, themes in simple standard French

Course Contents:

Module D: pp. 131 – 156 Unités 10,11

Contenu lexical: Unité 10: Prendre des décisions

1. Faire des comparaisons
2. décrire un lieu, le temps, les gens, l'ambiance
3. rédiger une carte postale

Unité 11: faire face aux problèmes

1. Exposer un problème.
2. parler de la santé, de la maladie
3. interdire/demander/donner uneautorisation
4. connaître la vie politique française

Contenu grammatical:

1. comparatif - comparer des qualités/ quantités/actions
2. supposition: Si + présent, futur
3. adverbe - caractériserune action
4. pronom "Y"

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- **le livre à suivre: Campus: Tome 1**

GERMAN - V

Course Code: **FLG 501** **Credit Units: 02**

Course learning outcomes (CLO)

After successful completion of the course, the students will be able to perform orally and in writing certain social functions:

- Students will be able to ask and tell time.
- Students will be able to frame sentences using Separable verb.
- Student will be able to write and speak sentences using the modal verb.
- Students will be able to frame sentences and speak using was/were/had.

Course Contents:

Module I: Genitive case
Genitive case – Explain the concept of possession in genitive
Mentioning the structure of weak nouns

Module II: Genitive prepositions
Discuss the genitive propositions and their usage: (während, wegen, statt, trotz)

Module III: Reflexive verbs
Verbs with accusative case
Verbs with dative case
Difference in usage in the two cases

Module IV: Verbs with fixed prepositions
Verbs with accusative case
Verbs with dative case
Difference in the usage of the two cases

Module V: Texts
A poem 'Maxi'
A text Rocko

Module VI: Picture Description
Firstly recognize the persons or things in the picture and identify the situation depicted in the picture;
Secondly answer questions of general meaning in context to the picture and also talk about the personal experiences which come to your mind upon seeing the picture.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, TangramAktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

SPANISH - V

Course Code: FLS 501 **Credit Units: 02**

Course Objective:

To enable students acquire working knowledge of the language; to give them vocabulary, grammar, voice modulations/intonations to handle everyday Spanish situations with ease.

Course Contents:

Module I
Revision of earlier semester modules

Module II
Future Tense

Module III
Presentations in English on
Spanish speaking countries'
Culture
Sports
Food
People
Politics
Society
Geography

Module IV
Situations:
En el hospital
En la comisaria
En la estacion de autobus/tren
Enel banco/cambio

Module V
General revision of Spanish language learnt so far.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español Sin Fronteras, Greenfield

CHINESE – V

Course Code: FLC 501 **CreditUnits: 02**

Course learning outcomes (CLO)

At the successful completion of this course, you will be able to:

1. **Read, write and speak approx. 100 New Chinese words and understand basic grammar points.**
2. **Interpret words, phrases and sentences of day today conversation related to using**
3. **Write Chinese characters, simple sentence and a paragraph on simple topic like 'Self Introduction' and dialogue writing on "Conversation between two friends discussing weather.".**

Course Contents:

Module I
Drills
Dialogue practice
Observe picture and answer the question.
Pronunciation and intonation.
Character writing and stroke order

Module II
Intonation
Chinese foods and tastes – tofu, chowmian, noodle, Beijing duck, rice, sweet, sour….etc. Learning to say phrases like – Chinese food, Western food, delicious, hot and spicy, sour, salty, tasteless, tender, nutritious, god for health, fish, shrimps, vegetables, cholesterol is not high, pizza, milk, vitamins, to be able to cook, to be used to, cook well, once a week, once a month, once a year, twice a week……
Repetition of the grammar and verbs taught in the previous module and making dialogues usingit.
Compliment of degree "de".

Module III
Grammar the complex sentence "suiran … danshi…."
Comparison – It is colder today than it was yesterday…..etc.
The Expression "chule….yiwai". (Besides)
Names of different animals.
Talking about Great Wall of China
Short stories

Module IV
Use of "huozhe" and "haishi"
Is he/she married?
Going for a film with a friend.
Having a meal at the restaurant and ordering a meal.

Module V
Shopping – Talking abut a thing you have bought, how much money you spent on it? How many kinds were there? What did you think of others?
Talking about a day in your life using compliment of degree "de". When you get up? When do you go for class? Do you sleep early or late? How is Chinese? Do you enjoy your life in the hostel?
Making up a dialogue by asking question on the year, month, day and the days of the week and answer them.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

Text & References:

- “Elementary Chinese Reader ” Part-II Lesson 39-46

SOFTWARE TESTING AND QUALITY ASSURANCE

Course Code:BCS 602 **CreditUnits: 03**

Course learning outcomes (CLO)

At the successful completion of this course, the student should be able to:

1) Distinguish between Software quality and Quality control.
2) Explain Software testing concept and its applications.
3) Represent knowledge using various testing techniques.
4) Use the appropriate testing techniques in achieving desired goals.

Course Contents:

Module I: Introduction

Terminology; Evolving Nature of Area

Module II: V & V Limitations

Theoretical Foundations; Impracticality of Testing All data; Impracticality of Testing All Paths; No Absolute Proof of Correctness

Module III: The Role of V & V in Software Evolution

Types of Products, Requirements; Specifications, Designs, Implementations, Changes, V & V Objectives, Correctness, Consistency, Necessity, Sufficiency, Performance.

Module IV: Software V & V Approaches and their Applicability

Software Technical Reviews, Software Testing: Levels of Testing, Module, Integration, System, Regression, Testing Techniques and their Applicability, Functional Testing and Analysis, Structural Testing and Analysis, Error-Oriented Testing and Analysis, Hybrid Approaches, Integration Strategies, Transaction Flow Analysis, Stress Analysis, Failure Analysis, Concurrency Analysis, Performance Analysis, Proof of Correctness, Simulation and Prototyping, Requirements Tracing.

Module V: Software V & V Planning

Identification of V & V Goals, Selection of V & V Techniques: Requirements, Specifications, Designs, Implementations, Changes, Organizational Responsibilities, Development Organization, Independent Test Organization, Software Quality Assurance, Independent V & V Contractor, V & V Standards, Integrating V & V Approaches, Problem Tracking, Tracking Test Activities, Assessment.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- William Perry, "Effective Methods for Software Testing", John Wiley & Sons, New York, 1995.
- Louise Tamres, "Software Testing", Pearson Education Asia, 2002
- Robert V. Binder, "Testing Object-Oriented Systems-Models, Patterns and Tools", Addison Wesley, 1999.

References:

- CemKaner, Jack Falk, Nguyen Quoc, "Testing Computer Software", Second Edition, Van Nostrand Reinhold, New York, 1993.
- K.K. Aggarwal & Yogesh Singh, "Software Engineering", 2nd Ed., New Age International Publishers, New Delhi, 2005
- Boris Beizer, "Software Testing Techniques", Second Edition, Wiley-Dreamtech India, New Delhi, 2003
- Boris Beizer, "Black-Box Testing – Techniques for Functional Testing of Software and Systems", John Wiley & Sons Inc., New York, 1995.

ANALYSIS AND DESIGN OF ALGORITHM

Course Code: **BCS603** **CreditUnits: 03**

Course learning outcomes (CLO)

At the successful completion of this course you should be able to:

1. Analyse time and space complexity of the given program/algorithms.
2. Apply Divide and conquer approach to solve real world problem
3. Implement sorting on a set of given unsorted values & searching algorithms
4. To impart the knowledge Greedy Method
5. To familiarize with Dynamic programming algorithms and its applications.
6. Apply Graph data structure on real life problems
7. To learn the back tracking & Brach and bound algorithms approach.
8. Identify the class of given the algorithms using Computational Complexity

Course Contents:

Module I: Introduction

Algorithm Design paradigms - motivation, concept of algorithmic efficiency, run time analysis of algorithms, Asymptotic Notations. Recurrences- substitution method, recursion tree method, master method

Module II: Divide and conquer
Structure of divide-and-conquer algorithms: examples; Binary search, quick sort, Merge sort**,** Strassen Multiplication; Analysis of divide and conquer run time recurrence relations.
Greedy Method
Overview of the greedy paradigm examples of exact optimization solution (minimum cost spanning tree), Approximate solution (Knapsack problem), Single source shortest paths, traveling salesman

Module III: Dynamic programming
Overview, difference between dynamic programming and divide and conquer, Applications: Shortest path in graph, chain Matrix multiplication, Traveling salesman Problem, longest Common sequence, knapsack problem

Module IV: Graph searching and Traversal
Overview, Representation of graphs, strongly connected components, Traversal methods (depth first and breadth first search)
Back tracking
Overview, 8-queen problem, and Knapsack problem
Brach and bound
LC searching Bounding, FIFO branch and bound, LC branch and bound application: 0/1 Knapsack problem, Traveling Salesman Problem

Module V: Computational Complexity
Complexity measures, Polynomial Vs non-polynomial time complexity; NP-hard and NP-complete classes, examples.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- E. Horowitz, S. Sahni, and S. Rajsekaran, "Funadmentals of Computer Algorithms," Galgotia Publication
- T. H. Cormen, Leiserson, Rivest and Stein, "Introduction of Computer algorithm,"

References:

- Sara Basse, A. V. Gelder, "Computer Algorithms," Addison W
- J.E Hopcroft, J.D Ullman, "Design and analysis of algorithms"
- D. E. Knuth, " The art of Computer Program

SYSTEM PROGRAMMING

Course Code: **BCS 605** **CreditUnits: 03**

Course learning outcomes (CLO)

At the successful completion of this course, the student should be able to:

CLO1. The student will know the Fundamentals of System Programming and able to understand about Machine instructions.

CLO2. The student will know the usage of Assemblers. And able to understand about compilers.

CLO3. The student has been able to understand how to link a program through linkers and how to load a program to loaders

CLO4. The student will learn about MS-Dos compiler as well as the debugging process.

CLO5. The student is aware about various types of operating systems.

Course Contents:

Module I: Introduction

Definition, Evolution, Components**,** Editors: Introduction to system Programming Line editor, Full screen editor and multi window editor. Case study MS-Word, DOS Editor and vi editor.

Module II: Assemblers

First pass and second pass of assembler and their algorithms. Assemblers for CISC Machines: case study x85 & x86 machines.

Module III: Compilers & Macro Processor

Introduction to various translators. Various phases of compiler. Bootstrapping for compilers, Introduction to. Design of a compiler in C++ as Prototype. Basic Macro Processor functions- Macro definition & expansion – Macro Processor Algorithm & Data Structures, conditional – Macro Expansion, Keyword Macro Parameters, Macro with in Macro Implementation, case study MASM and ANSI C Macro language.

Module IV: Debuggers, Loaders and Linkers

Introduction to various debugging techniques. Case study:- Debugging in Turbo C++ IDE. Linkers and Loaders Concept of linking. Case study of Linker in x86 machines. Loading of various loading schemes.

Module V: Operating System
Booting techniques and sub-routines. Design of kernel and various management for OS. Design of Shell and other utilities, (**Overview of Unix OS, Difference Between Unix and Linux, Commands in Unix.)-changes made**

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- Donovan J.J., Systems Programming, New York, Mc-Graw Hill, 1972.
- Dhamdhere, D.M., Introduction to Systems Software, Tata Mc-Graw Hill 1996.

References:

- Aho A.V. and J.D. Ullman Principles of compiler Design Addison Wesley/ Narosa 1985.

MICROPROCESSORS

Course Code: **BCS 604** **CreditUnits: 03**

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1) Obtain basic development skills for microprocessor / microcontroller applications.
2) They can Gain a detailed understanding of any system for a specific application.
3) Student are able to design a any hardware based on application.
4) To familiarize the Architecture of 8085 and 8086microprocessor.
5) To classify the types and characteristics of buses in microprocessor.
6) To analyze the features, addressing mode and programming of Intel 8085 and 8086microprocessor.

Course Contents:

Module I: Introduction to Microcomputer Systems
Introduction to Microprocessors and microcomputers, Study of 8 bit Microprocessor, 8085 pin configuration, Internal Architecture and operations,interrupts, Stacks and subroutines, various data transfer schemes.

Module II: ALP and timing diagrams

Introduction to 8085 instruction set, advance 8085 programming, Addressing modes, Counters and time Delays, Instruction cycle, machine cycle, T-states, timing diagram for 8085 instruction.

Module III: Memory System Design & I/O Interfacing

Interfacing with 8085.Interfacing with input/output devices (memory mapped, peripheral I/O), Cache memory system. Study of following peripheral devices 8255, 8253, 8257, 8255, 8251.

Module IV: Architecture of 16-Bit Microprocessor
Difference between 8085 and 8086, Block diagram and architecture of 8086 family, pin configuration of 8086, Minimum mode & Maximum mode Operation. Internal architecture of 8086, Bus Interface Unit, Register Organization, Instruction Pointer, Stack & Stack pointer, merits of memory segmentation, Execution Unit, Register Organization.

Module V: Pentium Processors
.Internal architecture of 8087, Operational overview of 8087, Introduction to 80186, 80286, 80386 & 80486 processors, Pentium processor.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:
- Ramesh. S. Gaonkar, "Microprocessor architecture Programming and Application with 8085" Penram International Publishing, 4th Edition
- B. Ram, "Fundamentals of microprocessors and microcomputer" Dhanpat Rai, 5th Edition.]
- Douglas V Hall.

References:
- M. Rafiquzzaman, "Microprocessor Theory and Application" PHI – 10th Indian Reprint.
- Naresh Grover, "Microprocessor comprehensive studies Architecture, Programming and Interfacing" Dhanpat Rai, 2003.
- Gosh," 0000 to 8085" PHI.

SOFTWARE TESTING AND QUALITY ASSURANCE LAB

Course Code: **BCS622** **CreditUnits: 01**

***Practical list for software testing and quality assurance**

List of experiments:

1. Write a test case to test login window using manual testing
2. Write a test case to test triangle using manual testing
3. Write a test case to test valid mobile no using manual testing
4. Write a test case to test ATM machine no using manual testing
5. Write the script to test the "save" functionality of notepad using rational robot
6. Write the script to test "find" functionality of notepad using rational robot
7. Write the script to test "replace" functionality of notepad using rational robot
8. Write the script to test "+" functionality of window calculator using rational robot
9. Write the script to test "*" functionality of window calculator using rational robot
10. Write the script to test "%" functionality of window calculator using rational robot
11. Write the script to test "/" functionality of window calculator using rational robot
12. Write the script to test login page of window using rational robot
13. Write the script to test Date field of window using rational robot
14. Write the script to test drop drown field of window using rational robot
15. Write the script to test hyperlink of web site using rational robot

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

MICROPROCESSOR LAB

Course Code: BCS 624 **CreditUnits: 01**

Course Contents:

1. To load the numbers 49H and 53H in the memory location 9510 and 9511
2. respectively and add the contents of memory location 9601
3. To write assembly language programming for 8 bit addition with and without carry.
4. To write assembly language programming for 8 bit subtraction with and without borrow.
5. To write assembly language programming for 8 bit multiplication and division.
6. To write assembly language programming for sorting an array of numbers in ascending and descending order.
7. To write assembly language programming with additional instructions.
8. To write and execute a program using stacks.
9. To study and program the programmable peripheral interface (8255) board.
10. To study and program the programmable interval timer (8253) board.
11. To study and program the programmable DMA controller (8257) board.
12. To study and program the programmable interrupt controller (8259) board.

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

Domain Elective-III : Choose any one from the following course

ADVANCED JAVA PROGRAMMING

Course Code: **BCS 606** **Credit Units: 03**

Course learning outcomes (CLO)

At the successful completion of this course you should be able to:

1. Define object oriented terminology and JAVA programming concepts
2. Illustrate the role of inheritance, packages and interface to solve programming problems
3. Apply RMI for networking
4. Apply the concept of JSP to work with web
5. Differentiate between C++ and java programming language
6. Create projects using JSP and database connectivity.

Course Contents:

Module I
Introduction to Java RMI, RMI services, RMI client, Running client and server, Introduction of Swing, Swing Components, Look and Feel for Swing Components, Introduction to Multimedia Programming.

Module II
ODBC and JDBC Drivers, Connecting to Database with the java.sql Package, Using JDBC Terminology; Evolving Nature of Area.

Module III
Introduction to Servlets, Servlet Life Cycle, Servlet based Applications, Servlet and HTML. JSP: Introduction to JSP, JSP implicit objects, JSP based Applications, Java. Net.

Module IV

Enterprise Java Beans:-EJB roles—EJB Client-Object -container-Transaction Management—implementing a Basic EJB Object-Implementing session Beans-Implementing Entity Beans-Deploying an enterprise Java Beans Object-Changes in EJB1.1 specification.

Module V
The Model-View-Controller Architecture What is Struts, Struts Tags, Creating Beans, Other Bean Tags, Bean Output, Creating HTML Forms, The Action Form class The Action class, Simple Struts: a simple Struts application

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- Java 2 Unleashed (Techmedia – SAMS), Jamie Jaworski
- Professional Java Server Programming (a Press), Allamaraju
- Developing Java Servlets (Techmedia – SAMS), James Goodwill sing Java 1.2 Special Edition (PHI), Webber

References:

- David Flanagan,Jim Parley, William Crawford & Kris Magnusson, Java Enterprise in a nutshell - A desktop Quick reference - O'REILLY, 2003
- Stephen Ausbury and Scott R. Weiner, Developing Java Enterprise Applications, Wiley-2001
- Jaison Hunder& William Crawford, Java Servlet Programming, O'REILLY, 2002
- Dietal and Deital, "JAVA 2" PEARSON publication

ADVANCED JAVA PROGRAMMING LAB

Course Code: BCS 626 **Credit Units: 01**

Programming Language: Java

1. WAP to display label on a frame with the help of JFrame
2. WAP to display six buttons on a panel using JFrame.
3. WAP. To display an image and a string in a label on the JFrame.
4. WAP that implement a JApplet that display a simple label
5. WAP that implement a JApplet and display the following frame
   a. Customer name
   b. Customer number
   c. Age
   d. Address
6. WAP to access a table Product Master from MS-Access using Java code.
7. WAP that implement a simple servlet program.
8. WAP for authentication, which validate the login-id and password by the servlet code.
9. WAP to connecting a database using user-id and password.
10. WAP to insert data into the database using the prepared statement.
11. WAP to read data from the database using the Resulset.
12. WAP to read data send by the client (HTML page) using servlet.
13. WAP to include a HTML page into a JSP page.
14. WAP to handle the JSPException.
15. WAP to read data send by a client (HTML page) using JSP.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	10	10	5	35	35

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

SOFTWARE PROJECT MANAGEMENT

Course Code: Bcs 607 **Credit Units: 04**

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Apply their knowledge of mathematics and computer science to the modelling, analysis, and measurement of software artefacts.
2. Analyse, specify and document software requirements for a software system.
3. Develop alternative design solutions to a given problem and recommend the best one within limitations of cost, time, knowledge, existing systems, and organizations.
4. Implement a given software design using development practices

Course Contents:

Module I: Introduction to Software Project Management
The nature of software production; Key objectives of effective management: quality, productivity, risk reduction; role of the software project manager.

Module II: Planning the Project
Business Planning: determining objectives, forecasting demand for product, proposal writing, requirement analysis, legal issues (patent, copyright, liability, warranty);

Module III: Technical planning
Life cycle models, types of plans, plan documentation methods: PERT and CPM, Gantt charts, work breakdown structures, standards,

Module IV: Planning for risk management and control
Entry and exit criteria, intermediate checkpoints, performance prediction and analysis people, prototyping and modeling, inspections and reviews, process and process assessment, development methods, metrics, configuration management, testing and quality assurance, capacity planning, estimating - what it takes to do the job: cost (direct and indirect), resources, time, size and complexity of product risk determination, role of requirements and design in estimating, financial planning-budgeting, resource allocation, organizational considerations (teams, hierarchies, etc), technology, human factors and usability, tools and environments, transition of product to the user.

Module V: Managing and Evaluating the Project
Managing the task: project control, managing the plan, reviews, feedback and reporting mechanisms, configuration management, quality control and quality assurance, managing change, readjusting goals and milestones, risk management, testing phases, formalized support activities; Managing the team: Team organizations, recruiting and staffing-picking the right people, technical leadership, avoiding obsolescence-training etc.; Managing the context: Communication skill, decision theory, business management, assessing the organization?s ability to perform the process, probability and statistics; Managing product support and

maintenance, Evaluation of the project.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- Tom Demarco, Controlling Software Project Management, Measurement, Prentice Hall, New Jersey.

References:

- Tom Glib, Finzi Susannah, Principles of Software Engineering Management, Addison Wesley, England.
- Bob Hughes and Mike Cotterell; Software Project Management, third edition, Tata McGraw Hill Publishing Company Ltd., New Delhi.
- Pankaj Jalote; Software Project Management in Practice, Pearson Education Asia.
- Watts S. Humphrey; Winning with Software? An Executive Strategy, Pearson Education Asia.
- Philip Metzger, Managing a Programming Project, Prentice Hall, New Jersey.

SOFTWARE PROJECT MANAGEMENT LAB

Course Code: Bcs 627 **Credit Units: 01**

Course Contents:

Implementation of software project management concepts using tools like MS Project, Rational Requisite Pro, Purify, etc., selected case studies.

Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	10	10	5	35	35

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

CLOUD COMPUTING

Course Code: **BCS 608** **CreditUnits: 03**

Course learning outcomes (CLO)

CLO1: Students will be able to identify the role of Cloud Computing. To understand the working of current cloud technology trends.

CLO2: Students will be able to analyse and understand cloud computing concepts and opportunities related with the cloud.

CLO3: Students will be able to describe the role of network-based systems, distributed and cloud computing and virtualization.

CLO4: Students will be able to understand description of virtual cluster-based systems and virtualization for data center automation.

CLO5: Students will be able to create cloud-based systems with MS-Azure, Amazon-AWS, Google-GCP and configure the virtualization over there.

Course Contents:

Module I: Systems Modeling, Clustering and virtualization:
Scalable Computing over the Internet, Technologies for Network based systems, System models for Distributed and Cloud Computing, Software environments for distributed systems and clouds, Performance, Security and Energy Efficiency

Module II: Virtual Machines and Virtualization of Clusters and Data Centers:
Implementation Levels of Virtualization, Virtualization Structures/ Tools and mechanisms, Virtualization of CPU, Memory and I/O Devices, Virtual Clusters and Resource Management, Virtualization for Data Center Automation.

Module III: Cloud Platform Architecture:
Cloud Computing and service Models, Architectural Design of Compute and Storage Clouds, Public Cloud Platforms, Inter Cloud Resource Management, Cloud Security and Trust Management. Service Oriented Architecture, Message Oriented Middleware.

Module IV: Cloud Programming and Software Environments:

Features of Cloud and Grid Platforms, Parallel & Distributed Programming Paradigms, Programming Support of Google App Engine, Programming on Amazon AWS and Microsoft Azure, Emerging Cloud Software Environments.

Module V: Cloud Resource Management and Scheduling:
Policies and Mechanisms for Resource Management Applications of Control Theory to Task Scheduling on a Cloud, Stability of a Two Level Resource Allocation Architecture, Feedback Control Based on Dynamic Thresholds. Coordination of Specialized Autonomic Performance Managers, Resource Bundling, Scheduling Algorithms for Computing Clouds, Fair Queuing, Start Time Fair Queuing, Borrowed Virtual Time, Cloud Scheduling Subject to Deadlines, Scheduling MapReduce Applications Subject to Deadlines.

Module VI: Storage Systems:
Evolution of storage technology, storage models, file systems and database, distributed file systems, general parallel file systems. Google file system., Apache Hadoop, BigTable, Megastore, Amazon Simple Storage Service(S3)

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- Distributed and Cloud Computing, Kai Hwang, Geoffry C. Fox, Jack J. DongarraMK Elsevier.
- Cloud Computing, Theory and Practice, Dan C Marinescu, MK Elsevier.
- Cloud Computing, A Hands on approach, ArshadeepBahga, Vijay Madisetti, University Press

References:

- Cloud Computing, A Practical Approach, Anthony T Velte, Toby J Velte, Robert Elsenpeter, TMH Mastering Cloud Computing, Foundations and Application Programming, Raj Kumar Buyya, Christenvecctiola, S Tammaraiselvi, TMH

COMMUNICATION SKILLS - IV

Course Code: BCS 601 **Credit Units: 01**

Course learning outcomes (CLO)

At the successful completion of this course the student should be able to:

1. Demonstrate professional attitude needed for interview preparedness, power dressing, and respectful self orientation.

2. Showcase their leadership skills with effective team work.

3. Outline the basic etiquettes in expressing their credentials for professional and HR setup

Course Contents:

Module I: Business/Technical Language Development
Advanced Grammar: Syntax, Tenses, Voices
Advanced Vocabulary skills: Jargons, Terminology, Colloquialism
Individualised pronunciation practice

Module II: Social Communication

Building relationships through Communication
Communication, Culture and Context
Entertainment and Communication
Informal business/ Technical Communication

Module III: Business Communication
Reading Business/ Technical press
Listening to Business/ Technical reports (TV, radio)
Researching for Business /Technology

Module IV: Presentations
Planning and getting started
Design and layoutof presentation
Information Packaging
Making the Presentation

Examination Scheme:

Components	CT1	CT2	CAF	V	GD	GP	A
Weightage (%)	20	20	25	10	10	10	5

CAF – Communication Assessment File
GD – Group Discussion
GP – Group Presentation

Text & References:

- Business Vocabulary in Use: Advanced Mascull, Cambridge
- Business Communication, Raman – Prakash, Oxford
- Business Communications, Rodgers, Cambridge
- Working in English, Jones, Cambridge
- New International Business English, Jones/Alexander, Cambridge

BEHAVIOURAL SCIENCE – VI
(STRESS AND COPING STRATEGIES)

Course Code: **BSS 604** **CreditUnits: 01**

Course learning outcomes (CLO)

At the successful completion of this course you (the student) would be able to:

1. Identify stress and that an individual come across.
2. Recognize the causes of stress in their lives.
3. Analyse symptoms and how they are affecting lives.
4. Create ways to effectively cope with it.

Course Contents:

Module I: Stress
Meaning & Nature
Characteristics
Types of stress
Module II: Stages and Models of Stress
Stages of stress
The physiology of stress
Stimulus-oriented approach.
Response-oriented approach.
The transactional and interact ional model.
Pressure – environment fit model of stress.
Module III: Causes and symptoms of stress
Personal
Organizational
Environmental
Module IV: Consequences of stress
Effect on behaviour and personality
Effect of stress on performance
Individual and Organizational consequences with special focus on health

Module V: Strategies for stress management
Importance of stress management
Healthy and Unhealthy strategies
Peer group and social support
Happiness and well-being

Module VI: End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

- Blonna, Richard; Coping with Stress in a Changing World: Second edition
- Pestonjee, D.M, Pareek, Udai, Agarwal Rita; Studies in Stress And its Management
- Pestonjee, D.M.; Stress and Coping: The Indian Experience
- Clegg, Brian; Instant Stress Management – Bring calm to your life now

FRENCH - VI

Course Code: **FLT 601** **Credit Units: 02**

Course learning outcomes (CLO)

At the successful completion of this course you should be able to:

1. **Identify and express in French vocabulary and grammar norms**
2. **Interpret different types of texts as well as cultural ideas and themes.**
3. **Demonstrate comprehension of nuance between script and sound in French**
4. **Narrate clearly ideas, themes in simple standard French**

Course Contents:

Module D: pp. 157 – 168 – Unité 12

Unité 12: s'évader

1. présenter, caractériser, définir
2. parler de livres, de lectures
3. préparer et organiser un voyage
4. exprimer des sentiments et des opinions
5. téléphoner
6. faire une réservation

Contenu grammatical:

1. proposition relative avec pronom relatif "qui", "que", "où" - pour caractériser
2. faire + verbe

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- le livre à suivre: Campus: Tome 1

GERMAN - VI

Course Code: FLG 601 **Credit Units: 02**

Course Learning outcomes

After successful completion of this semester, students will be able to:

- Express their likes and dislikes (buying groceries)
- Ask price and quantity
- express their likes and dislikes in terms of cloths
- buy clothes in the shopping mall

Course Contents:

Module I: Adjective endings
Adjective endings in all the four cases discussed so far
Definite and indefinite articles
Cases without article

Module II: Comparative adverbs
Comparative adverbs as and like

Module III: Compound words
To learn the structure of compound words and the correct article which they take
Exploring the possibility of compound words in German

Module IV: Infinitive sentence
Special usage of 'to' sentences called zu+ infinitive sentences

Module V: Texts
A Dialogue: 'Ein schwieriger Gast'
A text: 'Abgeschlossene Vergangenheit'

Module VI: Comprehension texts
Reading and comprehending various texts to consolidate the usage of the constructions learnt so far in this semester.

Module VII: Picture Description
Firstly recognize the persons or things in the picture and identify the situation depicted in the picture;
Secondly answer questions of general meaning in context to the picture and also talk about the personal experiences which come to your mind upon seeing the picture.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, TangramAktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

SPANISH – VI

Course Code: **FLS 601** **Credit Units: 02**

Course learning outcomes (CLO)

At the successful completion of this course you should be able to:

0. **Identify and express in Spanish vocabulary and grammar norms**
1. **Interpret different types of texts as well as cultural ideas and themes.**
2. **Demonstrate comprehension of nuance between script and sound in Spanish**
3. **Narrate clearly ideas, themes in simple standard Spanish**

Course Contents:

Module I
Revision of the earlier modules

Module II
Present Perfect Tense

Module III
Commands of irregular verbs

Module IV
Expressions with **Tener que** and **Hay que**

Module V
En la embajada
Emergency situations like fire, illness, accident, theft

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español, EnDirecto I A
- Español Sin Fronteras

CHINESE – VI

Course Code: **FLC 601** **Credit Units: 02**

Course learning outcomes (CLO)

At the successful completion of this course you should be able to:
At the successful completion of this course, you will be able to:

1. Read, write and speak approx. 100 New Chinese words and understand basic grammar points.
2. Interpret words, phrases and sentences of day today conversation related to colour, shopping,

transportation, medical care, Sports and entertainment etc
3. Write Chinese characters, simple sentence and a paragraph on simple topic like colour, shopping,

transportation, medical care, Sports and entertainment etc.

4. **Communicate** with Chinese speaking people using words, phrases and sentences related to colour, shopping, transportation, medical care, Sports and entertainment etc

Course Contents:

Module I
Drills
Dialogue practice
Observe picture and answer the question.
Pronunciation and intonation.
Character writing and stroke order.

Module II
Going out to see a science exhibition
Going to the theatre.
Train or Plane is behind schedule.
Indian Economy-Chinese Economy
Talking about different Seasons of the Year and Weather conditions. Learning to say phrases like-spring, summer, fall, winter, fairly hot, very cold, very humid, very stuffy, neither hot nor cold, most comfortable, pleasant …. etc.

Module III
Temperature – how to say – What is the temperature in May here?How is the weather in summer in your area?
Around 30 degrees
Heating, air-conditioning
Is winter is Shanghai very cold?
Talking about birthdays and where you were born?
The verb "shuo" (speak) saying useful phrases like speak very well, do not speak very well, if speak slowly then understand if speak fast then don't understand, difficult to speak, difficult to write, speak too fast, speak too slow, listen and can understand, listen and cannot understand … etc.
Tell the following in Chinese – My name is …. I was born in … (year). My birthday is …… Today is … (date and day of the week). I go to work (school) everyday. I usually leave home at . (O'clock). In the evening, I usually ……. (do what)? At week end, I ……. On Sundays I usually …… It is today….. It will soon be my younger sisters birthday. She was born in ….. (year). She lives in ……. (where). She is working (or studying)…… where… She lives in …….. (where.)

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Elementary Chinese Reader Part-2, 3; Lesson 47-54

ARTIFICIAL INTELLIGENCE

Course Code: **BCS 702** **CreditUnits: 03**

Course learning outcomes (CLO)

CLO1: To learn the Problem solving and Scope of AI
CLO 2: Explain Knowledge Representation & Natural Languages CLO 3: To impart the knowledge of Expert System & Robotics

Course Contents:

Module I: Problem solving and Scope of AI
Introduction to Artificial Intelligence. Applications- Games, theorem proving, natural language processing, vision and speech processing, robotics, expert systems. AI techniques- search knowledge, abstraction.
Problem Solving
State space search; Production systems, search space control: depth-first, breadth-first search. Heuristic search - Hill climbing, best-first search, branch and bound. Problem Reduction, Constraint Satisfaction End, Means-End Analysis.

Module II: Knowledge Representation
Knowledge Representation issues, first order predicate calculus, Horn Clauses, Resolution, Semantic Nets, Frames, Partitioned Nets, Procedural Vs Declarative knowledge, Forward Vs Backward Reasoning.

Module III: Understanding Natural Languages
Introduction to NLP, Basics of Syntactic Processing, Basics of Semantic Analysis, Basics of Parsing techniques, context free and transformational grammars, transition nets, augmented transition nets, Shanks Conceptual Dependency, Scripts, Basics of grammar free analyzers, Basics of sentence generation, and Basics of translation.

Module IV
Expert System: Need and justification for expert systems, knowledge acquisition, Case studies: MYCIN, RI.
Learning: Concept of learning, learning automation, genetic algorithm, learning by inductions, neural nets.
Programming Language: Introduction to programming Language, LISP and PROLOG.
Handling Uncertainties: Non-monotonic reasoning, Probabilistic reasoning, use of certainty factors, Fuzzy logic.

Module V: Introduction to Robotics
Fundamentals of Robotics, Robot Kinematics: Position Analysis, Dynamic Analysis and Forces, Trajectory Planning, Sensors and vision system.
Robot Programming languages & systems: Introduction, the three levels of robot programming, requirements of a robot programming language, problems peculiar to robot programming languages.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- E. Rich and K. Knight, "Artificial intelligence", TMH, 2nd ed., 1992.
- N.J. Nilsson, "Principles of AI", Narosa Publ. House, 1990.
- John J. Craig, "Introduction to Robotics", Addison Wesley publication
- Richard D. Klafter, Thomas A. Chmielewski, Michael Negin, "Robotic Engineering – An integrated approach", PHI Publication
- Tsuneo Yoshikawa, "Foundations of Robotics", PHI Publication

References:

- D.W. Patterson, “Introduction to AI and Expert Systems”, PHI, 1992.
- Peter Jackson, “Introduction to Expert Systems”, AWP, M.A., 1992.
- R.J. Schalkoff, “Artificial Intelligence - an Engineering Approach”, McGraw Hill Int. Ed., Singapore, 1992.
- M. Sasikumar, S. Ramani, “Rule Based Expert Systems”, Narosa Publishing House, 1994.

INFORMATION STORAGE AND MANAGEMENT

Course Code: **BCS 703** **Credit Units: 03**

Course learning outcomes (CLO)

At the end of this course the students will be able to

1. Describe the challenges found in today's complex information management environment

2.
Describe storage technology solutions (such as DAS, NAS, SAN and Virtualization technologies)

3. Explain the key business drivers for storage: Information Availability and Business Continuity

4. Illustrate common storage management roles and responsibilities

5. Describe the processes and technologies for identifying, analyzing security risks in storage infrastructure

Course Contents:

Module I: Introduction to Storage Technology
Data proliferation and the varying value of data with time & usage, Sources of data and states of data creation, Data center requirements and evolution to accommodate storage needs
Overview of basic storage management skills and activities, The five pillars of technology, Overview of storage infrastructure components, Evolution of storage, Information Lifecycle Management concept, Data categorization within an enterprise, Storage and Regulations

Module II: Storage Systems Architecture
Intelligent disk subsystems overview, Contrast of integrated vs. modular arrays, Component architecture of intelligent disk subsystems, Disk physical structure- components, properties, performance, and specifications, Logical partitioning of disks, RAID & parity algorithms, hot sparing, Physical vs. logical disk organization, protection, and back end management, Array caching properties and algorithms, Front end connectivity and queuing properties, Front end to host storage provisioning, mapping, and operation, Interaction of file systems with storage, Storage system connectivity protocols

Module III: Introduction to Networked Storage
JBOD, DAS, SAN, NAS, & CAS evolution, Direct Attached Storage (DAS) environments: elements, connectivity, & management
Storage Area Networks (SAN): elements & connectivity, Fibre Channel principales, standards, & network management principles, SAN management principles
Network Attached Storage (NAS): elements, connectivity options, connectivity protocols (NFS, CIFS, ftp), & management principles, IP SAN elements, standards (iSCSI, FCIP, iFCP), connectivity principles, security, and management principles,
Content Addressable Storage (CAS): elements, connectivity options, standards, and management principles, Hybrid Storage solutions overview including technologies like virtualization & appliances.

Module IV: Introduction to Information Availability
Business Continuity and Disaster Recovery Basics, Local business continuity techniques, Remote business continuity techniques, Disaster Recovery principles & techniques

Module V: Managing & Monitoring
Management philosophies (holistic vs. system & component), Industry management standards (SNMP, SMI-S, CIM), Standard framework applications, Key management metrics (thresholds, availability, capacity, security, performance), Metric analysis methodologies & trend analysis, Reactive and pro-active management best

practices, Provisioning & configuration change planning, Problem reporting, prioritization, and handling techniques, Management tools overview

Module VI: Security & Virtualization
Storage Security (Importance of Information security, elements and attributes of security), Developing a storage security model (Restricting Access Path, Vulnerability Management, Understanding Vulnerabilities), Securing Data Storage (Storage Security domains, Risk assessment Methodology, Security elements, threats against applications, Controlling user access to data, threats again backup, recovery and archive)
Virtualization (Define virtualization, types of virtualization), Storage Virtualization (Storage functionality, Virtual storage, Comparison of virtualization architectures, challenges of storage virtualization), Block level virtualization, File level virtualization.

Case Studies and Labs on the Simulator

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:
- Information Storage and Management, Wiley Publication ISBN: 978-81-265-2147-0

References:
- Marc Farley Osborne, "Building Storage Networks", Tata McGraw Hill
- Robert Spalding, "Storage Networks: The Complete Reference", Tata McGraw Hill

ARTIFICIAL INTELLIGENCE LAB

Course Code: BCS 721 **CreditUnits: 01**

Course Contents:

Assignments will be provided for the following:

- Programming in LISP
- Programming in Prolog
- Programming for Robotics

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

Internship – II (Evaluation)

Course Code: BCS 750 **CreditUnits: 04**

Course Objective:

The objective of this course is to provide practical training on some live projects that will increase capability to work on actual problem in industry. This training may undergo in an industrial environment or may be an in house training on some latest software which is in high demand in market. This training will be designed such that it will useful for their future employment in industry.

Examination Scheme:

Feedback from industry/work place	20
Training Report	40
Viva	15
Presentation	25
Total	**100**

Domain Elective-V : Choose any ONE from the following courses along with their corresponding labs

COMPILER CONSTRUCTION

Course Code: **BCS 704** **CreditUnits: 03**

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Describe the theory and practices involved in compilation process, in particular, the lexical analysis, parsing code generation and optimization phases of compilation.
2. Understand the issues related to the designing of a compiler for a programming language.
3. To study the implementation of various compiler design issues by undertaking various case studies.

Course Contents:

Module I: Introduction
Definition, functions of Compiler in Linux / Unix / TC etc environments, other associated terms e.g. Text formatter, Text Editors, Phases and Passes, FSM & RE's and their application to Lexical Analysis, Implementation of Lexical Analyzers, Lexical- Analyzer Generator, Lex – Compiler including case study, Formal Grammar and their application to Syntax Analysis, BNF Notation, YACC including case study. The Syntactic specification of Languages: CFG, Derivation and Parse Trees, Capabilities of CFG.

Module II: Basic Parsing Techniques
Parsers, Shift Reduce Parsing, Operator precedence parsing, topdown Parsing, Predictive Parsers.

Module III: Automatic Construction of efficient Parsers
LR Parsers, the canonical collection of LR(0) items, constructing SLR Parsing Tables, Constructing canonical LR Parsing tables and LALR parsing tables, An Automatic Parser Generator, Implementation of LR parsing
Tables, Constructing LALR sets of items.

Module IV: Syntax Directed Translation
Syntax directed Translation Schemes, Implementation of Syntax directed translators, Intermediate Code, Postfix notation, Parse Trees and Syntax Trees, Three address Code, Quadruple & Triples, Translation of Assignment Statements, Boolean expressions, Control Statements, Postfix Translation, Translation with a Top Down Parser, Array references in Arithmetic expressions, Procedure Calls, Declarations and Case statements Translations.
Symbol Tables
Data Structure for Symbol Tables, representing scope information. Run Time Administration: Implementation of simple Stack allocation scheme, storage allocation in block structured language.

Module V: Error detection and Recovery
Lexical phase errors, syntax phase errors, semantic errors Code Optimization: Loop optimization, the DAG representation of basic blocks, value numbers and Algebraic Laws, Global Data – Flow Analysis.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- Alfread V. Aho, Ravi Sethi & J.D. Ullman, "Compiler Design", Addison Wesley
- Ullman, Principles of Compiler Design, Narosa publications.

References:

- D.M. Dhamdhere, "Compiler Construction – Principles & Practice", Macmillan India Ltd.
- Holub, "Compiler Design in C", PHI.
- Tremblay K.P & Sorenson P.G., "The Theory and practice of Compiler writing" McGraw Hill
- Waite W.N. and Goos G., "Compiler Construction" Springer Verlag.

COMPILER CONSTRUCTION LAB

Course Code: BCS 723 **CreditUnits: 01**

Programming Language: C/C++

List of Programs:

1. WAP to check whether string is accepted or not for entered grammar.
2. WAP to convert Infix to Postfix notation.
3. WAP to convert Infix to Prefix notation.
4. WAP to find no of Tokens in an expression.
5. WAP to convert Regular Expression to NFA.
6. WAP to convert NFA to DFA.
7. WAP to calculate LEADING and TRAILING of a grammar.
8. WAP calculate FIRST and FOLLOW of a grammar.
9. WAP to implement shift reduce parser.
10. WAP to implement top down parser.

Examination Scheme:

IA				EE		
A	Practical (Mid-Term)	PR	V	LR	PR (End Term)	V
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

PROGRAMMING WITH ASP .NET

Course Code: **BCS 705** **CreditUnits: 03**

Course learning outcomes (CLO)

At the successful completion of this course you should be able to:

1. Define object oriented terminology and C# programming concepts
2. Illustrate the role of inheritance, packages and interface to solve programming problems
3. Apply Exception handling for avoiding the run time errors
4. Apply the concept of multithreading to increase the execution speed of an application
5. Differentiate between C# and java programming language
6. Create projects using ASP.NET programming.

Course Contents:

Module I: Introduction to .NET technologies
Features of .NET, .NET Framework, CLR, MSIL, .NET class library, .NET Languages, CTS, assemblies, manifest, and metadata, What is ASP.NET?, Difference between ASP and ASP.NET.

Module II: Controls in ASP.NET
Overview of Dynamic Web page, Understanding ASP.NET Controls, Applications, Web servers, Installation of IIS. Web forms, web form controls -server controls, client controls. Adding controls to a web form, Buttons, Text Box, Labels, Checkbox, Radio Buttons, List Box. Adding controls at runtime. Running a web Application, creating a multiform web project. Form Validation: Client side validation, server Side validation, validation Controls: Required Field Comparison Range. Calendarcontrol, Ad rotator Control, Internet Explorer Control.

Module III: Overview of ADO.NET and XML
What is ADO.NET, from ADO to ADO.NET. ADO.NET architecture, Accessing Data using Data Adapters and Datasets, using Command & Data Reader, binding data to data bind Controls, displaying data in data grid, XML basics, attributes, fundamental XML classes: Document, text writer, text reader. XML validations, XML in ADO.NET, The XML Data Document.

Module IV: ASP.NET Applications
Creating, tracking, caching, error handling, Securing ASP.NET applications- form based applications, window based application.

Module V: Web services
Introduction, State management- View state, Session state, Application state, Building ASP.NET web services, working with ASP.NET applications, creating custom controls.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- ASP.NET Unleashed by Stephen Walther, SAMS publications

References:

- ASP.NET, Wrox Publications
- ASP.NET and VB.NET, Wrox Publication
- ASP.NET and C#.NET, Wrox publication.

PROGRAMMING WITH ASP.NET LAB

Course Code: BCS 725 **Credit Units: 01**

Course Contents:

- Use of Controls in creating web pages
- Creating sessions
- Creating Custom controls
- Implementing security

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

MOBILE COMPUTING

Course Code: **BCS 706** **Credit Units: 04**

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:
1. Investigate various advanced wireless protocols for mobile communication. 2. Compare working of wired network and wireless networks.
3. Develop networking techniques to solve complex problems.
4. Create and maintain network used in wireless condition.

Course Contents:

Module I:Introduction to Personal Communications Services (PCS)
PCS Architecture, Mobility management, Networks signaling.
Global System for Mobile Communication (GSM) system overview: GSM Architecture, Mobility management, Network signaling.

Module II: General Packet Radio Services (GPRS) &Wireless Application Protocol (WAP)
GPRS Architecture, GPRS Network Nodes.
Mobile Data Communication: WLANs (Wireless LANs) IEEE 802.11 standard, Mobile IP.
Wireless Application Protocol (WAP): The Mobile Internet standard, WAP Gateway and Protocols, wireless mark up Languages (WML).

Module III:Third Generation (3G) Mobile Services
Introduction to International Mobile Telecommunications 2000 (IMT 2000) vision, Wideband Code Division Multiple Access (W-CDMA), and CDMA 2000, Quality of services in 3G.
Wireless Local Loop(WLL): Introduction to WLL Architecture, wireless Local Loop Technologies.

Module IV: Global Mobile Satellite Systems
Global Mobile Satellite Systems; case studies of the IRIDIUM and GLOBALSTAR systems.
Wireless

Module V:Enterprise Networks
Introduction to Virtual Networks, Blue tooth technology, Blue tooth Protocols. Advanced techniques in mobile computing.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- "Wireless and Mobile Networks Architectures", by Yi-Bing Lin &ImrichChlamtac, John Wiley & Sons, 2001.
- "Mobile and Personal Communication systems and services", by Raj Pandya, Prentice Hall of India, 2001.

References:

- "Guide to Designing and Implementing wireless LANs", by Mark Ciampa, Thomson learning, Vikas Publishing House, 2001.
- "Wireless Web Development", Ray Rischpater, Springer Publishing, 2000.

- “The Wireless Application Protocol”, by Sandeep Singhal, Pearson Education Asia, 2000.
- “Third Generation Mobile Telecommunication systems”, by P.Stavronlakis, Springer Publishers, 2001.

DATA WAREHOUSING AND DATA MINING

Course Code: **BCS 707** **Credit Units: 03**

Course learning outcomes (CLO)

1. Understand what data mining is and how data mining can be employed and applied to solve real problems.
2. Recognize wither a data mining solution is feasible alternative for a specific problem.
3. Apply basic statistical to evaluate the results of data mining models.
4. Develop a comprehensive understanding of how several data mining techniques can be applied to solve problems.

Course Contents:

Module I: Data Warehousing
An Introduction to data ware housing and characteristics of a data warehouse, various aspects of data marts. Data warehouse logical design: star schemas, fact tables, dimensions, other schemas, materialized, views, Data warehouse physical design: hardware and i/o considerations, parallelism, indexes.

Module II: On Line Analytical processing
OLTP and OLAP systems, Data Modelling, OLAP Tools, web OLAP, Decision support system.Developing a Data Ware house: Architectural strategies and Organization Issues, Design Considerations, Tools for Data Warehousing,

Module III: Data Mining
Data mining approaches and methods: concept description, classification, association rules, clustering, Mining complex types of data, Research trends in data warehousing and data mining. Objectives of Data Mining the Technical context for Data Mining, machine learning, decision support and computer technology.

Module IV: Data Mining Techniques and Algorithms
Process of data mining, Algorithms, Data base segmentation or clustering, predictive Modelling, Link Analysis, Data Mining Techniques, Automatic Cluster Detection, Decision trees and Neural Networks.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- "Mastering Data Mining: The Art and Science of Customer Relationship Management", by Berry and Lin off, John Wiley and Sons, 2001.
- "Data Ware housing: Concepts, Techniques, Products and Applications", by C.S.R. Prabhu, Prentice Hall of India, 2001.

References:

- "Data Mining: Concepts and Techniques", J.Han, M.Kamber, Academic Press, Morgan Kanf man Publishers, 2001.
- "Data Mining", by Pieter Adrians, DolfZantinge, Addison Wesley,2000.
- "Data Mining with Microsoft SQL Server", by Seidman, Prentice Hall of India,2001.

DATA WAREHOUSING AND DATA MINING LAB

Course Code: BCS 727 **CreditUnits: 01**

Course Contents:

Software Required: Informatica Tool, Cognos, Todd.

Assignments:

1. Write a program to implement text mining.
2. Write a program to implement web mining.
3. Write a program to develop snowflake schema.
4. Write a program to develop the tree schema with the help of binary tree.
5. Write a program to implement BFS and DFS with respect to 2-D modeling.
6. Write a program to implement the basic step of informatics tool.
7. Write a Program to implement the K-means algorithm
8. Write a Program to implement PAM K-medoids algorithm
9. Write a Program to implement AGNES hierarchical clustering
10. Do the compare between K-Means, K-Medoid, hierarchical clustering Results

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

COMMUNICATION SKILLS - V

Course Code: **BCS 701** **Credit Units: 01**

Course learning outcomes (CLO)

At the successful completion of this course students should be able to:

1. Investigate their personal strengths and insights to be revealed in a Formal Setup of Communication.
2. Create right selection of words and ideas while choosing the appropriate channel of formal communication
3. Apply acquired knowledge with the appropriate selection of channel of formal communication.
4. Develop and empower self with the ease of using appropriate medium of communication.

Course Contents:

Module I
Introduction to Public Speaking
Business Conversation
Effective Public Speaking
Art of Persuasion

Module II: Speaking for Employment
Types of Interview
Styles of Interview
Facing Interviews-Fundamentals and Practice Session
Conducting Interviews- Fundamentals and Practice Session
Question Answer on Various Dimensions

Module III
Resume Writing
Covering Letters
Interview Follow Up Letters

Module IV: Basic Telephony Skills
Guidelines for Making a Call
Guidelines for Answering a Call

Module V: Work Place Speaking
Negotiations
Participation in Meetings
Keynote Speeches

Examination Scheme:

Components	CT1	CT2	CAF	V	GD	GP	A
Weightage (%)	20	20	25	10	10	10	5

CAF – Communication Assessment File
GD – Group Discussion
GP – Group Presentation

Text & References:

- Jermy Comfort, Speaking Effectively, et.al, Cambridge
- Krishnaswamy, N, Creative English for Communication, Macmillan
- Raman Prakash, Business Communication, Oxford.
- Taylor, Conversation in Practice,

BEHAVIOURAL SCIENCE - VII
(INDIVIDUAL, SOCIETY AND NATION)

Course Code: **BSS 704** **Credit Units: 01**

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Recognize their personality and individual differences and identify its importance of diversity at workplace and ways to enhance it.
2. Recognize effective socialization strategies and importance of patriotism and taking accountability of integrity.
3. Recognize different types of human rights and its importance.
4. Identify Indian values taught by different religions.
5. Identify long term goals and recognize their talent, strengths and styles to achieve them.

Course Contents:

Module I: Individual differences& Personality

Personality: Definition& Relevance
Importance of nature & nurture in Personality Development
Importance and Recognition of Individual differences in Personality
Accepting and Managing Individual differences (adjustment mechanisms)
Intuition, Jugement, Perception & Sensation (MBTI)
BIG5 Factors

Module II: Managing Diversity
Defining Diversity
Affirmation Action and Managing Diversity
Increasing Diversity in Work Force
Barriers and Challenges in Managing Diversity

Module III: Socialization

Nature of Socialization
Social Interaction
Interaction of Socialization Process
Contributions to Society and Nation

Module IV: Patriotism and National Pride
Sense of pride and patriotism
Importance of discipline and hard work
Integrity and accountability

Module V: Human Rights, Values and Ethics
Meaning and Importance of human rights
Human rights awareness
Values and Ethics- Learning based on project work on Scriptures like- Ramayana, Mahabharata, Gita etc.

Module VI: End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

Davis, K. Organizational Behaviour,
Bates, A. P. and Julian, J.: Sociology - Understanding Social Behaviour
Dressler, David and Cans, Donald: The Study of Human Interaction
Lapiere, Richard. T – Social Change
Lindzey, G. and Borgatta, E: Sociometric Measurement in the Handbook of Social Psychology, Addison – Welsley, US.Rose, G.: Oxford Textbook of Public Health, Vol.4, 1985.
Robbins O.B. Stephen; OrganizationalBehaviour

FRENCH - VII

Course Code: **FLT 701** **CreditUnits: 02**

Course learning outcomes (CLO)

At the successful completion of this course the students would be able to:

Perform communicative tasks (oral and written) like:

1. Identify and express in French vocabulary and grammar norms
2. Interpret different types of texts as well as cultural ideas and themes.
3. Demonstrate comprehension of nuance between script and sound in French 4. Narrate clearly ideas, themes in simple standard French

Course Contents:

Module A: Unités 1 – 3: pp. 06 - 46

Contenu lexical :

Unité 1: Rédiger et présenter son curriculum vitae
Exprimer une opinion
Caractériser, mettre en valeur
Parler des rencontres, des lieux, des gens

Unité 2: Imaginer - Faire des projets
Proposer - conseiller
Parler des qualités et des défauts
Faire une demande écrite
Raconter une anecdote
Améliorer son image

Unité 3: Exprimer la volonté et l'obligation
Formuler des souhaits
Exprimer un manque/un besoin
Parler de l'environnement, des animaux, des catastrophes naturelles

Contenu grammatical :

Le passé : passé composé/imparfait
Pronoms compléments directs/indirects, y/en (idées/choses)
Propositons relatives introduites par qui, que, où
Comparatif et superlatif
Le conditionnel présent
Situer dans le temps
Féminin des adjectifs
La prise de paroles : expressions
Le subjonctif : volonté, obligation

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- **le livre à suivre: Campus: Tome 2**

GERMAN - VII

Course Code: **FLG 701** **Credit Units: 02**

Course learning outcomes (CLO)

After successful completion of the course, the students will be able to perform orally and in writing certain social functions:

- Talk and acquire information about their vacations and holidaying.
- Talk and acquire information about Weather and climat
- Talk and acquire information about the body parts
- Talk and discuss about diseases and health

Course Contents:

Module I: Dass- Sätze
Explain the use of the conjunction "-that", where verb comes at the end of the sentence

Module II: IndirekteFragesätze
To explain the usage of the "Question Pronoun" as the Relative Pronoun in a Relative Sentence, where again the verb falls in the last place in that sentence.

Module III: Wenn- Sätze
Equivalent to the conditional "If-" sentence in English. Explain that the verb comes at the end of the sentence.

Module IV: Weil- Sätze
Explain the use of the conjunction "because-" and also tell that the verb falls in the last place in the sentence.

Module V: Comprehension texts
Reading and comprehending various texts to consolidate the usage of the constructions learnt so far in this semester.

Module VI: Picture Description
Firstly recognize the persons or things in the picture and identify the situation depicted in the picture;
Secondly answer questions of general meaning in context to the picture and also talk about the personal experiences which come to your mind upon seeing the picture.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, TangramAktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

SPANISH - VII

Course Code: **FLS 701** **Credit Units: 02**

Learning Outcomes:

After successful completion of the course, students will be able to perform orally and in writing certain social functions:

Students will be able to perform communicative tasks (oral and written) with proficiencies in,

- Complementos directos e indirectos (Direct & Indirect Object Pronun)
- Estructuras comparativas (Comparative Structures)
- Preterito perfecto (Past Perefect)
- Imperativos (Imperative)
- Advertisements (Advertisements)
- Pasado Indefinido (Past Indefinite)

Course Contents:

Module I
Revision of earlier semester modules

Module II
Zodiac signs. More adjectives…to describe situations, state of minds, surroundings, people and places.

Module III
Various expressions used on telephonic conversation (formal and informal)

Module IV
Being able to read newspaper headlines and extracts (Material to be provided by teacher)

Module V
Negative commands (AR ending verbs)

Module VI
Revision of earlier sessions and introduction to negative ER ending commands, introduction to negative IR ending verbs

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- EspañolEnDirecto I A, 1B
- Español Sin Fronteras
- Material provided by the teacher from various sources

CHINESE – VII

Course Code: FLC 701 **CreditUnits: 02**

Course Objective:

The story of Cinderella first appears in a Chinese book written between 850 and 860 A.D. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I
Drills
Dialogue practice
Observe picture and answer the question.
About china part –I Lesson 1,2.

Module II
Pronunciation and intonation
Character Writing and stroke order.

Module III
Ask someone what he/she usually does on weekends?
Visiting people, Party, Meeting, After work….etc.

Module IV
Conversation practice
Translation from English to Chinese and vise-versa.
Short fables.

Module V
A brief summary of grammar.
The optative verb "yuanyi".
The pronoun "ziji".

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- "Kan tushuohua" Part-I Lesson 1-7

DIGITAL IMAGE PROCESSING

Course Code: **BCS 803** **CreditUnits: 03**

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:
1. Investigate the fundamental concepts of a digital image processing system.
2. Create the spatial domain and frequency domain image enhancement techniques.
3. Apply which tools of image processing should be applied in order to solve the real problems.

4. Develop Matlab algorithms for digital image processing operations such as histogram equalization, image enhancement, image restoration, image analysis, image compression, morphology, representation and description, filtering and denoising.

Course Contents:

Module I: Introduction and Digital Image Fundamentals
The origins of Digital Image Processing, Examples of Fields that Use Digital Image Processing, Fundamentals Steps in Image Processing, Elements of Digital Image Processing Systems, Image Sampling and Quantization, Some basic relationships like Neighbours, Connectivity, Distance Measures between pixels, Linear and Non Linear Operations.

Module II: Image Enhancement in the Spatial Domain
Some basic Gray Level Transformations, Histogram Processing, Enhancement Using Arithmetic and Logic operations, Basics of Spatial Filters, Smoothening and Sharpening Spatial Filters, Combining Spatial Enhancement Methods.

Module III: Image Enhancement in the Frequency Domain:
Introduction to Fourier Transform and the frequency Domain, Smoothing and Sharpening Frequency Domain Filters, Homomorphic Filtering.
Image Restoration
A model of The Image Degradation / Restoration Process, Noise Models, Restoration in the presence of Noise Only Spatial Filtering, Pereodic Noise Reduction by Frequency Domain Filtering, Linear Position-InvarientDedradations, Estimation of Degradation Function, Inverse filtering, Wiener filtering, Constrained Least Square Filtering, Geometric Mean Filter, Geometric Transformations.

Module IV: Image Compression
Coding, Interpixel and Psychovisual Redundancy, Image Compression models, Elements of Information Theory, Error free comparison, Lossy compression, Image compression standards.**Image Segmentation:** Detection of Discontinuities, Edge linking and boundary detection, Threshold, Region Oriented Segmentation, Motion based segmentation.

Module V: Representation and Description
Representation, Boundary Descriptors, Regional Descriptors, Use of Principal Components for Description, Introduction to Morphology, Some basic Morphological Algorithms.
Object Recognition
Patterns and Pattern Classes, Decision-Theoretic Methods, Structural Methods.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:
- Rafael C. Conzalez& Richard E. Woods, "Digital Image Processing", 2nd edition, Pearson Education.
- A. K. Jain, "Fundamental of Digital Image Processing", PHI.

References:
- RosefieldKak, "Digital Picture Processing",

- W.K. Pratt, “Digital Image Processing”,

CRYPTOGRAPHY AND NETWORK SECURITY

Course Code: **BCS 802** **CreditUnits: 03**
s

Course learning outcomes (CLO)

CLO1: Students will be able to understand the concept of different cryptography techniques transposition and substitution methods.

CLO2: Students will be able to analyse the DES, IDEA, Feistel Cipher cryptographic algorithm.

CLO3: Students will be able to Understand and analyse public key Cryptosystem using RSA and learn various techniques used for the distribution of key in public key cryptosystem.

CLO4: Students will be able to apply and evaluate Message authentication and hash function using MD5 and SHA and learn the concept of digital signature.

CLO5: Students will be able to understand the concept of IP security and password message protocols.

Course Contents:

Module I
Codes and Ciphers – Some Classifical systems – Statistical theory of cipher systems-Complexity theory of crypto systems – Stream ciphers, Block ciphers.
Stream Ciphers: Rotor based system – shift register based systems – Design considerations for stream ciphers – Cryptanalysis of stream ciphers – Combined encryption and encoding.
Block Ciphers – DES and variant, modes of use of DES.

Module II
Public key systems – Knacksack systems – RSK – Diffie Hellman Exchange – Authentication and Digital signatures, Elliptic curve based systems.

Module III
Network Security: Hash function – Authentication:
Protocols – Digital Signature standards.
Electronics Mail Security – PGP (Pretty Good Privacy) MIME, data Compression technique.

Module IV
IP Security: Architecture, Authentication Leader, Encapsulating security Payload – Key Management.
Web security: Secure Socket Layer & Transport Layer security, Secure electronics transactions, Firewalls Design principle, established systems.

Module V
Telecommunication Network architecture, TMN management layers, Management information Model, Management servicing and functions, Structure of management information and TMN information model.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

- William Stallings" Cryptography and Network Security: Principles and Practices" PHI
- "Applied Cryptography", Bruce Schiener

DIGITAL IMAGE PROCESSING LAB

Course Code: **BCS 822** **Credit Units: 01**

Software Required: Java

List of Assignements:

Experiments will be based on Image Representation, Image transformation, Image Enhancements, Edge Detection, Morphological Image processing and Segmentation.

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

PROJECT

Course Code: **BCS 860** **CreditUnits: 15**

GUIDELINES FOR PROJECT FILE

Research experience is as close to a professional problem-solving activity as anything in the curriculum. It provides exposure to research methodology and an opportunity to work closely with a faculty guide. It usually requires the use of advanced concepts, a variety of experimental techniques, and state-of-the-art instrumentation. Research is genuine exploration of the unknown that leads to new knowledge which often warrants publication. But whether or not the results of a research project are publishable, the project should be communicated in the form of a research report written by the student.

Sufficient time should be allowed for satisfactory completion of reports, taking into account that initial drafts should be critiqued by the faculty guide and corrected by the student at each stage.

The File is the principal means by which the work carried out will be assessed and therefore great care should be taken in its preparation.

In general, the File should be comprehensive and include

A short account of the activities that were undertaken as part of the project;

A statement about the extent to which the project has achieved its stated goals.

A statement about the outcomes of the evaluation and dissemination processes engaged in as part of the project;

Any activities planned but not yet completed as part of the project, or as a future initiative directly resulting from the project;

Any problems that have arisen that may be useful to document for future reference.

- Report Layout

The report should contain the following components:

- **Title or Cover Page**

The title page should contain the following information: Project Title; Student's Name; Course; Year; Supervisor's Name.

- **Acknowledgements** (optional)

Acknowledgment to any advisory or financial assistance received in the course of work may be given.

- **Abstract**

A good"Abstract" should be straight to the point; not too descriptive but fully informative. First paragraph should state what was accomplished with regard to the objectives. The abstract does not have to be an entire summary of the project, but rather a concise summary of the scope and results of the project

- **Table of Contents**

Titles and subtitles are to correspond exactly with those in the text.

- **Introduction**

Here a brief introduction to the problem that is central to the project and an outline of the structure of the rest of the report should be provided. The introduction should aim to catch the imagination of the reader, so excessive details should be avoided.

- **Materials and Methods**

This section should aim at experimental designs, materials used. Methodology should be mentioned in details including modifications if any.

- **Results and Discussion**

Present results, discuss and compare these with those from other workers, etc. In writing these section, emphasis should be given on what has been performed and achieved in the course of the work, rather than discuss in detail what is readily available in text books. Avoid abrupt changes in contents from section to section and maintain a lucid flow throughout the thesis. An opening and closing paragraph in every chapter could be included to aid in smooth flow.

Note that in writing the various secions, all figures and tables should as far as possible be next to the associated text, in the same orientation as the main text, numbered, and given appropriate titles or captions. All major equations should also be numbered and unless it is really necessary never write in "point" form.

- **Conclusion**

A conclusion should be the final section in which the outcome of the work is mentioned briefly.

- **Future prospects**

- **Appendices**

The Appendix contains material which is of interest to the reader but not an integral part of the thesis and any problem that have arisen that may be useful to document for future reference.

- **References / Bibliography**

This should include papers and books referred to in the body of the report. These should be ordered alphabetically on the author's surname. The titles of journals preferably should not be abbreviated; if they are, abbreviations must comply with an internationally recognised system.

Examples

For research article

Voravuthikunchai SP, Lortheeranuwat A, Ninrprom T, Popaya W, Pongpaichit S, Supawita T. (2002) Antibacterial activity of Thai medicinal plants against enterohaemorrhagic *Escherichia coli* O157: H7. *Clin Microbiol Infect*, **8** (suppl 1): 116–117.

For book

Kowalski,M.(1976) Transduction of effectiveness in *Rhizobium meliloti*. SYMBIOTIC NITROGEN FIXATION PLANTS (editor P.S. Nutman IBP), **7**: 63-67

ASSESSMENT OF THE PROJECT FILE

Essentially, marking will be based on the following criteria: the quality of the report, the technical merit of the project and the project execution.
Technical merit attempts to assess the quality and depth of the intellectual efforts put into the project.
Project execution is concerned with assessing how much work has been put in.
The File should fulfill the following ***assessment objectives:***

Range of Research Methods used to obtain information

Execution of Research

Data Analysis
Analyse Quantitative/ Qualitative information
Control Quality

Draw Conclusions

Examination Scheme:

Dissertation	50
Viva Voce	50
Total	**100**

AMITY UNIVERSITY
RAJASTHAN

AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY (ASET)

Bachelor of Technology
(Mechanical Engineering)

Programme Code: BME

Duration – 4 Years Full Time

(Programme Syllabus)

Choice Based Credit System (CBCS)

2021-25

AMITY UNIVERSITY RAJASTHAN

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
APPLIED MATHEMATICS – I	AM 101	3 1 0	4	I

A. Course Learning Outcomes:

CLO 1	Investigate the basic concept about Calculus and differential equations.
CLO 2	Create an interest in finding the solution of problem, length, area, volume etc of the curve and application of Vector calculus.
CLO 3	Apply the basic concepts of Calculus to find Asymptotes, curvature, tangents & normal's, maxima & minima, partial derivatives and approximate calculation of a function.
CLO 4	Develop the formulation of the problem and differential equation, define its nature by using the fundamental of calculus and its applications.

B. Syllabus:

Module I: Differential Calculus

Successive differentiation, Leibnitz's theorem (without proof), Mean value theorem, Taylor's theorem (proof), Remainder terms, Asymptote & Curvature, Partial derivatives, Chain rule, Differentiation of Implicit functions, Exact differentials, Tangents and Normals, Maxima, Approximations, Differentiation under integral sign, Jacobians and transformations of coordinates.

Module II: Integral Calculus

Fundamental theorems, Reduction formulae, Properties of definite integrals, Applications to length, area, volume, surface of revolution, improper integrals, Multiple Integrals-Double integrals, Applications to areas, volumes.

Module III: Ordinary Differential Equations

Formation of ODEs, Definition of order, degree & solutions, ODE of first order : Method of separation of variables, homogeneous and non homogeneous equations, Exactness & integrating factors, Linear equations & Bernoulli equations, General linear ODE of n^{th} order, Solution of homogeneous equations, Operator method, Method of undetermined coefficients, Solution of simple simultaneous ODE.

C. Evaluation:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

D. Text & References:

Text:

- Differential Calculus by Shanti Narain
- Integral Calculus by Shanti Narain

References:

- Differential Equation by A.R. Forsyth
- Higher Engineering Mathematics by H.K. Dass

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
APPLIED PHYSICS - I - FIELDS AND WAVES	AP 102	2 1 0	3	I

A. Course Learning Outcomes:

CLO 1	develop an understanding of the various concepts of simple harmonic motion for with and without damping.
CLO 2	solve simple problems on simple harmonic motion and related topics.
CLO 3	explain and interpret the wave nature of light.
CLO 4	solve simple problems on the applications of wave nature of light
CLO 5	define and understand vector calculus and electromagnetics.
CLO 6	solve numerical problems on vector calculus and electromagnetic

SYLLABUS

Module I: Oscillations & Waves

Oscillations: Introduction to S.H.M. Damped Oscillations: Differential Equation and its solution, logarithmic decrement, Quality Factor, Different conditions of damping of harmonic oscillations. Forced oscillations: Amplitude and Frequency Response, Resonance, Sharpness of Resonance

Plane Progressive Waves: Differential Equation and Solution, Superposition of Progressive Waves stationary waves.

Ultrasonics: Generation and application of ultrasonicwaves.

Module II: Wave Nature of Light

Interference: Coherent Sources, Conditions of interference, Interference due to division of wavefront, Fresnels biprism Interference due to division of amplitude, Newton's rings, Interference due to thin films, .

Diffraction: Fresnel and Fraunhofer diffraction, Fraunhofer diffraction at a single slit, double slit, N Slits, Transmission grating, Rayleigh criterion and Resolving power of grating.

Polarization: Birefringence, Nicol prism, Production and analysis of plane, circularly and elliptically polarized light, Half and quarter wave plates, Optical rotation, Polarimeter.

Module III: Electromagnetics

Scalar and vector fields, gradient of a scalar field, physical significance of gradient, equipotential surface. Line, surface and volume integrals, Divergence and curl of vector field and mathematical analysis physical significance, Electric flux, Gauss' law, Proof and Applications, Gauss divergence and Stokes theorems.

Differential form of Gauss' Law, Amperes' Law, Displacement current, Faradays Law, Maxwell equations in free space & isotropic media (Integral form & differential form), EM wave propagation in free space, Poynting vector.

Evaluation:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text & References:

- Waves & oscillation, A. P. French
- Physics of waves, W. C. Elmore & M. A. Heald
- Introduction to Electrodynamics, D. J. Griffith

- Electrodynamics, Gupta, Kumar & Singh
- Optics, A. K. Ghatak
- Engineering Physics, Satya Prakash

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
APPLIED CHEMISTRY	AC 103	2 1 0	3	I

A. Course Learning Outcomes:

CLO 1	to understand the characateriziaton of materials.
CLO 2	to demonstrate the experimental techniques and methods of their area of specialization in Chemisry.
CLO 3	to use the evidence based comparative chemistry approach to explain the chemical synthesis and analysis.

B. Syllabus

Module I: Water Technology

Introduction and specifications of water,
Hardness and its determination (EDTA method only),
Alkalinity,
Boiler feed water, boiler problems – scale, sludge, priming & foaming: causes & prevention, Boiler problems – caustic embrittlement & corrosion : causes & prevention,
Carbonate & phosphate conditioning, colloidal conditioning & calgon treatment
Water softening processes : Lime – soda process, Ion exchange method,
Water for domestic use.

Module II: Fuels

Classification, calorific value of fuel, (gross and net),
Determination of calorific value of fuels, bomb calorimeter,
Solid fuels - Proximate and ultimate analysis,
Octane & Cetane No. and its significance.
Numericals on combustion

Module III: Instrumental Methods of analysis

Introduction; Principles of spectroscopy; Laws of absorbance
IR: Principle, Instrumentation, Application
UV: Principle, Instrumentation, Application
NMR: Principle, Instrumentation, Application

Module IV: Lubricants

Introduction; Mechanism of Lubrication;
Types of Lubricants; Chemical structure related to Lubrication;
Properties of lubricants; Viscosity and Viscosity Index; Iodine Value; Aniline Point; Emulsion number; Flash Point; Fire Point; Drop Point; Cloud Point; Pour Point.
Selection of Lubricants.

Module V: Corrosion

Introduction, Mechanism of dry and wet corrosion,
Types of corrosion-Galvanic, Concentration cell, soil, pitting, intergranular, waterline. Passivity.
Factors influencing corrosion.
Corrosion control.

Evaluation:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text & References:

Text:

- Engineering Chemistry- Jain and Jain
- Engineering Chemistry- Sunita Rattan
- Engineering Chemistry - Shashi Chawla

References:

- Engineering Chemistry – Dara and Dara
- Spectroscopy- Y.R Sharma
- Corrosion Engineering – Fontenna and Greene

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
ELEMENTS OF MECHANICAL ENGINEERING	BME 104	2 1 0	3	I

A. Course Learning Outcomes:

CLO 1	[Identify, formulate and solve basic mechanical engineering problems]
CLO 2	[Analyse and critically evaluate design and basic components of machines]
CLO 3	[Select and implement knowledge of modern engineering tools and techniques in engineering practice]
CLO 4	[Demonstrate awareness of use of basic mechanical tools in day to day life]

B. Syllabus

Module I: Materials: Classification of engineering material, composition of cast iron and carbon steels on iron- carbon diagram and their mechanical properties; Alloy steel and their applications; stress-strain diagram, Hooks law and modulus of elasticity. Tensile, shear, hardness and fatigue testing of materials.

Module II: Measurement:
Temperature, pressure, velocity, flow, strain, force and torque measurement, measurement by Vernier caliper, micrometer, dial gauges, slip gauges, sine-bar and combination set;

Module III: Mechanical Machines:
Introduction to Lathe, Drilling, Milling and Shaping machines, NC machine, CNC machine and DNC machine..

Module IV: Fluids: Fluid properties, pressure, density and viscosity; pressure variation with depth, static and kinetic energy; Euler and Bernouli's equation for incompressible fluids, viscous and turbulent flow, working principle of pumps, compressors and turbines,

Module V: Thermodynamics:
First and second law of thermodynamics; Formation of steam, steam properties, classification and working of boilers, efficiency & performance analysis, natural and induced draught, Refrigeration, vapor absorption & compression cycles, coefficient of perform (COP), Refrigerants

Module VI: I. C. Engines:
Construction, Nomenclature; working of two stroke & four stroke petrol & diesel IC engines, Carnot cycle and ideal efficiency; Otto and diesel cycles;

Module VII: Introduction to Fabrication Processes
Casting Process, Welding & allied process, Forging process.

Evaluation:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text & References:

- S Trymbaka Murthy (2011) Elements of Mechanical Engineering- I K International Publishing House Pvt. Ltd;
- R.K. Rajput (, 2005) Elements of Mechanical Engineering- Firewall Media
- P.K. Nag,(2005) Engineering thermodynamics- Tata McGraw-Hill Education,
- Automation, Productions systems, and computer Integrated manufacturing by Mikell P. Groover

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
INTRODUCTION TO COMPUTERS AND PROGRAMMING IN C	BCS 105	2 1 0	3	I

A. Course Learning Outcomes:

CLO 1	Attempting algorithmic solutions to problems
CLO 2	Designing and coding moderate sized programs running to the order of a few hundred lines of code
CLO 3	Reading, understanding, and modifying code written by others

Course Contents:

Module I: Introduction
Introduction to computer, history, von-Neumann architecture, memory system (hierarchy, characteristics and types), H/W concepts (I/O Devices), S/W concepts (System S/W & Application S/W, utilities). Data Representation: Number systems, character representation codes, Binary ,octal, hexadecimal and their interconversions. Binary arithmetic, floating point arithmetic, signed and unsigned numbers, Memory storage unit.

Module II: Programming in C
History of C, Introduction of C, Basic structure of C program, Concept of variables, constants and data types in C, Operators and expressions: Introduction, arithmetic, relational, Logical, Assignment, Increment and decrement operator, Conditional, bitwise operators, Expressions, Operator precedence and associativity. Managing Input and output Operation, formatting I/O.

Module III: Fundamental Features in C
C Statements, conditional executing using if, else, nesting of if, switch and break Concepts of loops, example of loops in C using for, while and do-while, continue and break. Storage types (automatic, register etc.), predefined processor, Command Line Argument.

Module IV: Arrays and Functions
One dimensional arrays and example of iterative programs using arrays, 2-D arrays Use in matrix computations. Concept of Sub-programming, functions Example of user defined functions. Function prototype, Return values and their types, calling function, function argument, function with variable number of argument, recursion.

Module V: Advanced features in C
Pointers, relationship between arrays and pointers Argument passing using pointers, Array of pointers. Passing arrays as arguments.
Strings and C string library.
Structure and Union. Defining C structures, Giving values to members, Array of structure, Nested structure, passing strings as arguments.
File Handling.

Evaluation:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text & References:

Text:
- "ANSI C" by E Balagurusamy

- Yashwant Kanetkar, “Let us C”, BPB Publications, 2nd Edition, 2001.
- Herbert Schildt, “C: The complete reference”, Osbourne McGraw Hill, 4th Edition, 2002.
- V. Raja Raman, “Computer Programming in C”, Prentice Hall of India, 1995.

***References*:**

- Kernighan & Ritchie, “C Programming Language”, The (Ansi C Version), PHI, 2nd Edition.
- J. B Dixit, “Fundamentals of Computers and Programming in ‘C’.
- P.K. Sinha and Priti Sinha, “Computer Fundamentals”, BPB publication.

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
ELECTRICAL SCIENCE	BEE 106	2 1 0	3	I

A. Course Learning Outcomes:

CLO 1	Develop a practical approach for analysis of resistive circuits and solution of resistive circuits with independent sources
CLO 2	Able to apply two terminal element relationships for inductors and capacitors in an electrical network.
CLO 3	Capable of analysis ofsingle phase AC circuits, the representation of alternating quantities and determining the power in these circuits.
CLO 4	To acquire the knowledge about the constructional concepts & working principles for the applications of DC machines, AC machines & measuring instruments
CLO 5	Able to identify, formulate, and solve the electrical engineering problems

Course Contents:

Module I: Basic Electrical Quantities
Basic Electrical definitions-Energy, Power, Charge, Current, Voltage, Electric Field Strength, Magnetic Flux Density, etc., Resistance, Inductance and Capacitance. Ideal Source, Independent Source and Controlled Source

Module II: Network Analysis Techniques & Theorems
Circuit Principles: Ohm's Law, Kirchoff's Current Law, Kirchoff's Voltage Law Network Reduction: Star–Delta Transformation, Source Transformation, Nodal Analysis, Loop analysis. Superposition theorem, Thevenin's Theorem, Norton's theorem and Reciprocity theorem.

Module III: Alternating Current Circuits
Peak, Average and RMS values for alternating currents, Power calculation:
reactive power, active power, Complex power, power factor, impedance, reactance, conductance, susceptance
Resonance: series Resonance, parallel resonance, basic definition of Q factor & Band-width.

Module IV: Transformers
Basic Transformer Operation principle, Construction, Voltage relations, current relations, Linear circuit models, open circuit test, short circuit test, Transformer Efficiency.

Evaluation:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text & References:

- R.J. Smith, R.C. Dorf: Circuits, devices and Systems
- B.L. Thareja: Electrical Technology : Part -1 & 2
- V. Deltoro: Electrical Engineering fundamentals
- Schaum's Series: Electrical Circuits

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
APPLIED PHYSICS LAB - I	AP 122	0 0 2	1	I

A. Course Learning Outcomes:

CLO 1	To gain practical knowledge by applying the experimental methods to correlate with the Physics theory.
CLO 2	To learn the usage of electrical and optical systems for various measurements.
CLO 3	Apply the analytical techniques and graphical analysis to the experimental data.
CLO 4	To develop intellectual communication skills and discuss the basic principles of scientific concepts in a group.

List of Experiments:

1. To determine the wavelength of sodium light by Newton's rings method.
2. To determine the dispersive power of the material of prism with the help of a spectrometer.
3. To determine the specific rotation of sugar by Bi-quartz or Laurent half shade polarimeter.
4. To determine the speed of ultrasonic waves in liquid by diffraction method.
5. To determine the width of a narrow slit using diffraction phenomena.
6. To determine the temperature coefficient of platinum wire, using a platinum resistance thermometer and a Callender & Griffth's bridge.
7. To determine the value of specific charge (ratio of e/m) of an electron by Thomson method.
8. To determine the internal resistance of Leclanche cell with the help of Potentiometer.
9. To determine the resistance per unit length of a Carey Foster's bridge wire and also to find out the specific resistance of a given wire.
10. To plot graph showing the variation of magnetic field with distance along the aixs of a circular coil carrying current, and hence estimate the radius of the coil.
11. To determine the value of acceleration due to gravity ('g') in the laboratory using bar pendulum.
12. To determine the moment of inertia of a flywheel about its own axis of rotation.
13. To determine the density of material of the given wire with the help of sonometer.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

APPLIED CHEMISTRY LAB

Course Code: AC 123 P:02,C:01

Course Contents:

List of Experiments:

(Any 10 Experiments)

1. To determine the ion exchange capacity of a given cation exchanger.
2. To determine the temporary, permanent and total hardness of a sample of water by complexometric titration method.
3. To determine the type and extent of alkalinity of given water sample.
4. To determine the number of water molecules of crystallization in Mohr's salt (ferrous ammonium sulphate) provided standard potassium dichromate solution (0.1N) using diphenylamine as internal indicator.
5. To determine the ferrous content in the supplied sample of iron ore by titrimetric analysis against standard $K_2Cr_2O_7$ solution using potassium ferricyanide $[K_3Fe(CN)_6]$ as external indicator.
6. To determine the surface tension of a given liquid by drop number method.
7. To determine the composition of a liquid mixture A and B (acetic acid and water) by surface tension method.
8. To prepare and describe a titration curve for phosphoric acid – sodium hydroxide titration using pH-meter.
9. To find the cell constant of conductivity cell.
10. Determine the strength of hydrochloric acid solution by titrating it against standard sodium hydroxide solution conduct metrically
11. Determination of Dissolved oxygen in the given water sample.
12. To determine the total residual chlorine in water.
13. Determination of amount of oxalic acid and H_2SO_4 in 1 L of solution using N/10 NaOH and N/10 $KMnO_4$ solution.
14. Determination of viscosity of given oil by means of Redwood viscometer I.
15. To determine flash point and fire point of an oil by Pensky Martin's Apparatus
16. To determine the Iodine value of the oil.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

ELEMENTS OF MECHANICAL ENGINEERING LAB

Course Code: BME 124 **P:02,C:01**

Course Contents:

- Tensile testing of standard mild steel specimen.
- To verify Bernoulli's theorem.
- Flow measurements by venturi and orifice meters.
- Linear and angular measurement using, Vernier; Micrometer, slip gauge, dial gauge and sine-bar.
- Study of different types of boilers and mountings.
- Study of 4 – Stroke Petrol and Diesel Engines
- Study of 2 – Stroke Petrol and Diesel Engines
- To find COP of a Vapour Compression Refrigeration system
- To perform various operations on Lathe and Study of Lathe.
- ***Welding:***
  Introduction of welding processes, classification, gas welding, arc welding, resistance welding.
- ***Sheet metal working:***
  Introduction to sheet metal shop, Shearing, trimming, blanking, piercing, shaving, notching, stretch forming, nibbling coining, embossing and drawing.
- ***Casting****:*
  Introduction of casting, pattern, mould making procedures, sand mould casting, casting defects, allowances of pattern.
- ***Forging:***
  Forging-introduction, upsetting & drawing out, drop forging, press forging & m/c forging

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

PROGRAMMING IN C LAB

Course Code: **BCS 125** **P:02,C:01**

Software Required: Turbo C

Course Contents:

- C program involving problems like finding the nth value of cosine series, Fibonacci series. Etc.
- C programs including user defined function calls
- C programs involving pointers, and solving various problems with the help of those.
- File handling

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

ELECTRICAL SCIENCE LAB

Course Code: BEE 126 P:02, C:01

List of Experiments:

1. To verify KVL & KCL in the given network.
2. To verify Superposition Theorem.
3. To verify Maximum Power Transfer Theorem.
4. To verify Reciprocity Theorem.
5. To determine and verify RTh, VTh, RN, IN in a given network.
6. To perform open circuit & short circuit test on a single-phase transformer.
7. To study transient response of a given RLC Circuit.
8. To perform regulation, ratio & polarity test on a single-phase transformer.
9. To measure power & power factor in a three phase circuit by two wattmeter method.
10. To measure power & power factor in a three phase load using three ammeter & three voltmeter method.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

AMITY UNIVERSITY
RAJASTHAN

AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY (ASET)

Course Name	Course Code	LTP	Credit	Semester
General English	BCS 101	1:0:0	1	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	**Identify** the basic elements of grammar required for good and effective communication.
CLO 2	**Interpret and discuss** key ideas of grammar, diction and communication.
CLO 3	**Develop** Creative & Literary Sensitivity in all communication.
CLO 4	**Design** and create texts for a variety of purposes and audiences, evaluating and assessing the effectiveness of grammatical aspects.

B. SYLLABUS

Topic
Vocabulary development- Root Words, Affixes, Synonyms, Antonyms, One Word Substitution
Grammar: Fluency and Expression
Tenses
Voices
Tag Questions
Sentence Formation
Communication Essentials, Basics of Communication, Communication Circle

EXAMINATION SCHEME:

Components	CT/Mid-term	Project/ Presentation	Assignment 1	Quiz	Attendance	EE
Weightage (%)	15	10	10	10	5	50

SUGGESTED READINGS

- Martin Hewings, *Advance English Grammar*. Cambridge University Press
- J.V.Vilanilam. *More Effective Communication*. Response Books:NewDelhi

- Wren and Martin, *English Grammar & Comosition*. S.Chand & Co. Ltd.
- Dr. P.Prasad. *Communication Skills*.S.K.Kataria &Sons
- Kavita Sharma, *New Upgraded Encyclopedia of English Grammar & Composition.* English Edition Publishers
- Raman, Meenakshi and Sangeeta Sharma, *Technical Communication: Principles and Practice.* OUP: New Delhi, 2004.Print.
- Koneru, Aruna. *Professional Communication.* The McGraw Hill: New Delhi, 2008. Print
- Krishnaswamy N, *Creative English for Communication***.** Delh**i:** Macmillan Publishers India Ltd. Print. 2007.

BEHAVIOURAL SCIENCE - I
(UNDERSTANDING SELF FOR EFFECTIVENESS)

Course Code: BSS 104 C: 01

Course Objective:

This course aims at imparting:

- Understanding self & process of self exploration
- Learning strategies for development of a healthy self esteem
- Importance of attitudes and its effective on personality
- Building Emotional Competence

Course Contents:

Module I: Self: Core Competency
Understanding of Self
Components of Self – Self identity
Self concept
Self confidence
Self image

Module II: Techniques of Self Awareness
Exploration through Johari Window
Mapping the key characteristics of self
Framing a charter for self
Stages – self awareness, self acceptance and self realization

Module III: Self Esteem & Effectiveness
Meaning and Importance
Components of self esteem
High and low self esteem
Measuring your self esteem

Module IV: Building Positive Attitude
Meaning and nature of attitude
Components and Types of attitude
Importance and relevance of attitude

Module V: Building Emotional Competence
Emotional Intelligence – Meaning, components, Importance and Relevance
Positive and Negative emotions
Healthy and Unhealthy expression of emotions

Module VI: End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

- Organizational Behaviour, Davis, K.
- Hoover, Judhith D. Effective Small Group and Team Communication, 2002,Harcourt College Publishers
- Dick, Mc Cann & Margerison, Charles: Team Management, 1992 Edition, viva books
- Bates, A. P. and Julian, J.: Sociology - Understanding Social Behaviour
- Dressler, David and Cans, Donald: The Study of Human Interaction
- Lapiere, Richard. T – Social Change
- Lindzey, G. and Borgatta, E: Sociometric Measurement in the Handbook of Social Psychology, Addison – Welsley, US.
- Rose, G.: Oxford Textbook of Public Health, Vol.4, 1985.

- LaFasto and Larson: When Teams Work Best, 2001, Response Books (Sage), New Delhi
- J William Pfeiffer (ed.) Theories and Models in Applied Behavioural Science, Vol 2, Group (1996); Pfeiffer & Company
- Smither Robert D.; The Psychology of Work and Human Performance, 1994, Harper Collins College Publishers

French

Semester 1 Course Code: FLT 101 Credit Units: 02

Program Learning Outcomes:

- To produce global citizens speaking an International language in keeping with the institutional vision.
- To give students a platform to understand Culture and Society of a different world.
- To enhance the possibilities of jobs in MNCs established in/outside the country.

To enhance the possibilities of Studying Abroad

Course Learning Objective:

- Students will hone Basic language skills such as reading, writing, speaking, listening & interactive in the language
- Students will be able to read and interpret small texts.
- Students will be able to communicate in small sentences in writing, self introduction, family description etc.
- Students will be able to communicate in small sentences in oral, self introduction, family description etc.
- To tell ones name and to spell it
- To understand the French keyboard
- To wish/welcome/identify/name someone
- To present oneself and someone else
- To fill a form
- To ask for information
- To understand and ask simple questions

Course Contents:

Unité 1 Premiers pas en France. Page: 1-17 Leçons 0, 1, 2 & 3

Contenu Lexical:

1. Les mots transparent (en sciences)
2. Quelquesprénomsfrançais
3. La prise de contact
4. La politesse
5. Les salutations
6. La famille
7. Les présentations
8. Quelquesspécialitésscientifiques
9. Les Chiffres de 0 à 20
10. Les ordinaux
11. L'adressepostale
12. L'adresse mail
13. Le numéro de téléphone

Contenu Grammatical:

1. Les accents
2. Etre au présent
3. Les articles indéfinis
4. Les pronomspersonnels
5. Le feminin et le masculin
6. Les prépositions de lieu
7. Les articles définis
8. Avoir, étudier, habiter au présent, Les verbs du 1 er groupe au présent
9. Les adjectifspossessifs au singulier
10. Les pronomstoniques
11. L'interrogation

EXAMINATION SCHEME

Total: 100 marks

Continuous Evaluation (Total 50 Marks)					End Sem Evaluation (Total 50 Marks)
Quiz	**Mid Term Test**	**Presentation**	**Viva Voce**	**Attendance**	**End-Term Exam**
10	**15**	**10**	**10**	**5**	**50**

Text & References:

- Le Gargasson, I. Naik, S. Chaize, C. (2012) Tech French, Delhi : Goyal Publications
- Ray. A, Robert (2010) Le Petit Robert French Dicitionary, Paris: Le Robert
- Robert, Collins (2006) Collins Robert French Dictionary, Paris : Harper Collins

Foreign Language German

Semester 1:Course Code: FLG 101/111

Credit units : 02

Program Learning Outcomes :

- To produce global citizens speaking an International language in keeping with the institutional vision .
- To give students a platform to understand Culture and Society of a different world.
- To enhance the possibilities of jobs in MNCs established in/outside the country.
- To enhance the possibilities of Studying Abroad

Course Learning Objective:

- Students will hone Basic language skills such as reading, writing, speaking, listening & interactive in the language
- Students will be able to read and interpret small texts .
- Students will be able to communicate in small sentences in writing, self introduction, family description etc.
- Students will be able to communicate in small sentences in oral, self introduction, family description etc.

After successful completion of the course, students will be able to express simple vocabulary in oral and writingGerman language.

After successful completion of this semester, students will be able to:

- greeting formally and informally.
- self introduction
- countings from 1 To 100
- make simple sentences using present tense
- spelling names.
- describing objects with articles in the classroom

Course Contents:
Vocabulary:

- Personal information like age, name etc.
- Alphabets
- Greetings: Good morning, good afternoon, good evening,
- partinggood bye Etc.
- describing objects with articles in the classroom

Grammar:

- Personal Pronouns
- Use of verbs>**to be**< and >**to have**<in simple present tense
- Use of regular verbs liketo live, to go, to learn etc.
- Using definite and indefinite article in German in nominative case
- Interrogative pronouns> **who, what, where, where from, where to**<
- talk about gender, numbers and articles.
- Singular and plural

- Basic Phonetics: Consonants and Vowels

EXAMINATION SCHEME

Total: 100 marks

Continuous Evaluation (Total 50 Marks)					End Sem Evaluation (Total 50 Marks)
Quiz	**Mid Term Test**	**Presentation**	**Viva Voce**	**Attendance**	**End-Term Exam**
10	**15**	**10**	**10**	**5**	**50**

PrescribedText-Book:First 10 LessonsfromDeutschalsFremdsprache -1A, IBH & Oxford, New Delhi, 1977

References: Studio D A1 by Hermann Funk, Christina Kuhn and Silke Demme, Cornelsen, 2013

Tangram A1by Rosa Maria Dallapiazza, Eduard von Jan & Till Schoenherr, Max Hueber, 2007

Sprachtraining A1 by Rita Maria Niemann, Dong Ha Kim, Cornelsen, 2013

Dictionaries for reference: Studio D: Glossar A1 - Deutsch – Englisch, Cornelsen, 2013

http://www.duden.de/woerterbuch

Materials are given in form of photocopies if felt to be necessary

Foreign Language Spanish

Semester 1: Course Code: FLS 101/111 Credit units : 02

Program Learning Outcomes :

- To produce global citizens speaking an International language in keeping with the institutional vision .
- To give students a platform to understand Culture and Society of a different world.
- To enhance the possibilities of jobs in MNCs established in/outside the country.
- To enhance the possibilities of Studying Abroad

Course Learning Objective:

- Students will hone Basic language skills such as reading, writing, speaking, listening & interactive in the language
- Students will be able to read and interpret small texts .
- Students will be able to communicate in small sentences in writing, self introduction, family description etc.
- Students will be able to communicate in small sentences in oral, self introduction, family description etc.

After successful completion of the course, students will be able to express simple vocabulary in oral and writing. Students will be able to:

- Greet Formally and Informally
- Talk about gender, numbers and articles.
- Deal withbasicPhonetics
- Introduce oneself and others
- Talk about Professions and nationalities
- Count from 1 To 20
- Get introduced to Hispanic Culture

Course Contents:
Vocabulary: Passport Form, personal information, age, Interrogative pronouns, Alphabets, to be able to spell names, surnames, Good morning, good afternoon, Good bye Etc. different professions, countries, nationalities, languages.

Grammar:
Subject pronouns
Use of verbs SER/ESTAR/TENER in simple present tense
Use of regular AR /ER/IR ending verbs.
Llamarse y dedicarse
Simple Negativesenteses

ExaminationScheme:

Total: 100 marks

ContinuousEvaluation (Total 50 Marks)	EndSemEvaluation (Total 50 Marks)

Quiz	MidTerm Test	Presentation	Viva Voce	Attendance	End-TermExam
10	15	10	10	5	50

Text &References:

Nuevo Español Sin Fronteras (ESF1) by Jesús sánchez Lobato, Concha Moreno Garcia, Concha Moreno Garcia, Isabel Santos Gargallo, Sociedad General Española De Librería, S.A 2005

Pasaporte Nivel (A1) byMatideCerraloza Aragón, oscarCerraloza Gilli, Begoña Llovet Barquero, EdelsaGroup didascalia, S.A. 2005

Dictionaries for reference: Collins, www.wordreferences.com.

Essential materials are given in the form of photocopies.

FOREIGN LANGUAGE CHINESE

Semester I **Course Code: FLC- 101/111** **Credit Units : 02**

Program Learning Outcomes :

- To produce global citizens speaking an International language in keeping with the institutional vision .
- To give students a platform to understand Culture and Society of a different world.
- To enhance the possibilities of jobs in MNCs established in/outside the country.
- To enhance the possibilities of Studying Abroad

Aim: The Aims of Chinese language course at AUR is to equip students with the basic knowledge & skills in Chinese language so as to enable them to interact with Chinese speaking people and efficiently work in the Chinese environment and also to build a solid foundation for further studies in the language.

Course Learning Objectives:

- Students will hone Basic language skills such as reading, writing, speaking, listening & interactive in the language
- Students will be able to read and interpret small texts .
- Students will be able to communicate in small sentences in writing, self introduction, family description etc.
- Students will be able to communicate in small sentences in oral, self introduction, family description etc.

On the completion of first semester the students will be able to:

- Understand the nature and characteristics of Chinese language.
- Read Chinese Pinyin and Chinese Characters.
- Write Chinese Characters and sentences related to greetings & personal information.
- Speak Chinese dialogues related to greetings & personal information.
- Listen and understand simple Chinese words and dialogues of the text.
- Manipulate basic grammatical structures.
- Master and use most essential vocabulary items of day to day use; approx 70 Characters including 50 characters of HSK level -I.
- Understand China as a powerful nation.

COURSE CONTENT

1. Introduction to Chinese Language
2. Introduction to the Sound System , Initials and Finals
3. Table of sounds of Beijing Dialect
4. Tones
5. Writing System & Basic Strokes of Chinese Character
6. Rules of Stroke-Order of Chinese Character,
7. Expression of Greetings & Good wishes
8. Farewell
9. Asking & telling Personal Information : Name & Age
10. Personal Information : Residence
11. Personal Information : Family Members
12. Listening Skill & Practice
13. Conversation based on dialogues
14. China; an emerging world power (In English)

VOCABULARY CONTENT

Vocabulary will have approx 70 Characters including 50 characters of HSK-I level.

1. Vocab related to greetings & farewell; 你， 好，再见。。。
2。Vocab related to personal information; 名字，年纪， 家， 住，爸爸。。

GRAMMATICAL CONTENT

1. Introduction to the sound system, initials and finals, sound table & tones.
2. Basic strokes of Chinese Character & stroke- order.
3. Conjunction 和.
4. Word order in Chinese sentence.
5. Adjective Predicate sentence.
6. 是 sentence type (1).
7. Interrogative sentence with 吗.
8. Attributive & structural particle 的.

ExaminationScheme:

Total: 100 marks

ContinuousEvaluation (Total 50 Marks)					EndSemEvaluation (Total 50 Marks)
Quiz	MidTerm Test	Presentation	Viva Voce	Attendance	End-TermExam
10	15	10	10	5	50

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
APPLIED MATHEMATICS – II	AM 201	3 1 0	4	II

A. Course Learning Outcomes:

CLO 1	Solve system of linear equations; be familiar with the definition and properties of matrix; find the eigenvalues and eigenvectors of a square matrix.
CLO 2	Investigate the convergence of infinite series using different tests.
CLO 3	Calculate the measure of central tendency, moments, skewness and kurtosis.
CLO 4	Develop knowledge of basic discrete and continuous distributions (Binomial, Poisson, Normal) and how to work with them.
CLO 5	Apply the method to use complex variable and complex valued functions and able to perform their differentiation and integration.

Course Contents:

Module I: Linear Algebra
Hermitian and Skew Hermitian Matrix, Unitary Matrix, Orthogonal Matrix, Elementary Row Transformati on, Reduction of a Matrix to Row Echelon Form, Rank of a Matrix, Consistency of Linear Simultaneous Equations, Gauss Elimination Method, Gauss-Jordan Method, Eigen Values and Eigen Vectors of a Matrix, Caley-Hamilton Theorem, Diagonalization of a Matrix, Vector Space, Linear Independence and Dependence of Vectors, Linear Transformations.

Module II: Infinite Series
Definition of Sequence, Bounded Sequence, Limit of a Sequence, Series, Finite and Infinite Series, Convergence and Divergence of Infinite series, Cauchy's Principle of Convergence, Positive Term Infinite Series, Comparison test, D'Alembert's Ratio test. Raabe's Test, Cauchy's nth root Test. Logarithmic Test, Alternating Series, Leibnitz's Test, Absolute and conditioinal convergence, Uniform Convergence, Power Series and its Interval of Convergence.

Module III: Complex Analysis
De Moivre's Theorem and Roots of Complex Numbers, Logarithmic Functions, Circular, Hyperbolic Functions and their Inverses.
Functions of a Complex Variables, Limits, Continuity and Derivatives, Analytic Function, Cauchy-Riemann Equations (without proof), Harmonic Function, Harmonic Conjugates, Conformal Mapping, Bilinear Transformations, Complex Line Integral, Cauchy Integral Theorem, Cauchy Integral Formula, Derivative of Analytic Function, Power Series, Taylor Series, Laurent Series, Zeroes and Singularities, Residues, Residue Theorem, Evaluation of Real Integrals of the Form $\int_0^{2\pi} F(\cos\theta, \sin\theta)\, d\theta$ and $\int_{-\infty}^{\infty} \frac{f(x)}{F(x)} dx$.

Module IV: Statistics and Probability
Moments, Skewness, Kurtosis, Random Variables and Probability Distribution, Mean and Variance of a Probability Distribution, Binomial Distribution, Poisson Distribution and Normal Distribution.

Evaluation:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text & References:

- Engineering Mathematics by Erwin Kreyszig.
- Engineering Mathematics by R.K. Jain and S.R.K. Iyengar.
- Higher Engineering Mathematics by H.K. Dass.
- Engineering Mathematics by B.S. Grewal.
- Differential Calculus by Shanti Narain.
- Integral Calculus by Shanti Narain.
- Linear Algebra- Schaum Outline Series.

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
APPLIED PHYSICS - II - MODERN PHYSICS	AP 202	2 1 0	3	II

A. Course Learning Outcomes:

CLO 1	Define and understand space and time and the variations in other related fundamental quantities such as mass, velocity and force.
CLO 2	Solve simple problems relating to the above concepts.
CLO 3	Explain by extending the understanding as laid down in Quantum theory to other phenomenon as observed in sub-atomic Physics and also to solve simple problems in Quantum Theory
CLO 4	Appreciate and understand the various spectra as observed during electronic transitions
CLO 5	Understand the way nature has endowed properties to materials.

Module I: Special Theory of Relativity
Michelson-Morley experiment, Importance of negative result, Inertial & non-inertial frames of reference, Einstein's postulates of Special theory of Relativity, Space-time coordinate system, Relativistic Space Time transformation (Lorentz transformation equation), Transformation of velocity, Addition of velocities, Length contraction and Time dilation, Mass-energy equivalence (Einstein's energy mass relation) & Derivation of Variation of mass with velocity,

Module II: Wave Mechanics
Wave particle duality, De-Broglie matter waves, phase and group velocity, Heisenberg uncertainty principle, wave function and its physical interpretation, Operators, expectation values. Time dependent & time independent Schrödinger wave equation for free & bound states, square well potential (rigid wall), Step potential.

Module III: Atomic Physics
Vector atom model, LS and j-j coupling, Zeceman effect (normal & anomalous), Paschen-Bach effect, X-ray spectra and energy level diagram, Moseleys Law, Lasers – Einstein coefficients, conditions for light amplification, population inversion, optical pumping, three level and four level lasers, He-Ne and Ruby laser, Properties and applications of lasers.

Module IV: Solid State Physics
Sommerfield's free electron theory of metals, Fermi energy, Introduction to periodic potential & Kronig-Penny model (Qualitative) Band Theory of Solids, Semi-conductors: Intrinsics and Extrinsic Semiconductors, photoconductivity and photovotaics, Basic aspects of Superconductivity, Meissner effect.

Evaluation:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text & References:

- Concept of Modern Physics, A. Beiser
- Applied Physics II, Agarawal & Goel
- Solid State Physics, S. O. Pallai
- Physics of Atom, Wehr & Richards

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
OBJECT ORIENTED PROGRAMMING USING C++	BCS 203	2 1 0	3	II

A. Course Learning Outcomes:

CLO 1	Understand object-oriented programming and advanced C++ concepts.
CLO 2	Improve your problem-solving skills
CLO 3	Goal: to make you a good programmer. Apply methods to analyse running time of essential data structures and estimate efficiency of the algorithms and implementations.

Syllabus:

Module I: Introduction
Review of C, Difference between C and C++, Procedure Oriented and Object Oriented Approach. Basic Concepts: Objects, classes, Principals like Abstraction, Encapsulation, Inheritance and Polymorphism. Dynamic Binding, Message Passing. Characteristics of Object-Oriented Languages. Introduction to Object-Oriented Modeling techniques (Object, Functional and Dynamic Modeling).

Module II: Classes and Objects
Abstract data types, Object & classes, attributes, methods, C++ class declaration, Local Class and Global Class, State identity and behaviour of an object, Local Object and Global Object, Scope resolution operator, Friend Functions, Inline functions, Constructors and destructors, instantiation of objects, Types of Constructors, Static Class Data, Array of Objects, Constant member functions and Objects, Memory management Operators.

Module III: Inheritance
Inheritance, Types of Inheritance, access modes – public, private & protected, Abstract Classes, Ambiguity resolution using scope resolution operator and Virtual base class, Aggregation, composition vs classification hiérarchies, Overriding inheritance methods, Constructors in derived classes, Nesting of Classes.

Module IV: Polymorphism
Polymorphism, Type of Polymorphism – Compile time and runtime, Function Overloading, Operator Overloading (Unary and Binary) Polymorphism by parameter, Pointer to objects, this pointer, Virtual Functions, pure virtual functions.

Module V: Strings, Files and Exception Handling
Manipulating strings, Streams and files handling, formatted and Unformatted Input output. Exception handling, Generic Programming – function template, class Template Standard Template Library: Standard Template Library, Overview of Standard Template Library, Containers, Algorithms, Iterators, Other STL Elements, The Container Classes, General Theory of Operation, Vectors.

Evaluation:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text & References:

Text:

- A.R. Venugopal, Rajkumar, T. Ravishanker "Mastering C++", TMH, 1997
- R. Lafore, "Object Oriented Programming using C++", BPB Publications, 2004.
- "Object Oriented Programming with C++" By E. Balagurusamy.

- Schildt Herbert, “C++: The Complete Reference”, Wiley DreamTech, 2005.

References:

- Parasons, “Object Oriented Programming with C++”, BPB Publication, 1999.
- Steven C. Lawlor, “The Art of Programming Computer Science with C++”, Vikas Publication, 2002.
- Yashwant Kanethkar, “Object Oriented Programming using C++”, BPB, 2004

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
ENGINEERING MECHANICS	BMC 204	2 1 0	3	II

A. Course Learning Outcomes:

CLO 1	Able to analyse the force system and its effects.
CLO 2	Explain the nature of forces acting upon a system.
CLO 3	Evaluate the static and dynamic system's problem.

Syllabus:

Module I: Force system & Structure
Free body diagram, Equilibrium equations and applications. Plane truss, perfect and imperfect truss, assumption in the truss analysis, analysis of perfect plane trusses by the method of joints, method of section.

Module II: Friction
Static and Kinetic friction, laws of dry friction, co-efficient of friction, angle of friction, angle of repose, cone of friction, friction lock, efficiency of screw jack, transmission of power through belt, Ratio of tension, centrifugal tension, condition of maximum power transmission., Initial tension

Module III: Distributed Force
Determination of center of gravity, center of mass and centroid by direct integration and by the method of composite bodies, area moment of inertia by direct integration and composite bodies method, radius of gyration, parallel axis theorem, perpendicular axis theorem, polar moment of inertia.

Module IV: Stress Strain Analysis
Simple stress and strain: introduction, normal shear, and stresses-strain diagrams for ductile and brittle materials. Elastic constants, Strain Energy, Properties of material-strength, elasticity, stiffness, malleability, ductility, brittleness, hardness and plasticity etc; Concept of stress and strain.

Examination Scheme:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

MTE- Mid-term Examination

Text & References:

- D.S. Kumar (2009) Engineering Mechanics – S. K. Kataria & Sons
- Dr. R.K. Bansal (2008) Engineering Mechanics – Laxmi Publication
- J. L. Meriam, L. G. Kraige (2012) Engineering Mechanic-Don Fowley
- Timoshenko, Engineering Mechanics, McGraw Hill
- R. S. Khurmi, Engineering Mechanics, S. Chand Publication
- H. Shames & G. K. M. Rao, Engineering Mechanics, Pearson Education, 2006

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
ENGINEERING GRAPHICS	BME 205	1 0 0	3	II

A. Course Learning Outcomes:

CLO 1	Describe the theory of scales, engineering curves, different Projection used in engineering drawing.
CLO 2	Draw the different engineering curves, maps and projection of planes and solid accurately.
CLO 3	Identify different geometrical shape and their application used in engineering application.

Syllabus

Module 1: Scales & Curves

Representative factor, Plain Scales, Diagonal Scales, Comperative Scales and Scale of chords. Construction of ellipse, Parabola, Hyperbola, Cycloid, Epicycloid, Hypocycloid, Involutes and Spirals by various methods.

Module 2: Projection of Points & Straight lines

Projection of points, Projection of straight lines. True inclinations and true length of straight lines.

Module 3: Projection of planes and solids

Projection of circle, triangle, polygons, polyhedrons, pyramids, cylinders and cones in different positions.

Module 1: Section of solids and Isometric projections

Section of right solids by normal and inclined planes, Orthographic projection, first angle & third angle projection. Isometric scale, Isometric axes, Isometric projection from orthographic drawing.

Examination Scheme:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

MTE- Mid-term Examination

Text & References:

- Engineering Graphics – Basant Agrawal and Dr. C. M. Agrawal, Tata McGraw-Hill Publishing Company Ltd.
- Engineering Drawing – by N. D. Bhatt
- Engineering Drawing and Graphics – by Veenugopal
- Engineering Drawing – by T. Jeyopoovan

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
DOMAIN WORKSHOP	BME 206	1 0 0	1	II

A. Course Learning Outcomes:

CLO 1	To get acquainted with various basic technical skills.
CLO 2	To develop and enhance relevant technical skills required in the various engineering industries and workshops

Syllabus

Module I: Introduction to workshop
Workshop layout, Importance of various sections/shops of workshop , Types of jobs done in each shop , General safety rules and work procedure in workshop.

Module II: Fitting and Carpentry Shop

Introduction , various types of woods. different types of tools, machines and accessories. various marking, measuring, cutting, holding and striking tools, different fitting operation like chipping ,filing, right angle, marking, drilling, tapping etc

Module III: Sheet Metal Shop
Introduction, Various types of tools, equipments and accessories, Different types of operations in sheet metal shop, Safety precautions.

Module IV: Welding Shop
Introduction types of welding ,ARC welding, Gas Welding, Gas Cutting. welding of dissimilar materials, Selection of welding rod material Size of welding rod and work piece, different types of flame, Elementary Symbolic representation , Safety precautions in welding safety equipments and its use in welding processes..

Examination Scheme:

Components	Other Components	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text & References:

Text:

- Elements of Workshop Technology", Vol. I 2008 and Vol. II 2010, Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy S.K., , Media promoters and publishers private limited,Mumbai.
- "Manufacturing Technology", Vol. I and Vol. II, 2017, Rao P.N., Tata McGraw Hill House.

References:

- "Workshop Technology" Vol. 1 and 2,1998 by Raghuvanshi B.S. Dhanpat Rai & Sons
- "Workshop Technology", 1998, Chapman W.A. J and Arnold E. Viva low priced student edition,

- “Workshop Practices”, 2009, H S Bawa, Tata McGraw-Hill

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
PPLIED PHYSICS LAB - II	AP 222	0 0 2	1	II

A. Course Learning Outcomes:

CLO 1	To gain practical knowledge by applying the experimental methods to correlate with the Physics theory.
CLO 2	Apply the analytical techniques and graphical analysis to the experimental data.
CLO 3	To learn the usage of electrical and optical systems for various measurements.
CLO 4	To develop intellectual communication skills and discuss the basic principles of scientific concepts in a group.

APPLIED PHYSICS LAB - II

Course Code: AP 222 **P:02 C: 01**

List of Experiments:

1. To determine the wavelength of prominent lines of mercury spectrum using plane transmission grating.
2. To determine the thickness of a given wire by Wedge method.
3. To determine the wavelength of He-Ne laser light using single slit.
4. To determine the frequency of an electrically maintained tunning fork by Melde's method.
5. To study the variation of magnetic field along the axis of Helmholtz coil and to find out reduction factor.
6. To draw the V – I characteristics of a forward and reverse bias PN junction diode.
7. To determine the frequency of AC mains using sonometer.
8. To determine the energy band-gap of Germanium crystal using four probes method.
9. To draw V – I characteristics of a photocell and to verify the inverse square law of radiation.
10. To determine the acceleration due to gravity ('g') using Keter's reversible pendulum.
11. To study the characteristics of photo voltaic cell (solar cell).

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

OBJECT ORIENTED PROGRAMMING USING C++ LAB

Course Code: **BCS 223** **P:02 C: 01**

Software Required: Turbo C++

Course Contents:

- Creation of objects in programs and solving problems through them.
- Different use of private, public member variables and functions and friend functions.
- Use of constructors and destructors.
- Operator overloading
- Use of inheritance in and accessing objects of different derived classes.
- Polymorphism and virtual functions (using pointers).
- File handling.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

ENGINEERING MECHANICS LAB

Course Code: BME 224 P:02 C: 01

Course Contents:

- To verify the law of Force Polygon.
- To verify the law of Moments using Parallel Force apparatus. (Simply supported type)
- To determine the co-efficient of friction between wood and various surface (like Leather, Wood, Aluminum) on an inclined plane.
- To find the forces in the members of Jib Crane.
- To determine the mechanical advantage, Velocity ratio and efficiency of a screw jack.
- To determine the mechanical advantage, Velocity ratio and Mechanical efficiency of the Wheel and Axle
- To determine the MA, VR, of Worm Wheel (2-start)
- Verification of force transmitted by members of given truss.
- To verify the law of moments using Bell crank lever
- To find CG and moment of Inertia of an irregular body using Computation method

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

ENGINEERING GRAPHICS LAB

Course Code: BME 225 **P:02 C: 01**

List of Experiments:

- Sketching and drawing of scale & Curve
- Sketching and drawing of Cycloidal Curve
- Sketching and drawing of Involute & Spirals
- Sketching and drawing of points & line
- Sketching and drawing of projection of planes
- Sketching and drawing of projection of solids
- Sketching and drawing of intersection of surfaces
- Sketching and drawing of development of surfaces
- Sketching and drawing of orthographic and isometric projection

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

Text & References:

- M.B. Shah & B.C. Rana, Engineering Drawing, Pearson Education, 2007
- PS Gill, Engineering Drawing, Kataria Publication
- ND Bhatt, Engineering Drawing, Charotar publications
- N Sidheshwar, Engineering Drawing, Tata McGraw Hill
- CL Tanta, Mechanical Drawing, "Dhanpat Rai"

AMITY UNIVERSITY
RAJASTHAN

AMITY SCHOOL OF ENGENEERING AND TECHNOLOGY (ASET)

Course Name	Course Code	LTP	Credit	Semester
General English	BCS 201	1:0:0	1	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Participate in conversation and in small- and whole-group discussion
CLO 2	Explore and use English as medium of communication in real life situation
CLO 3	Discuss topics and themes of a reading, using the vocabulary and grammar of the lesson
CLO 4	Identify features of a reading textbook and utilize them as needed
CLO 5	Prepare and deliver organized presentations in small groups and to whole class
CLO 6	Apply sentence mechanics and master spelling of high frequency words

B. SYLLABUS

Developing Listening Skills
Developing Speaking Skills
Developing Reading Skills
Developing Writing Skills
Principles of Good Writing - L Hill
Toasted English -R. K. Narayan
On Saying Please- A G Gardiner
All the World's a Stage : Shakespeare
Where the Mind is without Fear: R N Tagore
O Captain, My Captain: W. Whitman
Psalm of Life: H. Longfellow
Go Kiss the World by Subroto Bagchi; Steve Jobs By Walter Isaacson; Rich Dad, Poor Dad by Robert Kiyosaki; The Road Ahead by Bill Gates; What You See, Is What You Get By Alan Sugar (Non detailed study; any of books)

EXAMINATION SCHEME:

Components	CT/Mid-term	Project/Presentation/ Assignment/Viva	Book Review	Quiz	Attendance	EE
Weightage (%)	15	10	10	10	5	50

SUGGESTED READINGS

Bhardwaj, Ashu. *A Course Book of English & Communication Skills*. Paragon: New Delhi,2011.

Farhanthullah, T M. *Communication Skills for Technical Students*. Orient Black PVT: 2008.

Jha, Madhulika. *Echoes.* Orient Blackswan: New Delhi, 2007.

Koneru, Aruna. *Professional Communication.* The McGraw Hill: New Delhi, 2008.

Prasad, Dr P. *The Functional Aspects of Communication Skills*.SK & Sons: New Delhi, 2003.

Raman, Meenakshi and Sangeeta Sharma, *Technical Communication: Principles and Practice*. OUP: New Delhi, 2004.

BEHAVIOURAL SCIENCE - II
(PROBLEM SOLVING AND CREATIVE THINKING)

Course Code: BSS 204 C: 01

Course Objective:

To enable the students:

- Understand the process of problem solving and creative thinking.
- Facilitation and enhancement of skills required for decision-making.

Course Contents:

Module I: Thinking as a tool for Problem Solving
What is thinking: The Mind/Brain/Behaviour
Critical Thinking and Learning:
Making Predictions and Reasoning
Memory and Critical Thinking
Emotions and Critical Thinking
Thinking skills

Module II: Hindrances to Problem Solving Process
Perception
Expression
Emotion
Intellect
Work environment

Module III: Problem Solving
Recognizing and Defining a problem
Analyzing the problem (potential causes)
Developing possible alternatives
Evaluating Solutions
Resolution of problem
Implementation
Barriers to problem solving:
Perception
Expression
Emotion
Intellect
Work environment

Module IV: Plan of Action
Construction of POA
Monitoring
Reviewing and analyzing the outcome

Module V: Creative Thinking
Definition and meaning of creativity
The nature of creative thinking
Convergent and Divergent thinking
Idea generation and evaluation (Brain Storming)
Image generation and evaluation
Debating
The six-phase model of Creative Thinking: ICEDIP model

Module VI: End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

- Michael Steven: How to be a better problem solver, Kogan Page, New Delhi, 1999
- Geoff Petty: How to be better at creativity; Kogan Page, New Delhi, 1999
- Richard Y. Chang and P. Keith, Kelly: Wheeler Publishing, New Delhi, 1998.
- Phil Lowe Koge Page: Creativity and Problem Solving, New Delhi, 1996
- J William Pfeiffer (ed.) Theories and Models in Applied Behavioural Science, Vol 3, Management (1996); Pfeiffer & Company
- Bensley, Alan D.: Critical Thinking in Psychology – A Unified Skills Approach, (1998), Brooks/Cole Publishing Company.

Semester 2 Course Code: FLT 201/211 (Tech French) Credit Units: 02

Course Learning Objective:

- Students will hone Basic language skills such as reading, writing, speaking, listening & interactive in the language
- Students will be able to read and interpret small texts .
- Students will be able to communicate in small sentences in writing, self introduction, family description etc.
- Students will be able to communicate in small sentences in oral, self introduction, family description etc
- To speak about the activities and hobbies
- To express ones tastes
- To excuse oneself
- To understand a mail
- To ask ones way
- To indicate the direction
- To express a wish
- To ask for information
- To give an order or a suggestion
- To read a plan of metro and RER.

Course Contents:

Unité 1 (Leçon 4) and Unité 2 Université et les grandes écoles : 18-39 Leçons 4, 5 & 6.

Contenu Lexical:

1. Les loisirs
2. Les saisons
3. Les nombres
4. Le logement et la ville
5. Les prépositions de lieu
6. Les verbes de direction
7. Les lieux de l'université
8. Les documents administratifs
9. Les expressions utiliseés en classe par le professeur
10. Quelquesraccourcis: diminutis et sigles

Contenu Grammatical:

1. Aimer, faire et savoir au present
2. La negation
3. Les adjectifs possessives au pluriel
4. Le partitifs
5. Aller au présent
6. <<il y a>>
7. L'usage des prepositions de lieu
8. Vouloir et pouvoir au présent
9. L'impératif
10. Le conditionnel de politesse

EXAMINATION SCHEME

Total: 100 marks

Continuous Evaluation (Total 50 Marks)					End Sem Evaluation (Total 50 Marks)
Quiz	Mid Term Test	Presentation	Viva Voce	Attendance	End-Term Exam

10	**15**	**10**	**10**	**5**	**50**

Text & References:

- Le Gargasson, I. Naik, S. Chaize, C. (2012) Tech French, Delhi : Goyal Publications
- Ray. A, Robert (2010) Le Petit Robert French Dicitionary, Paris: Le Robert
- Robert, Collins (2006) Collins Robert French Dictionary, Paris : Harper Collins

Foreign Language German

Semester 2:Course Code: FLG 201/211 **Credit units : 02**

Course Learning Objective:

- Students will hone Basic language skills such as reading, writing, speaking, listening & interactive in the language
- Students will be able to read and interpret small texts .
- Students will be able to communicate in small sentences in writing, self introduction, family description etc.
- Students will be able to communicate in small sentences in oral, self introduction, family description etc.

After successful completion of this semester, students will be able to:

- Recognizing geographical locations.
- Know famous places in Germany and Europe.
- To be able to form basic questions
- use of past participle of verb was/were and make sentences.
- able to conjugate irregular verbs
- use possessive article for the nominative case
- Use of adjectives in sentences.
- They can describe their house like number of bedroom, kitchen etc
-

Course Content:

Vocabulary

- Verb was/were
- Types of Houses and Apartments,
- State and cities
- directions like north, south etc.,
- Neighboring countries of Germany and their respective languages.
- Description of house: Bedroom, bathroom, kitchen etc.

Grammar:

- Interrogatives – what, which, why, how, who, when
- Yes - no question
- Introduction of irregular verbs
- Article in accusative (definite and indefinite)
- Possessive article

EXAMINATION SCHEME

Total: 100 marks

Continuous Evaluation (Total 50 Marks)					End Sem Evaluation (Total 50 Marks)
Quiz	Mid Term Test	Presentation	Viva Voce	Attendance	End-Term Exam
10	15	10	10	5	50

PrescribedText-Book: Lesson 11 onwardsfromDeutschalsFremdsprache -1A, IBH & Oxford, New Delhi, 1977

References: **Studio D A1** by Hermann Funk, Christina Kuhn and Silke Demme, Cornelsen, 2013

Tangram A1by Rosa Maria Dallapiazza, Eduard von Jan & Till Schoenherr, Max Hueber, 2007
SprachtrainingA1 by Rita Maria Niemann, Dong Ha Kim, Cornelsen, 2013
Dictionaries for reference: **Studio D: Glossar** A1 - Deutsch –Englisch, Cornelsen, 2013
http://www.duden.de/woerterbuch
Materials are given in form of photocopies if felt to be necessary

Foreign Language Spanish

Semester 2: **Course Code: FLS 201/211 Credit units : 02**

Course Learning Objective:

- Students will hone Basic language skills such as reading, writing, speaking, listening & interactive in the language
- Students will be able to read and interpret small texts .
- Students will be able to communicate in small sentences in writing, self introduction, family description etc.
- Students will be able to communicate in small sentences in oral, self introduction, family description etc.
- To enhance all five skills of the language: Reading, Writing, Listening, Interacting and speaking.
- Adjectives to describe people
- To talk about locations and places.
- To be able to form basic questions
- Counting till 100
- To be able to speak about daily Routine and verbs of daily usage both regular & irregular verbs.

Course Content:
Vocabulary:

Home, Classroom, Neighborhood, hotel, Restaurant, Market, Days name, Months name, Colors names etc. Interrogatives.
Grammar:

Use of SER/ESTAR/TENER/ HAY
Difference between Estar and Hay
Demonstrative pronouns
Interrogatives – what, which, why, how, who, when
Introduction of irregular verbs
Possessive pronouns

ExaminationScheme:

Total: 100 marks

ContinuousEvaluation (Total 50 Marks)					EndSemEvaluation (Total 50 Marks)
Quiz	MidTerm Test	Presentation	Viva Voce	Attendance	End-TermExam
10	15	10	10	5	50

Skills Evaluated: Writing, Comprehension, grammar, and Vocabulary
Text &References:
Nuevo Español Sin Fronteras (ESF1) by Jesús sánchez Lobato, Concha Moreno Garcia, Concha Moreno Garcia, Isabel Santos Gargallo, Sociedad General Española De Librería, S.A 2005
Pasaporte Nivel (A1) byMatideCerraloza Aragón, oscarCerraloza Gilli, Begoña Llovet Barquero, EdelsaGroup didascalia, S.A. 2005
Dictionaries for reference: Collins, www.wordreferences.com.
Essential materials are given in the form of photocopies.

FOREIGN LANGUAGE CHINESE

Semester - II **Course Code: 201/211** **Credit Units: 02**

Course Learning Objectives:

- Students will hone Basic language skills such as reading, writing, speaking, listening & interactive in the language
- Students will be able to read and interpret small texts .
- Students will be able to communicate in small sentences in writing, self introduction, family description etc.
- Students will be able to communicate in small sentences in oral, self introduction, family description etc.

On the completion of second semester the students will be able to:

- Read Chinese words, phrases and simple sentences both in Pin Yin and Characters.
- Write Chinese Characters and sentences.
- Speak Chinese dialogues with correct pronunciation & tone.
- Listen and understand simple Chinese words and dialogues used in syllabi.
- Manipulate basic grammatical structures such as questions type (2), 有 sentence, verbal predicate, 们， numeration, time etc.
- Master and use most essential vocabulary items of day to day use; approx 110 Characters including 50 characters of HSK level -I.
- Understand Sino-Indian Relations.

COURSE CONTENT

1. Personal information : hobbies & habits
2. Personal information : abilities
3. Expression of gratitude
4. Expression of apology
5. Numbers & currencies
6. Expression of time
7. Description of weather
8. Description of direction,
9. Listening of dialogues
10. Conversation based on dialogues
11. Chinese CBT package /video clipping
12. Sino-Indian relations (in English)

VOCABULARY CONTENT

Vocabulary will include approx 110 Characters including 50 Characters of HSK-I level.

1. Vocab related to hobbies, abilities, gratitude, apology numbers, time, weather, direction, etc will be covered.

GRAMMAR CONTENT

1. Question of type (2) & (3)
2. 有 sentence
3. Auxiliary verbs:要,会,能, 可以
3. The sentence with a verb as its predicate.
4. 们: a plural suffix
5. Numeration
6. Interrogative pronoun 多少
7. Counting Money
8. A numeral-measure word as the attributive

9. Time words: Time, month, day & date
10. The demonstrative pronoun as the attributive
11. The adverbial adjunct:
12. Words of location

EXAMINATION SCHEME

Total: 100 marks

Continuous Evaluation (Total 50 Marks)					End Sem Evaluation (Total 50 Marks)
Quiz	Mid Term Test	Presentation	Viva Voce	Attendance	End-Term Exam
10	15	10	10	5	50

Text books & References

1. Learn Chinese with me book-I (Major Text book), People's Education Press

2. Elementary Chinese Reader Book-I (suggested reading)

2. Chinese Reader (HSK Based) book-I (suggested reading)

3. Practical Chinese Grammar for foreigners (suggested reading)

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
NUMERICAL ANALYSIS AND PROGRAMMING	BME 301	3 0 0	3	III

A. Course Learning Outcomes:

CLO 1	Able to create numerical methods to obtain approximate solutions to mathematical problems.
CLO 2	Explain the numerical methods for various mathematical operations
CLO 3	Evaluate the accuracy of common numerical methods.

Syllabus

Module I: Solution of Algebraic and Transcendental Equation
Error in a series approximation, Bisection Method, Iteration method, Method of false position, Newton-Raphson method
Solutions of Simultaneous equation
Gauss elimination method, Jacobi iteration method, Gauss Seidal method

Module II: Interpolation
Finite Differences, Difference tables
Polynomial Interpolation**:** Newton's forward and backward formula
Central Difference Formulae: Gauss forward and backward formula.
Interpolation with unequal intervals: Lagrange's Interpolation, Newton Divided difference formula

Module III: Numerical Integration and Differentiation
Introduction, Numerical differentiation Numerical Integration: Trapezoidal rule, Simpson's 1/3 and 3/8 rules.

Module IV: Solution of differential Equations
Euler's Method, Runga-Kutta Methods.

Module V: Statistical Computation
Frequency chart, Curve fitting by method of least squares, fitting of straight lines, polynomials, exponential curves etc, Data fitting with Cubic splines.

Evaluation:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text & References:

Text:
- Rajaraman V, "Computer Oriented Numerical Methods", Pearson Education
- Gerald & Whealey, "Applied Numerical Analyses", AW
- Jain, Iyengar and Jain, "Numerical Methods for Scientific and Engineering Computations", New Age Int.
- Grewal B S, "Numerical methods in Engineering and Science", Khanna Publishers, Delhi

References:
- T Veerarajan, T Ramachandran, "Theory and Problems in Numerical Methods, TMH
- Pradip Niyogi, "Numerical Analysis and Algorithms", TMH
- Francis Scheld, " Numerical Analysis", TMH
- Sastry S. S, "Introductory Methods of Numerical Analysis", Pearson Education.
- Gupta C.B., Vijay Gupta, "Introduction to Statistical Methods", Vikas Publishing.
- Goyal, M, "Computer Based Numerical and Statistical Techniques", Firewall Media, New Delhi.

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
THERMODYNAMICS	BME 302	2 1 0	3	III

A. Course Learning Outcomes:

CLO 1	Improvement of efficiency processes.
CLO 2	Making the processes more non-polluting and environmental friendly.
CLO 3	Study and research regarding alternative energy sources or transformation methods.

Course Contents:

Module I: Basic concepts of thermodynamics

Thermodynamic system, intensive and extensive properties, cyclic process, Zeroth Law of Thermodynamics, Work and heat, Flow work,First law of thermodynamics, Mechanical equivalent of heat, internal energy, Analysis of non-flow system, flow process and control volume, steady flow, energy equation, flow processes

Module II: Second Law of Thermodynamics and Entropy

Heat Engine, heat pump, Kelvin Planck and Clausius statement of Second Law of Thermodynamics, Perpetual motion machine, Reversible cycle- Carnot Cycle, Clausius inequality, entropy, Principle of entropy increase, concepts of availability, irreversibility,Carnot theorem, Max-well-relation,

Module III: Air-Standard Cycles

Carnot cycle, Otto cycle, Diesel cycle, Dual cycle, Stirling cycle, Erricsson cycle, Brayton cycle; Reversed Carnot cycle.

Module IV: Steam

Use of steam tables, wet steam, superheat steam, different processes of vapour, Mollier Diagram,steam Nozzle, calorimeter.

Module V : Compressors

Introduction,Types of compressors, Isothermal efficiency, adiabatic efficiency, clearance volume, volumetric efficiency, and multi-stage compression with intercooling.

Evaluation:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text & References:

Text:

- P.K. Nag, “Engineering Thermodynamics”, Tata McGraw Hill
- Incropera, “Engineering Thermodynamics”, John Willy

References:

- Engel, T. and Reid, P., Thermodynamics, Statistical Thermodynamics & Kinetics, Pearson Education, 2006
- Cengel & Boles, “Thermodynamics”, Tata McGraw Hill.
- Sonntag/Vanhylene, Fundamentals of Thermodynamics, Wiley
- Rahul Gupta, Engineering Thermodynamics, Asian Books P. Ltd.
- Y.V.C. Rao, Engineering Thermodynamics, Khanna Publications
- Onkar Singh, Applied Thermodynamics, New Age Publications.
- Dhomkundwar Kothandaraman, “A Course in Thermal Engineering”, Dhanpat Rai Publications

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
MECHANICS OF SOLIDS	BME 303	2 1 0	3	III

A. Course Learning Outcomes:

CLO 1	Quote the stress and strain relationship and also distinguish the determinate an indeterminate structures
CLO 2	Determine the shear force and bending moment diagrams for various beams.
CLO 3	Estimate the torsional load over shaft.
CLO 4	Illustrate principle stresses, knowledge of calculating deformation in thin cylindrical and spherical shells

Course Contents:

Module I: Simple stresses and strains:

Concept of stress and strain; Hooke's law, Young's modulus, Poisson ratio, stress at a point, stress and strains in bars subjected to axial loading. Modulus of elasticity, stress produced in compound bars subject to axial loading. Temperature stress and strain calculations due to applications of axial loads and variation of temperature in single and compound walls.

Module II: Compound stress and strains:

The two dimensional system; stress at a point on a plane, principal stresses and principal planes; Mohr's circle of stress. Graphical and Analytical methods for stresses on oblique section of body. Shear force and bending moment diagrams for cantilever, simply supported and overhanging beams.

Module III: Bending &Shear Stress:

Theory of bending stresses in beams due to bending, assumptions in the simple bending theory, derivation of formula: its application to beams of rectangular, circular and channel sections, composite beams, Shear stress in symmetric and Unsymmetric sections, bending and shear stresses in composite beams.

Module IV: Torsion& Spring:

Derivation of torsion equation and its assumptions. Applications of the equation of the hollow and solid circular shaft torsional rigidity, combined torsion and bending of circular shafts, principal stress and maximum shear stress under combined loading of bending and torsion, analysis of close-coiled-helical springs.

Module V: Thin cylinders and spheres:

Derivation of formulae and calculation of hoop stress, longitudinal stress in a cylinder and sph ere subjected to internal pressure.

Module VI: Columns and struts:

Columns and failure of columns, Euler's formulas; Rankine-Gordon's formula, Johnson's empirical formula for axially loaded columns and their applications.

Module VII: Slope and deflection:

Relationship between moment, slope and deflection, Mohr's theorem; Moment area method; method of integration; Macaulay's method,Calculate slope and deflection for the Cantilever beams, Simply supported beams with or without overhanging under concentrated loads, uniformly distributed loads or combination of concentrated and uniformly distributed loads by using these three methods.

Evaluation:

Components	Internal Assessment	Attendance	MTE	ESE
Weight age (%)	30	5	15	50

Text & References:

- Jindal U.C., “Strength of Materials”, Galgotia Publication, New Delhi, 1998.
- Ryder G.H., “Strength of Materials”, Macmillan, Delhi, 2003.
- R.K. Bansal, “Strength of Materials”, Laxmi Publication, New Delhi, 2001.
- Sadhu Singh, “Strength of Materials”, Khanna Publishers, New Delhi, 2000.
- Timoshenko S.P., “Elements of Strength of Materials”, East-West affiliated, New Delhi, 2000.

- Hibbler R.C., “Mechanics of Materials”, Prentice Hall, New Delhi, 1994.
- Popov Eger P., “Engg. Mechanics of solids”, Prentice Hall, New Delhi, 1998.
- Fenner, Roger. T, “Mechanics of Solids”, U.K. B.C. Publication, New Delhi, 1990.
- Srinath L.S. et.al., “Strength of Materials”, McMillan, New Delhi,2001

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
MANUFACTURING PROCESS	BME 304	3 0 0	3	III

Course Learning Outcomes

CLO 1	Illustrate the basic principles of foundry practices and special casting processes, their Advantages, Limitations and Applications
CLO 2	Explain and relate the basics of hot and cold working process, their advantages, Limitations and Applications
CLO 3	Demonstrate the various types of joining processes and select the appropriate one according to the application
CLO 4	Illustrate basic principles of working of machine tools viz. Lathe, Milling, Grinding, Drilling machines etc.
CLO 5	Distinguish between basic manufacturing processe

Course Contents:

Module I: Introduction to Machine Tools
Classification of machine tools, kinds of motion in machine tool operations, definition of cutting speed, feed and depth of cut

Module II: Lathe
Classification and various parts of Lathe, specification, Description of important mechanism viz. apron, tail stock, head stock, work holding, devices and operations, e.g. taper, turning, eccentric turning and screw-cutting, Geometry of a single point cutting tool. Capstan and turret lathe, cutting speed, feed, depth of cut and calculation machining time in lathe machine

Module III: Drilling Machine
Geometry and nomenclature of a twist drill, specification and classification of drilling machines, tool holding devices, work holding devices, different types of operations performed on a drilling machine, cutting speed, feed, depth of cut and calculation machining time in drilling

Module IV: Milling Machine
Working principle, milling methods, classification of milling machines, different types of operations e.g. slab, face, Angular, form, straddle, gang, end, T-slot, saw milling operations, Dividing Head e.g. Plain, universal and optical, Indexing methods e.g. simple, compound and differential indexing

Module V: Shaper, Slotter & Planer
Principal part of a shaper, classification, Quick Return mechanism, table feed mechanism of a shaper, Operations, e.g. horizontal, vertical and inclined shaping, Principal part of a Planer, Types of planer, Planer Operations, Principal part of a Slotter, Types of slotter, Difference between a shaper, planer and slotter.

Module VI: Grinding Machines
Abrasive machining, surface finishing parameters, grinding wheels selection parameters, wheel turning and dressing, Types of grinding machines e.g. Rough grinders, Cylindrical grinders, Internal grinders, surface grinder, Tool and cutter grinder, special purpose grinding machines.

Module VII: Special Machines
Introduction of NC, DNC and CNC machines, Broaching machines, Gear hobbing machine, Lapping, honing and super finishing processes.

EXAMINATION SCHEME:

Components	Other Components	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

MTE: Mid-term Examination, **ESE**: End Semester Examination**; A:** Attendance

Text & References:

Text:

- P.N. Rao, "Manufacturing Technology: Metal Cutting & Machine Tools", Tata McGraw Hill, Delhi, 2004.
- B.S. Raghuwanshi, "Workshop Technology", Vol.2, Dhanpat Rai & Sons, 2003.
- Hazra Chandhari S.K., "Elements of Workshop Technology", Vol.2, Media Promoters, 2003.

References:

- P.C. Sharma, "A Text Book of Production. Engineering", S. Chand, New Delhi, 2004.
- Bawa H.S., "Workshop Technology", Vol.2, Tata McGraw Hill, 2004.
- Juneja & Shekhon, "Fundamental of Metal Cutting", New Age Publications
- S.F. Krar Stevan F. and Check A.F., "Technology of M/C Tools", McGraw Hill Book Co., 1986.
- Kibbe Richard et al, "M/c Tool practices", Prentice Hall India, 2003.
- Bangalore HMT, "Production Technology", Tata McGraw Hill, 1980.
- R.K. Jain, "Production Technology", Khanna Publishers

Gerling Heinrich, "All about Machine Tools", New Age Publication, 2003.

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
COMPUTER GRAPHICS	BME 305	2 0 0	2	III

Course Learning Outcomes

CLO 1	Understand the basics of computer graphics, different graphics systems and applications of computer graphics.
CLO 2	Extract scene with different clipping methods and its transformation to graphics display device
CLO 3	Discuss various algorithms for scan conversion and filling of basic objects and their comparative analysis

Course Contents:

Module I: Introduction to Graphics and Graphics Hardware System
Video display devices, CRT, LCD Display devices Raster scan displays, Random scan displays, Raster scan systems, Random scan Systems.
Input devices, keyboard, mouse, Trackball and spaceball, Joystick, Data glove, Digitizers, Image scanners, Touch panels, Light pens, Voice systems.
Hardcopy devices, Printers, Plotters.

Module II: Output Primitives and Clipping operations
Algorithms for drawing 2D Primitives lines (DDA and Bresenham's line algorithm),circles (bresenham's and midpoint circle algorithm),ellipses(midpoint ellipse algorithm),other curves(conic sections, polynomials and spline curves).
Antialiasing and filtering techniques
Line clipping (cohen-sutherland algorithm), clip windows, circles, ellipses, polygon, clipping with Sutherland Hodgeman algorithm.

Module III: Geometric transformation
2D Transformation: Basic transformation, Translation, Rotation, scaling, Matrix Representations and Homogeneous coordinates, window to viewport transformation.
3D Concepts: Parallel projection and Perspective projection, 3D Transformation.

Module IV: 3D object Representation, Colour models and rendering
Polygon meshes in 3D, Spheres, Ellipsoid, Bezier curves and Bezier surfaces, Bspline curves and surfaces, solid modeling, sweep representation, constructive solid geometry methods. Achromatic and color models.
Shading ,rendering techniques and visible surface detection method: Basic illumination, diffuse reflection, specular reflection. Polygon rendering method, Gouraud & Phong shading. Depth-buffer method, A-buffer method, Depth-sorting method(painter's algorithm).

Module V: Introduction to multimedia
File formats for BMP, GIF, TIFF, IPEG, MPEG-II, Animation techniques and languages.

Evaluation:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text & References:

Text:

- Foley et. al., "Computer Graphics Principles & practice", 2nd ed. AWL., 2000.
- D. Hearn and P. Baker, "Computer Graphics", Prentice Hall, 1986.
- R. Plastock and G. Kalley, "Theory and Problems of Computer Graphics", Schaum's Series, McGraw Hill, 1986

References:

- R.H. Bartels, J.C. Beatty and B.A. Barsky, “An Introduction to Splines for use in Computer Graphics and Geometric Modeling”, Morgan Kaufmann Publishers Inc., 1987.
- C.E. Leiserson, T.H. Cormen and R.L. Rivest, “Introduction to Algorithms”, McGraw-Hill Book Company, 1990.
- W. Newman and R. Sproul, “Principles of Interactive Computer Graphics, McGraw-Hill, 1973.
- F.P. Preparata and M.I. Shamos, “Computational Geometry: An Introduction”, Springer-Verlag New York Inc., 1985.
- D. Rogers and J. Adams, “Mathematical Elements for Computer Graphics”, McGraw-Hill International Edition, 1989
- David F. Rogers, “Procedural Elements for Computer Graphics”, McGraw Hill Book Company, 1985.
- Alan Watt and Mark Watt, “Advanced Animation and Rendering Techniques”, Addison-Wesley, 1992

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
ALTERNATIVE SOURCES OF ENERGY	BME 307	3 0 0	3	III

Course Learning Outcomes

CLO 1	Conceptual knowledge of the technology, economics and regulation related issues associated with wind and alternative sources of energy
CLO 2	Ability to analyse the viability of wind and alternative energy projects
CLO 3	Capability to integrate various options and assess the business and policy environment regarding wind and alternative energy projects

Course Contents:

Module I: Introduction
Energy source, India's production and reserves of commercial energy sources, need for non-conventional energy sources, energy alternatives, solar, thermal, photovoltaic. Water power, wind biomass, ocean temperature difference, tidal and waves, geothermal, tarsands and oil shale, nuclear (Brief descriptions); advantages and disadvantages, comparison (Qualitative and Quantitative).

Module II: Solar Thermal Conversion: Collection and storage, thermal collection devices, liquid flat plate collectors, solar air heaters concentrating collectors (cylindrical, parabolic, paraboloid) (Quantitative analysis); sensible heat storage, latent heat storage, application of solar energy water heating. Space heating and cooling, active and passive systems, power generation, refrigeration. Distillation (Qualitative analysis) solar pond, principle of working, operational problems.

Module III: Wind Energy: Properties of wind, availability of wind energy in India, wind velocity and power from wind; major problems associated with wind power, wind machines; Types of wind machines and their characteristics, horizontal and vertical axis wind mills, elementary design principles; coefficient of performance of a wind mill rotor, aerodynamic considerations of wind mill design, numerical examples.

Module IV: Geothermal and Tidal Energy: Geothermal Energy Conversion : Principle of working, types of geothermal station with schematic diagram, geothermal plants in the world, problems associated with geothermal conversion, scope of geothermal energy.
Tides and waves as energy suppliers and their mechanics; fundamental characteristics of tidal power, harnessing tidal energy, limitations. Ocean Thermal Energy Conversion : Principle of working, Rankine cycle, OTEC power stations in the world, problems associated with OTEC.

Module V: Energy from Biomass: Photosynthesis, photosynthetic oxygen production, energy plantation, bio gas production from organic wastes by anaerobic fermentation, description of bio-gas plants, transportation of bio-gas, problems involved with bio-gas production, application of bio-gas, application of bio-gas in engines, advantages.

Evaluation:

Components	Other Components	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text & References:

- Non-Convention Energy Resources B H Khan McGraw Hill Education (India) Pvt. Ltd. 3rd Edition
- Solar energy Subhas P Sukhatme T ata McGraw Hill 2nd Edition, 1996.
- Non-Conventional Energy Sources G.D Rai Khanna Publishers 2003

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
Introduction to Optimization	BME 307	3 0 0	3	III

Course Learning Outcomes

CLO 1	The student can solve convex optimization problems with the basic optimization algorithms
CLO 2	The student is also able to form the necessary and sufficient conditions for the optimality.

Course Contents:

Module-I: Introduction

Concept of optimization – classification of optimization – problems.

Module-II: Linear Programming

Examples of linear programming problems – formulation simplex methods variable with upper bounds – principleduality -dual simplex method - sensitivity analysis – revised simplex procedure – solution of the transportation problem – assignment – network minimization – shortest route problem – maximal two problem – L.P. representation of networks

Module-III: Queuing Theory

Queuing Model, poison and exponential distributions -Queues with combined arrivals and departures-random and series queues.

Module-IV: Unconstrained Optimization

Maximization and minimization of convex functions. Necessary and sufficient conditions for local minima – speed and order of convegence – unibariate search – steepest and desent methods- metcher reeves method -conjugate gradient method.

Module-V: Constrained Optimization

Necessary and sufficient condition – equality constraints, inequality constraints -kuhu – tucker conditions – gradient projection method – penalty function methods – cutting plane methods of sibel directions.

Examination Scheme:

Components	Internal assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

MTE: Mid Term Exam, ESE: End Semester Examination;

Text & References

Text

1. Rao S.S,"Optimization – Theory and applications", Wiley Easter Ltd., 1979

References

1. David G.Luerbeggan, "Introduction to Linear and Non Linear Programming", Addison Wesley Publishing Co. 1973.

2. Hadley G. "Nonlinear and – dynamic programming" Addison Wesley Publishing Co. 1964.

3. Cordan C.C. Beveridge and Robert S. Schedther, "Optimization, Theory and Practice" McGraw Hill Co.1970.

4. HarndyA.Tahh. "operations Research, An Introduction", Macmillan Publishers

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Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
GREEN VEHICLE TECHNOLOGY	BME 308	3 0 0	3	I

Course Learning Outcomes

CLO 1	Explain the basics of electric and hybrid electric vehicles, their architecture, technologies and fundamentals
CLO 2	Analyse the use of different power electronics devices and electrical machines in hybrid electric vehicles.
CLO 3	Explain the use of different energy storage devices used for hybrid electric vehicles, their technologies and control and select appropriate technology
CLO 4	Interpret working of different configurations of electric vehicles and its components, hybrid vehicle configuration, performance analysis and Energy Management strategies in HEVs.

Course Contents:

Module I - Introduction

Overview of green vehicles in India. Benefit of using green vehicles. Economic and environmental impact of electric hybrid vehicle. Comparison of hybrid electric vehicles and conventional vehicles. Introduction to Hybrid Electric Vehicles: History of hybrid and electric vehicles, social and environmental importance of hybrid and electric vehicles, impact of modern drive-trains on energy supplies. Conventional Vehicles: Basics of vehicle performance, vehicle power source characterization, transmission characteristics.

Module II -Hybrid and Electric Drive-trains

Hybrid Electric Drive-trains: Basic concept of hybrid traction, introduction to various hybrid drive-train topologies, power flow control in hybrid drive-train topologies, fuel efficiency analysis. Electric Drive-trains: Basic concept of electric traction, introduction to various electric drive-train topologies, power flow control in electric drive-train topologies, fuel efficiency analysis.

Module III-Propulsion System

Introduction to electric components used in hybrid and electric vehicles, Configuration and control of DC Motor drives, Configuration and control of Induction Motor drives, configuration and control of Permanent Magnet Motor drives, Configuration and control of Switch Reluctance Motor drives, drive system efficiency.

Module IV- Energy Storage System

Introduction to Energy Storage Requirements in Hybrid and Electric Vehicles, Battery based energy storage and its analysis, Fuel Cell based energy storage and its analysis, Super Capacitor based energy storage and its analysis, Flywheel based energy storage and its analysis, Hybridization of different energy storage devices. .

Module V- Testing of Electric Vehicles

Homologation & its Types, Regulations overview (EEC, ECE, FMVSS, AIS, CMVR), Type approval Scheme. Types of test tracks, Hardware in The Loop (HIL) concepts for EV/HEVs. static testing of vehicle, dynamics testing of vehicle, vehicle component testing.

Examination Scheme:

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	EE
Weightage (%)	15	5	30	50

Text:

- Mehrdad Ehsani, Yimin Gao, Stefano Longo and Kmbiz Ebrahimi, “Modern Electric, Hybrid Electric, and Fuel Cell Vehicles”, CRC Press, 3rd edition (2019)
- A.K. Babu, “Electric & Hybrid Vehicles”,Khanna Publishing, 1st edition (2019).
- Tom Denton, “Electric and Hybrid Vehicles”, Routledge; 1st edition (2016).
- ARAI Standards for Electric Vehicles (https://www.araiindia.com/downloads)

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
SOLAR ENERGY FUNDAMENTALS	BME 309	3 0 0	3	I

Course Learning Outcomes

CLO 1	the principles that underlie the ability of various natural phenomena to deliver solar energy
CLO 2	outline the technologies that are used to harness the power of solar energy
CLO 3	discuss the positive and negative aspects of solar energy in relation to natural and human aspects of the environment.

Course Contents:

Module I: Solar Radiation: Sun as a source of energy, Solar radiation, Solar radiation at the Earth's surface, Measurement of Solar radiation-Pyroheliometer, Pyranometer, Sunshine recorder, Prediction of available solar radiation, Solar energy-Importance, Storage of solar energy, Solar pond

Module II: Solar radiation geometry: Solar radiation geometry - Earth-Sun angles – Solar angles. Calculation of angle of incidence - Surface facing due south, horizontal, inclined surface and vertical surface. Solar day length – Sun path diagram – Shadow determination. Estimation of Sunshine hours at different places in India. Calculation of total solar radiation on horizontal and tilted surfaces. Prediction of solar radiation availability.

Module III: Solar Thermal Systems: Principle of conversion of solar radiation into heat, Collectors used for solar thermal conversion: Flat plate collectors and Concentrating collectors, Solar Thermal Power Plant, Solar cookers, Solar hot water systems, Solar dryers, Solar Distillation, Solar greenhouses

Module IV: Solar Photovoltaic Systems: Conversion of Solar energy into Electricity - Photovoltaic Effect, Solar photovoltaic cell and its working principle, Different types of Solar cells, Series and parallel connections, Photovoltaic applications: Battery chargers, domestic lighting, street lighting and water pumping

Evaluation:

Components	Other Components	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text & References:

- Solar Energy Utilization, G. D. Rai, Khanna Publishers
- Solar Energy- Fundamentals, design, modeling & applications, G.N. Tiwari, Narosa Pub., 2005.
- Solar Energy-Principles of thermal energy collection & storage, S.P. Sukhatme, Tata McGraw Hill Publishers, 1999.
- Solar Photovoltaics- Fundamentals, technologies and applications, Chetan Singh Solanki, PHI Learning Pvt. Ltd.,
- Science and Technology of Photovoltaics, P. Jayarama Reddy, BS Publications, 2004.

THERMODYNAMICS LAB

Course Code: **BME 322** **P:2, C:01**

Course Contents:

- To study about the different Boilers.
- To study different types of Boilers mountings.
- To study different boilers accessories.
- To study two-stroke and four stroke petrol engine.
- To study two-stroke and four storke diesel engine.
- To study air reciprocation compressor unit.
- To determine the CV of fuel using bomb calorimeter.

Examination Schedule:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

MECHANICS OF SOLIDS LAB

Course Code: BME 323 P:02 C:01

Course Contents:
Experimental work will be based on the paper of Mechanics of Solids.

List of Experiments:

MECHANICS OF SOLIDS LAB

1. Tensile Test (MS)
2. Double Shear Test (MS)
3. Compression Test (CI)
4. BrinellHardness No.
5. Izod Impact
6. Testing Machine
7. Rockwell Hardness Tester
8. Spring Stiffness (Spring Compression Testing machine)
9. Torsion testing machine

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva .

MANUFACTURING PROCESS LAB

Course Code: BME 324 P:02 C:01

Course Contents:

1. Operations on the Lathe Machine.
2. Operations on the Shaper Machine.
3. Operations on the Planner Machine.
4. Operations on the Drilling Machine.
5. Operations on the Grinding Machine.
6. Operations on the Milling Machine.
7. To make a Single point cutting tool

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

COMPUTER GRAPHICS LAB

Course Code: **BME 325** **P:02 C:01**

Software Required: Turbo C/C++

Course Contents:

Assignments will be provided for the following:

1. Geometrical shapes based on graphics algorithms
2. 2D Geometric transformation translation, rotation, scaling, reflection.
3. Clipping
4. Animation

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

PROGRAMMING IN MAT LAB

Course Code: **BTM 326** **C:01 P:02**

Course Objective:

It is matrix based simulation software which works on algorithms. It carries various tool boxes which is helpful for day -to-day accessibility to real world. It helps in designing graphic user interface, provides tools for neural network. Hardware which are not economical for general purpose, this software tool box helps to minimize the cost ability.

Course Contents:

Software Requirement: MAT LAB 6.5

Name of Experiments:

1 To draw the time response for first order transfer function

$$H(S) = \frac{6}{S+9}$$

second order transfer function

$$H(S) = \frac{45}{S^2 + 6S + 49}$$

third order transfer function

$$H(S) = \frac{8S}{S(S+2)(S+3)}$$

2 To realize the time response in simulink by importing the system parameters from the work window for given transfer function

$$H(S) = \frac{4S}{S(S+9)(S+5)}$$

3 To draw the bode plot for following function

$$H(S) = \frac{46S}{(S+2)(S+4)(S^2+2S+4)}$$

and draw the bode plot using input arguments that represents the continuous state space system:

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ -3 & -4 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u$$

$$y = \begin{bmatrix} 10 & 0 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + [0]u$$

4 To draw the Nyquist plot for following function

$$H(S) = \frac{46S}{(S+2)(S+4)(S^2+2S+4)}$$

and draw the Nyquist plot using input arguments that represents the continuous state space system:

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ -3 & -4 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u$$

$$y = \begin{bmatrix} 10 & 0 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + [0]u$$

5 To draw the root locus plot for following transfer function

$$H(S) = \frac{45}{S(S+2)(S+4)^2}$$

6 Write a program to determine the values of the DTFT of a real sequence described as a rational function in $e^{-j\omega}$

$$X\left(e^{-j\omega}\right) = \frac{0.008 - 0.033e^{-j\omega} + 0.05e^{-j2\omega} - 0.033e^{-j3\omega} + 0.033e^{-j4\omega}}{1 + 2.37e^{-j\omega} + 2.7e^{-j2\omega} + 1.6e^{-j3\omega} + 0.41e^{-j4\omega}}$$

where K= 256

7 Write a program to determine the M-point DFT $u(k)$ of the following N-points sequence

$$u(n) = \begin{cases} 1, & 0 \le n \le N-1 \\ 0, & \text{Otherwise} \end{cases}$$

here N=8 and M=16

8 Express the following Z- transform in factored form , plot its poles and zeros, and then determine its ROCs

$$G(Z) = \frac{2z^4 + 16z^3 + 44z^2 + 56z + 32}{3z^4 + 3z^3 - 15z^2 + 18z - 12}$$

9 Write a program to test the stability of the transfer function

$$H(Z) = \frac{1}{4z^4 + 3z^3 + 2z^2 + z + 1}$$

10 Design a DAS of given four signals with signal conditioning equipments in SIMULINK

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

AMITY UNIVERSITY
RAJASTHAN

AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY(ASET)

Course Name	Course Code	LTP	Credit	Semester
Professional Communication Skills	BCS 301	1:0:0	1	1

B. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Inculcating creative thinking skills
CLO 2	Construct and showcase their communication skills in a creative manner.
CLO 3	Comprehending and demonstrating ways of self-introduction
CLO 4	Outlining and illustrating presentation Skills

B. SYLLABUS

Topic
Self-Actualization (Baseline, Self-Image Building, SWOT, Goal Setting)
Telephone Etiquette
GD-1 (Basics, Do's & Don'ts, Mannerism, Dynamics, GD Markers)
Book Review Presentation

EXAMINATION SCHEME:

Components	Self Introduction	GD	Book Review Presentation	Attendance
Weightage (%)	30	35	30	5

SUGGESTED READINGS

- Business Communication, Raman – Prakash, Oxford
- Creative English for Communication, Krishnaswamy N, Macmillan
- Textbook of Business Communication, Ramaswami S, Macmillan
- Writing Skills, Coe/Rycroft/Ernest, Cambridge

BEHAVIOURAL SCIENCE - III
(INTERPERSONAL COMMUNICATION)

Course Code: BSS304 **Credit Units: 01**

Course learning outcomes (CLOs):

At the successful completion of this course you (the student) should be able to:

1. Demonstrate knowledge of strategies for developing a healthy interpersonal communication .
2. Recognize the importance of transactional analysis, script analysis .
3. Identify the difference between healthy and unhealthy expression of emotions and develop emotional competence necessary for conflict resolution and impression management.
4. Enhance personal effectiveness and performance through effective interpersonal communication .

Course Objective:

This course provides practical guidance on

- Enhancing personal effectiveness and performance through effective interpersonal communication
- Enhancing their conflict management and negotiation skills

Course Contents:

Module I: Interpersonal Communication: An Introduction
Importance of Interpersonal Communication
Types – Self and Other Oriented
Rapport Building – NLP, Communication Mode
Steps to improve Interpersonal Communication

Module II: Behavioural Communication
Meaning and Nature of behavioiural communication
Persuasion, Influence, Listening and Questioning
Guidelines for developing Human Communication skills
Relevance of Behavioural Communication for personal and professional development

Module III: Interpersonal Styles
Transactional Analysis
Life Position/Script Analysis
Games Analysis
Interactional and Transactional Styles

Module IV: Conflict Management
Meaning and nature of conflicts
Styles and techniques of conflict management
Conflict management and interpersonal communication

Module V: Negotiation Skills
Meaning and Negotiation approaches (Traditional and Contemporary)
Process and strategies of negotiations
Negotiation and interpersonal communication

Examination Scheme:

Components	SAP	JOS	FC/MA/CS/HA	P/V/Q	A
Weightage (%)	25	15	30	25	05

SAP- Social Awareness Programme; **JOS**-Journal of Success; **HA**-Home Assignment; **P**-Presentation; **V**-Viva; **Q**-Quiz; **FC**- Flip class; **MA**- Movie Analysis; **CS**- Case study; **A**-Attendance

Text & References:

- Vangelist L. Anita, Mark N. Knapp, Inter Personal Communication and Human Relationships: Third Edition, Allyn and Bacon
- Julia T. Wood. Interpersonal Communication everyday encounter
- Simons, Christine, Naylor, Belinda: Effective Communication for Managers, 1997 1st Edition Cassel
- Goddard, Ken: Informative Writing, 1995 1st Edition, Cassell
- Harvard Business School, Effective Communication: United States of America
- Foster John, Effective Writing Skills: Volume-7, First Edition 2000, Institute of Public Relations (IPR)

Beebe, Beebe and Redmond; Interpersonal Communication, 1996; Allyn and Bacon Publishers

Semester 3 Course Code: FLT 301/311 (Tech French) Credit Units: 02

Course Learning Objective:

- Students will hone Basic language skills such as reading, writing, speaking, listening & interactive in the language
- Students will be able to read and interpret small texts .
- Students will be able to communicate in small sentences in writing, self introduction, family description etc.
- Students will be able to communicate in small sentences in oral, self introduction, family description etc
- To understand and present the time schedule and to tell the time
- To understand and draft a short biography and to present a scientist
- To understand an online conversation and read a program and the timings.
- To propose an outing and to accept an outing.
- To leave a message on the answering machine

Course Contents:

Unité 3 La science au quotidien Page : 40-61 Leçons 7, 8 & 9

Contenu Lexical:

1. L'heure
2. Les jours de la semaine
3. Les mois de l'année
4. Les matières et types de cours
5. Les spécialitésscientifiques.
6. L'annéeuniversitaire
7. Les nationalités
8. Les noms de pays
9. Les métiers scientifiques
10. Les chiffres de 69 à l'infini
11. Quelquesunités de mesure
12. Quelquestermesscientifques
13. Les termes de l'exposition
14. Les expression familières pour accepter une invitation.

Contenu Grammatical:

1. Finir, commencer au présent
2. Les prepositions de temps
3. Féminins et masculine des noms de métiers scientifiques
4. Les adjectifs de nationalité.
5. Le future proche
6. Les adjectifs demonstratives
7. Le but: pour + infinitive
8. Le register familier

EXAMINATION SCHEME

Total: 100 marks

Continuous Evaluation (Total 50 Marks)					End Sem Evaluation (Total 50 Marks)
Quiz	**Mid Term Test**	**Presentation**	**Viva Voce**	**Attendance**	**End-Term Exam**
10	**15**	**10**	**10**	**5**	**50**

Text & References:

- Le Gargasson, I. Naik, S. Chaize, C. (2012) Tech French, Delhi : Goyal Publications
- Ray. A, Robert (2010) Le Petit Robert French Dicitionary, Paris: Le Robert
- Robert, Collins (2006) Collins Robert French Dictionary, Paris : Harper Collins

Foreign Language German

Semester 3:Course Code: FLG 301/311 **Credit units : 02**

Course Learning Objective:

- Students will hone Basic language skills such as reading, writing, speaking, listening & interactive in the language
- Students will be able to read and interpret small texts .
- Students will be able to communicate in small sentences in writing, self introduction, family description etc.
- Students will be able to communicate in small sentences in oral, self introduction, family description etc.

After successful completion of this semester, students will be able to:

- describe furniture in a room.
- ask question related to time like when, from when etc.
- tell time (formal and informal)
- how to make calls on phone
- can excuse for cancel appointments.
- speak about their daily routine.

Course Contents

Vocabulary:

- Furniture
- Days and months name
- Time vocabulary like 15 min, quarter, minute, seconds.
- Adjectives use to describe furniture.

Grammar:

- Past participle of verb had
- Usage of negation like **not = nicht; kein= not a single.**
- Preposition of time.
- Use of adjective in sentences.
- Introduction and use of separable verbs

EXAMINATION SCHEME

Total: 100 marks

Continuous Evaluation (Total 50 Marks)					**End Sem Evaluation (Total 50 Marks)**
Quiz	**Mid Term Test**	**Presentation**	**Viva Voce**	**Attendance**	**End-Term Exam**
10	**15**	**10**	**10**	**5**	**50**

PrescribedText-Book: First 10 LessonsfromDeutschalsFremdsprache -1B, INBH & Oxford, New Delhi, 1977

References: **Studio D A1** by Hermann Funk, Christina Kuhn and Silke Demme, Cornelsen, 2013

Tangram A1by Rosa Maria Dallapiazza, Eduard von Jan & Till Schoenherr, Max Hueber, 2007

SprachtrainingA1 by Rita Maria Niemann, Dong Ha Kim, Cornelsen, 2013
Dictionaries for reference: **Studio D: Glossar** A1 - Deutsch –Englisch, Cornelsen, 2013
http://www.duden.de/woerterbuch
Materials are given in form of photocopies if felt to be necessary

Foreign Language Spanish

Semester 3: Course Code: FLS 301/311 Credit units : 02

Course Learning Objective:

- Students will hone Basic language skills such as reading, writing, speaking, listening & interactive in the language
- Students will be able to read and interpret small texts .
- Students will be able to communicate in small sentences in writing, self introduction, family description etc.
- Students will be able to communicate in small sentences in oral, self introduction, family description etc.
  - To enable the students to talk about a place like, class room, market, neighborhood and location of thing with the use of prepositions.
  - To talk about one's likes/dislikes, how one is feeling, to express opinions, pain and illness.
  - Time and date
  - Speaking about prices/currency/ market and quantity.
  - Counting above 100,
  - To discuss near future plans

Course Content

Vocabulary:

Vocabulary pertaining to describe people/ place /objects, Illness, Currency, Market etc. preferences, opinions , body parts etc.

Grammar:
Introduction of stem changing irregular verbs
Introductionofprepositions (Cerca de/ lejos de/ encima de etc.)
Present continuous tense **(Estar+ gerundio)**
Introduction of third person verbs Gustar/Parecer/Encantar/ Doleretc
Interrogatives – How much/ How many
Introduction of irregular verbs.
Immediate uture plans (Ir a + verbo)

ExaminationScheme:

Total: 100 marks

ContinuousEvaluation (Total 50 Marks)					EndSemEvaluation (Total 50 Marks)
Quiz	MidTerm Test	Presentation	Viva Voce	Attendance	End-TermExam
10	15	10	10	5	50

Skills Evaluated: Writing, Comprehension, grammar, and Vocabulary
Text &References:
Nuevo Español Sin Fronteras (ESF1) by Jesús sánchez Lobato, Concha Moreno Garcia, Concha Moreno Garcia, Isabel Santos Gargallo, Sociedad General Española De Librería, S.A 2005
Pasaporte Nivel (A1) byMatideCerraloza Aragón, oscarCerraloza Gilli, Begoña Llovet Barquero, EdelsaGroup didascalia, S.A. 2005
Dictionaries for reference: Collins, www.wordreferences.com.

Essential materials are given in the form of photocopies.

FOREIGN LANGUAGE CHINESE

Semester - III **Course Code: FLC- 301/311** **Credit Units: 02**

Course Learning Objectives:

- Students will hone Basic language skills such as reading, writing, speaking, listening & interactive in the language
- Students will be able to read and interpret small texts .
- Students will be able to communicate in small sentences in writing, self introduction, family description etc.

Students will be able to communicate in small sentences in oral, self introduction, family description etc

On the completion of third semester the students will be able to attain the proficiency of HSK-I and they will be able to

- Read Chinese words, phrases and simple sentences both in Pin Yin and Characters given in the text.
- Write Chinese Characters and sentences.
- Speak Chinese dialogues from various fields of day to day life.
- Listen and understand simple Chinese words and dialogues used in syllabi.
- Carry out conversation in the target language.
- Manipulate basic grammatical structures such as: 在， 是, 有 sentence, etc.
- Master and use most essential vocabulary items of day to day use and programme specific vocabulary; approx 100 Characters including 50 characters of HSK level -I.

COURSE CONTENTS

1. Description of size
2. Description of quantity
3. Asking and replying questions on shopping
4. Asking and replying questions on Communication
5. Conversation Related to Study
6. Conversation Related to Work
7. Expression of Simple Feelings
8. Listening of dialogues
9. Conversation based on dialogues
10. Programme Specific Vocabulary & Expressions
11. Chinese CBT Package
12. Chinese Festivals (In English)

VOCABULARY CONTENTS

1. Vocabulary will include approx 100 Characters including 50 Characters of HSK-I level.

2. Vocab related to size, quantity, shopping, communication, study, work and simple feelings and Programme Specific Vocabulary will be covered during this semester.

3. By the end of third semester the students will be able to master all 150 characters set for the HSK level-I.

GRAMMATICAL CONTENTS

1. Antonyms
2. Prepositional phrases
3. The object of 在， 从
4. Complement of degree

5. Preposed object
6. Verb 在
7. 有 and 是 indicating existence
8. Question of type (4)
9. The 是 sentence type (2).
10. Sentence with a verb taking two objects

EXAMINATION SCHEME

Total: 100 marks

Continuous Evaluation (Total 50 Marks)					End Sem Evaluation (Total 50 Marks)
Quiz	Mid Term Test	Presentation	Viva Voce	Attendance	End-Term Exam
10	15	10	10	5	50

Text & References

1. Learn Chinese with me book-I (Major Text book), People's Education Press

2. Elementary Chinese Reader Book-I

2. Chinese reader (HSK Based) book-I

3. Module on Programme specific vocab.

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
KINEMATICS AND DYNAMICS OF MACHINES	BME 401	2 1 0	3	IV

Course Learning Outcomes

CLO 1	Identify the inversions of fundamental mechanisms and write their applications.
CLO 2	Analyze velocity and acceleration of different links of a given mechanism.
CLO 3	Classify gears and gear trains and compute velocity ratio.
CLO 4	Perform static and dynamic analysis to attain equilibrium in mechanisms and synthesize mechanisms for motion, path, and function generation.
CLO 5	Assess friction clutches, brakes dynamometer and Governors

Course Contents:

Module I: Mechanisms and Machines:

Mechanism, machine, plane and space mechanisms, kinematic pairs, kinematic chains and their classification, degrees of freedom, Grubler's criterion, kinematic inversions of four bar mechanism and slider crank mechanism, equivalent linkages, pantograph, straight line motion mechanisms, Davis and Ackermann's steering mechanisms, Hooke's joint.

Module II: Kinematic analysis of plane mechanisms using graphical and Cartesian vector notations:

Planar kinematics of a rigid body, rigid body motion, translation, rotation about a fixed axis, absolute general plane motion. General case of plane motion, relative velocity method, velocity and acceleration analysis, instantaneous center and its application, Kennedy's theorem, relative motion, Coriolis component of acceleration.

Module III: Friction

Surface contacts, Types of friction, Friction in screws with square thread and V threads, Pivot and collar friction, Friction clutches-single, multi-plate, cone clutch, Film friction, greasy friction. Friction aspects in Brakes, Different types of brakes, rope belt and chain drive.

Module IV: Gyroscope

Angular velocity and acceleration, gyroscopic torque/couple; gyroscopic effect on naval ships; stability of two and four wheel vehicles. .

Module V: Cams and Followers

Classification of followers and cams, radial cam nomenclature, analysis of follower motion (uniform, modified uniform, simple harmonic, parabolic, cycloidal), pressure angle, radius of curvature, synthesis of cam profile by graphical approach, cams with specified contours.

Evaluation:

Components	Internal Assessment	Attendance	MTE	ESE
Weight age (%)	30	5	15	50

Text & References:

- Rattan SS; Theory of machines; TMH

- Ambekar AG; Mechanism and Machine Theory; PHI.
- Sharma CS; Purohit K; Theory of Mechanism and Machines; PHI.
- Thomas Bevan; Theory of Machines; Pearson/ CBS PUB Delhi.
- Rao JS and Dukkipati; Mechanism and Machine Theory; NewAge Delhi.
- Dr.Jagdish Lal; Theory of Machines; Metropolitan Book Co; Delhi –
- Ghosh,A,.Mallik,AK; Theory of Mechanisms & Machines, 2e,;East West Press, Delhi.
- Khurmi RS, Theory of Machines, S Chand.

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
FLUID MECHANICS	BME 402	2 1 0	3	IV

Course Learning Outcomes

CLO 1	Define the different types of fluid and its properties
CLO 2	Understand and analyze the different types of flow.
CLO 3	Solve simple problems relating to fluid
CLO 4	Define, analyze boundary layer.
CLO 5	Solve simple problems relating to the above concepts.

Course Contents:

Module I: Fluid Properties and Fluid Statics

Newtonian and Non-Newtonian Fluids; Viscosity; Incompressible and compressible fluids, compressibility. Forces on plane surfaces, forces on curved surfaces, buoyant forces, and stability of floating bodies, metacentre and metacentre height.

Module II: Kinematics of Fluid Motion

Steady and unsteady flow; uniform and non-uniform flow; Laminar and turbulent flow; streamline, path line and streak line; continuity equation, irrotational and rotational flow, velocity potential and stream function, vortex flow, free and forced vortex, sink and source flow.

Module III: Dynamics of Fluid Flow

Euler's equation of motion and its integration to yield Bernoulli's equation, its practical applications – Pilot tube, Venturi meter; steady flow momentum equation, force exerted on a pipe bend. Measurement of flow using Venturi meter, orifice meter, Pitot tube, measurement of flow in open channels – rectangular, triangular

Module IV: Dimensional Analysis and Principles of Similarity

Buckingham -Theorem and its applications, Geometric, Kinematics and Dynamic similarity; Dimensionless numbers-Reynolds, Froude, Euler, Mach, Weber Number and their significance.

Module V: Laminar and Turbulent Flow

Reynold's experiment, critical velocity, steady laminar flow through a circular tube, flow between parallel plates. Transition from laminar to turbulent flow, courses of turbulence, velocity distribution law near a solid boundary, velocity distribution in rough pipes, Hazen – Williams's formula. Boundary layer theory.

Module VI: Analysis of Pipe Flow

Energy losses, minor losses in pipe lines, concept of equivalent length, flow between two reservoirs, and multiple pipe systems – in series and parallel, siphon.

Evaluation:

Components	Internal Assessment	Attendance	MTE	ESE
Weight age (%)	30	5	15	50

Text & References:

Text:

- R.K. Bansal, "Fluid Mechanics & Hydraulic Machines", Laxmi Publications (P) Ltd., 2002.
- Gupta, S. C., Fluid Mechanics and Hydraulic Machines, Pearson Education, 2007
- D.S. Kumar, "Fluid Mechanics and Fluid Power Engineering", S.K. Kataria & Sons, 2000.

References:

- F. M. White, Introduction to Fluid Mechanics, McGraw Hill
- I.H. Shames, "Mechanics of Fluids", Tata McGraw Hill
- Douglas, J. F., Gasiorek, J.M. and Swaffield, J., Fluid Mechanics, Pearson Education, 4/e, 2006
- V.L. Streeter and E.B. Wylie, "Fluid Mechanics", Tata McGraw Hill
- Massey B S, Mechanics of Fluids, Van Nostrand Reinhold Co

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
METROLOGY	BME 403	2 0 0	2	IV

Course Learning Outcomes

CLO 1	Investigate – various national and international organizations from which we get many of our metrology references, resources, and standards
CLO 2	Create – mathematical models of fundamental physical phenomenon and apply them to predict the behaviour of engineering systems
CLO 3	Apply – dimensional analysis concepts correctly by looking up reference values for unit conversions; accurately perform associated mathematics, and present final values with the correct units/symbols
CLO 4	Develop – Ability to perform and conduct basic experiments and evaluate the results of the same

Course Contents:

Module I: Principles of measurement

Definition of Metrology, difference between precision and accuracy. Sources of errors: Controllable and Random Errors, Effects of Environment and Temperature, Effects of support, alignment errors.

Length Standards: Line standards, end standards and wavelength standards, transfer from line standards to end standards. Numerical based on line standards. Slip gauges – its use and care, methods of building different heights using different sets of slip gauges.

Limits, fits and tolerances: Various definitions, different types of fits and methods to provide these fits. Numerical to calculate the limits, fits and tolerances, ISO system of limits and fits; Gauges and its types, limit gauges – plug and ring gauges. Gauge Design – Taylor's Principle, wear allowance on gauges.

Module II: Comparators

Principles and working of Mechanical, Electrical, Optical and Pneumatic Comparators.

Angular Measurement: Sine Bar – different types of sine bars, use of sine bars in conjunction with slip gauges, Use of angle gauges, spirit level, errors in use of sine bars. Numericals.Principle and working of autocollimator.

Module III: Straightness and flatness

Definition of Straightness and Flatness error.Numericals based on determination of straightness error of straight edge with the help of spirit level and auto collimator

Screw Thread Measurement: Errors in threads, Measurement of elements of screw threads – major diameter, minor diameter, pitch, flank angle and effective diameter (Two and three wire methods). Effect of errors in pitch and flank angles

Gear Measurement: Measurement of tooth thickness – Gear tooth vernier caliper, Constant chord method, base tangent method and derivation of mathematical formulae for each method.Parkinson Gear Tester.

Module IV

Coordinate measuring machine (CMM)- Constructional features – types, applications – digital devices- computer aided inspection.

Surface texture: Introduction, types of irregularities, Elements of surface Texture, Measurement of surface finish, Examination of surface Roughness.

EXAMINATION SCHEME:

Components	Other Components	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

MTE: Mid-term Examination, **ESE**: End Semester Examination**; A:** Attendance

Text and Reference Books:

1. Engineering Metrology and Measurement, N V Raghavendra and Krishnamurthy, Oxford University Press,
2. Engineering Metrology and Measurements, Bentley, Pearson Education
3. Theory and Design for Mechanical Measurements, 3 rd Edition,Richard S Figliola, Donald E Beasley, Wiley India
4. Metrology and Measurement, AnandBewoor&VinayKulkarni McGraw-Hill
5. Doebelin's Measurement Systems Ernest Doebelin, DhaneshManik McGraw-Hill
6. A Text book of Engineering Metrology, I C Gupta, DhanpatRai Publications 8. A course in Mechanical Measurements and Instrumentation, A K Sawhney, DhanpatRai Publications
7. Mechanical Measurements and Instrumentations, Er. R K Rajput, Kataria Publication(KATSON)
8. Mechanical Measurement and Metrology by R K Jain, KhannaPublisherMechanical Measurement & Control by D.S. Kumar.
9. Industrial Instrumentation & Control by S K Singh, McGrawHill
10. Mechanical Measurements by Beckwith & Buck, Narosa publishing House

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
MEASUREMENTS AND CONTROLS	BME 404	2 0 0	2	IV

Course Learning Outcomes

CLO 1	Develop a practical approach for the construction, characteristics, operation and application of measurement concept
CLO 2	Able to solve problems relating to generated voltage, terminal voltage, currents, torque, speed, input and output power, efficiency, and voltage/speed regulation in control systems.
CLO 3	Capable of solving problems relating to rotor speed, flux, torque, developed power, efficiency in M&C.
CLO 4	Able to identify, formulate, and solve the mechanical engineering related problems

Course Contents:

Module I
Introduction to generalized measurement system and their functional elements. Basic characteristics of measuring devices, Standards & Calibration. Accuracy, Precision, Sensitivity, Resolution, Linearity & Errors in measurement.

Module II
Transducers, Stages & their classification, Resistive transducers, Strain gauges, Rosettes, Inductive transducers, Displacement measurement, LVDT.
Measurement of viscosity & flow, Transient Time & Doppler's flow meter, Measurement of liquid level, humidity, hair hygrometers.

Module III
Control engineering applications, Introduction to type of control Systems, Open loop & close loop Control Systems; Examples & their block diagrams. Transfer function.

Module IV: Modes of Control & Controller Mechanism
P, PI and PID Controller. Pneumatic & Hydraulic Controller, General Pr. of generating various Control Actions. Concept of Control Valves.

Examination Scheme:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text & References:

Text:

- Sawhney A. K 2000, "A course in Electrical & Electronics Measurement & Instrumentation", Dhanpat Rai & Son's.
- B.C Nakra, K K Chaudhary. 2004,"Instrumentation, Measurement & Analysis". TMH.
- M Ogata, "Modern Control Engineering" PHI.

References:

- H.S Kalsi, 1999, Electronic Instrumentation", TMH.
- B. C Kuo, "Automatic Control System", Prentice Hall.

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
MATERIAL SCIENCE AND METALLURGY	BME 405	2 0 0	2	IV

Course Learning Outcomes

CLO 1	To apply the concept of miller indices and types of materials
CLO 2	To study properties and dislocation theory of materials
CLO 3	To study alloys and composite materials and also analyse equilibrium and non equilibrium diagram of alloy
CLO 4	Define application of various materials

Course Contents:

Module I

Crystal Atoms of Solid: Structure of atom binding in solids metallic, Vander walls, ionic and covalent, Space lattice and crystal system arrangement of atoms in BCC, FCC and HCP crystal. Manufacture of Refractory and Ferrous Metals: Properties uses and selection of acid, basic and natural refractory, metallurgical coke, Properties, types, uses and brief description of the manufacturing processes for iron and steel making.

Module II

Plastic deformation of Metals: Point and line defects in crystals, their relation to mechanical properties, deformation of metal by slip and twinning stress strain curves of poly crystalline materials viz. mild steel cast iron and brass yield point phenomenon. Cold and hot working of metals and their effect on mechanical properties, annealing of cold worked metals, principles of re-crystallization and grain growth phenomenon, fracture in metal and alloys, ductile and brittle fracture, fatigue failure

Module III

Alloy Formation and Binary Diagram: Phase in metal system solution and inter-metallic compounds. Hume-Rottery's rules, solidification of pure metals and alloy equilibrium diagrams of isomorphous, eutectic peritectic and eutectoid system, non-equilibrium cooling and coring iron, iron carbon equilibrium diagram.

Module IV

Principles and applications of heat treatment processes viz. annealing, normalizing hardening, tempering; harden ability & its measurement, surface hardening processes. Defects in heat treatment and their remedies; effects produced by alloying elements on the structures and properties of steel. Distribution of alloying elements (Si, Mn. Ni. Cr. Mo. TL. Al) in steel

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EXAMINATION SCHEME:

Components	Other Components	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text & References:

Text:

- V. Raghavan, "Material Science & Engineering", Prentice Hall India Ltd., 2001.
- Shackelford, J.F. and Muralidhara, M.K., Introduction to Material Science for Engineers (6/e), Pearson Education, 2007
- S.K. Hazra Chaudhuri, "Material Science & Processes", Indian Book Publishers, Calcutta, 1983.
- R.B. Gupta, "Material Science Processes", Satya Prakashan, New Delhi, 2000.

References:

- Degarmo E. Paul et.al, "Materials & Processes in Manufacture", Prentice Hall India, New Delhi, 2001.
- Raymond A Higgim., "Engineering Metallurgy Part 1", Prentice Hall India, New Delhi, 1998.
- L. Krishna Reddi, "Principles of Engineering Metallurgy", New Age Publication, New Delhi, 2001.
- Buduisky et al, "Engineering Materials & Properties", Prentice Hall India, New Delhi, 2004.
- Peter Haasten, "Physical Metallurgy", Cambridge Univ. Press, 1996.

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
STATICAL QUALITY CONTROL	BME 406	3 0 0	3	IV

Course Learning Outcomes

CLO 1	Understand the philosophy and basic concepts of quality improvement.
CLO 2	Describe the DMAIC process (define, measure, analyze, improve, and control).
CLO 3	Demonstrate the ability to use the methods of statistical process control.
CLO 4	Design, use, and interpret exponentially weighted moving average and moving average control charts.
CLO 5	Perform analysis of process capability and measurement system capability.
CLO 6	Demonstrate the ability to design, use, and interpret control charts for attributes.

Unit-1Introduction

The Meaning of Quality and Quality Improvement; Brief History of Quality Methodology; Statistical Methods for Quality Control and Improvement; Total Quality Management (quality philosophy, links between quality and productivity, quality costs, legal aspects of quality implementing, quality improvement).

Unit-2Modeling Process Quality

Mean, Median, Mode, Standard deviation, Calculating area, The Deming funnel experiment, Normal distribution tables, Finding the Z score, Central limit theorem.

Unit-3Methods And Philosophy Of Statistical Process Control

Chance and assignable causes, Statistical Basis of the Control Charts (basic principles, choices of control limits, significance of control limits, sample size and sampling frequency, rational subgroups, analysis of pattern on control charts, warning limits, Average Run Length-ARL)

Unit-4Control Charts For Variables

Control Charts for X-Bar and R- Charts, Type I and Type II errors, the probability of Type II error. Simple Numerical Problems

Unit-5Process Capability

The foundation of process capability, Natural Tolerance limits, cp – process capability index, cpk, pp – process performance index, summary of process measures. Numerical problems

Unit-6Control Charts For Attributes

Binomial distribution, Poisson distribution (from the point of view of Quality control) Control Chart for Fraction Nonconforming, Control Chart for number Nonconforming, Control Charts for Nonconformities or Defects, Control Chart for Number of non-conformities per unit. Numerical problems

EXAMINATION SCHEME:

Components	**Other Components**	**Attendance**	**MTE**	**ESE**
Weightage (%)	30	5	15	50

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
APPLIED TRIBOLOGY	BME 407	3 0 0	3	IV

Course Learning Outcomes

CLO 1	Apply the basic theories of friction, wear and lubrication to predictions about the frictional behaviour of commonly encountered sliding interfaces.
CLO 2	Characterize features of rough surface and liquid lubricants as they pertain to interface sliding
CLO 3	Interpret the latest research on new topics in tribology including its application to nanoscale devices and biological systems.
CLO 4	Establish a fundamental understanding of tribological engineering by balancing both, theoretical and practical aspects of tribology.
CLO 5	Illustrate the behaviour of tribological components subjected to different working conditions and describe different tribological measures.

Course Contents:

Unit I

Introduction: Historical background, the importance of tribology in mechanical systems and the economic aspects of tribology, Solid surface characterization, contact between solid surfaces

Unit II

Friction: Causes of Friction, Adhesion Theory, Abrasive Theory, Junction Growth Theory, Laws of Rolling Friction, Friction Instability.

Unit III

Wear: Wear Mechanisms, Adhesive Wear, Abrasive Wear, Corrosive Wear, Fretting Wear, Wear Analysis

Unit IV

Lubrication and Lubricants: Importance of Lubrication, Boundary Lubrication, Mixed Lubrication, Full Fluid Film Lubrication; Hydrodynamic, Elasto-hydrodynamic lubrication, Types & Properties of Lubricants, Lubricants Additives

Unit V

Application of Tribology, Nanotribology, Green Tribology, Biomimetics, Sliding Friction and Wear Tests, Abrasion Tests, Rolling-Contact Fatigue Tests, Solid-Particle Erosion Test, Corrosion Tests

Evaluation:

Components	Other Components	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text &reference book

- Introduction to Tribology, Bharat Bhushan, 2013 / 2nd Ed., Wiley
- . Stachowiak G N,Batchelor A W and Stachowick G B "Experimental methods in Tribology", Tribology Series 44, Editor D Dowson, 2004.
- Dowson D, History of Tribology, Longman London, 1979
- Michael M Khonsari, Applied Tribology (Bearing Design and Lubrication),John Wiley & Sons, 2001.

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Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
NON-DESTRUCTIVE TESTING METHODS	BME 408	3 0 0	3	IV

Course Learning Outcomes

CLO 1	The student shall be able to select an appropriate NDT technique as per requirement.
CLO 2	The student shall be able to set various process parameters and control the NDT process for the desired output parameters.
CLO 3	The student shall be able to find the internal flaws in the material by NDT and take measures to eliminate them
CLO 4	The student shall be able to solve various problems encountered like leakage, cracks, blowholes etc with the manufacturing process by analyzing the data.
CLO 5	The student shall be competent enough to make use of modern tools and softwares for analyzing and solving real life problems.
CLO 6	The student shall be able to introduce environmental friendly solutions to achieve organizational sustainability.

Course Contents:

Module I: Introduction: Fundamentals of and introduction to destructive and non-destructive testing. Scope and limitations of NDT, Visual examination methods, Different visual examination aids.

Module II: Dye penetrant Testing/ Liquid Penetrant Testing:
Principle, procedure, characteristics of penetrant, types of penetrants, penetrant testing materials, fluorescent penetrant testing method– sensitivity, application and limitations.

Module III: Magnetic Particle Testing:
Important terminologies related to magnetic properties of material, principle, magnetizing technique, procedure, equipment, fluorescent magnetic particle testing method, sensitivity, application and limitations.

Module IV: Ultrasonic Testing: Basic principles of sound propagation, types of sound waves, Principle of UT, methods of UT, their advantages and limitations, flaw characterization technique, defects in welded products by UT, Thickness determination by ultrasonic method, Study of A, B and C scan presentations, advantage and limitations.

Module V: Radiographic Testing:
X-ray and Gamma-Ray radiography, Their principles, methods of generation, Industrial radiography techniques, inspection techniques, applications, limitations, Types of films, screens and penetrameters. Interpretation of radiographs, Safety in industrial radiography.

Module VI: Leak and Pressure Testing:
Definition of leak and types, Principle, Various methods of pressure and leak testing, Application and limitation

Module VII: Eddy Current Testing
Principle, instrument , techniques, sensitivity, application, limitation Thermal methods of NDT.

Evaluation:

Components	Assignment	Viva	MTE	Attendance	ESE
Weightage (%)	15	15	15	5	50

Text & References:

- Baldev Raj (2009) Practical Non-Destructive Testing- Narosa Publishing House Pvt. Ltd;
- J Prasad , and C. G. Krishnadas Nair (2017) Non-Destructive Test and Evaluation of Materials- McGraw Hill Education.
- Ravi Prakash,(2010) Non-Destructive Testing Techniques- New Age International Publishers.
- Lari and Kumar,(2013) Basics Of Non-Destructive Testing, S.K. Kataria & Sons.

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
TWO AND THREE-WHEELER VEHICLES	BME 409	3 0 0	3	IV

Course Learning Outcomes

CLO 1	Select frame and chassis for two and three-wheeler vehicles
CLO 2	Maintain the electrical system of vehicles
CLO 3	Rate the aerodynamics, aesthetics, ergonomics and safety aspect of vehicles

Course Contents:

Module I - Introduction
History of automobiles. Classification & layouts of two wheelers and Three wheelers vehicles . Study of technical specification of Two & Three wheelers.

Module II –Selection of Technology
Selection criteria and Design considerations for two wheeler & three wheeler engines. Systems requirements for Engine lubrication, cooling & starting. Recent developments in engine, Electric Vehicles.

Module III-Propulsion System
Clutch – special requirements, different types used in two & three wheelers. Need of primary reduction, selection of transmission - gear box, gear shift mechanism, Chain or belt drive system for transmission of torque to drive wheels, automatic transmission.

Module IV- Steering System

Steering system arrangement for two & three wheelers, steering column construction, steering geometry, Suspension requirements, design considerations, trailing & leading link, swinging arm, springs & shock absorbers.

Module V- Brake, Wheels & Tyres

Design consideration of brake, types of brakes – disc, drum and braking mechanism – mechanical, hydraulic & serv. Hand operated or Foot operated brakes. Wheel types – spokes construction, alloy wheels, pressed wheel disc or split wheel disc. Types of tyres for two & three wheelers.

Module V- Maintenance

Preventive & brake down maintenance, factors affecting fuel economy & emission.

Examination Scheme:

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	EE
Weightage (%)	15	5	30	50

Text:

- Smith Manilal Solanki, "Two and Three Wheeler Technology", Nirali Prakashan, 1st edition (2019).
- Panchal Dhruv U, "Two And Three Wheeler Technology, 1st edition PHI Learning Pvt Ltd (2015).
- Doshi J.A, "Vehicle Maintenance and Garage Practice", 1st edition PHI Learning Pvt Ltd (2014).
- Small Electric Vehicles, Springer (2021).

KINEMATICS AND DYNAMICS OF MACHINES LAB

Course Code: BME 421 P:02 C:01

Course Contents:
List of Experiments:

1. To study inversion of 3 R-IP Kinematics chain
2. To study inversions of 2R-2P Kinematics Chain
3. To carry out computer implementable kinematics analysis of 4 R mechanisms
4. To carry out computer implementable kinematics analysis of slider bar mechanism
5. To study gearbox, clutch and differential gear
6. To find the coefficient of friction for clutch plate
7. To determine gear ratio for an epicyclical gear train and verify it by analytical method
8. To study different types of Cam follower systems
9. To verify Gyroscopic Law
10. To determine and verify the whirling speed of a shaft-disc system
11. To determine the damping factor for a given horizontal vibration set up
12. To obtain dynamic balance for an unbalanced system with revolving masses

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

FLUID MECHANICS LAB

Course Code: BME 422 P:02 C:01
Course Contents:

FLUID MECHANICS LAB

1. Verification of Bernoulli's Theorem
2. Experiment using Venturimeter
3. Determination of coefficient of Discharge C_d, C_c, $C_!$ Using
4. Circular/triangular/rectangular orifice
5. To find major head losses in a pipe line
6. To find minor head losses in a pipe line (sudden expansion/contraction/bend)

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

METROLOGY LAB

Course Code: BME 423 P:02 C:01

Name of Experiments:

1 Set up a dimension by slip gauges (example 36.936; 14.727…..) Measure this set up by micrometer (least count 0.01) several times and read dimensions. Find statistical mean and record the expected variation between the actual dimension and dimension measured by micrometer.

2 To check the roundness of a circular bar with the help of dial gauge.

3 To calibrate the micrometer using slip gauges.

4 Check the bore in a component by a bore-indicator. Set the bore indicator by micrometer and measure the deviation in the bore. Measure several times and obtain the mean value at three positions along the length of the bore.

5 Set – up a sine bar for measuring the angle of an inclined surface (of a bracket, milling cutter arbor with 7/24 taper, ….). Measure the angle several times and record the mean value. Use height gauge wherever necessary.

6 Performance on angular measurement using angular measuring instruments.

7 Measure the straightness of a surface (surface plate; guide way of machine tool) by using str aight edge and dial gauge and dial gauge stand.

10 To machine a given surface and study its roughness characteristics

11 Measure the dimensions of a mechanical component using profile projector

12 Measure the dimensions of a mechanical component using tool maker's microscope.

13. Measurement of Temperature with different devices.

Open ended Problem:

Students will work on an industrial based problem on measurement.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

MEASUREMENT AND CONTROL LAB

Course Code: BME 424 **P:02 C:01**

Course Contents:

List of Experiments:

1. Measurement of resolution and sensitivity of thermocouple (study of various thermocouples J, K, T, etc.) (Calibration)
2. Measurement of resolution, sensitivity and non linearity of termistor. (termistor instability)
3. Measurement of thickness of LVDT.
4. Measurement of resolution of LVDT (and displacement measurement)
5. Study of proportional control and offset Problems.
6. Study of proportional integral control.
7. Study of proportional integral derivative (PID) control.
8. Vibration measurement by stroboscope (natural frequency of a cantilever)
9. Angular frequency (speed of rotating objects) measurement by stroboscope.
10. Pressure transducer study and calibration.
11. Proving ring (force measurement)
12. Torque cell.
13. Closed loop study of an electric circuit.
14. Young's modulus of a cantilever.
15. Young's modulus and poison's ratio of tensile test piece of M.S.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

COMPUTER AIDED DRAFTING AND DESIGN LAB

Course Code: **BME 425** **P:02 C:01**

Course Contents:

1. Basics of Auto CAD
2. Modeling of machine Components such as Connecting Rod, Piston etc.
3. Introductory exercise for 3-D modeling.
4. Exercise for advanced 3-D modeling.
5. Exercise for 3-D editing options.
6. Exercise for Assembly modeling.
7. Exercise for surface modeling.
8. Using Any One (From CREO, Unigraphics, CATIA, Solid Edge, Inventor) Parametric Software.
    a. Prepare solid models of dismantled parts of an assembly.
    b. Assemble the parts.
    c. Get orthographic projection of solid models prepared at "a" above.
    d. Get orthographic projection of an assembly model prepared at "b" above.
    e. Prepare the bill of material (BOM).
    f. Prepare a power point presentation of the work.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

AMITY UNIVERSITY
RAJASTHAN

A

MITY SCHOOL OF ENGINEERING & TECHNOLOGY(ASET)

Course Name	Course Code	LTP	Credit	Semester
Professional Communication Skills	BCS 401	1:0:0	1	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Identify steps to professional communication
CLO 2	Identify the key components of meeting, agendas and meeting minutes
CLO 3	Understand the key skills and behaviors required to facilitate a group discussion/presentation
CLO 4	Polish current affairs & rapport building

B. SYLLABUS

Topic
Enhancing Speaking Skills (Public Speaking)
Resume Building-1
GD-2 (Specifically: Social & Political)
Presentations-2

EXAMINATION SCHEME:

Components	Public Speaking	GD	Poster Presentation	Attendance
Weightage (%)	30	30	35	5

SUGGESTED READINGS

- Essential Telephoning in English, Garside/Garside, Cambridge
- Working in English, Jones, Cambridge
- Dr. P.Prasad. *Communication Skills*.S.K.Kataria &Sons
- Koneru, Aruna. *Professional Communication.* The McGraw Hill: New Delhi, 2008. Print

- Krishnaswamy N, *Creative English for Communication*. Delhi: Macmillan Publishers India Ltd. Print. 2007.

BEHAVIOURAL SCIENCE - IV
(RELATIONSHIP MANAGEMENT)

Course Code: BSS 404 **Credit Units: 01**

Course Objective:

To understand the basis of interpersonal relationship
To understand various communication style
To learn the strategies for effective interpersonal relationship

Course Learning Outcomes (CLOs)

At the successful completion of this course you (the student) would be able to:

1. Identify the basis of interpersonal relationship.
2. Describe the importance of interpersonal relationship and bridging individual differences.
3. Recognize the development and strategies for effective interpersonal relationship.
4. Explain and apply the theories of relationship concepts of impression management.

Course Contents:

Module I: Understanding Relationships
Importance of relationships
Role and relationships
Maintaining healthy relationships

Module II: Bridging Individual Differences
Understanding individual differences
Bridging differences in Interpersonal Relationship – TA
Communication Styles

Module III: Interpersonal Relationship Development
Importance of Interpersonal Relationships
Interpersonal Relationships Skills
Types of Interpersonal Relationships

Module IV: Theories of Interpersonal Relationships
Theories: Social Exchange, Uncertainty Reduction Theory
Factors Affecting Interpersonal Relationships
Improving Interpersonal Relationships

Module V: Impression Management
Meaning & Components of Impression Management
Impression Management Techniques (Influencing Skills)
Impression Management Training-Self help and Formal approaches

Examination Scheme:

Components	SAP	JOS	FC/MA/CS/HA	P/V/Q	A
Weightage (%)	25	15	30	25	05

SAP- Social Awareness Programme; **JOS**-Journal of Success; **HA**-Home Assignment; **P**-Presentation; **V**-Viva; **Q**-Quiz; **FC**- Flip class; **MA**- Movie Analysis; **CS**- Case study; **A**-Attendance

Text & References:

- Vangelist L. Anita, Mark N. Knapp, Inter Personal Communication and Human Relationships: Third Edition, Allyn and Bacon
- Julia T. Wood. Interpersonal Communication everyday encounter
- Simons, Christine, Naylor, Belinda: Effective Communication for Managers, 1997 1st Edition Cassell
- Goddard, Ken: Informative Writing, 1995 1st Edition, Cassell
- Harvard Business School, Effective Communication: United States of America
- Foster John, Effective Writing Skills: Volume-7, First Edition 2000, Institute of Public Relations (IPR)

Beebe, Beebe and Redmond; Interpersonal Communication, 1996; Allyn and Bacon Publishers

Semester 4 Course Code: FLT 401/411 (Tech French) Credit Units: 02

Course Learning Objective:

- Students will hone intermediate language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of intermediate level.
- Students will be able to communicate in small sentences in Simple Future and Past tenses .
- Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.
- To do the shopping
- To ask and express one's needs
- To present one's eating habits
- To understand a label
- To ask the price
- To order at the restaurant
- To organise a meeting
- To propose to someone to do an activity
- To understand the advertisement of a conference
- To understand the names of different stations
- To speak about ones schedule
- To express one's professional wish
- To formulate a project
- To read a notice board

Course Contents:

Unité 3 La science au quotidien Page : 62-84 Leçons 10, 11 & 12

Contenu Lexical:

1. La nourriture
2. Les ingredients
3. Les expressions de quantité
4. Les expressions familières avec les noms de fruits et les legumes
5. Les expressions pour proposer une invitation
6. Le processus de fabrication de quelques elements
7. Les expressions pour parler d'un projet

Contenu Grammatical:

1. Manger et boire au présent
2. L'articlepartitif
3. Les prépositions de lieu
4. Les verbs pronominaux
5. La date, l'heure et le jour: les prépositions
6. La nominalisation

EXAMINATION SCHEME

Total: 100 marks

Continuous Evaluation (Total 50 Marks)					End Sem Evaluation (Total 50 Marks)
Quiz	Mid Term Test	Presentation	Viva Voce	Attendance	End-Term Exam
10	15	10	10	5	50

Text & References:

- Le Gargasson, I. Naik, S. Chaize, C. (2012) Tech French, Delhi : Goyal Publications
- Ray. A, Robert (2010) Le Petit Robert French Dicitionary, Paris: Le Robert
- Robert, Collins (2006) Collins Robert French Dictionary, Paris : Harper Collins

Foreign Language German

Semester 4:Course Code: FLG 401/411 **Credit units : 02**

Credit Units : 02

Course Learning Objective:

- Students will hone intermediate language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of intermediate level.
- Students will be able to communicate in small sentences in Simple Future and Past tenses .
- Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.

After successful completion of this semester, students will be able to:

- talk about different professions
- express positive and negative aspect of different professions.
- talk about daily routine of a job
- enquire about direction.
- use preposition in sentences.
- understand the visiting cards etc.

Course Content:

Vocabulary Content:

- Professions
- Workplaces
- Professional Tasks like writing mail, make phone calls etc.
- Locations (right left, etc.)
- Public places

Grammar Content:

- Possessive article in accusative.
- Introducing prepositions in dative, accusativ cases and changing prepositions in dat + acc.
- Usage of preposition : in through, to , at etc

EXAMINATION SCHEME

Total: 100 marks

Continuous Evaluation (Total 50 Marks)					End Sem Evaluation (Total 50 Marks)
Quiz	Mid Term Test	Presentation	Viva Voce	Attendance	End-Term Exam
10	15	10	10	5	50

PrescribedText-Book: Lessonsfrom 11 onwardsfromDeutschalsFremdsprache -1B, INBH & Oxford, New Delhi, 1977

References: **Studio D A1** by Hermann Funk, Christina Kuhn and Silke Demme, Cornelsen, 2013

Tangram A1by Rosa Maria Dallapiazza, Eduard von Jan & Till Schoenherr, Max Hueber, 2007

SprachtrainingA1 by Rita Maria Niemann, Dong Ha Kim, Cornelsen, 2013

Dictionaries for reference: **Studio D: Glossar** A1 - Deutsch –Englisch, Cornelsen, 2013

http://www.duden.de/woerterbuch

Materials are given in form of photocopies if felt to be necessary

Foreign Language Spanish

Semester 4: Course Code: FLS 401/411 Credit units : 02

Course Learning Objective:

- Students will hone intermediate language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of intermediate level.
- Students will be able to communicate in small sentences in Simple Future and Past tenses .
- Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.
- To talk about relations
- To express obligation
- To enquire about direction
- To be able to describe your locality
- Telephonic conversation etiquettes
- Dialogue between two friends/sales man and client etc.

Course Content:

Vocabulary Content:
Family, friends, directions, way(going straight, left, right etc.) Temple, hospital, restaurant, church, hospital, Town hall, parks, shopping mall, etc.

Grammar Content:
Revision of present indefinite, continuous and near future tense.
Doublenegation – No Nunca, Ningun/a, Nada, nadie etc.
Tener que / Hay que
Expressionswith Tener and Estar.
Use of Apetecer, Llevarse bein o mal con alguien / Caer +bien/mal + a alguien

Examination Scheme

ExaminationScheme:

Total: 100 marks

ContinuousEvaluation (Total 50 Marks)					EndSemEvaluation (Total 50 Marks)
Quiz	MidTerm Test	Presentation	Viva Voce	Attendance	End-TermExam
10	15	10	10	5	50

Skills Evaluated: Writing, Comprehension, grammar, and Vocabulary

Text &References:
Nuevo Español Sin Fronteras (ESF1) by Jesús sánchez Lobato, Concha Moreno Garcia, Concha Moreno Garcia, Isabel Santos Gargallo, Sociedad General Española De Librería, S.A 2005
Pasaporte Nivel (A1) byMatideCerraloza Aragón, oscarCerraloza Gilli, Begoña Llovet Barquero, EdelsaGroup didascalia, S.A. 2005
Dictionaries for reference: Collins, www.wordreferences.com.
Essential materials are given in the form of photocopies.

Foreign Language Chinese

Semester - IV **Course Code: FLC- 401/411** **Credit Units: 02**

Course Learning Objectives:

- Students will hone intermediate language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of intermediate level.
- Students will be able to communicate in small sentences in Simple Future and Past tenses .
- Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.

On the completion of Fourth semester the students will be able to consolidate their proficiency of HSK-I and will be able to

- Read Chinese words, phrases and simple sentences both in Pin Yin and Characters given in the text.
- Write Chinese Characters, sentences and small paragraphs.
- Speak Chinese dialogues from various fields of day to day life.
- Listen and understand simple Chinese words and dialogues used in syllabi.
- Carry out conversation in the target language.
- Manipulate basic grammatical structures such as: 疑问代词.etc.
- Master and use most essential vocabulary items of day to day use and office related vocabulary; approx 70 Characters including 50 characters of HSK level –II
- Refer Chinese dictionaries.
- Translate a Chinese paragraph with the help of dictionaries and translation software.

COURSE CONTENTS

1. Revision of Important expressions
2. Expression of welcome
3. Expression of time: past, present & future
4. Expression of right or wrong.
5. Questioning and answering simple questions about medical care
6. Questioning and answering simple questions about sports & entertainment
7. Office related vocabulary , expressions & email writing
8. Referring Chinese dictionaries (hard and electronic dictionaries)
9. Translation with the help of dictionaries & translation software
10. Practice of model test series of HSK-I
11. CBT package
12. Listening
13. Conversation based on above topics
14. Chinese poetry

VOCABULARY CONTENT

1. Vocabulary will include approx 70 Characters including 50 Characters of HSK-II level.

1. Vocab related to welcome, tenses, right wrong etc and office related vocabulary will be covered during this semester.

GRAMMATICAL CONTENT

1. Interrogative pronouns 疑问代词: 什么，哪儿，谁，为什么， 怎么样， 哪，什么时候，多少，几，

2。Money 表示钱数

3. Weight 表示重量

4. Measure words量词

5. Adverbs 副词

6. 时间副词：正在

7. 频率副词：再

ExaminationScheme:

Total: 100 marks

ContinuousEvaluation (Total 50 Marks)					EndSemEvaluation (Total 50 Marks)
Quiz	**MidTerm Test**	**Presentation**	**Viva Voce**	**Attendance**	**End-TermExam**
10	**15**	**10**	**10**	**5**	**50**

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
MACHINE DESIGN – I	**BME 501**	3 0 0	3	V

A. Course Learning Outcomes:

CLO 1	Analyse combined stresses in a plane (tension/compression and shear in two dimensions) using Mohr's Circle.
CLO 2	Evaluate the stress situation which involves additional design criteria other than static stress, such as cyclical loading and local stress concentrations due to notches.
CLO 3	Examine and identify the various elements involved in power transmission and rotary motion in a machine and analyse whether they are properly designed.
CLO 4	Understand and analyse the various elements of a machine followed by the appropriate selection of suitable components from manufacturers' catalogues.
CLO 5	Integrate the various individual elements into a system composed of several elements

B. Syllabus:

Module I: Variable stresses in Machine Parts

Fatigue and Endurance Limit, Factor of Safety for Fatigue Loading, Stress concentration, Notch sensitivity, Gerber Method, Goodman Method and Soderberg Method for a combination of stresses.

Module II: Power Screws

Types of screw threads, Torque required to raise and lower the load, Efficiency of square threaded screw, overhauling and self locking screw, stresses in power screw, design of screw jacks.

Module III: Shaft, Keys and Couplings

Design of shaft, Types of Keys, Splines, Strength of Sunk Key, types of shaft coupling, Sleeve and muff coupling, Flange coupling, Flexible coupling, Oldham coupling, Universal coupling.

Module IV: Cotter and Knuckle Joints

Types of cotter joints, design of socket and spigot joint, design of sleeve and cotter joint, design of jib and cotter joint, Design procedure of Knuckle joint.

Module V: Drives

Types of Belt drives, Flat Belt drives, Velocity ratio, Sleep, Creep of Belt, Length of open Belt, length of cross belt, power transmission by belt, Maximum tension in the belt. Types of V belt and Pulleys, advantages and disadvantages of V belt over Flat Belt, Ratio of Driving tensions for V belt, Rope drives. Chain drives, advantages and disadvantages of Chain drives.

Module VI: Riveted and Welded Joint

Types of Riveted joint, Lap joint, Butt Joint, Caulking and Fullering, Failure of Riveted joint, Strength of Riveted joint, Efficiency of Riveted joint. Advantages and Disadvantages of welded joint over Riveted joint, Strength of Fillet joint, strength of Butt joints.

C. Examination Scheme:

Components	Internal Assessment	Attendance	MTE	ESE
Weight age (%)	30	5	15	50

D. Text & References:

- J.E. Shigley, Mechanical Engineering Design.
- Sadhu Singh, Machine Design
- R.S. Khurmi & J.K. Gupta, Machine design
- D.K. Aggarwal & P.C. Sharma, Machine Design

Amity School of Engineering and Technology (ASET)

A. Course Learning Outcomes:

Course Name	Course Code	L T P	Credit	Semester
ADVANCED MANUFACTURING PROCESS	**BME 502**	3 0 0	3	V

CLO 1	Investigate – Modern machines used in the field of mechanical engineering
CLO 2	Create –Fundamental physical phenomenon in advance machining and apply them to predict the outcome.
CLO 3	Apply – this knowledge to analyse the working of advance metal cutting operations
CLO 4	Develop – Ability to perform and conduct basic experiments and evaluate the results of the same to optimize the overall productivity

B. Syllabus:

Module I: Introduction
Basic shape of cutting tools, Function of different angles of cutting tools, tool geometry and Nomenclatures - ASA, ORS systems, Conversion of angles, Tool Materials.

Module II: Mechanism of chip formation
Fracture & yielding mechanism, Types of chips, Factors involved in chip formation analysis, shear plane in flat chips, chip formation in drilling and milling.

Module III: Mechanism of metal cutting
Force system during turning, merchant circle diagram, velocity relationship, stress in conventional shear plane, Energy of cutting process, Ernst& merchant angle relationship, Lee-Shafer relationship, measurement of forces, Heat generation and temperature distribution in metal cutting.

Module IV: Theory of Tool wears
Criteria of wear, machinability and tool life, Flank wear, Crater wear, Taylor's tool life equation, causes and mechanism of tool failure, cutting fluid, Economics of metal machining.

Module V: Design for sheet metal works
Press working Terminology, press operation, types of dies, clearance, cutting forces, methods of reducing cutting forces, minimum diameter of piercing, center of pressure, Drawing dies-blank diameter, drawing force.

Module VI: Jigs and Fixture design
Important considerations in jig and fixture design, Locating and clamping, principles for location purposes, principles for clamping purposes, design principles for jigs and fixtures.

C. Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

D. Text & References:

Text:

- A Bhattacharya , "Metal cutting theory& practice", C.B. Publication

References:

- Geoffrey Boothroyd, "Fundamentals of Metal Machining & Machine Tools", Tata McGraw Hill Kogakusha Ltd.
- P.N. Rao, "Manufacturing Technology", Tata McGraw Hill Publication Ltd.
- Dr. P.C. Pandey & C.K. Singh, "Production Engg. Sciences", Standard Publisher. Distributors.

- Dr. B.J. Ranganath, “Metal Cutting & Tool Design” Vikas Publishing House Pvt. Ltd.

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
HEAT AND MASS TRANSFER	**BME 503**	3 0 0	3	V

A. Course Learning Outcomes:

CLO 1	Ability to do **heat**, **mass** and momentum **transfer** analysis.
CLO 2	Ability to analyze industrial problems along with appropriate boundary conditions.
CLO 3	Ability to develop steady and time dependent solutions along with their limitations

B. Syllabus:

Module I Conduction
One-dimensional steady-state conduction through homogeneous and composite plane walls, cylinders and spheres, critical thickness of insulation; heat transfer from fins of uniform cross section.
Module II Free convection
Introduction, Laminar Boundary Layer Equations of Free convection on a vertical flat plate, Integral method for Free convection on a vertical flat plate, Empirical correlations for Natural convection, Free convection under uniform heat flux, free convection caused by centrifugal forces.
Module III Forced convection Introduction, Parllel flow over a flat plate, flow over Cylinders and Spheres, Fully developed Laminar flow in circular Tubes, Flow of Liquid Mettals, Combined free and forced convection
Module IV Radiation
Thermal radiation; Kirchoff's law; Planck's distribution law, Wien's displacement law; Stefan-Boltzmann's relation, Configuration factors; radiant interchange between black and grey surfaces; radiation shielding solar radiation.
Module V Heat exchangers
Combined heat transfer analysis; overall heat transfer co-efficient; types of heat exchangers; LMTD methods of heat exchanger design; simple heat exchanger calculations.
Module VI Mass transfer
Steady state moleculer diffusion in fluids, Mass heat momentum transfer analysis, unsteady state diffusion, diffusion in solids,Ficks law of diffusion, interface mass transfer

C. Evaluation:

Components	**Internal Assessment**	**Attendance**	**MTE**	**ESE**
Weightage (%)	30	5	15	50

D. Text & References:

- Incropera, F.P. and DeWitt, D.P. (2002). Fundamentals of Heat and Mass Transfer, John Willy & Sons, New York, NY.
- Nag, P.K. (2002). Heat and Mass Transfer, TMH.
- John R.Howell & Richrd O Buckius, Fundamentals of Engg. Thermodynamics, McGraw Hill International.
- Holman, J.P. (1997). Heat Transfer, 9th edition, McGraw-Hill.
- Mills, A.F. (1999). Basic Heat and Mass Transfer. Prentice-Hall.
- Thirumaleshwar, M. (2006). Fundamentals of Heat and Mass Transfer, Pearson education.
- Ghoshdastidar, P.S. (2004). Heat Transfer. Oxford University Press.
- Arora, Domkundwar, S. and Domkundwar, A. (1988). A Course in Heat & Mass Transfer, Dhanpat Rai & Co.

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
WEB DEVELOPMENT	**BCS 510**	3 0 0	3	V

A. Course Learning Outcomes:

CLO 1	Use their learned skills, knowledge and abilities to develop web sites for the internet
CLO 2	Apply basic design principles to present ideas, information, products, and services on websites
CLO 3	Apply basic programming principles to the construction of websites
CLO 4	Effectively manage website projects using available resources

B. Syllabus:

Module I: **Overview of Internet**

Introduction to Internet and WWW, Concept of Networking and Layers of OSI Model, Internet protocols like TCP/IP, http, telnet and ftp, URL, email, domain name, Web Browsers.

Module II: **Principles of Web Design**

Key issues to be considered in web site design. Structure of a Web Page: Introduction to HTML, Elements of HTML syntax, Head and Body sections, Building HTML documents, Inserting text, images, hyperlinks, Backgrounds and Color Control, HTML Editors & Tools: Use of different HTML editors and tools like Netscape Communicator and Microsoft Front Page etc

Module III: **HTML Tags**

Use of Different HTML tags in web pages. Table Handling: Table layout & presentation, constructing tables in a web page, developing a web page in a table. Ordered and unordered lists. Frames: Developing Web pages using frames. Advantages and disadvantages of frames. Creating forms, Role of Databases in web applications.
Use of at least one graphical and animation tools like Adobe Fireworks, Abode Photoshop, Gif Animator, Gimp etc.

Module IV: **Cascading style-sheet (CSS) in HTML**

Introduction to Cascading Style Sheets (CSS), Types of Style Sheets (Inline, Internal and External), CSS for Website Layout and Print Layout.
Types of various CSS Selectors, CSS properties: Type Properties, Background Properties, Block Properties, Box Model Properties, List Properties, Border Properties, Positioning Propeties.

Module V: **Introduction to Java Script**

Role of java script in a web page, Script writing basics, Adding interactivity to a web page, creating dynamic web pages,
Similarities to java, embedding JavaScript code, embedding java applets in a web page**,** Form validation using java script

Projects:

Creating a discussion form, creating an online store, creating a job site.

C. Examination Scheme:

Components	A	CT	S/V/Q	HA	EE

Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

D. Text & References:

Text:

- Ramesh Bangia, "Web Technology", Firewall media
- C. Xavier, "World Wide Web Design with HTML", Tata McGraw Hill.
- Unleashed ASP, Techmedia

References:

- Rick Dranell, "HTML4 unleashed", Techmedia Publication.
- Shelly Powers, "Dynamic Web Publishing Unleashed", Techmedia.
- Don Gosselin, "JavaScript", Vikas Publication
- **Mark Swank & Drew Kittel, "World Wide Web Database", Sams net**

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
Product Design and Development	**BME 504**	3 0 0	3	V

A. Course Learning Outcomes:

CLO 1	Demonstrate individual skill using selected manufacturing techniques, including drilling, pressing, tapping, and rapid prototyping
CLO 2	Employ engineering, scientific, and mathematical principles to execute a design from concept to finished product
CLO 3	Fabricate an electromechanical assembly from engineering drawings 6. Work collaboratively on a team to successfully complete a design project
CLO 4	Effectively communicate the results of projects and other assignments in a written and oral format

B. Syllabus

Unit I

Need for developing products – the importance of engineering design – types of design –the design process – relevance of product lifecycle issues in design –designing to codes and standards- societal considerations in engineering design –generic product development process – various phases of product development-planning for products –establishing markets- market segments- relevance of market research

Unit II

Task – Structured approaches – clarification – search – externally and internally – explore systematically – reflect on the solutions and processes – concept selection – methodology – benefits. Identifying customer needs –voice of customer –customer populations- hierarchy of human needs-need gathering methods – affinity diagrams – needs importance- establishing engineering characteristics-competitive benchmarking- quality function deployment-house of quality- product design specification-case studies

Unit III

Decision making –decision theory –utility theory –decision trees –concept evaluation methods –Pugh concept selection method- weighted decision matrix –analytic hierarchy process – introduction to embodiment design – product architecture – types of modular architecture –steps in developing product architecture, Design for manufacturing - machining - casting and metal forming - optimum design - Design for assembly and disassembly – probabilistic design concepts - FMEA – QFD

Unit IV

RECENT ADVANCES: Intelligent Information Systems - Knowledge based product and process models - Applications of soft computing in product development process - Advanced database design for integrated manufacturing.

C. Evaluation:

Components	Other Components	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

D. Text &reference book

1. George E.Dieter, Linda C.Schmidt, “Engineering Design”, McGraw-Hill International Edition, 4th Edition, 2009, ISBN 978-007-127189-9
2. Anita Goyal, Karl T Ulrich, Steven D Eppinger, “Product Design and Development “, 4th Edition, 2009, Tata McGraw-Hill Education, ISBN-10-007-14679-9
3. Kevin Otto, Kristin Wood, “Product Design”, Indian Reprint 2004, Pearson Education,ISBN 9788177588217
4. Yousef Haik, T. M. M. Shahin, “Engineering Design Process”, 2nd Edition Reprint, Cengage Learning, 2010, ISBN 0495668141
5. Clive L.Dym, Patrick Little, “Engineering Design: A Project-based Introduction”, 3rd Edition, John Wiley & Sons, 2009, ISBN 978-0-470-22596-7

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
MIS, ERP and Business	**BME 505**	3 0 0	3	V

A. Course Learning Outcomes:

CLO 1	Understand the leadership role of Management Information Systems in achieving business competitive advantage through informed decision making.
CLO 2	Analyze and synthesize business information and systems to facilitate evaluation of strategic alternatives.
CLO 3	Describe basic concepts of erp systems for manufacturing or service companies
CLO 4	Effectively communicate strategic alternatives to facilitate decision making.

B. Syllabus

Module I: Introduction
Nature and Scope of Marketing; Core Marketing Concepts; Evolution of modern marketing concept; Modern marketing concepts; Marketing Mix; emerging trends in marketing, Environmental Scanning.

Module II: Product and Pricing Decisions
Product - concept and classification; Major product decisions; New product development; Product life cycle – concept and appropriate strategies adopted at different stages, Pricing policies and strategies.

Module III: Distribution Decisions
Channels of distribution – concept and importance; Role of Channel intermediaries and their functions; Channel management; Distribution logistics – concept, importance and major logistics decisions; Channel integration and systems

Module IV: Differentiation Segmentation Targeting and Positioning
Differentiation, Market Segmentation, Targeting and Positioning: Bases for segmenting a consumer market; Levels of market segmentation; Factors influencing selection of market segments; Criteria for effective market segmentation; Target market selection and strategies; Positioning – concept, bases and process

Module V: Consumer Behavior
Consumer vs. business buying behavior; Consumer buying decision process and influences

Module VI: Integrated Marketing Communication
Integrated Marketing Communication – Concept; Communication process and promotion; determining promotion mix; Factors influencing promotion mix; Ethical issues in promotion decisions.

C. Evaluation:

Components	Other Components	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

D. Text & References:

- Kotler, P., Keller, K. L., Koshy, A. & Jha, M. (2013), Marketing Management– A South Asian Perspective, 14th Ed, Pearson India
- Lamb, C. W., Hair, J. F., & McDaniel, C. (2015). Mktg, 8th Ed, Cengage Learning.
- Etzel, M. J., Walker, B. J., Staton, W. J., & Pandit, A. (2008). Marketing Concepts and Cases, 13th Ed, Tata McGraw Hill (Special Indian Edition).
- Czinkota, M. (2012). Marketing Management, 10th Ed, Cengage Learning.
- Kazmi, S. H. H. (2007). Marketing Management – Text and Cases, 1st Ed, Excel Books.
- Kumar, A., & Meenakshi, N. (2010). Marketing Management, 2nd Ed, Vikas Publishing House.
- Zikmund, W. G., & D'Amico, M. (1998). Marketing: Creating and Keeping Customers in an Ecommerce World, 6th Ed, South-Western College Publication

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
FULL CELLS	**BME 506**	3 0 0	3	VI

A. Course Learning Outcomes:

CLO 1	Understand the fundamentals and characteristics of fuel cells
CLO 2	Apply chemical engineering principles to distinguish fuel cells from conventional energy systems Analyze the performance of fuel cells using different characterization techniques
CLO 3	Evaluate the possibility of integrating fuel cell systems with conventional energy systems
CLO 4	Understand the fundamentals and characteristics of fuel cells

B. Syllabus

Module I: – Introduction – Fuel cell definition, historical developments, working principle of fuel cell, components of fuel cell, EMF of the cell and general performance characteristics, Types of fuel cells, Advantages and disadvantages of fuel cells

Module II: Fuel cells for automotive applications: Fuel cells for automotive applications – technology advances in fuel cell vehicle systems – onboard hydrogen storage – liquid hydrogen and compressed hydrogen – metal hydrides, fuel cell control system – alkaline fuel cell – road map to market

Module III: Fuel cell performance characteristics – current/voltage, voltage efficiency and power density, ohmic resistance, kinetic performance, mass transfer effects – membrane electrode assembly components, fuel cell stack, bi-polar plate, humidifiers and cooling plates.

Module IV: Fuelling and cycle analysis – Hydrogen storage technology – pressure cylinders, liquid hydrogen, metal hydrides, carbon fibers – reformer technology – steam reforming, partial oxidation, auto thermal reforming – CO removal, fuel cell technology based on removal like bio-mass, application to fuel cell and other competing technologies like battery powered vehicles, SI engine fuelled by natural gas and hydrogen and hybrid electric vehicle.

C. Evaluation:

Components	**Other Components**	**Attendance**	**MTE**	**ESE**
Weightage (%)	30	5	15	50

D. Text & References:

- Fuel Cells for automotive applications – professional engineering publishing UK. ISBN 1-86058 4233, 2004.
- Fuel Cell Technology Handbook SAE International Gregor Hoogers CRC Press ISBN 0-8493-0877-1-2003.

Course Name	Course Code	L T P	Credit	Semester
MANAGEMENT OF MANUFACTURING SYSTEMS	**BME 507**	3 0 0	3	VI

Amity School of Engineering and Technology (ASET)

A. Course Learning Outcomes:

CLO 1	Classify the materials
CLO 2	Understand the basic properties that characterize the behaviour of materials.
CLO 3	Understand the type of loadings/environment that materials should withstand
CLO 4	Select appropriate type of material for specific application
CLO 5	Offer different approaches to modify structure/microstructure in order to get desired properties
CLO 6	Classify the materials

B. Syllabus

Module I: Introduction
Production functions, Plant Organization: Principles of organization, Organization structure-line and staff Organization
Plant Location, Layout: Process layout product layout and combination layout – methods of layout, economics of layout.

Module II: Production Planning & Control
Types of products, demand, demand forecasting, marketing strategies, scheduling and control of scheduling, production control.

Module III: Work and method study
Definition and concepts, method study procedures, symbols, advantages, Flow process charts, Motion study, micro motion, SIMO charts, system concepts, classification, analysis techniques.

Module IV: Industrial maintenance
Types, organization for maintenance department, Breakdown and preventive maintenance.

Module V: Inventory control and replacement analysis
Introduction replacement policy and method adopted, EOQ.

Module VI: Management concepts
Development of management principles, scientific management, human relation aspects. Project Management – CPM and PERT.

C. Examination Scheme:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

D. Text & References:

Text:

- S.K. Sharma, “Industrial Engg. & Operation Management”, S.K. Kataria & Sons.
- Dr. Ravi Shankar, “Industrial Engg. & Management”, Galgotia Publications
- M. Mahajan, “Industrial Engg. & Production Management”, Dhanpat Rai & Co.
- J Moore, Manufacturing Management, Prentice Hall
- Buffa, Modern production and operations management, E.S. Wiley eastern.

References:

- Joseph S. Martinich, “Production & Operation Management”, John Wiley & Sons.

MACHINE DESIGN-I LAB

Course Code: BME 521 **P:02 C:01**

Course Contents:

Design of:

(i) Cotter Joint
(ii) Knuckle Joint
(iii) Pipe Joint
(iv) Screw Jack
(v) Rigid and Flexible coupling

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

ADVANCED MANUFACTURING PROCESS LAB

Course Code: BME 522 P:02 C:01

Course Contents:

Name of Experiments:

1. Step and taper turning on lathe machine
2. To make a hexagonal headed bolt on a milling machine.
3. To make a job on a shaper.
4. To study the Kinematics design of workshop machines.
5. To make a job on drilling machine as per given specifications.
6. To measure cutting forces on a single point cutting tool
7. To measure cutting parameters for multipoint cutting tool.
8. Study of a punch and die set.
9. Study of a jig and fixture.
10. Fixture fabrication with case study.
11. Study of formation of chips during turning and shaping operations on samples of C.I., M.S., Brass, Cu & aluminum.
12. Determination of the life of the cutting tool used on lathe for various cutting speeds, feeds and different work piece materials.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

PRACTICAL TRAINING (EVALUATION)

Course Code: BME 550 C:06

Methodology

Practical training is based on the theoretical subjects studied by students. It can be arranged within the college or in any related industrial unit. The students are to learn various industrial, technical and administrative processes followed in the industry. In case of on-campus training the students will be given specific task of fabrication/assembly/testing/analysis. On completion of the practical training the students are to present a report covering various aspects learnt by them and give a presentation on same.

Examination Scheme:

Feedback from industry/work place	20
Training Report	40
Viva	15
Presentation	25
Total	**100**

WEB WEVELOPMENT LAB

Course Code: **BCS 530** **Credit Units**: **01**

Software Required: Java

List of Assignment:

1. Design a HTML page using all the basic tags.
2. Design a page containing your educational qualification in a table.
3. Design a page containing an ordered list/unordered list.
4. Design a HTML page for your resume.
5. Design a form in HTML to enter different attribute of student information.
6. Design a home page for ASE using Frame.
7. Design another page and connect these to the home page.
8. Write a function in Javascript for input validation.
9. Write a function in Javascript to calculate monthly installation of the loan.
10. Write an input form and save its data in a database using ASP.
11. Display the data stored in database in tabular form on the page.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

AMITY UNIVERSITY
RAJASTHAN

AMITY School of Engineering and Technology (ASET)

Course Name	Course Code	LTP	Credit	Semester
Professional Communication Skills	BCS501	1:0:0	1	1

B. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Create right selection of words and ideas while also choosing the appropriate channelof formalcommunication.
CLO 2	Demonstrate the ability to analyse a problem and devise a solution in a group.
CLO 3	Demonstrate proficiency in the use of written communication.
CLO 4	Recognize the mannerisms and methodology of Interview and GD to become more expressive in their body language and verbal performance.

B. SYLLABUS

Topic
Email Writing (Briefing, Do's & Don'ts & Practice)
Corporate Dressing & Body Language (Verbal & Non-Verbal Cues & its role in Interview Selection)
Interview-1 (Briefing, Do's & Don'ts, Questions, Mock Sessions)
GD-3(Practice Sessions)

EXAMINATION SCHEME:

Components	Email Writing	GD	Personal Interview	Attendance
Weightage (%)	30	30	35	5

SUGGESTED READINGS

- Essential Telephoning in English, Garside/Garside, Cambridge
- Working in English, Jones, Cambridge
- Dr. P.Prasad. *Communication Skills*.S.K.Kataria&Sons
- Koneru, Aruna. *Professional Communication.* The McGraw Hill: New Delhi, 2008. Print
- Krishnaswamy N,*Creative English for Communication***.** Delh**i:** Macmillan Publishers India Ltd. Print. 2007.

BEHAVIOURAL SCIENCE - V
(GROUP DYNAMICS AND TEAM BUILDING)

Course Code: BSS504 **Credit Units: 01**

Course learning outcomes (CLOs)
At the successful completion of this course you (the student) should be able to:

1. Recognize their personality and individual differences and identify its importance of diversity at workplace and ways to enhance it.
2. Recognize effective socialization strategies and importance of patriotism and taking accountability of integrity.
3. Recognize different types of human rights and its importance.
4. Identify Indian values taught by different religions.
5. Identify long term goals and recognize their talent, strengths and styles to achieve them.

Course Objective:

To inculcate in the students an elementary level of understanding of group/team functions
To develop team spirit and to know the importance of working in teams

Course Contents:

Module I: Group formation
Definition and Characteristics
Importance of groups
Classification of groups
Stages of group formation
Benefits of group formation

Module II: Group Functions
External Conditions affecting group functioning: Authority, Structure, Org. Resources, Organizational policies etc.
Internal conditions affecting group functioning: Roles, Norms, Conformity, Status, Cohesiveness, Size, Inter group conflict.
Group Cohesiveness and Group Conflict
Adjustment in Groups

Module III: Teams
Meaning and nature of teams
External and internal factors effecting team
Building Effective Teams
Consensus Building
Collaboration

Module IV: Leadership
Meaning, Nature and Functions
Self leadership
Leadership styles in organization
Leadership in Teams

Module V: Power to empower: Individual and Teams
Meaning and Nature
Types of power
Relevance in organization and Society

Examination Scheme:

Components	SAP	JOS	FC/MA/CS/HA	P/V/Q	A
Weightage (%)	25	15	30	25	05

SAP- Social Awareness Programme; **JOS**-Journal of Success; **HA**-Home Assignment; **P**-Presentation; **V**-Viva; **Q**-Quiz; **FC**- Flip class; **MA**- Movie Analysis; **CS**- Case study; **A**-Attendance

Text & References:

- Organizational Behaviour, Davis, K.
- Hoover, Judhith D. Effective Small Group and Team Communication, 2002,Harcourt College Publishers
- Dick, Mc Cann & Margerison, Charles: Team Management, 1992 Edition, viva books
- Bates, A. P. and Julian, J.: Sociology - Understanding Social Behaviour
- Dressers, David and Cans, Donald: The Study of Human Interaction
- Lapiere, Richard. T – Social Change
- Lindzey, G. and Borgatta, E: Sociometric Measurement in the Handbook of Social Psychology, Addison –

Welsley, US.
- Rose, G.: Oxford Textbook of Public Health, Vol.4, 1985.
- LaFasto and Larson: When Teams Work Best, 2001, Response Books (Sage), New Delhi
- J William Pfeiffer (ed.) Theories and Models in Applied Behavioural Science, Vol 2, Group (1996); Pfeiffer & Company
- Smither Robert D.; The Psychology of Work and Human Performance, 1994, Harper Collins College Publishers

Semester 5 Course Code: FLT 501/511 (Tech French) Credit Units: 02

Course Learning Objective:

- Students will hone intermediate language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of intermediate level.
- Students will be able to communicate in small sentences in Simple Future and Past tenses .
- Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.
  - To understand the TP
  - To understand an experiment
  - To read the chemical equations
  - To identify the chemical formulas
  - To understand the instructions of a project
  - To express a desire
  - To understand a testimony
  - To understand and read an exercise of mathematics
  - Read and note the equations

Course Contents:

Unité 4 Formation Scientifique Page : 85-99 Leçons 13, 14 & 15

Contenu Lexical:

1. La chimie: les elements chimique et le matériel
2. La formulation des équationschimiques
3. Le corps humain
4. Les transports encommun
5. Les signes et formulations mathémathiques
6. Les verbes utilisés dans les exercises de mathémathiques

Contenu Grammatical:

1. L'infintif pour exprimer un ordre ou un conseil (dans les consignes)
2. La nominalization
3. Savoir ouconnaître au présent
4. Les pronoms relatives (qui, que, qu')
5. L'infinitif dans les consignes

EXAMINATION SCHEME

Total: 100 marks

Continuous Evaluation (Total 50 Marks)					End Sem Evaluation (Total 50 Marks)
Quiz	Mid Term Test	Presentation	Viva Voce	Attendance	End-Term Exam
10	15	10	10	5	50

Text & References:

- Le Gargasson, I. Naik, S. Chaize, C. (2012) Tech French, Delhi : Goyal Publications
- Ray. A, Robert (2010) Le Petit Robert French Dicitionary, Paris: Le Robert
- Robert, Collins (2006) Collins Robert French Dictionary, Paris : Harper Collins

Foreign Language German

Semester 5:Course Code: FLG 501/511 **Credit units : 02**

Course Learning Objective:

- Students will hone intermediate language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of intermediate level.
- Students will be able to communicate in small sentences in Simple Future and Past tenses .
- Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.

After successful completion of this semester, students will be able to:

- tell where they work and live
- tell location of their offices and house
- explain, how they reach their work place
- ask and tell the location of thing or person in a house like behind, in front of etc.
- describe the office things like printer, files etc

Course Content:

Vocabulary:

- Workplace
- Location like 1st floor, ground floor.
- Ordinal numbers
- Things and furniture in a office
- Means of transportation

Grammar:

- changing preposition in dative and accusative case
- Verbs related to changing prepositions like to put, to lay etc
- Dative and accusative preposition
- Modal verb : must and can

EXAMINATION SCHEME

Total: 100 marks

Continuous Evaluation (Total 50 Marks)					End Sem Evaluation (Total 50 Marks)
Quiz	Mid Term Test	Presentation	Viva Voce	Attendance	End-Term Exam
10	15	10	10	5	50

PrescribedText-Book: ZielsprachеDeutschalsFremdsprachePart 1
References: **Studio D A1** by Hermann Funk, Christina Kuhn and Silke Demme, Cornelsen, 2013

Tangram A1by Rosa Maria Dallapiazza, Eduard von Jan & Till Schoenherr, Max Hueber, 2007

SprachtrainingA1 by Rita Maria Niemann, Dong Ha Kim, Cornelsen, 2013
Dictionaries for reference: **Studio D: Glossar** A1 - Deutsch –Englisch, Cornelsen, 2013

http://www.duden.de/woerterbuch
Materials are given in form of photocopies if felt to be necessary

Foreign Language Spanish

Semester 5: Course Code: FLS 501 Credit units : 02

Course Learning Objective:

- Students will hone intermediate language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of intermediate level.
- Students will be able to communicate in small sentences in Simple Future and Past tenses .
- Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.
- To talk about a pre decided plan
- To talk about a plan yet to materialize
- Topropose a plan
- To talk about what they have done today/during vacations etc.
- Reading texts about Spanish festivals
- Writing composition about Festivals

Course Content:

Vocabulary:
Vocabulary related to leisure time, going out with friends, traveling, shopping, club, transport, decoration and celebration.

Grammar:
Introduction of direct/indirect object pronouns
(Pensar + infinitive),
(Estar pensando en + infinitive)
(Por qué no + verbo / Te Parece + Infinitivo.. etc)
(Haber + participio Pasado)
Introductionof pretérito perfecto

ExaminationScheme:

Total: 100 marks

ContinuousEvaluation (Total 50 Marks)					EndSemEvaluation (Total 50 Marks)
Quiz	MidTerm Test	Presentation	Viva Voce	Attendance	End-TermExam
10	15	10	10	5	50

Text &References:
Nuevo Español Sin Fronteras (ESF1) by Jesús sánchez Lobato, Concha Moreno Garcia, Concha Moreno Garcia, Isabel Santos Gargallo, Sociedad General Española De Librería, S.A 2005
Pasaporte Nivel (A1) byMatideCerraloza Aragón, oscarCerraloza Gilli, Begoña Llovet Barquero, EdelsaGroup didascalia, S.A. 2005
Dictionaries for reference: Collins, www.wordreferences.com.
Essential materials are given in the form of photocopies.

Foreign Language Chinese

Semester - V **Course Code: FLC- 501** **Credit Units: 02**

Course Learning Objectives:

- Students will hone intermediate language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of intermediate level.
- Students will be able to communicate in small sentences in Simple Future and Past tenses .
- Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.

On the completion of Fifth semester the students will be able to

- Read Chinese words, phrases and simple sentences both in Pin Yin and Characters given in the text.
- Write Chinese Characters and sentences and small paragraphs.
- Speak Chinese dialogues from various fields of day to day life.
- Listen and understand simple Chinese words and dialogues used in syllabi.
- Carry out conversation in the target language based on the topics learnt.
- Manipulate basic grammatical structures.
- Master and use most essential vocabulary items of day to day use, programme specific and internet related vocabulary; approx 80 Characters including 50 characters of HSK level – II
- Type Chinese document.
- Express their opinion and ask opinion of others in Chinese

COURSE CONTENT

1. Revision of vocabulary
2. Detailed study of greetings, farewell & personal information (HSK-II topics 1& 2)
3. A brief description of mood & colours
4. Expression of opinions
5. Asking the opinion of the others
6. Listening of dialogues
7. Conversation based on topics learnt
8. CBT package
9. Programme specific vocabulary and expressions
10. Chinese typing and making soft copy of a Chinese document
11. Important Chinese sites and internet related vocabulary

GRAMMAR CONTENT

1. Pattern:因为……所以……
2. Preposition 介词: 在
3. Auxiliary verbs; 助动词
4. Modal Particle 语气助词:了

EXAMINATION SCHEME

Total: 100 marks

Continuous Evaluation (Total 50 Marks)	End Sem Evaluation

					(Total 50 Marks)
Quiz	**Mid Term Test**	**Presentation**	**Viva Voce**	**Attendance**	**End-Term Exam**
10	**15**	**10**	**10**	**5**	**50**

Text Books & References

1. Learn Chinese with me book-II. (Major Text Book)

2. Module on HSK-II. (suggested reading)

3. Practical Chinese Grammar for foreigners. (suggested reading)

4. Internet Chinese. (suggested reading)

5. Office Talk (suggested reading)

6. Elementary Chinese Reader Book-I (suggested reading)

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
MACHINE DESIGN – II	**BME 601**	3 0 0	3	VI

A. Course Learning Outcomes:

CLO 1	Analyse combined stresses in a plane (tension/compression and shear in two dimensions) using Mohr's Circle.
CLO 2	Evaluate the stress situation which involves additional design criteria other than static stress, such as cyclical loading and local stress concentrations due to notches.
CLO 3	Examine and identify the various elements involved in power transmission and rotary motion in a machine and analyse whether they are properly designed.
CLO 4	Understand and analyse the various elements of a machine followed by the appropriate selection of suitable components from manufacturers' catalogues.
CLO 5	Integrate the various individual elements into a system composed of several elements.

B. Syllabus:

Module I: Gears

Selection of transmission, spur, helical, bevel and worm gears,

Module II: Friction Clutches & Brakes

Materials for friction surface, uniform pressure and uniform wear theories, Design of friction clutches: Disk , plate clutches, cone & centrifugal clutches.

Design of brakes: Band & block brake, Internal expending brakes, Disk brakes.

Module III: Bearings and Lubrication

Types of lubrication, viscosity, hydrodynamic theory, design factors, temperature and viscosity considerations, Reynold's equation, stable and unstable operation, heat dissipation and thermal equilibrium, boundary lubrication, dimensionless numbers, Design of journal bearings, Rolling-element Bearings: Types of rolling contact bearing, bearing friction and power loss, bearing life; Radial, thrust & axial loads; Static & dynamic load capacities; Selection of ball and roller bearings; lubrication and sealing.

Module IV:Springs

Design of helical compression and tension springs, consideration of dimensional and functional constraints, leaf springs and torsion springs; fatigue loading of springs, surge in spring; special springs.

Module V: Design of I.C. Engine components

Selection of type, general design consideration, design of cylinder, cylinder liner, cylinder head, pistons, connecting rod, crank shaft, valves gears mechanism, flywheel.

C. **Examination Scheme:**

Components	Internal Assessment	Attendance	MTE	ESE
Weight age (%)	30	5	15	50

D. **Text & References:**

Text:

- Maleeve Hartman and O.P. Grover, “Machine Design”, CBS Publication & Publishers.
- V.B Bhandari, “Machine Design”, Tata McGraw Hill.
- P.C. Sharma and D.K Aggarwal., “Machine Design”, S.K. Kataria & Sons.

References:

- Mahadevan, “Design Data Book”, CBS Publication & Publisher

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
INDUSTRIAL ENGINEERING & OPERATIONS RESEARCH	**BME 602**	3 0 0	3	VI

A. Course Learning Outcomes:

CLO 1	Identify and develop operational research models from the verbal description of the real system.
CLO 2	Understand the meaning of Operations Research and how to use it. How to write linear program in the event of minimum cost or maximum profit.
CLO 3	Examine and identify to choose rational options in practical decision-making problems using standard mathematical models of operations research;
CLO 4	Have skills in analysis of operations research objectives, mathematical methods and computer systems.
CLO 5	Know principles of construction of mathematical models of conflicting situations and mathematical analysis methods of operations research;

B. Syllabus:

Module I: Introduction, Definition of operation Research, Characteristics and limitations of operation Research, Applications, advantages and disadvantages of operation Research, Linear Programming Formulation of problem. Graphical and Simplex method for maximization and minimization, Big M Method, Duality Theory and Sensitivity Analysis **Module II:** Transportation Models, NWCR Method, Least Cost Method, Row Minima And Column Minima Method, Stepping Stone Algorithm, MODI Method And Vogel'S Approximation Method (VAM), Balanced, Unbalanced Transportation Problems and Problems of Degeneracy and Maximization.
Module III: Assignment Models, Hungarian Method, Assignment model for maximization and traveling salesman problems, Industrial Problems
Module IV: Queuing Theory Basic structured, Terminology, classification, (M/M/I)
:(FCFS/∞/∞) Model, Birth and death process. Sequencing: Processing in jobs through machines with the same processing order. Processing of 2 jobs through machines with each having different processing order.
Module V: Network Models Introduction to PERT and CPM, Fundamental Concept of Network Models and Construction of Network Diagrams, PERT Activity, Time Estimates, Critical Path and Project Time Duration, Probability of Completing The Project On Or Before Specified Time, Float Of An Activity.
Module VI: Games Theory Zero Sum Two Person Competitive Games, Minimax And Maximini Principle Arithmetic, Algebraic, Matrix Algebra Method, Solution By Dominance, Sub Game, Graphical And Linear Programming Method.

C. EXAMINATION SCHEME:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

D. Text & References:

- HM Wagner, Principles of Operations Research, Prentice Hall
- Heizer, J. & Render B., Operations Management, Pearson Education (8/e), 2006

- PK Gupta and DS Hira, Operations Research, S. Chand & Co.
- Taha, Introduction to Operation Research, TMH
- F.S. Hiller and G.I. Libermann, Introduction to Operation Research, Holden Ray.

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
FLUID POWER SYSTEMS	**BME 603**	2 1 0	3	VI

A. Course Learning Outcomes:

CLO 1	understand the terminology, functional role, applications and industry practices related to fluid power systems
CLO 2	use mathematical models to describe the operation, and analyze the performance of various fluid power systems using appropriate statics, dynamics, fluid mechanics, thermodynamics and heat transfer equations
CLO 3	design a fluid power system starting from its required function.
CLO 4	have hands-on experience using hydraulic learning stations. Build basic hydraulic systems, operate them, and collect experimental data

B. Syllabus:

Module I: Introduction
Euler's equations for turbo machines; impulse and reaction forces due to fluid systems on stationery and moving system of vanes; jet propulsion.
Module II: Water & Gas Turbines
Classification: Pelton, Francis, Propeller and Kaplan turbines; velocity triangles; efficiency; draft tubes, governing.
General aspect of gas turbine, Jules cycle, Brayton cycle, classification, merits of gas turbine, open- cycle gas turbine, closed cycle gas turbine, Inter cooling, Reheating, Re-generation in gas turbine.

Module III: Pumps
Centrifugal pumps, velocity triangles, efficiency, turbine pumps, axial and mixed flow pumps.
Module IV: Fluid Machines
Similarity laws applied to roto dynamic machines; specific speed, unit quantities; characteristic curves; use of models; cavitations and attendant problems in turbo machines; selection of turbines hydroelectric plants.
Module V: Hydraulic Power Transmission
Transmission of hydraulic power through pipe lines; water hammer; precautions against water hammer in turbine and pump installations.
Module VI: Fluid Systems
Hydraulic press, hydraulic accumulator, Hydraulic intensifier, Hydraulic ram, Hydraulic lift, Hydraulic crane, Positive pumps ,gear , fluid coupling and torque converter,
Pneumatic Power: comparison of pneumatic and hydraulic Systems.

C. Evaluation:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

D. Text & References:

Text:

- Gupta, S. C., Fluid Mechanics and Hydraulic Machines, Pearson Education, 2007
- R.K. Bansal, "Fluid Mechanics & Hydraulic Machines", Laxmi Publications (P) Ltd., 2002.

References:

- Dr. D.S. Kumar, "Fluid Mechanics & Fluid Power Engineering", S.K. Kataria & Sons,2001
- D.R. Malhotra & N.K. Malhotra, "The Fluid Mech. & Hydraulics", Satya Prakashan, 2001
- V.P. Gupta, Alam Singh, Manish Gupta, "Fluid Mechanics, Fluid Mechanics & Hydraulics", CBS Publishers; 1999.

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
AUTOMOTIVE ENGINEERING	**BME 604**	3 0 0	3	VI

A. Course Learning Outcomes:

CLO 1	Identify the different parts of the automobile
CLO 2	Explain the working of various parts like engine, transmission, clutch, brakes
CLO 3	Describe how the steering and the suspension systems operate.
CLO 4	Understand the environmental implications of automobile emissions
CLO 5	Develop a strong base for understanding future developments in the automobile industry

B. Syllabus:

Module I
Introduction, Components of an automobile, basic engine terminology, engine cycles, working of an IC engine. Basic engine design considerations, constructional details of C.I. and S.I. engines. crank shafts, connecting rod, piston, values, cams, manifolds, air cleaners, mufflers, radiators, and oil filters.

Module II: Transmission System
Description and working of manually operated gearboxes like sliding mesh, constant mesh, synchromesh and epicycle; hydraulic torque convertor and its construction working and performance, sem-automatic and fully automatic transmission, Hydramatic transmission, analysis of differentials, live axles, construction working and requirements of overdrive.

Module III:Steering System
Introduction, Front axle, wheel alignment, Steering geometry, steering mechanisms, Ackerman steering, center point steering, power steering.

Module IV: Suspension
Objective, requirement, function, types Shock absorbers, Independent suspension, Stabilizer, air suspension, Hydroelastic suspension, Hydragas interconnected suspension.

Module V
Principle, braking requirements, brake efficiency, fading of brakes, types of brakes, bleeding of brakes, brake fluid.

C. Examination:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

D. Text & References:

- Kirpal Singh, “Automobile Engg.”, Vol. I & II, Standard Publishers, 2004
- N.K. Giri, “Automotive Mechanics”, Khanna Publishers
- Narang G.B.S., “Automobile Engg.”, Khanna Publishers
- Srinivasan, “Automotive Engines”, Tata McGraw Hill
- K.K. Jain & R.B. Asthana, “Automobile Engineering”, Tata McGraw Hill
- James D. Halderman and Chase D. Mitchell Jr., Automotive Engines- Theory and Servicing, Pearson Education, 2007

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
IC ENGINES	**BME 605**	3 0 0	3	VI

A. Course Learning Outcomes:

CLO 1	Investigate –Cycles used in the Internal combustion engines and gas turbines.
CLO 2	Create – mathematical models of fundamental physical phenomenon and apply them to predict the behaviour of engineering systems
CLO 3	Apply – this knowledge to analyse the working of IC Engines and gas turbines.
CLO 4	Develop – Ability to perform and conduct basic experiments and evaluate the results of the same

B. Syllabus:

Module I: Fundamentals
Development of IC engine, Classification, Working Cycles, Indicator diagram, comparison of SI Engine and CI Engine, two stroke and four-stroke engine, Valve timing diagram of SI and CI engine.

Module II: Air Standard Cycle
Assumptions in air standard cycle & fuel-air cycle, fuel-air cycle calculations, factors influencing fuel-air cycle, effects of variable specific heats, dissociation.

Module III: Fuel and Combustion
Combustion of SI engine, ignition limits, normal combustion, abnormal combustion, effect of engine Variable in ignition lag, spark advance and factors affecting ignition timing, pre-ignition, theory, and factors affecting detonation, PN, HUCR. Combustion in CI engine, fundamentals of combustion process in Diesel engine, delay period, diesel knock, and cold starting of CI engine. IC engine Fuel, combustion equations, theoretical air and excess air, stoichiometric air fuel ratio, desirable Properties of good IC engine fuels knock rating of SI engine fuel.

Module IV: Performance & Testing
Testing and performance of IC engine, performance parameters, basic measurement, engine Performance curve, fuel consumption, load outputs, engine power, heat balance.

C. Evaluation:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

D. Text & References:

Text:

- Ganesan, V. Internal Combustion Engine, Tata McGraw-Hill.
- Mathur, M.L. and Sharma, R.P. Internal Combustion Engine. Dhanpat Rai Publication
- Vladimir Leonidas Maleev. Internal-combustion Engines, Theory and Design. McGraw-Hill.

References:

- Lester Clyde Lichty, Robert Leroy Streeter. Internal Combustion Engines, McGraw-Hill
- Wallace Ludwig Lind. Internal-combustion Engines: Their Principles and Applications to Automobile, Aircraft, Ginn.
- Edward Frederic Obert, Burgess Hill Jennings, Internal Combustion Engines: Analysis and Practice
- Joseph Albert Polson. Internal Combustion Engines, Chapman & Hall, limited
- Rolla Clinton Carpenter, Herman Diederichs. Internal Combustion Engines, Their Theory Construction and Operation. Van Nostrand companies
- John Benjamin Heywood. Internal Combustion Engine Fundamentals. McGraw-Hill

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
Programming with Python	**BCS 610**	3 0 0	3	VI

A. Course Learning Outcomes:

CLO 1	Explain basic principles of Python programming language
CLO 2	Implement object oriented concepts
CLO 3	Implement database and GUI applications

B. Syllabus:

Module I: Basic of Python Programming

The concept of data types; variables, assignments; immutable variables; numerical types; arithmetic operators and expressions; comments in the program; understanding error messages.

Module II: Conditioning and looping in python

Conditions, Boolean logic, logical operators; ranges; Control statements: if-else, loops (for, while); lambda function in python.

Module III: String, List, Tuple, Set, Dictionary data structure

String manipulations: subscript operator, indexing, slicing a string; strings and number system: converting strings to numbers and vice versa. Lists, tuples, and dictionaries; basic list operators, replacing, inserting, removing an element; searching and sorting lists; dictionary literals, adding and removing keys, accessing and replacing values, traversing dictionaries.

Module IV: Function

Design with functions: hiding redundancy, complexity; arguments and return values; formal vs actual arguments, named arguments. Program structure and design. Recursive functions.

Module V: Basic Python Libraries

Pandas: creation of dataframe, Manipulation of dataframe, generation of series, iloc and loc function etc. NumPy: creation of arrays (1-D, 2-D and n-D array), random matrix, one's matrix, zero's matrix and all other operation over arrays, matplotlib: plotting of line graph, pi chart and box plot etc.

Projects:

Creating a discussion form, creating an online store, creating a job site.

C. Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	20	10	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

D. Text & References:

Text:

- Ramesh Bangia, ″Web Technology″, Firewall media
- C. Xavier, ″World Wide Web Design with HTML″, Tata McGraw Hill.
- Unleashed ASP, Techmedia

References:

- Rick Dranell, ″HTML4 unleashed″, Techmedia Publication.
- Shelly Powers, ″Dynamic Web Publishing Unleashed″, Techmedia.
- Don Gosselin, ″JavaScript″, Vikas Publication
- **Mark Swank & Drew Kittel, ″World Wide Web Database″, Sams net.**

Course Name	Course Code	L T P	Credit	Semester
POWER PLANT ENGINEERING	**BME 606**	3 0 0	3	VI

A mity School of Engineering and Technology (ASET)

A. Course Learning Outcomes:

CLO 1	Explain different type of energy used for power generation.
CLO 2	Analyze different plant layout and know about their economics for setup a plant.
CLO 3	Define principle power plant component such as economiser, feed water heater, boilers and other components associated with steam power plant
CLO 4	Explain layout of nuclear power plant setup, nuclear reactor, nuclear steam turbine and also safety measures associated with nuclear power plant.
CLO 5	Convey safety and control instruction associated with different power plants.

B. Syllabus:

Module I: Steam Generator Plant
Fuel handling systems, Indian coals, combustion of coal in furnaces; fluidized bed combustion; High-pressure heavy-duty boilers, Super critical and once through boilers influence of operating conditions on layout of evaporator, superheated, reheated and economizer; dust collectors; ash disposal, fans and draft systems.

Module II: Turbine Plane
Layout of turbine plant room, corrosion in condensers and boilers, feed water treatment; feed heating and de aeration system; cooling water systems and cooling towers.

Module III: Control
Important instruments on steam generator and turbine; drum water level control, combustion control and super heat temperature control; testing of power plants and heat balance.

Module IV: Other Power Plant
General layout of I.C. Engines and turbine power plants, types, gas turbine plants, fields of application, Nuclear power plants, power reactors and nuclear steam turbines; handling of nuclear waste and safety measures, peak load power generation methods.

Module V: Economics
Planning for power generation in India, super thermal power plants, estimation of cost of power generation; choice of plant site.

C. Evaluation:

Components	**Other Components**	**Attendance**	**MTE**	**ESE**
Weightage (%)	25	5	15	50

D. Text & References:

- Arora & Domkundwar, “A course in Power Plant Engineering”, Dhanpat Rai & Sons

- Black Veatch, “Power Plant Engineering”, CBS Publisher
- Nag. P.K., “Power Plant Engineering”, Third Edition, Tata McGraw – Hill Publishing Company Ltd., 2008.
- Rust, J.H., “Nuclear Power Plant Engineering”, Haralson Pub. Co., 1999

Course Name	Course Code	L T P	Credit	Semester
TOTAL QUALITY MANAGEMENT	**BME 607**	3 0 0	3	VI

Amity School of Engineering and Technology (ASET)

A. Course Learning Outcomes:

CLO 1	To get familiarized with the basic concept and framework of Total Quality management
CLO 2	To Understand the contribution of Quality Gurus in TQM Journey
CLO 3	To grasp the nature and importance of various components that constitute TQM
CLO 4	To describe and discuss the role of techniques used in TQM

B. Syllabus:

Module I: Introduction
Meaning of Quality and quality improvement, need of Quality, Statistical methods for quality control, Process capability.
Module II: Quality Control
Statistical Quality Control, control charts, Control charts for attributes & variables, Moving average chart.
Module III: Production Control
Acceptance Sampling, OC curve, Sampling Plan, Producer’ risk, Consumer’s risk, Average Quality Level, AOQL, Design of Single & double sampling plan.
Module IV: Quality Assurance
Need of Quality Assurance, Quality Audit, Concept of Zero defect, ISO 9000 quality systems, total quality management.

C. EXAMINATION SCHEME:

Components	Other Components	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

MTE: Mid-term Examination, **ESE**: End Semester Examination**; A:** Attendance

D. Text & References:

Text:
- EL Grant & RS Leavenworth, “Statistical Quality Control”, McGraw Hill & Co.
- M. Mahajan, “Statistical Quality Control”, Dhanpat Rai & Co.
- O.P. Khanna, “Statistical Quality Control”, Dhanpat Rai & Co.
- R.C. Gupta, “Statistical Quality Control”, Khanna Pulishers

References:
- Amitav Mitra, “Fundamentals of Quality Control”, Pearson Education
- Feigenbaum, “Total Quality Control”, McGraw Hill & Co.
- Suresh Dalela, “Quality Systems”, Standard Publishers & Distributors
- Montgomery DC, “Introduction to Statistical Quality Control”, John Wiley & Sons Inc.
- Stephan B. Vardeman, J Marcus Jobe, “Statistical QA Methods for Engineers”, John Wiley & Sons Inc.
- Taylor J.R., “Quality Control systems”, McGraw Hill Int. Education
- K.C. Arora, “Total Quality Management”, S.K. Kataria & Sons.
- .

Course Name	Course Code	L T P	Credit	Semester
CREATIVITY AND ENTREPRENEURSHIP DEVELOPMENT	**BME 608**	3 0 0	3	VI

Amity

School of Engineering and Technology (ASET)

A. Course Learning Outcomes:

CLO 1	Apply new ideas, methods and ways of thinking
CLO 2	Engage with a range of stakeholders to deliver creative and sustainable solutions to specific problems
CLO 3	Work effectively with colleagues with diverse skills, experiences and be able to critically reflect on own practice
CLO 4	Consider the ethical and environmental issues and responsibilities which managers take into account when making decisions

B. Syllabus:

MODULE 1 – Entrepreneurship:
Definition of Entrepreneur, Internal and External Factors, Functions of an Entrepreneur, Entrepreneurial motivation and Barriers, Classification of Entrepreneurship, Theory of Entrepreneurship, Concept of Entrepreneurship, Development of entrepreneurship; Concept of entrepreneur ,Manager and Intraprenuer (differences in their roles, responsibilities and Career Opportunities)

MODULE 2 – **Creativity and Entrepreneurial Plan:**

The business plan as an entrepreneurial tool, Contents of a business plan, Idea Generation, Screening and Project Identification, Creative Performance, Feasibility Analysis: Economic, Marketing, Financial and Technical; Project Planning: Evaluation, Monitoring and Control segmentation. Creative Problem Solving: Heuristics, Brainstorming, Synectics, Value Analysis, Innovation. Project Feasibility and Project Appraisal.

MODULE 3 – Corporate entrepreneurship:

Introduction, Flavors of corporate entrepreneurship, Corporate venturing, Intrapreneurship, organizational transformation, Industry rule bending, Need for corporate entrepreneurship, domain of corporate entrepreneurship, conditions favorable for Corporate entrepreneurship, benefits of Corporate entrepreneurship, issues related to Corporate entrepreneurship.

MODULE 4 – Family and Non-Family Entrepreneur & Women entrepreneurs:

Role of Professionals, Professionalism vs family entrepreneurs, Role of Woman entrepreneur, Factors influencing women entrepreneur, Challenges for women entrepreneurs, Growth and development of

women entrepreneurs in India

MODULE 5 - Project Finance:

Need for finance, sources of finance, Venture capital, Nature and Overview, Venture capital process, locating venture capitalists.

MODULE 6- International Entrepreneurship Opportunities:

The nature of international entrepreneurship, Importance of international business to the firm, International versus domestics' entrepreneurship, Stages of economic development. Institutional support for new ventures: Supporting Organizations; Incentives and facilities; Financial Institutions and Small-scale Industries, Govt. Policies for SSIs. Case studies on Indian Start up

C. Examination Scheme:

Components	Other Components	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

MTE: Mid Term Examination, ESE: End Semester Examination;

D. Text & References:

1. Vasant Desai, Dynamics of Entrepreneurship Development ,Himalaya Publication house
2. David holt Entrepreneurship , New Venture Creation , Prentice Hall India.
3. S.S. Khanka ,Entrepreneurial Development S.Chand & Company Ltd. New Delhi
4. Peter F. Drucker , Innovation and Entrepreneurship

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
FINITE ELEMENT METHODS	**BME 609**	3 0 0	3	VI

A. Course Learning Outcomes:

CLO 1	Understand the concepts behind formulation methods in FEM.
CLO 2	Identify the application and characteristics of FEA elements such as bars, beams, plane and iso-parametric elements.
CLO 3	Develop element characteristic equation and generation of global equation.
CLO 4	Able to apply suitable boundary conditions to a global equation for bars, trusses, beams, circular shafts, heat transfer, fluid flow, axi symmetric and dynamic problems and solve them displacements, stress and strains induced.

B. Syllabus:

Module 1:

Introduction to Finite Element Methods, General Description of Methods, Brief Explanation of FEA for a stress analysis problem, Finite element method vs. classical method, History of FEM, Need of FEM.

Module 2:

Element shapes, nodes, Nodal unknown and coordinate systems, Matrix displacement formulation, Strain displacement matrix, Basic equations in elasticity.

Module 3:

Shape functions, Assembling stiffness equation-direct approach, Virtual work method, Variational methods, Rayleigh-Ritz Method,

Module 4

Finite Element Analysis: Bars and Trusses, Plain stress problems, Plain Strain Problems, Matrix algebra and Gaussian Eliminations, Conjugate Gradient method for problem solving.

C. Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	20	10	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

D. Textbooks and References:

1. P.Seshu, “Text Book of Finite Element Analysis”, Prentice-Hall of India Pvt. Ltd., New Delhi, 2007. ISBN-978-203-2315-5
2. Chandrupatla T.R., and Belegundu
3. A.D., “Introduction to Finite Elements in Engineering”, Pearson Education 2002, 3rd Edition.
4. Rao S.S., “The Finite Element Method in Engineering”, Pergammon Press, 1989
5. David V Hutton “Fundamentals of Finite Element Analysis”2004. McGraw-Hill Int. Ed.
6. J.N.Reddy, “An Introduction to the Finite Element Method”, McGraw-Hill International Editions (Engineering Mechanics Series), 1993. ISBN-0-07-051355-4

MACHINE DESIGN-II LAB

Course Code: **BME 621** **P:2 C:1**

Course Contents:

Design and drawing based upon the course Machine Design II such as automotive transmission, brakes, clutches connecting rod, I.C. engine piston, connecting rod,

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	**20**	**20**	**5**	**25**	**25**

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

INDUSTRIAL ENGINEERING & OPERATIONAL RESEARCH LAB

Course Code: BME 622 C:01 P:02

Course Contents:

1. Program on C or C++ for Linear Programming.
2. Program on C or C++ for Simplex Problem.
3. Program on C or C++ for Assignment Problem.
4. Program on C or C++ for Transportation Problem.
5. Program on C or C++ for PERT, CPM Problem.
6. Program on C or C++ for Sequencing Problem.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

FLUID POWER SYSTEMS LAB

Course Code: BME 623 **P:2, C:01**

Course Contents:

- To conduct a test on Centrifugal Pump and plot its characteristics
- To Plot the characteristics of Pelton turbine.
- To conducts an experiment on Francis turbine.
- To study the effect of a draft tube on reaction turbines.
- To find the friction factor for flow through pipes
- To study the hydraulic controls rig.
- To conduct an experiment for verifying model laws.
- To study the cavitations phenomenon in turbines.
- Study of hydraulic couplings and torque converters.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

AUTOMOTIVE ENGINEERING LAB

Course Code: BME 624 P:02 C:01

Course Contents:

List of Experiments:

1. Drawing Valve Timing Diagram
2. Determination of Firing Order of engine
3. Specification of engine
4. Study of different parts of engine
5. Study of Clutch
6. Study of Hydraulic Brake System
7. Study of Carburetor
8. **Study of various parts of Auxiliary systems**
9. **Study of Wheel**
10. **Study of emission system**
11. **Study of steering system**

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva

AMITY UNIVERSITY
RAJASTHAN

AMITY School of Engineering & Technology

Course Name	Course Code	LTP	Credit	Semester
Professional Communication Skills	BCS601	1:0:0	1	1

C. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Demonstrate professional attitude needed for interview preparedness, power dressing, and respectful self orientation.
CLO 2	Showcase their leadership skills with effective team work.
CLO 3	Outline the basic etiquettes in expressing their personality individually and in group.

B. SYLLABUS

Topic
Resume Building-2
GD-4 (General & Abstract Topics)
Presentations-3 (Corporate Terms, HR Policies, Rules & Regulations)
Document Preparation for Job (CV Update according to profiles, Photo, Passport, IDs)
Mock Personal Interview-2

EXAMINATION SCHEME:

Components	Resume Writing	GD	Mock Personal Interview	Attendance
Weightage (%)	30	30	35	5

SUGGESTED READINGS

- Working in English, Jones, Cambridge
- Dr. P.Prasad. *Communication Skills*.S.K.Kataria &Sons
- Koneru, Aruna. *Professional Communication.* The McGraw Hill: New Delhi, 2008. Print
- New International Business English, Jones/Alexander, Cambridge

PROGRAMMING WITH PYTHON LAB

Course Code: **BCS630** **Credit Units**: **01**

Software Required: Java

List of Assignment:

1. Write a program to demonstrate basic data type in python.
2. Write a program to compute distance between two points taking input from the user.
3. Write a program add.py that takes 2 numbers as command line arguments and prints its sum.
4. Write a Program for checking whether the given number is an even number or not. Using a for loop, write a program that prints out the decimal equivalents of1/2, 1/3, 1/4, . . . , 1/10.
5. Write a Program to demonstrate list and tuple in python.
6. Write a program using for loop that loops over a sequence.
7. Write a program using a while loop that asks the user for a number, and print countdown from that number to zero
8. WAP to find the sum of the even-valued terms.
9. Write a program to count the numbers of characters in the string and store them in a dictionary data structure.
10. Write a program to use split and join methods in the string and trace a birthday of a person with a dictionary data structure.
11. Write a program to print each line of a file in reverse order.
12. Write a program to compute the number of characters, words and lines in a file.
13. Write a function nearly equal to test whether two strings are nearly equal. Two strings a and b are nearly equal when a can be generated by a single mutation.
14. Write function to compute gcd, lcm of two numbers. Each function shouldn’texceed one line

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	15	20	10	40	10

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

BEHAVIOURAL SCIENCE - VI
(STRESS AND COPING STRATEGIES)

Course Code: BSS 604 **Credit Unit: 01**

Course learning outcomes (CLOs)

At the successful completion of this course you (the student) would be able to:

1. Identify stress and that an individual come across.
2. Recognize the causes of stress in their lives.
3. Analyze symptoms and how they are affecting lives.
4. Create ways to effectively cope with it.

Course Objective:

- To develop an understanding the concept of stress its causes, symptoms and consequences.
- To develop an understanding the consequences of the stress on one's wellness, health, and work performance.

Module I: Stress
Meaning & Nature
Characteristics
Types of stress

Module II: Stages and Models of Stress
Stages of stress
The physiology of stress
Stimulus-oriented approach.
Response-oriented approach.
The transactional and interactional model.
Pressure – environment fit model of stress.

Module III: Causes and symptoms of stress
Personal
Organizational
Environmental

Module IV: Consequences of stress
Effect on behaviour and personality
Effect of stress on performance
Individual and Organizational consequences with special focus on health

Module V: Strategies for stress management
Importance of stress management
Healthy and Unhealthy strategies
Peer group and social support
Happiness and well-being

Examination Scheme:

Components	**SAP**	**JOS**	**FC/MA/CS/HA**	**P/V/Q**	**A**
Weightage (%)	25	15	30	25	05

SAP- Social Awareness Programme; **JOS**-Journal of Success; **HA**-Home Assignment; **P**-Presentation; **V**-Viva; **Q**-Quiz; **FC**- Flip class; **MA**- Movie Analysis; **CS**- Case study; **A**-Attendance

Text & References:

- Blonna, Richard; Coping with Stress in a Changing World: Second edition
- Pestonjee, D.M, Pareek, Udai, Agarwal Rita; Studies in Stress And its Management

Semester 6 Course Code: FLT 601 (Tech French) Credit Units: 02

Course Learning Objective:

- Students will hone intermediate language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of intermediate level.
- Students will be able to communicate in small sentences in Simple Future and Past tenses .
- Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.
- To understand the essentials of an interview
- To present one research
- To present one university and professional course
- To speak about the professional projects
- To understand a remarkable topic
- To understand and ask questions
- To describe a person
- The content and the method of the report
- To make a plan of the report
- To write an introduction
- To understand a short technical message
- To reply to a survey

Course Contents:

Unité 5 Nouvelles technologies Page : 100-121 Leçons 16, 17 & 18

Contenu Lexical:

1. Le parcoursacadémique
2. Le monde du travail
3. Le fibreoptique
4. Les adjectifsdescriptifs
5. L'exposé
6. Les énergiesrenouvelable

Contenu Grammatical:

1. Le passé compose avec avoir
2. Quelquesadverbes
3. Quelquesindicateurstemporels
4. L'interrogation (forme standard et soutenue)
5. L'accord de l'adjectif (féminin, masculine et pluriel)
6. La place de l'adjectif
7. Les différentsniveaux de langue
8. Le future simple
9. Les questions avec << qu'est-ce que>>

EXAMINATION SCHEME

Total: 100 marks

Continuous Evaluation (Total 50 Marks)					End Sem Evaluation (Total 50 Marks)
Quiz	**Mid Term Test**	**Presentation**	**Viva Voce**	**Attendance**	**End-Term Exam**
10	**15**	**10**	**10**	**5**	**50**

Text & References:

- Le Gargasson, I. Naik, S. Chaize, C. (2012) Tech French, Delhi : Goyal Publications
- Ray. A, Robert (2010) Le Petit Robert French Dicitionary, Paris: Le Robert
- Robert, Collins (2006) Collins Robert French Dictionary, Paris : Harper Collins

Foreign Language German

Semester 6:Course Code: FLG 601 **Credit units : 02**

Course Learning Objective:

- Students will hone intermediate language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of intermediate level.
- Students will be able to communicate in small sentences in Simple Future and Past tenses .
- Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.

After successful completion of this semester, students will be able to:

- express their likes and dislikes (buying groceries)
- askprice and quantity
- express their likes and dislikes in terms of cloths
- buy cloths in the shopping mall

Course Content:

Vocabulary:

- How often- every day, sometime daily etc.
- Cloths
- Colours
- Groceries : fruits , vergetablesetc
- Groceries materials : packets, bottle etc.
- quantity and weight
- currency

Grammar:

- Make question with which, how many etc
- Comparative many, good etc
- Introduction of adjective ending in accusative with definite and indefinite article
- Verb like
- Demonstrative

EXAMINATION SCHEME

Total: 100 marks

Continuous Evaluation (Total 50 Marks)					End Sem Evaluation (Total 50 Marks)
Quiz	**Mid Term Test**	**Presentation**	**Viva Voce**	**Attendance**	**End-Term Exam**
10	**15**	**10**	**10**	**5**	**50**

Prescribed Text-Book: Zielsprache Deutsch alsFremdsprachePart 2

References: **Studio D A1** by Hermann Funk, Christina Kuhn and Silke Demme, Cornelsen, 2013

Tangram A1by Rosa Maria Dallapiazza, Eduard von Jan & Till Schoenherr, Max Hueber, 2007

SprachtrainingA1 by Rita Maria Niemann, Dong Ha Kim, Cornelsen, 2013

Dictionaries for reference: **Studio D: Glossar** A1 - Deutsch –Englisch, Cornelsen, 2013

http://www.duden.de/woerterbuch

Materials are given in form of photocopies if felt to be necessary

Foreign Language Spanish

Semester 6: Course Code: 601 **Credit Units : 02**

Course Learning Objective:

- Students will hone intermediate language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of intermediate level.
- Students will be able to communicate in small sentences in Simple Future and Past tenses .
- Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.
- To express future plans and intentions
- To talk about tourist destination in Spain and India
- Reading texts about Spanish historical monuments
- To talk about dance and music.
- Reading text about Spanish Cities
- Writing email to your friend/family members

Course Content:

Vocabulary: Names of the famous Spanish cities, monuments, dance forms (Flamenco, salsa, tango) informal greeting in letter writing.

Grammar:
Revision of Indefinite/ continuous /perfect tense
Introduction of Future Tense.

ExaminationScheme:

Total: 100 marks

ContinuousEvaluation (Total 50 Marks)					EndSemEvaluation (Total 50 Marks)
Quiz	MidTerm Test	Presentation	Viva Voce	Attendance	End-TermExam
10	15	10	10	5	50

Text &References:

Nuevo Español Sin Fronteras (ESF1) by Jesús sánchez Lobato, Concha Moreno Garcia, Concha Moreno Garcia, Isabel Santos Gargallo, Sociedad General Española De Librería, S.A 2005

Pasaporte Nivel (A1) byMatideCerraloza Aragón, oscarCerraloza Gilli, Begoña Llovet Barquero, EdelsaGroup didascalia, S.A. 2005

Dictionaries for reference: Collins, www.wordreferences.com.

Essential materials are given in the form of photocopies.

Foreign Language Chinese

Semester - VI **Course Code: FLC-601** **Credit Units: 2**

Course Learning Objectives:

- Students will hone intermediate language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of intermediate level.
- Students will be able to communicate in small sentences in Simple Future and Past tenses.
- Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.

On the completion of Sixth semester the students will be able to attain the proficiency of **HSK-II**. They will be able to:

- Read Chinese words, phrases and simple sentences both in Pin Yin and Characters given in the text.
- Write Chinese Characters and sentences and small paragraphs.
- Speak Chinese dialogues from various fields of day to day life.
- Listen and understand simple Chinese words and dialogues used in syllabi.
- Carry out effective conversation in the target language.
- Manipulate basic grammatical structures.
- Master and use most essential vocabulary items of day to day use: approx 70 Characters including 50 characters of HSK level –II
- Put up suggestions, explain reason, and do comparison.
- Do translation with the help of dictionaries and translation software.

COURSE CONTENT

1. Revision
2. Put up suggestions
3. Making comparison
4. Explaining the reason
5. Grammar points & exercises
6. Listening practice
7. Conversation based on dialogues
8. CBT package
9. Translation of small passages from English to Chinese
10. Practice of model test series of HSK-II
11. Chinese government system (in English)

VOCABULARY CONTENTS

1. Vocabulary will include approx 80 Characters including 50 Characters of HSK-II level.

1. Vocab related to suggestions, comparison, reason, will be covered during this semester.

2. By the end of sixth semester the students will be able to master **300 characters set for the HSK level-II .**

GRAMMAR CONTENTS

1. Aspectual particle 动态助词：**着**
2. Interjection 叹词: **喂**
3. Overlapping verbs 动词的重叠
4. Affirmative sentences肯定句
5. Negative Sentences 否定句

ExaminationScheme:

Total: 100 marks

ContinuousEvaluation (Total 50 Marks)					EndSemEvaluation (Total 50 Marks)
Quiz	MidTerm Test	Presentation	Viva Voce	Attendance	End-TermExam
10	15	10	10	5	50

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
Refrigeration & Air conditioning	BME-701	3 0 0	3	VII

A. Course Learning Outcomes:

CLO 1	Ilustrate the fundamental principles and applications of refrigeration and air conditioning system
CLO 2	Obtain cooling capacity and coefficient of performance by conducting test on vapour compression refrigeration systems
CLO 3	Present the properties, applications and environmental issues of different refrig
CLO 4	Calculate cooling load for air conditioning systems used for various
CLO 5	Operate and analyse the refrigeration and air conditioning systems.

B. Syllabus:

Module I: Introduction

Refrigeration, Second law of thermodynamics, Unit of Refrigeration, Reversed Carnot Cycle, Bell Coleman Cycle, Necessity of cooling an aircraft, types of air refrigeration systems, Basic Cycle, Boot Strap Cycle, Regenerative cycle of air refrigeration of aircraft,

Module II: Vapour compression Refrigeration system

Vapour Compression Refrigeration System, various compression refrigeration cycles, and basic components of the plant, factors affecting COP of VCRS, Multiple Compression and Evaporation System, Cascading of VCRS

Module III: Refrigerants

Refrigerants, Classification of Refrigerants, Nomenclature of Refrigerants, Azeotropes, Secondary Refrigerants, Properties and choice of refrigerants, Eco-friendly Refrigerants

Module IV:Vapour Absorption Refrigeration system

Vapour Absorption Cycle, Electrolux System, Steam Jet Refrigeration, Vortex Tube, Application of Refrigeration Systems Cascading, Introduction to Cryogenics

Module V:Psychrometrics

Psychrometrics, Psychrometrics processes, Basic Components of Air conditioning system, comfort air- conditioning, ventilation requirements, cooling and dehumidification system, estimation of cooling and heating loads, air handling, air distribution, duct design, industrial air conditioning.

C. Evaluation:-

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

D. Text & References:

- CP Arora, Refrigeration and Conditioning, Tata McGraw Hill
- Manohar Prasad, Refrigeration and Conditioning , Wiley Eastern Limited
- Jordan and Priester, Refrigeration and Conditioning, Prentice Hall of India
- WF Stoecker, Refrigeration and Conditioning, McGraw Hill.
- RS Rajput, Refrigeration and Air Conditioning, S K Kataria And Sons New Delhi

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
Computer Integrated Manufacuturing	BME-702	3 0 0	3	VII

A. Course Learning Outcomes:

CLO 1	Ilustrate the fundamental principles and applications of refrigeration and air conditioning system
CLO 2	Obtain cooling capacity and coefficient of performance by conducting test on vapour compression refrigeration systems
CLO 3	Present the properties, applications and environmental issues of different refrig
CLO 4	Calculate cooling load for air conditioning systems used for various
CLO 5	Operate and analyse the refrigeration and air conditioning systems.

B. Syllabus:

Module I: Fundamental of CIM:

Brief introduction to CAD and CAM – Manufacturing Planning, Manufacturing control- Introduction to CAD/CAM – Concurrent Engineering-CIM concepts – Computerised elements of CIM system –Types of production – Manufacturing models and Metrics – Mathematical models of Production Performance – Simple problems – Manufacturing Control – Simple Problems – Basic Elements of an Automated system – Levels of Automation – Lean Production and Just-In-Time Production.

Module II: PRODUCTION PLANNING AND CONTROL:

Process planning – Computer Aided Process Planning (CAPP) – Logical steps in Computer Aided Process Planning – Aggregate Production Planning and the Master Production Schedule – Material Requirement planning – Capacity Planning- Control Systems-Shop Floor Control-Inventory Control – Brief on Manufacturing Resource Planning-II (MRP-II) & Enterprise Resource Planning (ERP) – Simple Problems.

Module III: CELLULAR MANUFACTURING

Group Technology(GT), Part Families – Parts Classification and coding – Simple Problems in Opitz Part Coding system – Production flow Analysis – Cellular Manufacturing – Composite part concept – Machine cell design and layout – Quantitative analysis in Cellular Manufacturing – Rank Order Clustering Method – Arranging Machines in a GT cell – Hollier Method – Simple Problems.

Module IV: FLEXIBLE MANUFACTURING SYSTEM (FMS) AND AUTOMATED GUIDED VEHICLE SYSTEM (AGVS)

Types of Flexibility - FMS – FMS Components – FMS Application & Benefits – FMS Planning and Control– Quantitative analysis in FMS – Simple Problems. Automated Guided Vehicle System (AGVS) – AGVS Application – Vehicle Guidance technology – Vehicle Management & Safety

Module V: INDUSTRIAL ROBOTICS

Robot Anatomy and Related Attributes – Classification of Robots- Robot Control systems – End Effectors –

Sensors in Robotics – Robot Accuracy and Repeatability - Industrial Robot Applications – Robot Part Programming – Robot Accuracy and Repeatability – Simple Problems.

C. **Evaluation:-**

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

D. **Text & References:**

Text:

- Mikell P. Groover, "Automation, Production Systems and Computer-Integrated Manufacturing", 2nd Edition, Pentice Hall, 2001.
- Rao, Kundra&Tiwari, "Computer aided Manufacturing" Tata McGraw Hill, 2007.
- Numerical Control: by Koren, Khanna Publisher.

References:

- Mikell P. Groover, Emory W.Zimmers, "CAD/CAM", Pearson Education, 2006.
- P.N. Rao, "CAD/CAM Principles and Applications", Tata McGraw Hill, 2006.

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
Advanced Programming with Python	BCS-710	3 0 0	3	VII

A. Course Learning Outcomes:

CLO 1	Interpret the basic principles of Python programming language.
CLO 2	Articulate the Object-Oriented Programming concepts such as encapsulation, inheritance and polymorphism as used in Python.
CLO 3	Identify the commonly used operations involving file systems and regular expressions.
CLO 4	Implement Machine Learning algorithms.

B. Syllabus:

Module-I:
Introduction to Python, use IDLE to develop programs, Basic coding skills, working with data types and variables, working with numeric data, working with string data, Python functions, Boolean expressions, selection structure, iteration structure, working with lists, work with a list of lists, work with tuples, work with dates and times, get started with dictionaries

Module-II
Classes in Python: OOPS Concepts,Classes and objects ,Classes in Python, Constructors, Datahiding, Creating Classes, Instance Methods, Special Methods, Class Variables, Inheritance, Polymorphism, Type Identification, Custom Exception Classes, Iterators, generators and decorators.

Module-III
I/O and Error Handling In Python :Introduction, Data Streams, Creating Your Own Data Streams, Access Modes, Writing Data to a File, Reading Data From a File, Additional File Methods, Handling IO Exceptions, Errors, Run Time Errors, The Exception Model, Exception Hierarchy, Handling Multiple Exceptions, Working with Directories.

Module-IV
Implement Machine Learning algorthims:Usage of Numpy for numerical Data,Usage of Pandas for Data Analysis, Matplotlib for Python plotting, Seaborn for Statically plots, interactive Dynamic visualizations, SciKit for Machine learning.

C. Evaluation:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

D. Text & References:

1. Michael Urban and Joel Murach, Python Programming, Shroff/Murach, 2016.
2. Haltermanpython.
3. Mark Lutz, Programming Python, O`Reilly, 4th Edition, 2010ONLINE

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
Automation in Industries	BME-703	3 0 0	3	VII

A. Course Learning Outcomes:

CLO 1	verify automation / control systems using good design practice;
CLO 2	design, install and maintain automation and control systems;
CLO 3	work at a high level in industry with automation and control systems;
CLO 4	employ high-level PLC control systems in the computer integration of a manufacturing process;
CLO 5	implement the skills required for automation, control and monitoring of industrial processes;

B. Syllabus:

Module 01

Introduction to Automation: Definition and fundamentals of automation, reasons for Automating, basic elements of an automated system: Power, Program and control system **Advanced automation functions:** safety, maintenance & repair diagnosis, error detection and recovery, **Levels of automation** Automation principles and strategies: USA principle, ten strategies of automation and production system, automation migration strategy

Module 02

Mechanization and Automation: Mechanization and automation, product cycle, hard Vs flexible automation, Capital- intensive Vs low cost automation, Types of systems-mechanical, electrical, hydraulic, pneumatic and hybrid systems, Automation using CAMS, Geneva mechanisms, gears etc., Assembly line Automation: automated assembly systems, transfer systems, vibratory bowl feeders, non-vibratory feeders, part orienting, feed track, part placing & part escapement systems Introduction to Material storage/ handling and transport systems, and its automation using AS/RS, AGVS and conveyors etc.

Module 03:

Pneumatics and hydraulics: Hydraulic and pneumatic devices-Different types of valves, Actuators and auxiliary elements in Pneumatics & hydraulics , their applications and use of their ISO symbols Synthesis and design of circuits (up to 3 cylinders)–pneumatic, electro pneumatics and hydraulics Design of Electro-Pneumatic Circuits using single solenoid and double solenoid valves; with and without grouping

Module 04:

Sensors & Actuators Sensors: Selection of sensors (Displacement, temperature, acceleration, force /pressure) based on static and dynamic characteristics, Interfacing: Concept of interfacing, bit accuracy and sampling speed, amplifying electronics, and microcontroller, Actuators: Principle and selection of mechano-electrical actuators (1) DC motors (2) Stepper Motors (3) Solenoid Actuators (4) Servo Motors (5) BLDC

Module 05:

Industrial control systems: Process industries versus discrete manufacturing industries, Continuous verses discrete control, Computer process control, Forms of computer process control. Discrete control using PLC- discrete process control, Programmable logic controller, its architecture, ladder digs, Ladder Logic, Programming for different types of logic gates, Latching, Timers, Counter, Practical Examples of Ladder Programming

Module 06:

Robots and their applications: Introduction to robots, Types, Classifications, Selection of robots, Robot Degrees of freedom, Robot configuration, Accuracy and repeatability, Specification of a robot, Robot feedback controls: Point to point control and Continuous path control, Control system for robot joint, Adaptive control, Drives and transmission systems, End effectors, Industrial robot applications of robots

C. Evaluation:-

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

D. Text & References:

Text:

- Stamatios Manesis, George Nikolakopoulos, Introduction to Industrial Automation, CRC Press, 2018

References:

- Yusuf Altintas, Manufacturing Automation, Metal Cutting Mechanics, Machine Tool Vibrations, and CNC Design, Cambridge University Press, 2012
- A.K. Gupta, S. K. Arora, Industrial automation and robotics, university science press, 2013

Course Name	Course Code	L T P	Credit	Semester
Quality Engineering and Management Systems	BME-704	3 0 0	3	VII

Amity School of Engineering and Technology (ASET)

A. Course Learning Outcomes:

CLO 1	Apply measurement and analytical tools to improve process systems.
CLO 2	Apply measurement and analytical tools to increase the quality of products and/or services
CLO 3	Provide leadership, guidance, and assistance to coworkers when implementing changes
CLO 4	Understand the financial and legal workings of organizations

B. Syllabus:

Module I: Introduction
Different Definitions and Dimensions of Quality, Historical Perspective, 7 QC tools, 7 New Quality Management Tools, 5S Technique, Kaizen, Poka-Yoke, Quality Circle, Cost of Quality Technique, Introduction to Quality Management Standards – ISO : 9000, ISO:14000, QS:9000

Module II: Designing for Quality
Introduction to Concurrent Engineering, Quality Function Deployment (QFD) and Failure Mode and Effect Analysis (FMEA) – Concept, Methodology and Application (with case studies)

Module III: Introduction to Design of Experiments
Introduction , Methods, Taguchi approach, Achieving robust design, Steps in experimental design.

Module IV: Contemporary Trends in Quality Engineering & Management
Just in time (JIT) Concept, Lean Manufacturing, Agile Manufacturing, World Class Manufacturing, Total Productive Maintenance (TPM), Bench Marking, Business Process Re-engineering (BPR), Six Sigma - Basic Concept, Principle, Methodology, Implementation, Scope, Advantages and Limitation of all as applicable.

Module V: Quality in Service Sectors
Characteristics of Service Sectors, Quality Dimensions in Service Sectors, Measuring Quality in Different Service Sectors.

C. Evaluation:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	20	10	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

D. Text & References:

Text:

- Stephan B. Vardeman, J Marcus Jobe, "Statistical QA Methods for Engineers", John Wiley & Sons Inc.
- Taylor J.R., "Quality Control systems", McGraw Hill Int. Education
- K.C. Arora, "Total Quality Management", S.K. Kataria & Sons.

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References:

- Dale H.Besterfiled, "Total Quality Management", Pearson Education Asia, (Indian reprint 2011).
- John Bank, The essence of total quality management PHI 2000.
- Greg Bounds, Lyle Yorks et al, Beyond Total Quality Management, McGraw Hill, 1994
- Takashi Osada, The 5S's The Asian Productivity Organization, 1991

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
Rapid prototyping	BME-705	3 0 0	3	VII

A. Course Learning Outcomes:

CLO 1	Generating a good understanding of RP history, its development and applications. Expose the students to different types of Rapid prototyping processes, materials used in RP systems and reverse engineering.
CLO 2	Students will be exposed to different types of Rapid prototyping processes, materials used in RP systems and reverse engineering.
CLO 3	Students will understand steriolithography methods
CLO 4	Students learn processes of CAD
CLO 5	Students gain knowledge to develop prototypes

B. Syllabus:

Module I: Introduction to RP:

Prototyping fundamentals, Historical development, Fundamentals of Rapid Prototyping, Advantages and Limitations of Rapid Prototyping, commonly used Terms, Classification of RP process, Rapid Prototyping Process Chain: Fundamental Automated Processes, Process Chain.

Module II: Liquid-based Rapid Prototyping Systems:

Stereo lithography Apparatus (SLA): Models and specifications, Process, working principle, photopolymers, photo polymerization, Layering technology, laser and laser scanning, Applications, Advantages and Disadvantages, Case studies. Solid ground curing (SGC): Models and specifications, Process, working principle, Applications, Advantages and Disadvantages, Case studies Solid-based Rapid Prototyping Systems: Laminated Object Manufacturing (LOM): Models and specifications, Process, working principle, Applications, Advantages and Disadvantages, Case studies. Fused Deposition Modelling (FDM): Models and specifications, Process, working principle, Applications, Advantages and Disadvantages, Case studies.

Module III: Powder Based Rapid Prototyping Systems:

Selective laser sintering (SLS): Models and specifications, Process, working principle, Applications, Advantages and Disadvantages, Case studies. Three-dimensional Printing (3DP): Models and specifications, Process, working principle, Applications, Advantages and Disadvantages, Case studies. Rapid Tooling: Introduction to Rapid Tooling (RT), Conventional Tooling Vs. RT, Need for RT. Rapid Tooling Classification: Indirect Rapid Tooling Methods: Spray Metal Deposition, RTV Epoxy Tools, Ceramic tools, Investment Casting, Spin Casting, Die casting, Sand Casting, 3D Keltool process. Direct Rapid Tooling: Direct AIM, LOM Tools, DTM Rapid Tool Process, EOS Direct Tool Process and Direct Metal Tooling using 3DP.

Module IV: Rapid Prototyping Data Formats:

STL Format, STL File Problems, Consequence of Building Valid and Invalid Tessellated Models, STL file Repairs: Generic Solution, Other Translators, Newly Proposed Formats. Rapid Prototyping Software's: Features of various RP software's.

Module V: RP Applications:

Material Relationship, Application in Design, Application in Engineering, Analysis and Planning, Aerospace Industry, Automotive Industry, Jewelry Industry, Coin Industry, GIS application, Arts and Architecture. RP Medical and Bioengineering Applications: Planning and simulation of complex surgery, Customized Implants & Prosthesis, Design and Production of Medical Devices, Forensic Science and Anthropology, Visualization of Biomolecules.

C.Evaluation:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

C. Text Books:

1. Rapid prototyping: Principles and Applications – Chua C.K., Leong K.F. and LIM C.S, World Scientific publications , Third Edition, 2010.
2. Rapid Manufacturing – D.T. Pham and S.S. Dimov, Springer , 2001
3. Whalers Report 2000 – Terry Wohlers, Wohlers Associates, 2000 Rapid Prototyping & Manufacturing – Paul F. Jacobs, ASME Press, 1996
4. Rapid prototyping and Engineering Applications: Frank W.Liou CRC Press; 2007
5. Rapid prototyping Technologies: Kenneth Cooper, CRC Press, 2001

Course Name	Course Code	L T P	Credit	Semester
Disaster Management	BME-706	3 0 0	3	VII

Amity School of Engineering and Technology (ASET)

A. Course Learning Outcomes:

CLO 1	Understanding foundations of hazards, disasters and associated natural/social phenomena.
CLO 2	Familiarity with disaster management theory (cycle, phases)
CLO 3	Methods of community involvement as an essential part of successful DRR.
CLO 4	Experience on conducting independent DM study including data search, analysis and presentation of disaster case study
CLO 5	Technological innovations in Disaster Risk Reduction: Advantages and problems

B. Syllabus:

Module I: Introduction to Disaster Management

Importance and Significance, Types of Disaster- Natural Disaster: such as Flood, Cyclone, Earthquakes, Landslides etc. Man-made Disaster-such as Fire, Industrial Pollution, Nuclear Disaster, Biological Disasters, Accidents (Air, Sea, Rail & Road), Structural failures(Building and Bridge), War & Terrorism etc. Causes, effects and practical examples for all disasters.

Module II: Risk Management

Risk-Its concept and analysis, Risk Reduction, Vulnerability-Its concept and analysis, Strategic Development for Vulnerability Reduction, Disaster Preparedness and Response

Module III: Disaster Management(DM)

Phases, Cycle of Disaster Management, Institutional Framework, Incident Command System, DM Plan, Community Based DM. Community health and safety. Early Warning and Disaster Monitoring, Disaster Communication. Role of GIS and Remote Sensing, Do's and Don'ts in various disasters.

Module IV: Disaster Management Policy & Practice

Disaster Management Act 2005, Disaster Management Pol icy, National Guidelines and Plans, Role of Government, Non-Government and Private Agencies.

Module V: Role of an Engineer

Challenges and solutions for Disaster Management, Disaster Safe Designs and Constructions, Structural and Non-Structural Mitigation of Disasters

C.**Evaluation:**

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

D.Text Books:

1. Disaster Management Guidelines, GOI-UND Disaster Risk Program (2009-2012)
2. Damon, P. Copola, (2006) Introduction to International Disaster Management, Butterworth Heineman.
3. Gupta A.K., Niar S.S and Chatterjee S. (2013) Disaster management and Risk Reduction, Role of Environmental Knowledge, Narosa Publishing House, Delhi.
4. Murthy D.B.N. (2012) Disaster Management, Deep and Deep Publication PVT. Ltd. New Delhi.
5. Modh S. (2010) Managing Natural Disasters, Mac Millan publishers India LTD.

Course Name	Course Code	L T P	Credit	Semester
Electric & Hybrid Vehicles	BME-707	3 0 1	3	VII

Amity School of Engineering and Technology (ASET)

A. Course Learning Outcomes:

CLO 1	Analyze various electric drives suitable for hybrid electric vehicles.
CLO 2	Discuss different energy storage technologies used for hybrid electric vehicles and their control.
CLO 3	Demonstrate different configurations of electric vehicles and its components, hybrid vehicle configuration by different techniques, sizing of components and design optimization and energy management.
CLO 4	Explain plug – in hybrid electric vehicle architecture, design and component sizing and the power electronics devices used in hybrid electric vehicles.
CLO 5	Explain the basics of electric and hybrid electric vehicles, their architecture, technologies and fundamentals.

B.Syllabus:

Module I - Introduction
Introduction to Hybrid Electric Vehicles: History of hybrid and electric vehicles, social and environmental importance of hybrid and electric vehicles, impact of modern drive-trains on energy supplies. Conventional Vehicles: Basics of vehicle performance, vehicle power source characterization, transmission characteristics.

Module II -Hybrid and Electric Drive-trains
Hybrid Electric Drive-trains: Basic concept of hybrid traction, introduction to various hybrid drive-train topologies, power flow control in hybrid drive-train topologies, fuel efficiency analysis. Electric Drive-trains: Basic concept of electric traction, introduction to various electric drive-train topologies, power flow control in electric drive-train topologies, fuel efficiency analysis.

Module III-Propulsion System
Introduction to electric components used in hybrid and electric vehicles, Configuration and control of DC Motor drives, Configuration and control of Induction Motor drives, configuration and control of Permanent Magnet Motor drives, Configuration and control of Switch Reluctance Motor drives, drive system efficiency.

Module IV- Energy Storage System

Introduction to Energy Storage Requirements in Hybrid and Electric Vehicles, Battery based energy storage and its analysis, Fuel Cell based energy storage and its analysis, Super Capacitor based energy storage and its analysis, Flywheel based energy storage and its analysis, Hybridization of different energy storage devices. .

Module V- Testing of Electric Vehicles

Homologation & its Types, Regulations overview (EEC, ECE, FMVSS, AIS, CMVR), Type approval Scheme. Types of test tracks, Hardware in The Loop (HIL) concepts for EV/HEVs. static testing of vehicle, dynamics testing of vehicle, vehicle component testing.

C.Evaluation:

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	EE

Weightage (%)	15	5	30	50

D. Text:

- Mehrdad Ehsani, Yimin Gao, Stefano Longo and Kmbiz Ebrahimi, "Modern Electric, Hybrid Electric, and Fuel Cell Vehicles", CRC Press, 3rd edition (2019)
- A.K. Babu, "Electric & Hybrid Vehicles",Khanna Publishing, 1st edition (2019).
- Tom Denton, "Electric and Hybrid Vehicles", Routledge; 1st edition (2016).
- ARAI Standards for Electric Vehicles (https://www.araiindia.com/downloads)

REFRIGERATION AND AIR-CONDITIONING LAB

Course Code: BME 721 **P:02, C:01**

Course Contents:

List of Experiments:

1. Study of refrigeration testing.
2. Study of Air-Conditioning testing.
3. To calculate the COP of Refrigerator.
4. Study of Ice Making Plant
5. Study of Water Cooler.
6. To calculate total Heat Load for Air-Conditioning unit.
7. To calculate the COP of Heat Pump

EXAMINATION SCHEME:

IA				EE	
A	**V**	**LR**	**TA**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

COMPUTER INTEGRATED MANUFACTURING LAB

Course Code: BME 722 **P: 02, C: 01**

Course Contents:

1. To conduct briefly study into various aspects of CNC machines.
2. To Study the preparatory and miscellaneous function of CNC codes.
3. Study exercise on Milling operations:
   - Circular Pocketing
   - Rectangular pocketing
   - Peck Drilling cycle
   - Boring operation
   - End drilling operation

4. Study exercise on Turning operations:
   - Simple facing
   - Simple turning operation
   - Step turning operation Circular Pocketing
   - Rectangular pocketing
   - Peek Drilling cycle
   - Boring operation
   - End drilling operation

5. Study the work holding and tool holding devices in the CNC lathe and machining centre and draw up their specifications and capacities.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

INDUSTRIAL TRAINING EVALUATION

Course Code: BME 750 C:06

Methodology:

Practical training is based on the theoretical subjects studied by students. It can be arranged within the college or in any related industrial unit. The students are to learn various industrial, technical and administrative processes followed in the industry. In case of on-campus training the students will be given specific task of fabrication/assembly/testing/analysis. On completion of the practical training the students are to present a report covering various aspects learnt by them and give a presentation on same.

Examination Scheme:

Feedback from industry/work place	20
Training Report	40
Viva	15
Presentation	25
Total	**100**

SEMINAR/MINOR PROJECT STAGE-I

Course Code: BME 760 C:03

Methodology:

Topics of project are to be based on the latest trends, verifying engineering concepts /principle and should involve elementary research work. For that, students need to select their project title and basic requirements to accomplish their project. The projects may involve design, fabrications, testing, computer modeling, and analysis of any engineering problem. At last, the students have to submit a report and give presentation the methodology used to accomplish their project.

Examination Scheme:

Synopsis Report	50
Viva	25
Synopsis Presentation	25
Total	**100**

ADVANCED PROGRAMMING WITH PYTHON LAB

Course Code: **BCS730** **Credit Units**: **01**

List of Assignment:

- Practice Assignment based on string data, Python functions, and Boolean expressions.
- Practical based on iteration, working with lists, tuples and dictionaries.
- Practical based on class, objects, constructor, method in side class.
- Practical questions based on Inheritance, Polymorphism, Type Identification, Custom Exception Classes.
- Handling Errors using Python.
- Practical Assignment based on Usage of Numpy for numerical Data,
- Practical Assignment based on Usage of Usage of Pandas for Data Analysis.
- Practical Assignment based on Usage of Matplotlib for Python plotting.
- Practical Assignment based on Usage of Seaborn for Statically plots.
- Practical Assignment based on Usage of Interactive Dynamic visualizations.
- Practical Assignment based on Usage of SciKit for Machine learning.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	15	20	10	40	10

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

AMITY UNIVERSITY
RAJASTHAN

AMITY School of Engineering & Technology

Course Name	Course Code	LTP	Credit	Semester
Professional Communication Skills	BCS701	1:0:0	1	1

D. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Investigate their personal strengths and insights to be revealed in a Formal Setup of Communication.
CLO 2	Create right selection of words and ideas while choosing the appropriate channel of formal communication
CLO 3	Apply acquired knowledge with the appropriate selection of channel of formal communication.
CLO 4	Develop and empower self with the ease of using appropriate medium of communication.

B. SYLLABUS

Topic
Resume-3 (Revision/Updating)
Interview-3 (Mock Sessions-Technical & CRC)
GD-5 (Overall Revision)
Video & Conference Call Etiquettes (Virtual Interviews)
Formal SMS Drafting

EXAMINATION SCHEME:

Components	Hard Copy	Video	Hand Written	Hand Written	Self	Attendance

	of the Resume	Recording of self shot introduction	Detailed Answers on self-understanding of questions Part 1	Detailed Answers on self-understanding of questions Part 2	Drafted SMS on paper	
Weightage (%)	20	20	20	20	15	05

SUGGESTED READINGS

- Raman Prakash, Business Communication, Oxford
- Working in English, Jones, Cambridge
- Dr. P.Prasad. *Communication Skills*.S.K.Kataria&Sons
- Koneru, Aruna. *Professional Communication.* The McGraw Hill: New Delhi, 2008. Print
- New International Business English, Jones/Alexander, Cambridge

BEHAVIOURAL SCIENCE - VII
(INDIVIDUAL, SOCIETY AND NATION)

Course Code: BSS704 **Credit Units: 01**

Course learning outcomes (CLOs)

At the successful completion of this course you (the student) should be able to:

1. Recognize their personality and individual differences and identify its importance of diversity at workplace and ways to enhance it.
2. Recognize effective socialization strategies and importance of patriotism and taking accountability of integrity.
3. Recognize different types of human rights and its importance.
4. Identify Indian values taught by different religions.
   Identify long term goals and recognize their talent, strengths and styles to achieve them

Course Objective:

This course aims at enabling students towards:

- Understand the importance of individual differences
- Better understanding of self in relation to society and nation
- Facilitation for a meaningful existence and adjustment in society
- Inculcating patriotism and national pride

Course Contents:

Module I: Individual differences & Personality
Personality: Definition& Relevance
Importance of nature & nurture in Personality Development
Importance and Recognition of Individual differences in Personality
Accepting and Managing Individual differences (adjustment mechanisms)
Intuition, Judgment, Perception & Sensation (MBTI)
BIG5 Factors

Module II: Managing Diversity
Defining Diversity
Affirmation Action and Managing Diversity
Increasing Diversity in Work Force
Barriers and Challenges in Managing Diversity

Module III: Socialization
Nature of Socialization
Social Interaction
Interaction of Socialization Process
Contributions to Society and Nation

Module IV: Patriotism and National Pride
Sense of pride and patriotism
Importance of discipline and hard work
Integrity and accountability

Module V: Human Rights, Values and Ethics
Meaning and Importance of human rights
Human rights awareness
Values and Ethics- Learning based on project work on Scriptures like- Ramayana, Mahabharata, Gita etc.

Examination Scheme:

Components	SAP	JOS	FC/MA/CS/HA	P/V/Q	A
Weightage (%)	25	15	30	25	05

SAP- Social Awareness Programme; **JOS**-Journal of Success; **HA**-Home Assignment; **P**-Presentation; **V**-Viva; **Q**-Quiz; **FC**- Flip class; **MA**- Movie Analysis; **CS**- Case study; **A**-Attendance

Text & References:

- Davis, K. Organizational Behaviour,
- Bates, A. P. and Julian, J.: Sociology - Understanding Social Behaviour
- Dressler, David and Cans, Donald: The Study of Human Interaction

- Lapiere, Richard. T – Social Change
- Lindzey, G. and Borgatta, E: Sociometric Measurement in the Handbook of Social Psychology, Addison – Welsley, US.
- Rose, G.: Oxford Textbook of Public Health, Vol.4, 1985.
- Robbins O.B.Stephen;. Organizational Behaviour

Semester 7 Course Code: FLT 701 (Tech French) Credit Units: 02

Course Learning Objective:

- Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of advance level.
- Students will be able to communicate with complex sentences.

  - To express the obligation
  - To suggest and give the advices
  - To speak about the recycling
  - To understand an interview and a project of research
  - To make a survey
  - To prepare for the oral communication
  - To prepare the posters
  - To understand and give the suggestions

Course Contents:

Unité 5 (Leçon 19 and 20) and Unité 6 Les examens et le stage Page : 122-143 Leçons 19, 20 & 21

Contenu Lexical:

1. Les déchets, le recyclage et le tri
2. Les emballages
3. L'informatique
4. L'ordinateur et sespériphériques
5. Les revisions
6. Les couleurs

Contenu Grammatical:

1. Les pronoms compléments d'objets directs (COD)
2. Le pronom<<on>
3. Il faut/devoir
4. L'impératif
5. L'expression de la quantité
6. <<e train de>>/<<venir de>>
7. Le pronoms<<y>>

EXAMINATION SCHEME

Total: 100 marks

Continuous Evaluation (Total 50 Marks)					End Sem Evaluation (Total 50 Marks)
Quiz	Mid Term Test	Presentation	Viva Voce	Attendance	End-Term Exam
10	15	10	10	5	50

Text & References:

- Le Gargasson, I. Naik, S. Chaize, C. (2012) Tech French, Delhi : Goyal Publications
- Ray. A, Robert (2010) Le Petit Robert French Dicitionary, Paris: Le Robert
- Robert, Collins (2006) Collins Robert French Dictionary, Paris : Harper Collins

Foreign Language German

Semester 7:Course Code: FLG 701 **Credit units : 02**

Course Learning Objective:

- Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of advance level.
- Students will be able to communicate with complex sentences.

After successful completion of this semester, students will be able to:

describe their holidays or vacations (perfect tense)
talk about past events – What did you do yesterday? etc.
understand weather reports
express their opinion about weather.

Course Content:

Vocabulary:

Vacation places like sea shore, mountains etc.
Adjectives to describe weather
Seasons
Weather conditions

Grammar:

Perfect tense of both regular and irregular verb
Prepositions with places like sea, mountains, island etc.
Use of impersonal subject pronoun for describing weather: es

EXAMINATION SCHEME

Total: 100 marks

Continuous Evaluation (Total 50 Marks)					End Sem Evaluation (Total 50 Marks)
Quiz	Mid Term Test	Presentation	Viva Voce	Attendance	End-Term Exam
10	15	10	10	5	50

Prescribed Text-Book: Themen Part 1

References: **Studio D A1** by Hermann Funk, Christina Kuhn and Silke Demme, Cornelsen, 2013

Tangram A1by Rosa Maria Dallapiazza, Eduard von Jan & Till Schoenherr, Max Hueber, 2007

SprachtrainingA1 by Rita Maria Niemann, Dong Ha Kim, Cornelsen, 2013
Dictionaries for reference: **Studio D: Glossar** A1 - Deutsch –Englisch, Cornelsen, 2013
http://www.duden.de/woerterbuch

Materials are given in form of photocopies if felt to be necessary

Spanish-VII

Semester 7: Course Code: FLS 701 Credit units : 02

Course Learning Objective:

- Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of advance level.
- Students will be able to communicate with complex sentences.
- To be able to give order, command and make request. Formal and Informal
- Use of imperative in different types of situation: In a bar/ Classroom/ Market etc.
- To express prohibitions and permissions
- To be able to talk about actions in past indefinite tense
- Reading texts about Sports in Spain
- To be able to talk about past events – What did you do yesterday? Etc

Course Content:

Vocabulary:

Vocabulary related to bar, pub, restaurant.

Grammar:
Introduction of imperative in all forms
Affirmative and Negative Imperatives: Tú and Usted
Imperativeswith irregular verbs: Poner, venir, hacer etc.
Prohibitions and permissions: Se puede/ no se puede
Imperative with direct object pronouns
Introduction of Preteritoindefinido- Verbs conjugations

ExaminationScheme:

Total: 100 marks

ContinuousEvaluation (Total 50 Marks)					EndSemEvaluation (Total 50 Marks)
Quiz	MidTerm Test	Presentation	Viva Voce	Attendance	End-TermExam
10	15	10	10	5	50

Text &References:

Nuevo Español Sin Fronteras (ESF1) by Jesús sánchez Lobato, Concha Moreno Garcia, Concha Moreno Garcia, Isabel Santos Gargallo, Sociedad General Española De Librería, S.A 2005

Pasaporte Nivel (A1) byMatideCerraloza Aragón, oscarCerraloza Gilli, Begoña Llovet Barquero, EdelsaGroup didascalia, S.A. 2005

Dictionaries for reference: Collins, www.wordreferences.com.

Essential materials are given in the form of photocopies.

Semester - VII **Course Code: FLC-701** **Credit Units : 02**

Course Learning Objectives:

- Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of advance level.
- Students will be able to communicate with complex sentences.

On the completion of Seventh semester the students will be able to consolidate the proficiency of HSK-II. They will be able to

- Read Chinese sentences and paragraphs both in Pin Yin and Characters.
- Write Chinese Characters and sentences and small paragraphs.
- Speak Chinese dialogues from various fields of day to day life.
- Listen and understand simple Chinese words and dialogues used in syllabi.
- Carry out conversation in various situations such as at restaurants, office, visits, at bank, booking office etc.
- Manipulate basic grammatical structures.
- Master and use most essential vocabulary items used in specific situations; approx 80 Characters.
- Do translation with the help of dictionaries and translation software.
- Communicate in office environment

COURSE CONTENT

1. Revision of Grammar
2. Situational Chinese : at Restaurant (eating & drinking)
3. Working in the office
4. Visit to China (related vocab & sentences)
5. Model question HSK-II
6. At bank (exchanging money)
7. Booking a rail/air ticket/ room at a hotel
8. Job interview
9. CBT package
10. Chinese culture (In English)

VOCABULARY CONTENT

1. Vocabulary will include approx 80 Characters covering fields related to visits and office related vocab.

GRAMMAR CONTENT

1. Interrogative sentences 疑问句
2. Interrogative sentences with reply of Yes/No 正反疑问句
3. Imperatives, exclamatory 祈使句, 感叹句
4. 是……的"sentences stressing time place & manner

EXAMINATION SCHEME

Total: 100 marks

Continuous Evaluation (Total 50 Marks)					End Sem Evaluation (Total 50 Marks)
Quiz	Mid Term Test	Presentation	Viva Voce	Attendance	End-Term Exam
10	15	10	10	5	50

Text Books & References

1. Learn Chinese with me book-II. (Major Text Book), People's Education Press

2. Module on HSK-II. (Suggested reading)

3. Spoken Chinese Vol-I &II. (Suggested reading)

4. Office Talks. (Suggested reading)

5. Practical Chinese Grammar for foreigners

6. Travelers' guide

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
Power Maintenance & safety	BME-707	3 0 0	3	VII

A. Course Learning Outcomes:

CLO 1	Analyze various electric drives suitable for hybrid electric vehicles.
CLO 2	Discuss different energy storage technologies used for hybrid electric vehicles and their control.
CLO 3	Demonstrate different configurations of electric vehicles and its components, hybrid vehicle configuration by different techniques, sizing of components and design optimization and energy management.
CLO 4	Explain plug – in hybrid electric vehicle architecture, design and component sizing and the power electronics devices used in hybrid electric vehicles.
CLO 5	Explain the basics of electric and hybrid electric vehicles, their architecture, technologies and fundamentals.

B. Syllabus:-

Module-1: Fundamentals of maintenance engineering

Definition and aim of maintenance engineering.Primary and secondary functions and responsibility of maintenance department.Types of maintenance.Types and applications of tools used for maintenance .Maintenance cost & its relation with replacement economy.Service life of equipment.

Module-2: PLANT FACILITY LOCATION

Nature of Location Decision, Need for facility location planning, General procedures and Factors influencing location decisions, Facility Location Models, economics and cost analysis, Rural and urban location pattern in India.

Module-3: Periodic and preventive maintenance

Periodic inspection-concept and need.Degreasing, cleaning and repairing schemes.Overhauling of mechanical components.Overhauling of electrical motor.Common troubles and remedies of Electric motor.Repair complexities and its use.Definition, need, steps and advantages of preventive maintenance.Steps/procedure for periodic and preventive maintenance of:Machine tools,Pumps,Air compressors,Diesel generating (DG) sets.Program and schedule of preventive maintenance of mechanical and electrical equipments.Advantages of Preventive maintenance.Repair cycle-concept and importance.

Module-4: Industrial safety

Accident - causes, types, results and control.Mechanical and electrical hazards-types, causes and preventive steps/procedure.Describe salient points of Factories act 1948.for health and safety-, wash rooms, drinking water layouts, light, cleanliness, fire, guarding, pressure vessels, etc.Safety colour codes.Fire prevention and fire fighting, equipment and methods.

Module-5: Recovery, reconditioning and retrofitting

Definition of recovery, reconditioning and retrofitting.Methods of recovery and their applications.Selection criteria of recovery methods.Reconditioning - process, features and advantages.Retrofitting - concept, need and applications.

C. Evaluation:-

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

D. Text Book & References:-

1. Maintenance Engineering Handbook Higgins & Morrow DA Information Services
2. Maintenance Engineering H.P.Garg S. Chand and Company.
3. Maintenance of Machine Tools Gilbirg & Morrow
4. Pump-hydraulic Compressors Audels. McGrew Hill Publication.
5. Foundation Engineering Handbook Winterkorn, Hans. Chapman 3& Hall London

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	Credit	Semester
PROJECT STAGE - II	BME-860	12	VII

Methodology

Topics of project are to be based on the latest trends, verifying engineering concepts /principle and should involve elementary research work. The projects may involve design, fabrications, testing, computer modeling, and analysis of any engineering problem. On completion of the practical training the students are to present a report covering various aspects learnt by them and give a presentation on same.

Examination Scheme:

Literature study/ Fabrication/ Experimentation	40
Written Report	20
Viva	15
Presentation	25
Total	**100**

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
Robotics	BME-803	3 0 0	3	VIII

A. Course Learning Outcomes:

CLO 1	To understand the basic concepts associated with the design and functioning and applications of Robots.
CLO 2	To study about the drives and sensors used in Robots
CLO 3	To learn about analysing robot kinematics and robot programming

B. Syllabus:-

Module I: Fundamentals of Robot

Robot definition, Robot Anatomy, Co-ordinate Systems, Work Envelope, types and classification, Specifications Pitch, Yaw, Roll, Joint Notations, Speed of Motion, Pay Load Robot Parts and Functions –Need for Robots – Different Applications

Module II: Robot Kinematics

Forward Kinematics, Inverse Kinematics and Differences; Forward Kinematics and Reverse Kinematics of Manipulators with Two, Three Degrees of Freedom (In 2 Dimensional), Four Degrees of Freedom (In 3 Dimensional) –Deviations and Problems.

Module III: Robot drive systems and End effectors

Pneumatic Drives, Hydraulic Drives, Mechanical Drives, Electrical Drives, D.C. Servo Motors, Stepper Motor, A.C. Servo Motors – Salient Features, Applications and Comparison of Drives

End Effectors –Grippers – Mechanical Grippers, Pneumatic and Hydraulic Grippers, Magnetic Grippers, Vacuum Grippers; Two Fingered and Three Fingered Grippers; Internal Grippers and External Grippers; Selection and Design Considerations

Module IV: Robot Sensing & Vision

Various Sensors and their Classification, Use of Sensors and Sensor Based System in Robotics, Machine Vision System, Description, Sensing, Digitizing, Image Processing and Analysis and Application of Machine Vision System, Robotic Assembly Sensors and Intelligent Sensors, **Robot Programming**, Teach Pendant Programming, Lead through programming, Robot programming Languages – VAL Programming – Motion Commands, Sensor Commands, End effecter commands, and Simple programs

Module V: Industrial Applications

Objectives, Automation in Manufacturing, Robot Application in Industry, Task Programming, Basics of AI, Goals of AI Research, AI Techniques, Robot Intelligence and Task Planning, Modern Robots, Future Application and Challenges and Case Studies.

C. Evaluation:

Components	Other Components	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

D. Text & References:

1. M.P.Groover,“Industrial Robotics Technology, Programming and Applications”, McGraw-Hill, 2001
2. Fu.K.S. Gonzalz. R.C., and Lee C.S.G., “Robotics Control, Sensing, Vision and Intelligence”, McGraw-Hill Book Co., 1987
3. Yoram Koren, “Robotics for Engineers”, McGraw-Hill Book Co., 1992
4. Janakiraman. P.A.,“Robotics and Image Processing”, Tata McGraw-Hill, 1995

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
Project Management	BME-803	3 0 0	3	VIII

A. Course Learning Outcomes:

CLO 1	Strategically applies project management practices in a variety of organizational and international settings
CLO 2	Analyzes and manages stakeholder expectations and engagement to ensure a successful project outcome
CLO 3	Manages project risk, including identifying, analyzing and responding to risk
CLO 4	Applies processes required to manage the procurement of a project, including acquiring goods and services from outside the organization
CLO 5	Manages projects effectively including the management of scope, time, costs, and quality, ensuring satisfying the needs for which the project was undertaken

B. Syllabus:-

Module– I

Indian project management scenario, Projects - Project ideas and preliminary screening. Developments - Project planning to Project completion - Pre-investment phase, Investment phase, operational phase - Governmental Regulatory framework. Capital Budgeting : Capital cost-timevalue (CTV) system, managing project resources flow.

Module– II

Stages - Opportunity studies - General opportunity studies, specific opportunity studies, prefeasibility studies, functional studies or support studies, feasibility study expansion projects, data for feasibility study.

Market and Technical Appraisal : Market and Demand analysis, Market Survey, Demand forecasting. Technical analysis- Materials and inputs, Choice of Technology, Product mix, Plant location, capacity, Machinery and equipment

Module– III

Appraisal process, Concepts and Techniques, Cost and Benefit from Financial angle - Basic principles for measuring costs and benefits, components of cash flow. Time value of money - Present and future value. Appraisal criteria - Urgency, Payback period, Rate of return, Debt service coverage ratio, Net present value, Benefit cost ratio, Internal rate of return, Annual capital charge,

Investment appraisal in practice.

Module– IV

Cost of capital - Cost of different sources of finance, Cost of debt, preference capital, and Equity capital, Weighted average Cost of capital, Marginal cost of capital. Risk analysis- Measures of risk,

Sensitivity analysis, and Decision tree analysis. Social cost benefits analysis (SCBA) - Rationale for
SCBA, UNIDO approach.
Cost of Capital. Means of financing, Term Loans, Financial Institutions. Profitability - Cost of Production, Break-even analysis. Assessing the tax burden and financial projections.
(12 hours)

Module – V

Forms of Project Organization, Project Planning, Implementation, and Control - Network construction, CPM, PERT, Development of Project schedule, Crashing of Project Network, Scheduling based on the availability of Resources (Manpower and Release of Funds).
Introduction to Foreign collaboration projects - Governmental policy framework, Need for foreign
technology, Royalty payments, Foreign investments and procedural aspects.

C. Evaluation:

Components	Other Components	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

D. Text & References:

Text Books :

1. P.Gopalakrishnan and V.E.Rama Moorthy Project Management, Macmillan India Ltd., New Delhi, 1993.
2. Prasanna Chandra, Projects - Preparation, Appraisal, Budgeting and Implementation, Tata McGraw Hill Publishing Company Ltd., New Delhi, 1980.

Reference Books :

1. B.B.Goel, Project Management - Principles and Techniques, Deep & Deep Publications, New Delhi, 1986.
2. UNIDO Series on Project Management

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
Flexible Manufacturing system	BME-804	3 0 0	3	VIII

A. Course Learning Outcomes:

CLO 1	Apply the concepts of PPC and GT to the development of FMS.
CLO 2	Discuss the planning and scheduling methods used in manufacturing systems.
CLO 3	Identify various workstations, system support equipments.
CLO 4	Identify hardware and software components of FMS.
CLO 5	Summarize the concepts of modern manufacturing such as JIT, supply chain management and lean manufacturing etc.

B. Syllabus:-

Module-I

Understanding of FMS: Evolution of Manufacturing Systems, Definition, objective and Need, Components, Merits, Demerits and Applications Flexibility in Pull and Push type

Module- II

Classification of FMS Layout: Layouts and their Salient features, Single line, dual line, loop, ladder, robot centre type etc.

Module- III

Processing stations: Salient features Machining Centers, Turning centre, Coordinate measuring machine (CMM), Washing/ Deburring station

Module- IV

Material Handling System: An introduction, Conveyor, Robots, Automated Guided Vehicle (AGV), Automated Storage Retrieval System (ASRS) Management technology: Tool Management, tool magazine, Tool preset, identification, Tool monitoring and fault detection, routing, Production Planning and Control, Scheduling and loading of FMS

Module- V

Design of FMS: Performance Evaluation of FMS, Analytical model and Simulation model of FMS Case studies: Typical FMS problems from research papers

C. Evaluation:

Components	Other Components	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

D. Text books & References book:

1. William W Luggen, “Flexible Manufacturing Cells and System” Prentice Hall of Inc New Jersey, 1991
2. Reza A Maleki “Flexible Manufacturing system” Prentice Hall of Inc New Jersey, 1991
3. John E Lenz “Flexible Manufacturing” marcel Dekker Inc New York ,1989.

References

1. Groover, M.P “Automation, Production Systems and Computer Integrated Manufacturing”, Prentice Hall

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
Lean Manufacturing	BME-805	3 0 0	3	VIII

A. Course Learning Outcomes:-

CLO 1	Identify key features of a production line process and how it can be made more effective
CLO 2	Monitor a simulated process and identify skills needed to make it work efficiently
CLO 3	Understand concepts such as 'Just in Time manufacturing' and 'Lean manufacturing' and apply them to the process.
CLO 4	Identify how a production line can be run efficiently
CLO 5	Reflect upon the critical skills and evaluate their own performance
CLO 6	Relate concepts such as 'Just in Time manufacturing' and 'Lean manufacturing' to the context of an assembly line.

B. Syllabus:-

Module-1: PRINCIPLES OF LEAN MANUFACTURING: Review of manufacturing paradigm; Objectives of lean manufacturing, key principles and implications of lean manufacturing, traditional versus lean manufacturing characteristics; Value creation and waste elimination-major kinds of manufacturing waste, concept of takt time, continuous flow , continuous improvement, single piece flow.

Module-2: LEAN MANUFACTURING TOOLS AND METHODOLOGIES: Values stream mapping**:** Current state and future state value stream mapping; Standard work: Communication of standard work to employees, visual controls; Quality at the source, 5S principles, Total Productive Maintenance, Changeover and setup time reduction; Production leveling-Failure mode and effect analysis, line balancing, mistake proofing, case studies.

Module-3: GROUP TECHNOLOGY AND JUST IN TIME MANUFACTURING: Group technology philosophy: Part family, Machine cell design and analysis; JIT-Elements of JIT, Kanban, case studies.

Module-4: LEAN MANUFACTURING IMPLEMENTATION: Road map for lean manufacturing implementation; Reconciling lean with other systems-Lean six sigma, integrating lean principles in ERP and PLM; Lean production in Industry 4.0: Impact of industry 4.0 on lean production system, case studies.

C. Evaluation:-

Components	Other Components	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

D. Text & Reference books:

1. Askin R G, Goldberg J B, "Design and Analysis of Lean Production Systems", John Wiley and Sons Inc., 2003.

2. S. R. Devadasan, V. Sivakumar, "Lean and Agile Manufacturing: Theoretical, Practical and Research futurities", PHI, 2012.

3. Micheal Wader, “Lean Tools: A Pocket Guide to Implementing Lean Practices”, Productivity and Quality Pub, 2002.
4. Kenichi Sekine, “One-Piece Flow”, Productivity Press, Portland, Oregon, 1992.
5. Alan Robinson, “Continuous Improvement in Operations”, Productivity Press, Portland, Oregon, 1991.
6. Beata Mrugalska, Magdalena K. Wyrwicka, “Towards Lean Production in Industry 4.0”, Procedia Engineering, 182, 2017.

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
Automotive Safety and Ergonomics	BME-806	3 0 0	3	VIII

A. Course Learning Outcomes:-

CLO 1	Understand the basics of vehicle collision and its effects.
CLO 2	Understand the various safety concepts used in passenger cars.
CLO 3	Gain knowledge about various safety and its equipment.
CLO 4	Understand the concepts of vehicle ergonomics.
CLO 5	Gain knowledge about various automotive comforts features.

B. Syllabus:-

Module I: Introduction

Design Of The Body For Safety, Energy Equations, Engine Location, Effects Of Deceleration Inside Passenger Compartment, Active And Passive Safety, Concept Of Crumble Zone And Safety Sandwich Construction, Deceleration On Impact With Stationary And Movable Obstacle, Instrumentation, High Speed Photography, Image Analysis.

Module II: Safety Concepts

Active Safety- Driving Safety, Conditional Safety, Perceptibility Safety, Operating Safety, Interior Safety, Deformation Behavior Of Vehicle Body, Speed And Acceleration Characteristics Of Passenger

Compartment On Impact, Pedestrian Safety - Human Impact Tolerance- Determination Of Injury Thresholds

Module III: Safety Equipments

Seat Belt, Automatic Seat Belt Fastening System, Collapsible Steering Column, Tiltable Steering Wheel, Air Bags, Electronic Systems For Activating Air Bags, Frontal Design For Safety, Collision Warning System, Anti-Lock Braking System, Object Detection System With Braking System Interactions, ESP And EBD Systems

Module IV: Vehicle Ergonomics

Introduction To Human Body - Anthropometrics And Its Application To Vehicle Ergonomics, Cockpit Design, Driver Comfort – Seating, Visibility, Man-Machine System- Psychological Factors – Stress, Attention, Passenger Comfort - Ingress And Egress, Spaciousness, Dust And Fume Prevention And Vibration, Interior Features And Conveniences

C. Evaluation:-

Components	Other Components	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

D. Text & Reference books:

1. Prasad, Priya and Belwafa Jamel, "*Vehicles Crashworthiness and Occupant Protection*", American Iron and Steel Institute, USA.
2. JullianHappian-Smith "*An Introduction to Modern Vehicle Design*" SAE, 2002
3. Bosch - "*Automotive Handbook*" - 5th edition - SAE publication - 2000.
4. "*Recent development in Automotive Safety Technology*", SAE International Publication. Editor: Daniel J
Helt,2013.Keitz H.A.E. "Light Calculations and Measurements", Macmillan 1971.

AMITY UNIVERSITY
RAJASTHAN

AMITY SCHOOL OF ENGINEERING & TECHNOLOGY (ASET)

B.Tech (Civil Engineering) Programme

Code: BCE

Duration – 4 Years Full Time

(Programme Structure & Syllabus)

Choice Based Credit System (CBCS)

AMITY UNIVERSITY RAJASTHAN

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Credits Summary

B.Tech Civil Engineering (04 Years/ 08 Semesters)							
Semester	Core Course (CC)	Domain Electives (DE)	Value Added Course (VAC)	Minor Track/ Open Elective (MT/OE)	Non-Teaching Credit Courses (NTCC)	Anandam	Total
I	24	-	4	-	-	2	**30**
II	23	-	4	3	-	2	**32**
III	19	2	4	3	-	2	**30**
IV	18	2	4	3	-	2	**29**
V	20	2	4	3	3	2	**34**
VI	18	3	4	3	-	2	**30**
VII	9	2	4	-	6	2	**23**
VIII	6	3	-	-	12	-	**21**
Total	**137**	**14**	**28**	**15**	**21**	**14**	**229**

CC = Core Course

DE = Domain Elective

OE = Open Elective

VA = Value Added Course

NTCC = Non - Teaching Credit Courses (NTCC)

AMITY UNIVERSITY
RAJASTHAN

PROGRAMME STRUCTURE: B. Tech-Civil Engineering

FIRST SEMESTER

Course Code	Course Title	Category	Lecture (L) Hours Per Week	Tutorial (T) Hours Per Week	Practical (P) Hours Per Week	Total Credits
Core Courses						
AM 101	Applied Mathematics – I	CC	3	1	-	4
AP 102	Applied Physics - I – Fields & Waves	CC	2	1	-	3
AC 103	Applied Chemistry	CC	2	1	-	3
BME 104	Elements of Mechanical Engineering	CC	2	1	-	3
BCS 105	Introduction to Computers & Programming in C	CC	2	1	-	3
BEE 106	Basic Electrical Engg.	CC	2	1	-	3
Practical Courses						
AP 122	Applied Physics - I Lab	CC	-	-	2	1
AC 123	Applied Chemistry Lab	CC	-	-	2	1
BME 124	Elements of Mechanical Engineering Lab	CC	-	-	2	1
BCS 125	Programming in C Lab	CC	-	-	2	1
BEE 126	Basic Electrical Engg. Lab	CC	-	-	2	1
	Value Added Courses					
BCS 101	English	VA	1	-	-	1
BSS 104	Understanding Self for Effectiveness	VA	1	-	-	1
FLF 101 FLG 101 FLS 101 FLC 101	Foreign Language - I French German Spanish Chinese	VA	2	-	-	2
Non-Teaching Credit Course (NTCC)						
AND001	Anandam-I	NTCC	-	-	-	2
	TOTAL					**30**

AMITY UNIVERSITY
RAJASTHAN

SECOND SEMESTER

Course Code	Course Title	Category	Lecture (L) Hours Per Week	Tutorial (T) Hours Per Week	Practical (P) Hours Per Week	Total Credits
Core Courses						
AM 201	Applied Mathematics - II	CC	3	1	-	4
AP 202	Applied Physics-II – Modern Physics	CC	2	1	-	3
BCS 203	Object Oriented Programming in C^{++}	CC	2	1	-	3
BME 204	Engineering Mechanics	CC	2	1	-	3
BME 205	Engineering Graphics	CC	2	-	-	2
EVS 001	**Environmental Studies**	**CC**	**4**	**-**	**-**	**4**
Practical Courses						
AP 222	Applied Physics–II–Modern Physics Lab	CC	-	-	2	1
BCS 223	Object Oriented Programming in C^{++}Lab	CC	-	-	2	1
BME 224	Engineering Mechanics Lab	CC	-	-	2	1
BME-225	Engg. Graphics Lab	CC			2	1
Open Elective						
BCE 207	OE-I	OE	3	-	-	3
Value Added Courses						
BCS 201	English	VA	1	-	-	1
BSS 204	Behavioural Science – II	VA	1	-	-	1
FLF 201 FLG 201 FLS 201 FLC 201	Foreign Language - II French German Spanish Chinese	VA	2	-	-	2
Non-Teaching Credit Course (NTCC)						
AND002	Anandam-II	NTCC	-	-	-	2
	TOTAL					32

AMITY UNIVERSITY
RAJASTHAN

THIRD SEMESTER

Course Code	Course Title	Category	Lecture (L) Hours Per Week	Tutorial (T) Hours Per Week	Practical (P) Hours Per Week	Total Credits
Core Courses						
AM 301	Applied Mathematics – III	CC	2	1	-	3
BCE 302	Mechanics of Solids	CC	2	1	-	3
BCE 303	Mechanics of Fluids	CC	2	1	-	3
BCE 304	Building Technology	CC	3	-	-	3
BCE 305	Surveying-I	CC	3	-	-	3
Practical Courses						
BCE 322	Mechanics of Solids Lab	CC	-	-	2	1
BCE 323	Mechanics of Fluids Lab	CC	-	-	2	1
BCE 324	Building Drawing Lab	CC	-	-	2	1
BCE 325	Surveying-I Lab	CC	-	-	2	1
Domain Elective-I : Choose any one from the following courses						
BCE 306	Engineering Geology	DE	2	-	-	2
BCE 307	Remote Sensing & Geographic Information Systems	DE	2	-	-	
Open Elective						
	OE-II	OE	3	-	-	3
Value Added Course						
BCS 301	Communication Skills – I	VA	1	-	-	1
BSS 304	Behavioural Science – III	VA	1	-	-	1
FLF 301 FLG 301 FLS 301 FLC 301	Foreign Language – III French German Spanish Chinese	VA	2	-	-	2
Non-Teaching Credit Course (NTCC)						
AND003	Anandam-III	NTCC	-	-	-	2
TOTAL						**30**

AMITY UNIVERSITY
RAJASTHAN

FOURTH SEMESTER

Course Code	Course Title	Category	Lecture (L) Hours	Tutorial (T) Hours	Practical (P) Hours	Total Credits
Core Courses						
BCE 401	Numerical Analysis & Programming	CC	3	-	-	3
BCE 402	Structural Analysis - I	CC	3	-	-	3
BCE 404	Transportation Engineering - I	CC	3	-	-	3
BCE 405	Structural Steel-1	CC	2	1	-	3
BCE 406	Fluid Mechanics and Hydraulic	CC	2	-	-	2
Practical Courses						
BCE 421	Numerical Analysis & Programming	CC	-	-	2	1
BCE 423	Surveying –II Lab	CC	-	-	2	1
BCE 424	Highway Materials Testing Lab	CC	-	-	2	1
BCE 426	Fluid Mechanics and Hydraulic Machines Lab	CC	-	-	2	1
Domain Elective-II : Choose any one from the following courses						
BCE 408	Computer Aided Analysis & Design in Civil Engineering	DE	2	-	-	2
BCE 403	Surveying-II	DE	2	-	-	
Open Elective						
	OE-III	OE	3	-	-	3
Value Added Courses						
BCS 401	Communication Skills - II	VA	1	-	-	1
BSS 404	Behavioural Science – IV	VA	1	-	-	1
FLF 401 FLG 401 FLS 401 FLC 401	Foreign Language – IV French German Spanish Chinese	VA	2	-	-	2
Non-Teaching Credit Course (NTCC)						
AND004	Anandam-IV	NTCC	-	-	-	2
	TOTAL					**29**

SUMMER TRAINING - I (6-8 WEEKS)

AMITY UNIVERSITY
RAJASTHAN

FIFTH SEMESTER

Course Code	Course Title	Category	Lecture (L) Hours Per Week	Tutorial (T) Hours Per Week	Practical (P) Hours Per Week	Total Credits
Core Courses						
BCE 501	Structural Analysis - II	CC	2	1	-	3
BCE 502	Structural concrete design –I(LSM)	CC	3	1	-	4
BCE 503	Geotechnical Engineering - I	CC	2	1	-	3
BCE 504	Transportation Engineering - II	CC	3	-	-	3
BCE 505	Irrigation Structures and Water Resource Engineering	CC	3	-	-	3
BCS 510	Web Development	CC	2	-	-	2
Practical Courses						
BCE 523	Geotechnical Engineering Lab	CC	-	-	2	1
BCS 530	Web Development Lab	CC	-	-	2	1
Domain Elective-III : Choose any one from the following courses						
BCE 507	Architecture & Town Planning	DE	2	-	-	2
BCE 508	Hydrology and flood control	DE	2	-	-	
Open Elective						
	OE-IV	OE	3	-	-	3
Value Added Courses						
BCS 501	Communication Skills - III	VA	1	-	-	1
BSS 504	Behavioural Science – V	VA	1	-	-	1
FLF 501 FLG 501 FLS 501 FLC 501	Foreign Language – V French German Spanish Chinese	VA	2	-	-	2
Non-Teaching Credit Course (NTCC)						
BCE 550	In-house Practical Training (Evaluation)	NTCC	-	-	-	3
AND005	Anandam-V	NTCC	-	-	-	2
	TOTAL					**34**

AMITY UNIVERSITY
RAJASTHAN

SIXTH SEMESTER

Course Code	Course Title	Category	Lecture (L) Hours Per Week	Tutorial (T) Hours Per Week	Practical (P) Hours Per Week	Total Credits
Core Courses						
BCE 601	Environmental Engineering - I	CC	3	-	-	3
BCE 602	Structural Concrete Design-II(SCD)	CC	2	1	-	3
BCE 603	Structural Steel Design-II	CC	2	1	-	3
BCE 604	Concrete Technology	CC	3	-	-	3
BCS 610	Programming with Python	CC	2	-	-	2
	Practical Courses					
BCE 621	Environmental Engineering Lab	CC	-	-	2	1
BCE 622	Structural Detailing Lab	CC	-	-	2	1
BCE 624	Concrete Technology Lab	CC	-	-	2	1
BCS 630	Programming with Python Lab	CC	-	-	2	1
	Domain Elective-IV : Choose any one from the following courses					
BCE 605	Geotechnical Engineering – II	DE	3	-	-	3
BCE 606	Traffic Engineering & Management	DE	3	-	-	
BCE 607	Computer Application in Hydro Engineering	DE	3	-	-	
BCE 608	Water Resources Systems Planning & Design	DE	3	-	-	
BCE 609	Advanced Concrete Design	DE	3	-	-	
Open Elective						
	OE-V	-	3	-	-	3
Value Added Courses						
BCS 601	Communication Skills - IV	VA	1	-	-	1
BSS 604	Behavioural Science – VI	VA	1	-	-	1
FLF 601 FLG 601 FLS 601 FLC 601	Foreign Language – VI French German Spanish Chinese	VA	2	-	-	2
Non-Teaching Credit Course (NTCC)						
AND006	Anandam-VI	NTCC	-	-	-	2
	TOTAL					**30**

SUMMER TRAINING-II (6-8WEEKS)

AMITY UNIVERSITY
RAJASTHAN

SEVENTH SEMESTER

Course Code	Course Title	Category	Lecture (L) Hours Per Week	Tutorial (T) Hours Per Week	Practical (P) Hours Per Week	Total Credits
Core Courses						
BCE 701	Environmental Engineering – II	CC	3	-	-	3
BCE 702	Quantity survey and estimation	CC	2	1	-	3
BCS 710	Advanced Programming with Python	CC	2	-	-	2
BCS 730	Advanced Programming with Python Lab	CC	-	-	2	1
Domain Elective-V : Choose any one from the following courses						
BCE 707	Pavement Analysis & Design	DE	2	-	-	2
BCE 708	Pre-stressed Concrete	DE	2	-	-	
Value Added Courses						
BCS 701	Communication Skills - V	VA	1	-	-	1
BSS 704	Behavioral Science – VII	VA	1	-	-	1
FLF 701 FLG 701 FLS 701 FLC 701	Foreign Language – VI I French German Spanish Chinese	VA	2	-	-	2
Non-Teaching Credit Course (NTCC)						
BCE 750	Industrial Training (Evaluation)	NTCC	-	-	-	3
BCE 760	Seminar	NTCC	-	-	-	3
AND007	Anandam-VII	NTCC	-	-	-	2
	TOTAL					**23**

AMITY UNIVERSITY
RAJASTHAN

EIGHTH SEMESTER

Course Code	Course Title	Category	Lecture (L) Hours Per Week	Tutorial (T) Hours Per Week	Practical (P) Hours Per Week	Total Credits
Core Courses						
BCE 801	Engineering Economics & Management	CC	2	-	-	3
BCE 802	Construction Equipment and Project Management	CC				3
Domain Elective-VI : Choose any one from the following courses						
BCE 803	Finite Element Method	DE	3	-	-	3
BCE 804	Advanced Structural Analysis	DE	3	-	-	
Non-Teaching Credit Course (NTCC)						
BCE 860	Project	NTCC	-	-	-	12
	TOTAL					**21**

Total Credits = 229

Minor Track for Civil Engg.

Course Code	Sem.	Course Title	Category	L	T	P	Total
BCE 207	II	Basic Civil Engineering	MT	3			3
BCE-304	III	Building Technology	MT	3			3
BCE-404	IV	Transportation Engineering – I (Highway Engineering)	MT	3			3
BCE-508	V	Hydrology and flood control	MT	3			3
BCE-604	VI	Concrete Technology	MT	3			3
Total							**15**

Curriculum & Scheme of Examination

FIRST SEMESTER

APPLIED MATHEMATICS - I

Course Code: AM 101 **Credit Units: 04**

Course Objective:

The knowledge of Mathematics is necessary for a better understanding of almost all the Engineering and Science subjects. Here our intention is to make the students acquainted with the concept of basic topics from Mathematics, which they need to pursue their Engineering degree in different disciplines.

Course Learning Outcome:

At the successful completion of this course you (the student) should be able to:

1. Investigate the basic concept about Calculus and differential equations.

2. Create an interest in finding the solution of problem, length, area, volume etc of the curve and application of Vector calculus.

3. Apply the basic concepts of Calculus to find Asymptotes, curvature, tangents & normal's, maxima & minima, partial derivatives and approximate calculation of a function.

4. Develop the formulation of the problem and differential equation, define its nature by using the fundamental of calculus and its applications.

Course Contents:

Module I: Differential Calculus
Successive differentiation, Leibnitz's theorem (without proof), Mean value theorem, Taylor's theorem (proof), Remainder terms, Asymptote & Curvature, Partial derivatives, Chain rule, Differentiation of Implicit functions, Exact differentials, Tangents & Normals, Maxima, Approximations, Differentiation under integral sign, Jacobians & transformations of coordinates.

Module II: Integral Calculus
Fundamental theorems, Reduction formulae, Properties of definite integrals, Applications to length, area, volume, surface of revolution, improper integrals, Multiple Integrals-Double integrals, Applications to areas, volumes.

Module III: Ordinary Differential Equations
Formation of ODEs, Definition of order, degree & solutions, ODE of first order: Method of separation of variables, homogeneous & non homogeneous equations, Exactness & integrating factors, Linear equations & Bernoulli equations, General linear ODE of n^{th} order, Solution of homogeneous equations, Operator method, Method of undetermined coefficients, Solution of simple simultaneous ODE.

Module IV: Vector Calculus
Scalar & Vector Field, Derivative of a Vector, Gradient, Directional Derivative, Divergence and Curl and their Physical Significance, Arc Length, Tangent, Directional Derivative, Evaluation of Line Integral, Green's Theorem in Plane (without proof), Representation of Surfaces, Tangent Plane and Surface Normal, Surface Integral, Stoke's Theorem (without proof), Gauss Divergence Theorem (without proof).

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

Text:

- Differential Calculus by Shanti Narain
- Integral Calculus by Shanti Narain

References:

- Differential Equation by A.R. Forsyth
- Higher Engineering Mathematics by H.K. Dass

APPLIED PHYSICS - I - FIELDS AND WAVES

Course Code: **AP 102** **Credit Units: 03**

Course Objective:

Aim of this course is to introduce the students to fundamentals of graduate level physics, which form the basis of all applied science & engineering

Course Learning Outcome:

At the successful completion of this course you (the student) should be able to:

1. develop an understanding of the various concepts of simple harmonic motion for with and without damping.

2. solve simple problems on simple harmonic motion and related topics.

3. explain and interpret the wave nature of light.

4. solve simple problems on the applications of wave nature of light

5. define and understand vector calculus and electromagnetics.

6. solve numerical problems on vector calculus and electromagnetic

Course Contents:

Module I: Oscillations & Waves
Oscillations: Introduction to S.H.M. Damped Oscillations: Differential Equation & its solution, logarithmic decrement, Quality Factor, Different conditions of damping of harmonic oscillations. Forced oscillations: Amplitude & Frequency Response, Resonance, Sharpness of Resonance
Plane Progressive Waves: Differential Equation & Solution, Superposition of Progressive Waves stationary waves.
Ultrasonics: Generation & application of ultrasonicwaves.

Module II: Wave Nature of Light
Interference: Coherent Sources, Conditions of interference, Interference due to division of wavefront, Fresnels biprism Interference due to division of amplitude, Newton's rings, Interference due to thin films, .
Diffraction: Fresnel & Fraunhofer diffraction, Fraunhofer diffraction at a single slit, double slit, N Slits, Transmission grating, Rayleigh criterion & Resolving power of grating.
Polarization: Birefringence, Nicol prism, Production & analysis of plane, circularly & elliptically polarized light, Half & quarter wave plates, Optical rotation, Polarimeter.

Module III: Electromagnetics
Scalar & vector fields, gradient of a scalar field, physical significance of gradient, equipotential surface. Line, surface & volume integrals, Divergence & curl of vector field & mathematical analysis physical significance, Electric flux, Gauss' law, Proof & Applications, Gauss divergence & Stokes theorems.
Differential form of Gauss' Law, Amperes' Law, Displacement current, Faradays Law, Maxwell equations in free space & isotropic media (Integral form & differential form), EM wave propagation in free space, Poynting vector.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Waves & oscillation, A. P. French
- Physics of waves, W. C. Elmore & M. A. Heald
- Introduction to Electrodynamics, D. J. Griffith
- Electrodynamics, Gupta, Kumar & Singh
- Optics, A. K. Ghatak
- Engineering Physics, Satya Prakash

APPLIED CHEMISTRY

Course Code: **Credit Units: 03**

Course Objective: AC 103

Four basic sciences, Physics, Chemistry, Mathematics & Biology are the building blocks in engineering & technology. Chemistry is essential to develop analytical capabilities of students, so that they can characterize, transform & use materials in engineering & apply knowledge in their field. All engineering fields have unique bonds with chemistry whether it is Aerospace, Mechanical, Environmental & other fields the makeup of substances is always a key factor, which must be known. For electronics & computer science engineering, apart from the material, computer modeling & simulation knowledge can be inherited from the molecule designing. The upcoming field of technology like Nanotechnology & Biotechnology depends fully on the knowledge of basic chemistry. With this versatile need in view, course has been designed in such a way so that the student should get an overview of the whole subject.

Course learning outcomes (CLO).

At the successful completion of this course you (the student) should be able to:

1. Understand the structure and chemical transformations of molecules.
2. Understand the application of chemical process in industries.
3. Basic idea about water treatment, lubrication, corrosion, fuel, spectroscopy etc.

Course Contents:

Module I: Water Technology
Introduction & specifications of water,
Hardness & its determination (EDTA method only),
Alkalinity,
Boiler feed water, boiler problems – scale, sludge, priming & foaming: causes & prevention, Boiler problems – caustic embrittlement & corrosion: causes & prevention,
Carbonate & phosphate conditioning, colloidal conditioning & calgon treatment
Water softening processes: Lime – soda process, Ion exchange method,
Water for domestic use.

Module II: Fuels
Classification, calorific value of fuel, (gross & net),
Determination of calorific value of fuels, bomb calorimeter,
Solid fuels - Proximate & ultimate analysis,
Octane & Cetane No. & its significance
Numericals on combustion

Module III: Instrumental Methods of analysis
Introduction; Principles of spectroscopy; Laws of absorbance
IR: Principle, Instrumentation, Application
UV: Principle, Instrumentation, Application
NMR: Principle, Instrumentation, Application

Module IV: Lubricants
Introduction; Mechanism of Lubrication;
Types of Lubricants; Chemical structure related to Lubrication;
Properties of lubricants; Viscosity & Viscosity Index; Iodine Value; Aniline Point; Emulsion number; Flash Point; Fire Point; Drop Point; Cloud Point; Pour Point.
Selection of Lubricants.

Module VI: Corrosion
Introduction, Mechanism of dry & wet corrosion,
Types of corrosion-Galvanic, Concentration cell, soil, pitting, intergranular, waterline. Passivity.
Factors influencing corrosion.
Corrosion control.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE

Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

***Text*:**

- Engineering Chemistry - Jain & Jain
- Engineering Chemistry - Sunita Rattan
- Engineering Chemistry - Shashi Chawla

***References*:**

- Engineering Chemistry –Dara & Dara
- Spectroscopy - Y.R Sharma
- Corrosion Engineering – Fontenna & Greene

ELEMENTS OF MECHANICAL ENGINEERING

Course Code: BME 104 **Credit Units: 03**

Course Objective:

The objective of this course is to impart the basic knowledge of thermodynamics, stress - strain, materials & their properties and various manufacturing processes to the students of all engineering discipline.

Course Learning Outcome:

At the successful completion of this course you (the student) should be able to:

1. Investigate – Basic machines used in the field of mechanical engineering
2. Create – Mathematical models of fundamental physical phenomenon and apply them to predict the behaviour of engineering systems
3. Apply – this knowledge to analyse the working of IC Engines, Steam Turbines, Lathe machines etc.
4. Develop – Ability to perform and conduct basic experiments and evaluate the results of the same.

Course Contents:

Module I: Fundamental Concepts
Definition of thermodynamics, system, surrounding & universe, phase, concept of continuum, macroscopic & microscopic point of view, Thermodynamic equilibrium, property, state, path, process, cyclic process, Zeroth, first & second law of thermodynamics, Carnot Cycle, Introduction to I.C. Engines-two &four stoke S.I. and C.I. engines. Otto cycle. Diesel cycle.

Module II: Stress & Strain Analysis
Simple stress & strain: introduction, normal shear, and stresses-strain diagrams for ductile & brittle materials. Elastic constants, one-dimensional loadings of members of varying cross-section, Strain Energy, Properties of material-strength, elasticity, stiffness, malleability, ductility, brittleness, hardness & plasticity etc; Concept of stress & strain stress strain diagram, tensile test, impact test & hardness test.

Module III: Casting & Forging
Introduction of casting, pattern, mould making procedures, sand mould casting, casting defects, allowances of pattern. Forging-introduction, upsetting & drawing out, drop forging, press forging & m/c forging

Module IV: Welding & Sheet metal working
Introduction of welding processes, classification, gas welding, arc welding, resistance welding. Introduction to sheet metal shop, Shearing, trimming, blanking, piercing, shaving, notching, stretch forming, nibbling coining, embossing & drawing.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Engineering thermodynamics, by P.K. Nag, Tata McGraw Hill.
- Thermal Engineering, by D.S. Kumar. S.K. Kataria & Sons.
- Thermal Engineering by PL Ballaney; Khanna Publishers, Delhi.
- Engineering Thermodynamics: Work & Heat Transfer, by Rogers & Mayhew, ELBS Publications
- Heine, R.W. C.R. Loper and P.C. Rosenthal, Principles of metal casting McGraw Hill
- Welding Technology by R.S. Parmar, Khanna Publishers.
- Thermodynamics & Heat Engines Volume-I, by R. Yadav: Central Publications.
- Ganesan, V. Internal Combustion Engine, Tata McGraw-Hill.
- Mathur, M.L. & Sharma, R.P. Internal Combustion Engine. Dhanpat Rai Publication

INTRODUCTION TO COMPUTERS AND PROGRAMMING IN C

Course Code: BCS 105 **Credit Units: 03**

Course Objective:

The objective of this course module is to acquaint the students with the basics of computers system, its components, data representation inside computer & to get them familiar with various important features of procedure oriented programming language i.e. C.

Course Learning Outcome:

At the successful completion of this course you (the student) should be able to:

CLO1: Able to figure out the basic architecture and components of computers
CLO 2: Will be able to understand the syntax of programs in C language
CLO 3: Build C language programs and projects.

Course Contents:

Module I: Introduction
Introduction to computer, history, von-Neumann architecture, memory system (hierarchy, characteristics & types), H/W concepts (I/O Devices), S/W concepts (System S/W & Application S/W, utilities). Data Representation: Number systems, character representation codes, Binary, octal, hexadecimal & their interconversions. Binary arithmetic, floating point arithmetic, signed & unsigned numbers, Memory storage unit.

Module II: Programming in C
History of C, Introduction of C, Basic structure of C program, Concept of variables, constants & data types in C, Operators & expressions: Introduction, arithmetic, relational, Logical, Assignment, Increment & decrement operator, Conditional, bitwise operators, Expressions, Operator precedence & associativity. Managing Input & output Operation, formatting I/O.

Module III: Fundamental Features in C
C Statements, conditional executing using if, else, nesting of if, switch and break Concepts of loops, example of loops in C using for, while and do-while, continue and break. Storage types (automatic, register etc.), predefined processor, Command Line Argument.

Module IV: Arrays and Functions
One dimensional arrays & example of iterative programs using arrays, 2-D arrays Use in matrix computations.
Concept of Sub-programming, functions Example of user defined functions. Function prototype, Return values and their types, calling function, function argument, function with variable number of argument, recursion.

Module V: Advanced features in C
Pointers, relationship between arrays & pointers Argument passing using pointers, Array of pointers. Passing arrays as arguments.
Strings & C string library.
Structure & Union. Defining C structures, Giving values to members, Array of structure, Nested structure, passing strings as arguments.
File Handling.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

Text:

- "ANSI C" by E Balagurusamy
- Yashwant Kanetkar, "Let us C", BPB Publications, 2nd Edition, 2001.
- Herbert Schildt, "C: The complete reference", Osbourne Mcgraw Hill, 4th Edition, 2002.

- V. Raja Raman, “Computer Programming in C”, Prentice Hall of India, 1995.

***References*:**

- Kernighan & Ritchie, “C Programming Language”, The (Ansi C Version), PHI, 2nd Edition.
- J. B Dixit, “Fundamentals of Computers & Programming in ‘C’.
- P.K. Sinha & Priti Sinha, “Computer Fundamentals”, BPB publication.

ELECTRICAL SCIENCE

Course Code: BEE 106 **Credit Units: 03**

Course Objective:

The objective of the course is to provide a brief knowledge of Electrical Engineering to students of all disciplines. This Course includes some theorems related to electrical, some law's related to flow of current, voltages, basic knowledge of Transformer, basic knowledge of electromagnetism, basic knowledge of electrical network.

Course Learning Outcome:

At the successful completion of this course you (the student) should be able to:

1. Develop a practical approach for analysis of resistive circuits and solution of resistive circuits with independent sources.
2. Able to apply two terminal element relationships for inductors and capacitors in an electrical network.
3. Capable of analysis of single phase AC circuits, the representation of alternating quantities and determining the power in these circuits.
4. To acquire the knowledge about the constructional concepts & working principles for the applications of DC machines, AC machines & measuring instruments.
5. Able to identify, formulate, and solve the electrical engineering problems.

Course Contents:

Module I: Basic Electrical Quantities
Basic Electrical definitions-Energy, Power, Charge, Current, Voltage, Electric Field Strength, Magnetic Flux Density, etc., Resistance, Inductance & Capacitance. Ideal Source, Independent Source & Controlled Source

Module II: Network Analysis Techniques & Theorems
Circuit Principles: Ohm's Law, Kirchoff's Current Law, Kirchoff's Voltage Law Network Reduction: Star–Delta Transformation, Source Transformation, Nodal Analysis, Loop analysis. Superposition theorem, Thevenin's Theorem, Norton's theorem & Reciprocity theorem.practical application

Module III: Alternating Current Circuits
Peak, Average & RMS values for alternating currents, Power calculation:
reactive power, active power, Complex power, power factor, impedance, reactance, conductance, susceptance Resonance: series Resonance, parallel resonance, basic definition of Q factor & Band-width.

Module IV: Transformers
Basic Transformer Operation principle, Construction, Voltage relations, current relations, Linear circuit models, open circuit test, short circuit test, Transformer Efficiency.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- R.J. Smith, R.C. Dorf: Circuits, devices & Systems
- B.L. Thareja: Electrical Technology: Part -1 & 2
- V. Deltoro: Electrical Engineering fundamentals
- Schaum's Series: Electrical Circuits

APPLIED PHYSICS LAB - I

Course Code: AP 122 Credit Units: 01

Course Learning Objective:

It is expected that by the end of the course, students will be comfortable in –

1. To gain practical knowledge by applying the experimental methods to correlate with the Physics theory.

2. To learn the usage of electrical and optical systems for various measurements.

3. Apply the analytical techniques and graphical analysis to the experimental data.

4. To develop intellectual communication skills and discuss the basic principles of scientific concepts in a group.

List of Experiments:

1. To determine the wavelength of sodium light by Newton's rings method.
2. To determine the dispersive power of the material of prism with the help of a spectrometer.
3. To determine the specific rotation of sugar by Bi-quartz or Laurent half shade polarimeter.
4. To determine the speed of ultrasonic waves in liquid by diffraction method.
5. To determine the width of a narrow slit using diffraction phenomena.
6. To determine the temperature coefficient of platinum wire, using a platinum resistance thermometer & a Callender & Griffth's bridge.
7. To determine the value of specific charge (ratio of e/m) of an electron by Thomson method.
8. To determine the internal resistance of Leclanche cell with the help of Potentiometer.
9. To determine the resistance per unit length of a Carey Foster's bridge wire & also to find out the specific resistance of a given wire.
10. To plot graph showing the variation of magnetic field with distance along the aixs of a circular coil carrying current, & hence estimate the radius of the coil.
11. To determine the value of acceleration due to gravity ('g') in the laboratory using bar pendulum.
12. To determine the moment of inertia of a flywheel about its own axis of rotation.
13. To determine the density of material of the given wire with the help of sonometer.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

APPLIED CHEMISTRY LAB - I

Course Code: **AC 123** **Credit Units: 01**

Course Contents:

List of Experiments:

(Any 10 Experiments)

1. To determine the ion exchange capacity of a given cation exchanger.

2. To determine the temporary, permanent & total hardness of a sample of water by complexometric titration method.

3. To determine the type & extent of alkalinity of given water sample.

4. To determine the number of water molecules of crystallization in Mohr's salt (ferrous ammonium sulphate) provided standard potassium dichromate solution (0.1N) using diphenylamine as internal indicator.

5. To determine the ferrous content in the supplied sample of iron ore by titrimetric analysis against standard $K_2Cr_2O_7$ solution using potassium ferricyanide $[K_3Fe(CN)_6]$ as external indicator.

6. (a) To determine the surface tension of a given liquid by drop number method.
   (b) To determine the composition of a liquid mixture A and B (acetic acid & water) by surface tension method.

7. To prepare & describe a titration curve for phosphoric acid – sodium hydroxide titration using pH-meter.

8. (a) To find the cell constant of conductivity cell.
   (b) Determine the strength of hydrochloric acid solution by titrating it against standard sodium hydroxide solution conduct metrically
9. Determination of Dissolved oxygen in the given water sample.

10 To determine the total residual chlorine in water.

11 Determination of amount of oxalic acid and H_2SO_4 in 1 L of solution using N/10 NaOH and N/10 $KMnO_4$ solution.

12 Determination of viscosity of given oil by means of Redwood viscometer I.

13 To determine flash point & fire point of an oil by Pensky Martin's Apparatus

14 To determine the Iodine value of the oil.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR - Performance, LR – Lab Record, V – Viva.

ELEMENT OF MECHANICAL ENGINEERING LAB

Course Code: **BME 124** **Credit Units: 01**

Course Contents:

1. Welding

   (a) Arc Welding
   - Butt Joint
   - Lap Joint
   - T Joint

   (b) Gas Welding
   - Butt Joint
   - Lap Joint
   - Brazing of Broken pieces

2. Foundry
   - Sand mould casting by single piece pattern& Split pattern bracket with cores

3. Sheet Metal
   - Dust Bin
   - Mug
   - Funnel
   - Cylindrical Mug with handle-Rectangular

4. Fitting Shop
   - Male – Female Joint
   - Rectangular piece
   - Filing the job

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA – Internal Assessment, EE - External Exam, PR - Performance, LR – Lab Record, V – Viva.

PROGRAMMING IN C LAB

Course Code: **BCS 125** **Credit Units: 01**

Software Required: Turbo C

Course Contents:

- C program involving problems like finding the nth value of cosine series, Fibonacci series. Etc.
- C programs including user defined function calls
- C programs involving pointers, & solving various problems with the help of those.
- File handling

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA – Internal Assessment, EE - External Exam, PR - Performance, LR – Lab Record, V – Viva.

BASIC ELECTRICAL SCIENCE LAB

Course Code: **BEE 126** **Credit Units: 01**

List of Experiments:

1. To verify KVL & KCL in the given network.
2. To verify Superposition Theorem.
3. To verify Maximum Power Transfer Theorem.
4. To verify Reciprocity Theorem.
5. To determine & verify RTh, VTh, RN, IN in a given network.
6. To perform open circuit & short circuit test on a single-phase transformer.
7. To study transient response of a given RLC Circuit.
8. To perform regulation, ratio & polarity test on a single-phase transformer.
9. To measure power & power factor in a three phase circuit by two wattmeter method.
10. To measure power & power factor in a three phase load using three ammeter & three voltmeter method.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA – Internal Assessment, EE - External Exam, PR - Performance, LR – Lab Record, V – Viva.

ENGLISH

Course Code: BCS 101

Course Objective:

The course is intended to give a foundation of English Language. The literary texts are indented to help students to inculcate creative & aesthetic sensitivity & critical faculty through comprehension, appreciation and analysis of the prescribed literary texts. It will also help them to respond form different perspectives.

COURSE LEARNING OUTCOMES (CLO)

CLO 1	**Identify** the basic elements of grammar required for good and effective communication.
CLO 2	**Interpret and discuss** key ideas of grammar, diction and communication.
CLO 3	**Develop** Creative & Literary Sensitivity in all communication.
CLO 4	**Design** and create texts for a variety of purposes and audiences, evaluating and assessing the effectiveness of grammatical aspects.

Course Contents:

Module I: Vocabulary
Use of Dictionary
Use of Words: Diminutives, Homonyms & Homophones

Module II: Essentials of Grammar - I
Articles
Parts of Speech
Tenses

Module III: Essentials of Grammar - II
Sentence Structure
Subject -Verb agreement
Punctuation

Module IV: Communication
The process and importance
Principles & benefits of Effective Communication

Module V: Spoken English Communication
Speech Drills
Pronunciation and accent
Stress and Intonation

Module VI: Communication Skills - I
Developing listening skills
Developing speaking skills

Module VII: Communication Skills - II
Developing Reading Skills
Developing writing Skills

Module VIII: Written English communication
Progression of Thought/ideas
Structure of Paragraph
Structure of Essays

Module IV: Short Stories
Of Studies, by Francis Bacon
Dream Children, by Charles Lamb
The Necklace, by Guy de Maupassant
A Shadow, by R.K. Narayan
Glory at Twilight, Bhabani Bhattacharya

Module V: Poems

All the Worlds a Stage	Shakespeare
To Autumn	Keats
O! Captain, My Captain.	Walt Whitman
Where the Mind is Without Fear	Rabindranath Tagore
Psalm of Life	H.W. Longfellow

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

Text & References:

- Madhulika Jha, Echoes, Orient Long Man
- Ramon & Prakash, Business Communication, Oxford.
- Sydney Greenbaum Oxford English Grammar, Oxford.
- Successful Communications, Malra Treece (Allyn and Bacon)
- Effective Technical Communication, M. Ashraf Rizvi.

* 30 hrs Programme to be continued for Full year

BEHAVIOURAL SCIENCE - I
(UNDERSTANDING SELF FOR EFFECTIVENESS)

Course Code: **BSS 104** **Credit Units: 01**

Course Objective:

This course aims at imparting**:**

- Understanding self & process of self exploration
- Learning strategies for development of a healthy self esteem
- Importance of attitudes and its effective on personality
- Building Emotional Competence

Course learning outcomes (CLOs)

At the successful completion of this course you (the student) should be able to:

1. Demonstrate awareness of self and the process of self-exploration.
2. Demonstrate knowledge of strategies for developing a healthy self-esteem.
3. Recognize the importance of attitudes and its effect on personality.
4. Identify the difference between healthy and unhealthy expression of emotions and develop emotional competence necessary for personal and professional life.

Course Contents:

Module I: Self: Core Competency
Understanding of Self
Components of Self – Self identity
Self concept
Self confidence
Self image

Module II: Techniques of Self Awareness
Exploration through Johari Window
Mapping the key characteristics of self
Framing a charter for self
Stages – self awareness, self acceptance and self realization

Module III: Self Esteem & Effectiveness
Meaning and Importance
Components of self esteem
High and low self esteem
Measuring your self esteem

Module IV: Building Positive Attitude
Meaning and nature of attitude
Components and Types of attitude
Importance and relevance of attitude

Module V: Building Emotional Competence
Emotional Intelligence – Meaning, components, Importance and Relevance
Positive and Negative emotions
Healthy and Unhealthy expression of emotions

Module VI: End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

- Organizational Behaviour, Davis, K.

- Hoover, Judhith D. Effective Small Group and Team Communication, 2002,Harcourt College Publishers
- Dick, Mc Cann & Margerison, Charles: Team Management, 1992 Edition, viva books
- Bates, A. P. and Julian, J.: Sociology - Understanding Social Behaviour
- Dressler, David and Cans, Donald: The Study of Human Interaction
- Lapiere, Richard. T – Social Change
- Lindzey, G. and Borgatta, E: Sociometric Measurement in the Handbook of Social Psychology, Addison – Welsley, US.
- Rose, G.: Oxford Textbook of Public Health, Vol.4, 1985.
- LaFasto and Larson: When Teams Work Best, 2001, Response Books (Sage), New Delhi
- J William Pfeiffer (ed.) Theories and Models in Applied Behavioural Science, Vol 2, Group (1996); Pfeiffer & Company
- Smither Robert D.; The Psychology of Work and Human Performance, 1994, Harper Collins College Publishers

FRENCH - I

Course Code: FLF 101 **Credit Units: 02**

Course Objective:

To familiarize the students with the French language

- with the phonetic system
- with the syntax
- with the manners
- with the cultural aspects

Course Learning Objective:

- Students will hone Basic language skills such as reading, writing, speaking, listening & interactive in the language
- Students will be able to read and interpret small texts.
- Students will be able to communicate in small sentences in writing, self introduction, family description etc.
- Students will be able to communicate in small sentences in oral, self introduction, family description etc.

- To tell ones name and to spell it
- To understand the French keyboard
- To wish/welcome/identify/name someone
- To present oneself and someone else
- To fill a form
- To ask for information
- To understand and ask simple questions

Course Contents:

Module A: pp. 01 to 37: Unités 1, 2, Unité 3 Objectif 1, 2
Only grammar of Unité 3: objectif 3, 4 and 5

Contenu lexical: Unité 1: Découvrir la langue française: (oral et écrit)

1. se présenter, présenter quelqu'un, faire la connaissance desautres, formules de politesse, rencontres
2. dire/interroger si on comprend
3. Nommer les choses

Unité 2: Faire connaissance

1. donner/demander des informations sur une personne, premiers contacts, exprimer ses goûts et ses préférences
2. Parler de soi: parler du travail, de ses activités, de son pays, de sa ville.

Unité 3: Organiser son temps

1. dire la date et l'heure

Contenu grammatical:

1. organisation générale de la grammaire
2. article indéfini, défini, contracté
3. nom, adjectif, masculin, féminin, singulier et pluriel
4. négation avec « de », "moi aussi", "moi non plus"
5. interrogation: Inversion, est-ce que, qui, que, quoi, qu'est-ce que, où, quand, comment, quel(s), quelle(s)
   Interro-négatif: réponses: oui, si, non
6. pronom tonique/disjoint- pour insister après une préposition
7. futur proche

EXAMINATION SCHEME
Total: 100 marks

Continuous Evaluation (Total 50 Marks)					End Sem Evaluation (Total 50 Marks)
Quiz	**Mid Term Test**	**Presentation**	**Viva Voce**	**Attendance**	**End-Term Exam**
10	**15**	**10**	**10**	**5**	**50**

Text & References:

- le livre à suivre: Campus: Tome 1

GERMAN - I

Course Code: FLG 101 **Credit Units: 02**

Course Objective:

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.
To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany

Course Learning Objective :

- Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of advance level.
- Students will be able to communicate with complex sentences.

After successful completion of this semester, students will be able to:

- able to form dialogue between doctor and patient.
- give order, request, suggestions and commands in positive and negative both.(formal and informal)
- use of imperative in different types of situation: In a bar/ Classroom/ Market etc. and express prohibitions and permissions
- make a curriculum vitae.
- write job letters/formal letters and deal typical question answer preparation of a job interview

Course Contents:

Module I: Introduction
Self introduction: heissen, kommen, wohnwn, lernen, arbeiten, trinken, etc.
All personal pronouns in relation to the verbs taught so far.
Greetings: Guten Morgen!, Guten Tag!, Guten Abend!, Gute Nacht!, Danke sehr!, Danke!, Vielen Dank!, (es tut mir Leid!),
Hallo, wie geht's?: Danke gut!, sehr gut!, prima!, ausgezeichnet!,
Es geht!, nicht so gut!, so la la!, miserabel!

Module II: Interviewspiel
To assimilate the vocabulary learnt so far and to apply the words and phrases in short dialogues in an interview – game for self introduction.

Module III: Phonetics
Sound system of the language with special stress on Dipthongs

Module IV: Countries, nationalities and their languages
To make the students acquainted with the most widely used country names, their nationalitie and the language spoken in that country.

Module V: Articles
The definite and indefinite articles in masculine, feminine and neuter gender. All Vegetables, Fruits, Animals, Furniture, Eatables, modes of Transport

Module VI: Professions
To acquaint the students with professions in both the genders with the help of the verb "sein".

Module VII: Pronouns
Simple possessive pronouns, the use of my, your, etc.
The family members, family Tree with the help of the verb "to have"

Module VIII: Colours
All the color and color related vocabulary – colored, colorful, colorless, pale, light, dark, etc.

Module IX: Numbers and calculations – verb "kosten"
The counting, plural structures and simple calculation like addition, subtraction, multiplication and division to test the knowledge of numbers.
"Wie viel kostet das?"

Module X: Revision list of Question pronouns
W – Questions like who, what, where, when, which, how, how many, how much, etc.

EXAMINATION SCHEME
Total: 100 marks

Continuous Evaluation (Total 50 Marks)					End Sem Evaluation (Total 50 Marks)
Quiz	Mid Term Test	Presentation	Viva Voce	Attendance	End-Term Exam
10	15	10	10	5	50

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant - 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

SPANISH – I

Course Code: **FLS 101** **Credit Units: 02**

Course Objective:

To enable students acquire the relevance of the Spanish language in today's global context, how to greet each other. How to present / introduce each other using basic verbs and vocabulary

Course Learning objective:

- Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of advance level.
- Students will be able to communicate with complex sentences

To familiarize the students of Spanish Language with

- To talk about incidents in past
- To narrate your past habits, childhood experiences etc.
- To describe major historical & cultural events.
- To familiarize students with important Hispanic personalities
- Typical question/Answer preparation for a job interview & CV

Course Contents:

Module I
A brief history of Spain, Latin America, the language, the culture…and the relevance of Spanish language in today's global context.
Introduction to alphabets

Module II
Introduction to '*Saludos*' (How to greet each other. How to present / introduce each other).
Goodbyes (despedidas)
The verb *llamarse* and practice of it.

Module III
Concept of Gender and Number
Months of the years, days of the week, seasons. Introduction to numbers 1-100, Colors, Revision of numbers and introduction to ordinal numbers.

Module IV
Introduction to *SER* and *ESTAR* (both of which mean To Be).Revision of '*Saludos*' and '*Llamarse*'. Some adjectives, nationalities, professions, physical/geographical location, the fact that spanish adjectives have to agree with gender and number of their nouns. Exercises highlighting usage of *Ser* and *Estar*.

Module V
Time, demonstrative pronoun (Este/esta, Aquel/aquella etc)

Module VI
Introduction to some key AR /ER/IR ending regular verbs.

EXAMINATION SCHEME

Total: 100 marks

Continuous Evaluation (Total 50 Marks)					End Sem Evaluation (Total 50 Marks)
Quiz	Mid Term Test	Presentation	Viva Voce	Attendance	End-Term Exam
10	15	10	10	5	50

Text & References:

- Español, En Directo I A
- Español Sin Fronteras

CHINESE – I

Course Code: FLC 101 **Credit Units: 02**

Course Objective:

There are many dialects spoken in China, but the language which will help you through wherever you go is Mandarin, or Putonghua, as it is called in Chinese. The most widely spoken forms of Chinese are Mandarin, Cantonese, Gan, Hakka, Min, Wu and Xiang. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Learning Objectives:

- Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of advance level.
- Students will be able to communicate with complex sentences.

To familiarize the students of Chinese language with:

1. Shopping at Chinese shops/stores.
2. Using public transportation.
3. Taking medical assistance
4. Talk in Chinese on such topics as sports and entertainment
5. Conversation at hotel.

Course Contents:

Module I
Show pictures, dialogue and retell.
Getting to know each other.
Practicing chart with Initials and Finals. (CHART – The Chinese Phonetic Alphabet Called "Hanyu Pinyin" in Mandarin Chinese.)
Practicing of Tones as it is a tonal language.
Changes in 3rd tone and Neutral Tone.

Module II
Greetings
Let me Introduce
The modal particle "ne".
Use of Please 'qing" – sit, have tea …….. etc.
A brief self introduction – Ni hao ma? Zaijian!
Use of "bu" negative.

Module III
Attributives showing possession
How is your Health? Thank you
Where are you from?
A few Professions like – Engineer, Businessman, Doctor, Teacher, Worker.
Are you busy with your work?
May I know your name?

Module IV
Use of "How many" – People in your family?
Use of "zhe" and "na".
Use of interrogative particle "shenme", "shui", "ma" and "nar".
How to make interrogative sentences ending with "ma".
Structural particle "de".
Use of "Nin" when and where to use and with whom. Use of guixing.
Use of verb "zuo" and how to make sentences with it.

Module V
Family structure and Relations.
Use of "you" – "mei you".

Measure words
Days and Weekdays.
Numbers.
Maps, different languages and Countries.

EXAMINATION SCHEME
Total: 100 marks

Continuous Evaluation (Total 50 Marks)					End Sem Evaluation (Total 50 Marks)
Quiz	**Mid Term Test**	**Presentation**	**Viva Voce**	**Attendance**	**End-Term Exam**
10	**15**	**10**	**10**	**5**	**50**

Text & References:

- "Elementary Chinese Reader Part I" Lesson 1-10

SECOND SEMESTER

APPLIED MATHEMATICS – II

Course Code: AM 201 **Credit Units: 04**

Course Objective:

The knowledge of Mathematics is necessary for a better understanding of almost all the Engineering and Science subjects. Here our intention is to make the students acquainted with the concept of basic topics from Mathematics, which they need to pursue their Engineering degree in different disciplines.

Course Learning Outcome

At the successful completion of this course you (the student) should be able to:

1. Solve system of linear equations; be familiar with the definition and properties of matrix; find the eigenvalues and eigenvectors of a square matrix.

2. Investigate the convergence of infinite series using different tests.

3. Calculate the measure of central tendency, moments, skewness and kurtosis.

4. Develop knowledge of basic discrete and continuous distributions (Binomial, Poisson, Normal) and how to work with them.

5. Apply the method to use complex variable and complex valued functions and able to perform their differentiation and integration.

Course Contents:

Module I: Linear Algebra

Hermitian and Skew Hermitian Matrix, Unitary Matrix, Orthogonal Matrix, Elementary Row Transformation, Reduction of a Matrix to Row Echelon Form, Rank of a Matrix, Consistency of Linear Simultaneous Equations, Gauss Elimination Method, Gauss-Jordan Method, Eigen Values and Eigen Vectors of a Matrix, Caley-Hamilton Theorem, Diagonalization of a Matrix, Vector Space, Linear Independence and Dependence of Vectors, Linear Transformations.

Module II: Infinite Series

Definition of Sequence, Bounded Sequence, Limit of a Sequence, Series, Finite and Infinite Series, Convergence and Divergence of Infinite series, Cauchy's Principle of Convergence, Positive Term Infinite Series, Comparison test, D'Alembert's Ratio test. Raabe's Test, Cauchy's nth root Test. Logarithmic Test, Alternating Series, Leibnitz's Test, Absolute and conditional convergence, Uniform Convergence, Power Series and its Interval of Convergence.

Module III: Complex Analysis

De Moivre's Theorem and Roots of Complex Numbers, Logarithmic Functions, Circular, Hyperbolic Functions and their Inverses.

Functions of a Complex Variables, Limits, Continuity and Derivatives, Analytic Function, Cauchy-Riemann Equations (without proof), Harmonic Function, Harmonic Conjugates, Conformal Mapping, Bilinear Transformations, Complex Line Integral, Cauchy Integral Theorem, Cauchy Integral Formula, Derivative of Analytic Function, Power Series, Taylor Series, Laurent Series, Zeroes and Singularities, Residues, Residue Theorem, Evaluation of Real Integrals of the Form $\int_0^{2\pi} F(\cos\theta, \sin\theta)\, d\theta$ and $\int_{-\infty}^{\infty} \frac{f(x)}{F(x)}\, dx$.

Module IV: Statistics and Probability

Moments, Skewness, Kurtosis, Random Variables and Probability Distribution, Mean and Variance of a Probability Distribution, Binomial Distribution, Poisson Distribution and Normal Distribution.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Engineering Mathematics by Erwin Kreyszig.
- Engineering Mathematics by R.K. Jain and S.R.K. Iyengar.
- Higher Engineering Mathematics by H.K. Dass.
- Engineering Mathematics by B.S. Grewal.
- Differential Calculus by Shanti Narain.
- Integral Calculus by Shanti Narain.
- Linear Algebra- Schaum Outline Series.

APPLIED PHYSICS - II - MODERN PHYSICS

Course Code: AP 202 **Credit Units: 03**

Course Objective:

Aim of this course is to introduce the students to fundamentals of graduate level physics which form the basis of all applied science and engineering.

Course Learning Outcome

At the successful completion of this course you (the student) should be able to:

1) Define and understand space and time and the variations in other related fundamental quantities such as mass, velocity and force.

2) Solve simple problems relating to the above concepts.

3) Explain by extending the understanding as laid down in Quantum theory to other phenomenon as observed in sub-atomic Physics and also to solve simple problems in

Quantum Theory

4) Appreciate and understand the various spectra as observed during electronic transitions

5) Understand the way nature has endowed properties to materials.

Course Contents:

Module I: Special Theory of Relativity
Michelson-Morley experiment, Importance of negative result, Inertial & non-inertial frames of reference, Einstein's postulates of Special theory of Relativity, Space-time coordinate system, Relativistic Space Time transformation (Lorentz transformation equation), Transformation of velocity, Addition of velocities, Length contraction and Time dilation, Mass-energy equivalence (Einstein's energy mass relation) & Derivation of Variation of mass with velocity.

Module II: Wave Mechanics
Wave particle duality, De-Broglie matter waves, phase and group velocity, Heisenberg uncertainty principle, wave function and its physical interpretation, Operators, expectation values. Time dependent & time independent Schrödinger wave equation for free & bound states, square well potential (rigid wall), Step potential.

Module III: Atomic Physics
Vector atom model, LS and j-j coupling, Zeceman effect (normal & anomalous), Paschen-Bach effect, X-ray spectra and energy level diagram, Moseleys Law, Lasers – Einstein coefficients, conditions for light amplification, population inversion, optical pumping, three level and four level lasers, He-Ne and Ruby laser, Properties and applications of lasers.

Module IV: Solid State Physics
Sommerfield's free electron theory of metals, Fermi energy, Introduction to periodic potential & Kronig-Penny model (Qualitative) Band Theory of Solids, Semi-conductors: Intrinsics and Extrinsic Semiconductors, photoconductivity and photovotaics, Basic aspects of Superconductivity, Meissner effect.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Concept of Modern Physics, A. Beiser
- Applied Physics II, Agarawal & Goel

- Solid State Physics, S. O. Pallai
- Physics of Atom, Wehr & Richards

OBJECT ORIENTED PROGRAMMING USING C++

Course Code: BCS 203 **Credit Units: 03**

Course Objective:

The objective of this module is to introduce object oriented programming. To explore and implement the various features of OOP such as inheritance, polymorphism, Exceptional handling using programming language C++. After completing this course student can easily identify the basic difference between the programming approaches like procedural and object oriented.

Course Learning Outcome:

At the successful completion of this course you should be able to:

1. Interpret the characteristics of an object-oriented programming language in a program and advanced features of the C++ programming language as a continuation of the previous course.
2. Define classes and objects using C++ language to solve real world problems.
3. Apply inheritance and polymorphism through programming.
4. Conclude methods of handling files and strings using C++ and apply exception handling in real world applications.

Course Contents:

Module I: Introduction

Review of C, Difference between C and C++, Procedure Oriented and Object Oriented Approach. Basic Concepts: Objects, classes, Principals like Abstraction, Encapsulation, Inheritance and Polymorphism. Dynamic Binding, Message Passing. Characteristics of Object-Oriented Languages. Introduction to Object-Oriented Modeling techniques (Object, Functional and Dynamic Modeling).

Module II: Classes and Objects

Abstract data types, Object & classes, attributes, methods, C++ class declaration, Local Class and Global Class, State identity and behaviour of an object, Local Object and Global Object, Scope resolution operator, Friend Functions, Inline functions, Constructors and destructors, instantiation of objects, Types of Constructors, Static Class Data, Array of Objects, Constant member functions and Objects, Memory management Operators.

Module III: Inheritance

Inheritance, Types of Inheritance, access modes – public, private & protected, Abstract Classes, Ambiguity resolution using scope resolution operator and Virtual base class, Aggregation, composition vs classification hiérarchies, Overriding inheritance methods, Constructors in derived classes, Nesting of Classes.

Module IV: Polymorphism

Polymorphism, Type of Polymorphism – Compile time and runtime, Function Overloading, Operator Overloading (Unary and Binary) Polymorphism by parameter, Pointer to objects, this pointer, Virtual Functions, pure virtual functions.

Module V: Strings, Files and Exception Handling

Manipulating strings, Streams and files handling, formatted and Unformatted Input output. Exception handling, Generic Programming – function template, class Template Standard Template Library: Standard Template Library, Overview of Standard Template Library, Containers, Algorithms, Iterators, Other STL Elements, The Container Classes, General Theory of Operation, Vectors.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

Text:

- A.R. Venugopal, Rajkumar, T. Ravishanker “Mastering C++”, TMH, 1997
- R. Lafore, “Object Oriented Programming using C++”, BPB Publications, 2004.
- “Object Oriented Programming with C++” By E. Balagurusamy.
- Schildt Herbert, “C++: The Complete Reference”, Wiley Dream Tech, 2005.

References:

- Parasons, “Object Oriented Programming with C++”, BPB Publication, 1999.
- Steven C. Lawlor, “The Art of Programming Computer Science with C++”, Vikas Publication, 2002.
- Yashwant Kanethkar, “Object Oriented Programming using C++”, BPB, 2004

ENGINEERING MECHANICS

Course Code: BME 204 **Credit Units: 03**

Course Objective:

Objective of this course is to provide fundamental knowledge of force system and its effect on the behaviour of the bodies that may be in dynamic or in static state. It includes the equilibrium of different structures like beams, frames, truss etc and the force transfer mechanism in the different components of a body under given loading condition.

Course Learning Outcome:

At the successful completion of this course you should be able to:

CLO1: Able to analyse the force system and its effects.

CLO 2: Explain the nature of forces acting upon a system.

CLO 3: Evaluate the static and dynamic system's problem

Course Contents:

Module I: Force system & Structure
Free body diagram, Equilibrium equations and applications. Plane truss, perfect and imperfect truss, assumption in the truss analysis, analysis of perfect plane trusses by the method of joints, method of section.

Module II: Friction
Static and Kinetic friction, laws of dry friction, co-efficient of friction, angle of friction, angle of repose, cone of friction, friction lock, efficiency of screw jack, transmission of power through belt

Module III: Distributed Force
Determination of center of gravity, center of mass and centroid by direct integration and by the method of composite bodies, mass moment of inertia and area moment of inertia by direct integration and composite bodies method, radius of gyration, parallel axis theorem, Pappus theorems and its application, polar moment of inertia.

Module IV: Work -Energy
Work energy equation, conservation of energy, Virtual work, impulse, momentum conservation, impact of bodies, co-efficient of restitution, loss of energy during impact, D'alembert principle

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- S.S. Bhavikatti, Engineering Mechanics, New Age International Ltd
- Timoshenko, Engineering Mechanics, McGraw Hill
- R. S. Khurmi, Engineering Mechanics, S. Chand Publication
- I. H. Shames & G. K. M. Rao, Engineering Mechanics, Pearson Education, 2006

ENGINEERING GRAPHICS

Course Code: BME 205 **Credit Units: 01**

Course Learning Outcome:

At the successful completion of this course you (the student) should be able to:

1. Describe the theory of scales, engineering curves, different Projection used in engineering drawing.
2. Draw the different engineering curves, maps and projection of planes and solid accurately.
3. Identify different geometrical shape and their application used in engineering application.

Course Contents:

Module 1: Scales & Curves

Representative factor, Plain Scales, Diagonal Scales, Comparative Scales and Scale of chords. Construction of ellipse, Parabola, Hyperbola, Cycloid, Epicycloid, Hypocycloid, Involutes and Spirals by various methods.

Module 2: Projection of Points & Straight lines

Projection of points, Projection of straight lines. True inclinations and true length of straight lines.

Module 3: Projection of planes and solids

Projection of circle, triangle, polygons, polyhedrons, pyramids, cylinders and cones in different positions.

Module 4: Section of solids and Isometric projections

Section of right solids by normal and inclined planes, Orthographic projection, first angle & third angle projection. Isometric scale, Isometric axes, Isometric projection from orthographic drawing.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

MTE- Mid-term Examination

Text & References:

- Engineering Graphics – Basant Agrawal and Dr. C. M. Agrawal, Tata McGraw-Hill Publishing Company Ltd.
- Engineering Drawing – by N. D. Bhatt
- Engineering Drawing and Graphics – by Veenugopal
- Engineering Drawing – by T. Jeyopoovan

ENVIRONMENTAL STUDIES

Course Code: EVS 001 **Credit Units: 04**

Course Objective:

The term environment is used to describe, in the aggregate, all the external forces, influences and conditions, which affect the life, nature, behaviour and the growth, development and maturity of living organisms. At present a great number of environment issues, have grown in size and complexity day by day, threatening the survival of mankind on earth. A study of environmental studies is quite essential in all types of environmental sciences, environmental engineering and industrial management. The objective of environmental studies is to enlighten the masses about the importance of the protection and conservation of our environment and control of human activities which has an adverse effect on the environment.

Course Contents:

Module I: The multidisciplinary nature of environmental studies
Definition, scope and importance
Need for public awareness

Module II: Natural Resources
Renewable and non-renewable resources:
Natural resources and associated problems
Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.
Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, case studies.
Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

- Role of an individual in conservation of natural resources.
- Equitable use of resources for sustainable lifestyles.

Module III: Ecosystems
Concept of an ecosystem
Structure and function of an ecosystem
Producers, consumers and decomposers
Energy flow in the ecosystem
Ecological succession
Food chains, food webs and ecological pyramids
Introduction, types, characteristic features, structure and function of the following ecosystem:

a. Forest ecosystem
b. Grassland ecosystem
c. Desert ecosystem
d. Aquatic ecosystems (ponds, streams, lakes, rivers, ocean estuaries)

Module IV: Biodiversity and its conservation
Introduction – Definition: genetic, species and ecosystem diversity
Biogeographical classification of India
Value of biodiversity: consumptive use, productive use, social, ethical aesthetic and option values
Biodiversity at global, national and local levels
India as a mega-diversity nation
Hot-spots of biodiversity
Threats to biodiversity: habitat loss, poaching of wildlife, man wildlife conflicts
Endangered and endemic species of India
Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity

Module V: Environmental Pollution
Definition
Causes, effects and control measures of:

a. Air pollution
b. Water pollution
c. Soil pollution
d. Marine pollution
e. Noise pollution
f. Thermal pollution
g. Nuclear pollution

Solid waste management: Causes, effects and control measures of urban and industrial wastes.
Role of an individual in prevention of pollution.
Pollution case studies.
Disaster management: floods, earthquake, cyclone and landslides.

Module VI: Social Issues and the Environment
From unsustainable to sustainable development
Urban problems and related to energy
Water conservation, rain water harvesting, watershed management
Resettlement and rehabilitation of people; its problems and concerns. Case studies.
Environmental ethics: Issues and possible solutions
Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.
Wasteland reclamation
Consumerism and waste products
Environmental Protection Act
Air (Prevention and Control of Pollution) Act
Water (Prevention and control of Pollution) Act
Wildlife Protection Act
Forest Conservation Act
Issues involved in enforcement of environmental legislation
Public awareness

Module VII: Human Population and the Environment
Population growth, variation among nations
Population explosion – Family Welfare Programmes
Environment and human health
Human Rights
Value Education
HIV / AIDS
Women and Child Welfare
Role of Information Technology in Environment and Human Health
Case Studies

Module VIII: Field Work
Visit to a local area to document environmental assets-river / forest/ grassland/ hill/ mountain.
Visit to a local polluted site – Urban / Rural / Industrial / Agricultural
Study of common plants, insects, birds
Study of simple ecosystems-pond, river, hill slopes, etc (Field work equal to 5 lecture hours)

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

Text & References:

- Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
- Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad 380 013, India, Email:mapin@icenet.net (R)
- Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p
- Clark R.S., Marine Pollution, Clanderson Press Oxford (TB)
- Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Publ. House, Mumbai, 1196p
- De A.K., Environmental Chemistry, Wiley Eastern Ltd.
- Down to Earth, Centre for Science and Environment (R)
- Gleick, H.P. 1993. Water in Crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute Oxford Univ. Press. 473p
- Hawkins R.E., Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay (R)
- Heywood, V.H & Waston, R.T. 1995. Global Biodiversity Assessment. Cambridge Univ. Press 1140p.
- Jadhav, H & Bhosale, V.M. 1995. Environmental Protection and Laws. Himalaya Pub. House, Delhi 284 p.

- Mckinney, M.L. & School, R.M. 1996. Environmental Science Systems & Solutions, Web enhanced edition. 639p.
- Mhaskar A.K., Matter Hazardous, Techno-Science Publication (TB)
- Miller T.G. Jr. Environmental Science, Wadsworth Publishing Co. (TB)
- Odum, E.P. 1971. Fundamentals of Ecology. W.B. Saunders Co. USA, 574p
- Rao M N. & Datta, A.K. 1987. Waste Water treatment. Oxford & IBH Publ. Co. Pvt. Ltd. 345p.
- Sharma B.K., 2001. Environmental Chemistry. Geol Publ. House, Meerut
- Survey of the Environment, The Hindu (M)
- Townsend C., Harper J, and Michael Begon, Essentials of Ecology, Blackwell Science
- Trivedi R.K., Handbook of Environmental Laws, Rules Guidelines, Compliances and Standards, Vol I and II, Enviro Media (R)
- Trivedi R. K. and P.K. Goel, Introduction to air pollution, Techno-Science Publication (TB)
- Wanger K.D., 1998 Environnemental Management. W.B. Saunders Co. Philadelphia, USA 499p

APPLIED PHYSICS LAB - II

Course Code: AP 222 **Credit Units: 01**

Course Learning Objective:

It is expected that by the end of the course, students will be comfortable in –

1. To gain practical knowledge by applying the experimental methods to correlate with the Physics theory.

2. To learn the usage of electrical and optical systems for various measurements.

3. Apply the analytical techniques and graphical analysis to the experimental data.

4. To develop intellectual communication skills and discuss the basic principles of scientific concepts in a group.

Course Contents:

List of Experiments:

1. To determine the wavelength of prominent lines of mercury spectrum using plane transmission grating.
2. To determine the thickness of a given wire by Wedge method.
3. To determine the wavelength of He-Ne laser light using single slit.
4. To determine the frequency of an electrically maintained tunning fork by Melde's method.
5. To study the variation of magnetic field along the axis of Helmholtz coil and to find out reduction factor.
6. To draw the V – I characteristics of a forward and reverse bias PN junction diode.
7. To determine the frequency of AC mains using sonometer.
8. To determine the energy band-gap of Germanium crystal using four probes method.
9. To draw V – I characteristics of a photocell and to verify the inverse square law of radiation.
10. To determine the acceleration due to gravity ('g') using Keter's reversible pendulum.
11. To study the characteristics of photo voltaic cell (solar cell).

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

OBJECT ORIENTED PROGRAMMING USING C++ LAB

Course Code: **BCS 223** **Credit Units: 01**

Software Required: Turbo C++

Course Contents:

- Creation of objects in programs and solving problems through them.
- Different use of private, public member variables and functions and friend functions.
- Use of constructors and destructors.
- Operator overloading
- Use of inheritance in and accessing objects of different derived classes.
- Polymorphism and virtual functions (using pointers).
- File handling.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

ENGINEERING MECHANICS LAB

Course Code: BME 224 **Credit Units: 01**

Course Contents:

Engineering Mechanics:

- To verify the law of Force Polygon
- To verify the law of Moments using Parallel Force apparatus. (Simply supported type)
- To determine the co-efficient of friction between wood and various surface (like
- Leather, Wood, Aluminum) on an inclined plane.
- To find the forces in the members of Jib Crane.
- To determine the mechanical advantage, Velocity ratio and efficiency of a screw jack.
- To determine the mechanical advantage, Velocity ratio and Mechanical efficiency of the
- Wheel and Axle
- To determine the MA, VR, η of Worm Wheel (2-start)
- Verification of force transmitted by members of given truss.
- To verify the law of moments using Bell crank lever
- To find CG and moment of Inertia of an irregular body using Computation method

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

ENGINEERING GRAPHICS LAB

Course Code: BME 223 Credit Units: 01

Course Objective:

This course will provide students concepts on the drawings of different curves like straight line, parabola, ellipse etc. After completion of this course, students will be able to draw different figures manually & will be capable of using various instruments involved in drawings.

Course Contents:

Module I: General
Importance, Significance & scope of engineering drawing, Lettering, Dimensioning, Scales, Sense of proportioning, Different types of projections, Orthographic Projection, B.I.S. Specifications.

Module II: Projections of Point & Lines
Introduction of planes of projection, Reference & auxiliary planes, projections of points & Lines in different quadrants, traces, inclinations, & true lengths of the lines, projections on Auxiliary planes, shortest distance, intersecting & non-intersecting lines.

Module III: Planes other than the Reference Planes
Introduction of other planes (perpendicular & oblique), their traces, inclinations etc., Projections of points & lines lying in the planes, conversion of oblique plane into auxiliary Plane & solution of related problems.

Module IV: Projections of Plane Figures
Different cases of plane figures (of different shapes) making different angles with one or both reference planes & lines lying in the plane figures making different given angles (with one of both reference planes). Obtaining true shape of the plane figure by projection.

Module V: Projection of Solids
Simple cases when solid is placed in different positions, Axis faces & lines lying in the faces of the solid making given angles.

Module VI: Development of Surface
Development of simple objects with & without sectioning. Isometric Projection

Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	20	20	5	25	25

Note: IA – Internal Assessment, EE - External Exam, PR - Performance, LR – Lab Record, V – Viva.

Text & References:

- M.B. Shah & B.C. Rana, Engineering Drawing, Pearson Education, 2007
- PS Gill, Engineering Drawing, Kataria Publication
- ND Bhatt, Engineering Drawing, Charotar publications
- N. Sidheshwar, Engineering Drawing, Tata McGraw Hill
- CL Tanta, Mechanical Drawing, “Dhanpat Rai”

ENGLISH

Course Code: **BCS 201** **Credit Units: 01**

Course Objective:

The course is intended to give a foundation of English Language. The literary texts are indented to help students to inculcate creative & aesthetic sensitivity and critical faculty through comprehension, appreciation and analysis of the prescribed literary texts. It will also help them to respond form different perspectives.

COURSE LEARNING OUTCOMES (CLO)

CLO 1	Participate in conversation and in small- and whole-group discussion
CLO 2	Explore and use English as medium of communication in real life situation
CLO 3	Discuss topics and themes of a reading, using the vocabulary and grammar of the lesson
CLO 4	Identify features of a reading textbook and utilize them as needed
CLO 5	Prepare and deliver organized presentations in small groups and to whole class
CLO 6	Apply sentence mechanics and master spelling of high frequency words

Course Contents:

Module I: Vocabulary
Use of Dictionary
Use of Words: Diminutives, Homonyms & Homophones

Module II: Essentials of Grammar - I
Articles
Parts of Speech
Tenses

Module III: Essentials of Grammar - II
Sentence Structure
Subject -Verb agreement
Punctuation

Module IV: Communication
The process and importance
Principles & benefits of Effective Communication

Module V: Spoken English Communication
Speech Drills
Pronunciation and accent
Stress and Intonation

Module VI: Communication Skills-I
Developing listening skills
Developing speaking skills

Module VII: Communication Skills-II
Developing Reading Skills
Developing writing Skills

Module VIII: Written English communication
Progression of Thought/ideas
Structure of Paragraph
Structure of Essays

Module IV: Short Stories
Of Studies, by Francis Bacon
Dream Children, by Charles Lamb
The Necklace, by Guy de Maupassant
A Shadow, by R.K.Narayan
Glory at Twilight, Bhabani Bhattacharya

Module V: Poems

All the Worlds a Stage	Shakespeare
To Autumn	Keats
O! Captain, My Captain.	Walt Whitman
Where the Mind is Without Fear	Rabindranath Tagore
Psalm of Life	H.W. Longfellow

Examination Scheme:

Components	A	CT	HA	EE
Weightage (%)	05	15	10	70

Text & References:

- Madhulika Jha, Echoes, Orient Long Man
- Ramon & Prakash, Business Communication, Oxford.
- Sydney Greenbaum Oxford English Grammar, Oxford.
- Successful Communications, Malra Treece (Allyn and Bacon)
- Effective Technical Communication, M. Ashraf Rizvi.

BEHAVIOURAL SCIENCE - II
(PROBLEM SOLVING AND CREATIVE THINKING)

Course Code: **BSS 204** **Credit Units: 01**

Course Objective:

To enable the students:

- Understand the process of problem solving and creative thinking.
- Facilitation and enhancement of skills required for decision-making.

Course learning outcomes (CLOs)

At the successful completion of this course you (the student) would be able to:

1. Recognize the relation critical thinking with various mental processes.
2. Identify hindrance to problem solving processes.
3. Analyze the steps in problem-solving process.
4. Create plan of action applying creative thinkings.

Course Contents:

Module I: Thinking as a tool for Problem Solving
What is thinking: The Mind/Brain/Behaviour
Critical Thinking and Learning:
- Making Predictions and Reasoning
- Memory and Critical Thinking
- Emotions and Critical Thinking

Thinking skills

Module II: Hindrances to Problem Solving Process
Perception
Expression
Emotion
Intellect
Work environment

Module III: Problem Solving
Recognizing and Defining a problem
Analyzing the problem (potential causes)
Developing possible alternatives
Evaluating Solutions
Resolution of problem
Implementation
Barriers to problem solving:
- Perception
- Expression
- Emotion
- Intellect
- Work environment

Module IV: Plan of Action
Construction of POA
Monitoring
Reviewing and analyzing the outcome

Module V: Creative Thinking
Definition and meaning of creativity
The nature of creative thinking
- Convergent and Divergent thinking
- Idea generation and evaluation (Brain Storming)
- Image generation and evaluation
- Debating

The six-phase model of Creative Thinking: ICEDIP model

Module VI: End-of-Semester Appraisal

Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

- Michael Steven: How to be a better problem solver, Kogan Page, New Delhi, 1999
- Geoff Petty: How to be better at creativity; Kogan Page, New Delhi, 1999
- Richard Y. Chang and P. Keith, Kelly: Wheeler Publishing, New Delhi, 1998.
- Phil Lowe Koge Page: Creativity and Problem Solving, New Delhi, 1996
- J William Pfeiffer (ed.) Theories and Models in Applied Behavioural Science, Vol 3, Management (1996); Pfeiffer & Company
- Bensley, Alan D.: Critical Thinking in Psychology – A Unified Skills Approach, (1998), Brooks/Cole Publishing Company.

FRENCH - II

Course Code: FLF 201 **Credit Units: 02**

Course Objective:

To enable the students to overcome the fear of speaking a foreign language and take position as a foreigner speaking French.
To make them learn the basic rules of French Grammar.

Course Learning Objective:

- Students will hone Basic language skills such as reading, writing, speaking, listening & interactive in the language
- Students will be able to read and interpret small texts .
- Students will be able to communicate in small sentences in writing, self introduction, family description etc.
- Students will be able to communicate in small sentences in oral, self introduction, family description etc

- To speak about the activities and hobbies
- To express ones tastes
- To excuse oneself
- To understand a mail
- To ask ones way
- To indicate the direction
- To express a wish
- To ask for information
- To give an order or a suggestion
- To read a plan of metro and RER.

Course Contents:

Module A: pp.38 – 47: Unité 3: Objectif 3, 4, 5. 6

Module B: pp. 47 to 75 Unité 4, 5

Contenu lexical:

Unité 3: Organiser son temps

1. donner/demander des informations sur un emploi du temps, un horaire SNCF – Imaginer un dialogue
2. rédiger un message/ une lettre pour …
   i) prendre un rendez-vous/ accepter et confirmer/ annuler
   ii) inviter/accepter/refuser
3. Faire un programme d'activités
   imaginer une conversation téléphonique/un dialogue
   Propositions- interroger, répondre

Unité 4: **Découvrir son environnement**

1. situer un lieu
2. s'orienter, s'informer sur un itinéraire.
3. Chercher, décrire un logement
4. connaître les rythmes de la vie

Unité 5: s'informer

1. demander/donner des informations sur un emploi du temps passé.
2. donner une explication, exprimer le doute ou la certitude.
3. découvrir les relations entre les mots
4. savoir s'informer

Contenu grammatical:

1. Adjectifs démonstratifs
2. Adjectifs possessifs/exprimer la possession à l'aide de:
   i. « de » ii. A+nom/pronom disjoint

3. Conjugaison pronominale – négative, interrogative - construction à l'infinitif
4. Impératif/exprimer l'obligation/l'interdiction à l'aide de « il faut…. »/ «il ne faut pas… »
5. passé composé
6. Questions directes/indirectes

EXAMINATION SCHEME

Total: 100 marks

Continuous Evaluation (Total 50 Marks)					End Sem Evaluation (Total 50 Marks)
Quiz	Mid Term Test	Presentation	Viva Voce	Attendance	End-Term Exam
10	15	10	10	5	50

Text & References:

- le livre à suivre: Campus: Tome 1

GERMAN – II

Course Code: FLG 201 Credit Units: 02

Course Objective:

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.
To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany
Introduction to Grammar to consolidate the language base learnt in Semester I

Course Learning Objective :

- Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of advance level.
- Students will be able to communicate with complex sentences.

  - Modal verb to allow and should
  - Personal pronoun in accusative
  - Comparative and superlative

Course Contents:

Module I: Everything about Time and Time periods
Time and times of the day.
Weekdays, months, seasons.
Adverbs of time and time related prepositions

Module II: Irregular verbs
Introduction to irregular verbs like to be, and others, to learn the conjugations of the same, (fahren, essen, lessen, schlafen, sprechen und ähnliche).

Module III: Separable verbs
To comprehend the change in meaning that the verbs undergo when used as such
Treatment of such verbs with separable prefixes

Module IV: Reading and comprehension
Reading and deciphering railway schedules/school time table
Usage of separable verbs in the above context

Module V: Accusative case
Accusative case with the relevant articles
Introduction to 2 different kinds of sentences – Nominative and Accusative

Module VI: Accusative personal pronouns
Nominative and accusative in comparison
Emphasizing on the universal applicability of the pronouns to both persons and objects

Module VII: Accusative prepositions
Accusative propositions with their use
Both theoretical and figurative use

Module VIII: Dialogues
Dialogue reading: 'In the market place'
'At the Hotel'

EXAMINATION SCHEME

Total: 100 marks

Continuous Evaluation (Total 50 Marks)					End Sem Evaluation (Total 50 Marks)
Quiz	**Mid Term Test**	**Presentation**	**Viva Voce**	**Attendance**	**End-Term Exam**
10	**15**	**10**	**10**	**5**	**50**

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

SPANISH – II

Course Code: FLS 201 Credit Units: 02

Course Objective:

To enable students acquire more vocabulary, grammar, Verbal Phrases to understand simple texts and start describing any person or object in Simple Present Tense.

Course Learning objective:

- Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of advance level.
- Students will be able to communicate with complex sentences

- Narrating actions and incidents in past.
- Pluscuamperfecto Tense
- To be able to write job letters/formal letters.
- Typical Questions/answers for job interview preparation
- Spanish Food habits and culinary traditions

Course Contents:

Module I
Revision of earlier modules.

Module II
Some more AR/ER/IR verbs. Introduction to root changing and irregular AR/ER/IR ending verbs

Module III
More verbal phrases (eg, Dios Mio, Que lastima etc), adverbs (bueno/malo, muy, mucho, bastante, poco). Simple texts based on grammar and vocabulary done in earlier modules.

Module IV
Posessive pronouns

Module V
Writing/speaking essays like my friend, my house, my school/institution, myself….descriptions of people, objects etc, computer/internet related vocabulary

EXAMINATION SCHEME

Total: 100 marks

Continuous Evaluation (Total 50 Marks)					End Sem Evaluation (Total 50 Marks)
Quiz	Mid Term Test	Presentation	Viva Voce	Attendance	End-Term Exam
10	15	10	10	5	50

Text & References:

- Español, En Directo I A
- Español Sin Fronteras

CHINESE – II

Course Code: FLC 201 Credit Units: 02

Course Objective:

Chinese is a tonal language where each syllable in isolation has its definite tone (flat, falling, rising and rising/falling), and same syllables with different tones mean different things. When you say, "ma" with a third tone, it mean horse and "ma" with the first tone is Mother. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Learning Objectives:

- Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of advance level.
- Students will be able to communicate with complex sentences.

On the completion of second semester the students will be able to:

1. Engage in conversation at Chinese restaurant.
2. Express Simple Emotions and Ideas in Chinese.
3. Seek opinion of others, make suggestions, do comparison and explain reason in Chinese language.

Course Contents:

Module I
Drills
Practice reading aloud
Observe Picture and answer the question.
Tone practice.
Practice using the language both by speaking and by taking notes.
Introduction of basic sentence patterns.
Measure words.
Glad to meet you.

Module II
Where do you live?
Learning different colors.
Tones of "bu"
Buying things and how muchit costs?
Dialogue on change of Money.
More sentence patterns on Days and Weekdays.
How to tell time. Saying the units of time in Chinese. Learning to say useful phrases like – 8:00, 11:25, 10:30 P.M. everyday, afternoon, evening, night, morning 3:58, one hour, to begin, to end ….. etc.
Morning, Afternoon, Evening, Night.

Module III
Use of words of location like-li, wais hang, xia
Furniture – table, chair, bed, bookshelf,.. etc.
Description of room, house or hostel room.. eg what is placed where and how many things are there in it?
Review Lessons – Preview Lessons.
Expression 'yao", "xiang" and "yaoshi" (if).
Days of week, months in a year etc.
I am learning Chinese. Is Chinese difficult?

Module IV
Counting from 1-1000
Use of "chang-chang".
Making an Inquiry – What time is it now? Where is the Post Office?
Days of the week. Months in a year.
Use of Preposition – "zai", "gen".

Use of interrogative pronoun – “duoshao” and “ji”.
“Whose”??? Sweater etc is it?
Different Games and going out for exercise in the morning.

Module V
The verb “qu”
- Going to the library issuing a book from the library
- Going to the cinema hall, buying tickets
- Going to the post office, buying stamps
- Going to the market to buy things.. etc
- Going to the buy clothes …. Etc.

Hobby. I also like swimming.
Comprehension and answer questions based on it.

EXAMINATION SCHEME

Total: 100 marks

Continuous Evaluation (Total 50 Marks)					End Sem Evaluation (Total 50 Marks)
Quiz	Mid Term Test	Presentation	Viva Voce	Attendance	End-Term Exam
10	15	10	10	5	50

Text & References:

- “Elementary Chinese Reader Part I” Lesson 11-20

THIRD SEMESTER

APPLIED MATHEMATICS – III

Course Code: AM 301 **Credit Units: 03**

Course Objective:

The knowledge of Mathematics is necessary for a better understanding of almost all the Engineering and Science subjects. Here our intention is to make the students acquainted with the concept of basic topics from Mathematics, which they need to pursue their Engineering degree in different disciplines.

Course Learning Objective:

1. Investigate the basic concept about partial differential equations.
2. Create an interest in finding the solution by Fourier Series and Fourier Transforms.
3. Apply basic concepts of Laplace Transformation.
4. Develop the physical problems using optimization techniques.

Course Contents:

Module I: Partial Differential Equations
Formation of PDE, Equations solvable by direct integration, Linear equations of the first order, Non-linear equations of the first order, Charpit's method, Homogeneous linear equations with constant coefficients, Non homogeneous linear equations.

Module II: Fourier Series
Periodic Functions, Fourier Series, Functions having points of discontinuity, Even or Odd Functions, Change of Interval, Half-range series, Parseval's Formula, Complex form of Fourier series, Practical Harmonic Analysis, Fourier Transforms, Sine and Cosine Transforms.

Module III: Laplace Transformation
Definition, Transforms of elementary functions, Properties of Laplace transforms, Existence conditions, Transforms of derivatives, Transforms of integrals, Evaluation of integrals by Laplace transform, Inverse transforms, Other methods of finding inverse transforms, Convolution theorem, Application to differential equations, Simultaneous linear equations with constant coefficients, Unit step functions, Periodic functions.

Module IV: Linear Programming
Formulation of the problem, Graphical method, Canonical and Standard forms of L.P.P. Simplex Method, Artificial variable Techniques-M-method, Two phase method, Degeneracy, Dual simplex method.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

Text:

- Differential Calculus by Shanti Narain
- Integral Calculus by Shanti Narain
- Higher Engineering Mathematics by B.S. Grewal

References:

- Differential Equations by A.R. Forsyth
- Higher Engineering Mathematics by H.K. Dass
- Partial Differential Equations by I.N. Snedon

MECHANICS OF SOLIDS

Course Code: BCE 302 **Credit Units: 03**

Course Objective:

The objective of this course is to make the students understand the concept of stress and strain in different types of structure/machine under different loading conditions. The course also covers the simple and compound stresses due to forces, stresses and deflection in beams due to bending, torsion in circular section, stress in thin cylinder due to external and internal pressure.

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Determine the stresses and strains in the members subjected to axial, bending and torsional loads.
2. Determine the principal stresses and strains in structural members
3. Evaluate the shear force & bending moment on different type of structures
4. Analyse thin cylinders, thick cylinders & columns.

Course Contents:

Module I: Simple stresses and strains

Concept of stress and strain; Hooke's law, Young's modulus, Poisson ratio, stress at a point, stress and strains in bars subjected to axial loading. Modulus of elasticity, stress produced in compound bars subject to axial loading. Volumetric Strain, elastic constants. Temperature stress and strain calculations due to applications of axial loads and variation of temperature in single and compound walls. Strain energy for gradually applied, suddenly applied and impact loads

Module II: Compound stress and strains

The two dimensional system; stress at a point on a plane, principal stresses and principal planes; Mohr's circle of stress. Graphical and Analytical methods for stresses on oblique section of body.

Module III: Bending Moment and Shear Force

Beams and support conditions; Types of supports and loads; determinate and indeterminate structures; Shear force and bending moment diagrams for cantilever, simply supported and overhanging beams.

Module IV: Bending Stress and Shear Stress

Theory of bending stresses in beams due to bending, assumptions in the simple bending theory, derivation of formula: its application to beams of rectangular, circular and channel sections, composite / flitched beams, bending and shear stresses in composite beams.

Module V: Torsion

Derivation of torsion equation and its assumptions. Applications of the equation of the hollow and solid circular shafts torsional rigidity, Modulus Power. Combined torsion and bending of circular shafts principal stress and maximum shear stresses under combined loading of bending and torsion, analysis of close-coiled-helical springs.

Module VI: Thin cylinders and spheres

Derivation of formulae and calculation of hoop stress, longitudinal stress in a cylinder and sphere subjected to internal pressure.

Module VII: Columns

Short and long columns, slenderness ratio, crushing and buckling of column, short column subjected to axial and eccentric loads; Euler's formulas, theory and its limitation.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

Text:

- Jindal U.C., "Strength of Materials", Galgotia Publication, New Delhi, 1998.
- Ryder G.H., "Strength of Materials", Macmillan, Delhi, 2003.
- R.K. Bansal, "Strength of Materials", Laxmi Publication, New Delhi, 2001.
- Mechanics of Materials –B.C.Punmia Laxmi Publications
- S. B. Junarkar and Dr. H. J. Shah, Mechanics of Structures, 27th Revised and Enlarged, Charotar Publishing House, 2008.

References:

- Sadhu Singh, "Strength of Materials", Khanna Publishers, New Delhi, 2000.
- Timoshenko S.P., "Elements of Strength of Materials", East-West affiliated, New Delhi, 2000.
- Hibbler R.C., "Mechanics of Materials", Prentice Hall, New Delhi, 1994.
- Popov Eger P., "Engg. Mechanics of solids", Prentice Hall, New Delhi, 1998.

Srinath L.S. et.al., "Strength of Materials", McMillan, New Delhi,2001

MECHANICS OF FLUIDS

Course Code: BCE 303 **Credit Units: 03**

Course Objective:

The objective of Fluid Mechanics subject is that students should understand the, properties of fluids, pressure measurement devices, hydraulic forces on surfaces, bouncy and flotation in fluids, kinematics and static behavior of fluids, dimension and model analysis, laminar and turbulent flow, flow through pipes and orifices, boundary layer theory.

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Able to explain the effect of fluid properties on a flow system.
2. Able to identify type of fluid flow patterns and describe continuity equation
3. The effect of impact of jet on various vanes and to study the working of hydro electric power station
4. To select and analyse an appropriate turbine with reference to given situation in power plants
5. To estimate performance parameters of a given Centrifugal and Reciprocating pump.

Course Contents:

Module I: Fluid Properties and Fluid Statics
Newtonian and Non-Newtonian Fluids; Viscosity; Incompressible and compressible fluids, compressibility. Forces on plane surfaces, forces on curved surfaces, buoyant forces, and stability of floating bodies, metacentre and metacentre height.

Module II: Kinematics of Fluid Motion
Steady and unsteady flow; uniform and non-uniform flow; Laminar and turbulent flow; streamline, path line and streak line; continuity equation, irrotational and rotational flow, velocity potential and stream function, vortex flow, free and forced vortex.

Module III: Dynamics of Fluid Flow
Euler's equation of motion and its integration to yield Bernoulli's equation, its practical applications – Pilot tube, Venturi meter; steady flow momentum equation, force exerted on a pipe bend.

Module IV: Dimensional Analysis and Principles of Similarity
Buckingham π-Theorem and its applications, Geometric, Kinematics and Dynamic similarity; Dimensionless numbers-Reynolds, Froude, Euler, Mach, Weber Number and their significance.

Module V: Laminar and Turbulent Flow
Reynold's experiment, critical velocity, steady laminar flow through a circular tube, flow between parallel plates, measurement of viscosity. Transition from laminar to turbulent flow, courses of turbulence, velocity distribution law near a solid boundary, velocity distribution in rough pipes, Hazen – Williams's formula.

Module VI: Analysis of Pipe Flow
Energy losses, minor losses in pipe lines, concept of equivalent length, flow between two reservoirs, and multiple pipe systems – in series and parallel, siphon.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

Text:

- R.K. Bansal, “Fluid Mechanics & Hydraulic Machines”, Laxmi Publications (P) Ltd., 2002.
- Gupta, S. C., Fluid Mechanics and Hydraulic Machines, Pearson Education, 2007
- D.S. Kumar, “Fluid Mechanics and Fluid Power Engineering”, S.K. Kataria & Sons, 2000.

References:

- F. M. White, Introduction to Fluid Mechanics, McGraw Hill
- I.H. Shames, “Mechanics of Fluids”, Tata McGraw Hill
- Douglas, J. F., Gasiorek, J.M. and Swaffield, J., Fluid Mechanics, Pearson Education, 4/e, 2006
- V.L. Streeter and E.B. Wylie, “Fluid Mechanics”, Tata McGraw Hill Massey B S, Mechanics of Fluids, Van Nostrand Reinhold Co

BUILDING TECHNOLOGY

Course Code: BCE 304 **Credit Units: 03**

Course Objective:

The course covers building materials and their testing, cement and its applications foundation and structural members of building. Different areas and utilities of building like floors, doors etc.

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Understand the essentials of analysing and interpreting blueprints and specifications.
2. Acquire knowledge of ingredients and components in various building materials like bricks, stone, cement, concrete, etc.
3. Demonstrate an understanding of the principal components of building and their functions.
4. Understand how various building codes apply to residential structures.
5. Understanding of latest construction procedures, materials, terminology and details for different classes of buildings.

Course Content:

Module I: Building Materials: Stones: Classification of rocks, Quarrying, Dressing, Properties and uses; **Timber**: Defects, Seasoning, Decay and Preservation. **Clay products:** Bricks – Manufacture, IS classification, Properties, Tests and Types. **Tiles**: Manufacture, properties, uses and Types. **Lime**: Classification, Manufacture, properties, Test and uses. Sand – Properties & Uses. **Admixture:** Types & Properties.

Module II: Cement: Raw materials, constituents of cement and their role, Manufacturing Process, Types, Properties, Tests and Uses; **Mortar**: Properties, Types, and uses; **Concrete**: Properties & Uses. **Iron and steel**: Properties and uses. **Miscellaneous materials:** Glass – Plastics - A.C. Sheets. **Industrial Waste Products:** Fly-ash, Slag, Silica Fumes.

Module III: Sub-Structure: Foundations: Purpose, types, depth of footing, foundation for black cotton soil, causes of failure of foundation & remedial measure. Introduction to Shuttering, Scaffolding & Underpinning. Expansion and construction joints.

Module IV: Brick and stone masonry: Bonds in brick work, Types of stone masonry. **Types of floors**: Construction details and selection criteria. **Doors and windows**: Types, Sizes and Material. **Vertical Transportation**: Types of Stairs and materials. Lifts and escalators.

Module V: Cavity & Partition walls, Lintels and arches. Types of roof and roof covering. White Washing, Colour Washing, Painting, Distempering. Damp proofing materials. Sound and fire

proofing construction, Fire load & Fire resisting properties of building materials. Plastering and pointing. Introduction to Prefabrication – Slip form and lift slab constructions.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Punmia B.C, Ashok Kr. Jain, Arun Kr. Jain, Building Construction, Laxmi Publications, New Delhi. (2008)
- Shetty M. S, Concrete Technology, S. Chand & Co., New Delhi (2008).
- Building Construction, Arora, S.P., Bindra, S.P. Dhanpat Rai and Sons. Delhi.

SURVEYING-I

Course Code: BCE 305 **Credit Units: 03**

Course Objective:
Surveying is the basic element of mapping areas for civil engineering construction. Methods of surveying including leveling, and leveling methods, contours, estimation of volumes etc are covered.

Course learning outcomes (CLO)
At the successful completion of this course you (the student) should be able to:

1. To define the relative position of objects on earth surface.
2. Establishing the points on ground which are predetermined on paper.
3. Determine the reduced level for different points on ground surface.
4. Calculation of area and volume for various earth work.
5. Identify and examine the suitable methods to execute surveying work.

Course Contents:

Module I
Introduction - classification of surveys - plane surveying - geodetic surveying – topographic surveying - reconnaissance - principle of working from whole to part - provision of control - conventional signs - chain survey - instruments - principles of chain survey - field book - plotting - tie line and check line - chaining and ranging - obstacles - chaining on sloping ground - errors in chain survey - uses of cross staff and optical square

Module II
Compass survey - prismatic compass - surveyor's compass - whole circle and reduced bearing- true and magnetic bearing - dip and declination - local attraction - traversing - plotting - error of closure - graphical and analytical adjustments - plane table survey - instruments and accessories - different methods - orientation - advantages and disadvantages of plane tabling -two point problem - three point problem - errors in plane tabling - minor instruments – hand levels - clinometer - Ceylon ghat tracer - hypsometer - pantagraph - box sextant -telescopic alidade

Module III
Levelling - definition of level surfaces - mean sea level - reduced level - bench marks - levelling instruments - temporary and permanent adjustments - fly leveling - booking - reduction of levels - corrections for refraction and curvature - reciprocal leveling - longitudinal levelling and cross sectioning - contour survey - definition - characteristics of contour - uses of contour - methods of contouring - direct and indirect interpolation – plotting - areas and volumes - trapezoidal rule - Simpson's rule - area from latitude and departure - uses of planimeter - volumes - trapezoidal and prismoidal formula

Module IV
Theodolite surveying - study of theodolite - temporary and permanent adjustments -measurement of horizontal angles - method of repetition and reiteration - measurement of vertical angles - theodolite traverse - calculation of co ordinates - corrections - traverse table -omitted measurements - tacheometric surveying - stadia system - fixed and movable hair methods - staff held vertical and normal - instrument constants - analytic lens – tangential system - direct reading tacheometer - subtense bar – trigonometric leveling – various methods– E.D.M – total station.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE

Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- S.K Duggal, Surveying Vol 1 and II, 2nd ed., Tata - McGraw Hill, New Delhi (2004).
- Text book of Surveying By Agor Khanna Publishers,
- Arora K.R., Surveying Vol I &II, Standard Book House, New Delhi (2008)
- Punmia, B.C., Ashok Kr. Jain, Arun Kr. Jain, Surveying Vol I & II, Laxmi Publications, New Delhi (2008).

ENGINEERING GEOLOGY (Domain Elective)

Course Code: BCE 306 **Credit Units: 02**

Course Objective:

The student is given an introduction to basics of Geology genesis and characteristic of rocks: Geological structure and other effects of civil engineering structures. Geology of India is introduced.

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Understand & classify various weathering process.
2. Identify and distinguish diverse geological formations.
3. Understand internal geological developments (e.g. faults, earthquakes, volcanoes) and their effect on engineering structures.
4. Identify basic rock types and their properties.
5. Apply geological principles for reduction of natural hazards and select sites for dams and tunnels.

Course Contents:

Module I: Branches and scope of geology
Physical geology
Geological agents and their action, weathering, volcanism, earthquake and plate tectonics

Module II: Elements of crystallography and mineralogy
Petrology
Types of rocks, genesis and physical and chemical characters, Building stones

Module III: Structural geology
Types of structures and classification and their effect on civil engineering projects and Geological mapping
Hydrogeology
Groundwater and occurrence, investigations, quality, artificial recharge

Module IV: Geology in Civil Engineering
Tunnels, dams, reservoirs, bridges, Runways, Roads and Buildings.
Slope failures and landslides. Investigations, Remote sensing and GIS applications
Geology of India
Types, age and occurrence of rock formations and economic importance

Examination Scheme:

Components	**A**	**CT**	**S/V/Q**	**HA**	**EE**
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Parbin Singh, Engineering & General Geology, S.K. Kataria & Sons, New Delhi (2008)
- Bangar, K.M., Principles of Engineering Geology, Standard Publishers Distributors, Delhi (2009)
- Billings, Marland P., Structural Geology, 3rd ed., Prentice-Hall India, New Delhi.
- Todd, D.K., Ground Water Hydrology, 2nd ed., Wiley India, New Delhi (2008)

REMOTE SENSING AND GEOGRAPHIC INFORMATION SYSTEMS
(Domain Elective)

Course Code: BCE 307 **Credit Units: 02**

Course Objective:
This course deals with remote sensing and geographic information systems.

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. gain background knowledge and understanding of principles of RS, RS Sensors and systems;
2. overview information retrieval of earth surface features using multi-resolution, multi-scale and multi-temporal imagery;
3. understand the concept image processing and classification techniques; and
4. enable spatial and temporal thinking to relate remote sensing for real-world applications.
5. use various remote sensing data types / formats, imagery products;

Course Contents:

Module I
Concepts and foundations of remote sensing- electromagnetic spectrum, energy sources and radiation principles, energy interactions in the atmosphere and with earth surface features, data acquisition and interpretation, reference data, ideal remote sensing systems, characteristics of real remote sensing systems. Classification of maps, map scale, spatial reference system, map projections, grid systems, linkage of GIS to remote sensing. Radar principle- Factors affecting microwave measurements, radar wavebands, SLAR systems, interaction between microwaves and earth's surface. Elements of photographic systems - film exposure, film density and characteristic curves, spectral sensitivity of black and white films, colour film and colour infrared film, filters, aerial cameras, film resolution, electronic and multi band imaging, aerial videography. Basic principles of photogrammetry – geometrical characteristics of aerial photographs, photographic scale, ground coverage, area measurement, relief displacement of vertical features, image parallax, ground control, mapping.

Module II
Remote sensing platforms and sensors - Satellite system parameters, sensor parameters, imaging sensor systems, earth resources and meteorological satellites with microwave sensors, scanners, radiometers. The Indian Remote Sensing Program. Data types and format, scale and legend.
Visual Image Interpretation - types of pictorial data products, fundamentals of visual image interpretation, equipment, image interpretation strategy, process of image interpretation, key elements of visual image interpretation, false colour composites, application in natural resources management. Digital Image Processing - Basic character of a digital image, image rectification & restoration, preprocessing, registration, enhancement, contrast, spatial feature and multi-image manipulation, spatial filtering, image transformations, image classification, performance analysis, data merging and GIS integration.

Module III
GIS overview – what is GIS, components, definitions & terminology, uses, GIS queries & architecture, theoretical models & framework, GIS technology trends, data sources, collection, and entry, data formats &

standards, types of analysis, spatial data modeling, GIS data management, database models, storage of data, object based GIS models, data input & editing, data quality issues. Data analysis & modeling – Integration of remote sensing & GIS.

Module IV

Application of Remote Sensing& GIS in natural resources management with specific reference to impact of mining activities on environment, biodiversity, coastal zone protection, flood management, forest protection, monitoring urban growth, managing watersheds & water resources, hydrologic modeling, preventing natural disasters etc.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Thomas. M. Lillesand and Ralph. W. Kiefer, Remote Sensing and Image Interpretation:, John Wiley and Sons, Inc., 2002
- M. Anji Reddy, Text Book of Remote Sensing and Geographical Information Systems:, B.S. Publications, 2001
- Ian Heywood, Sarah Cornelius, and Steve Carver, An Introduction to Geographical Information Systems, Pearson Education Asia, 2001
- George. B. Korte, The GIS Book:, Onward Press, Thomson Learning, 2001
- D. P. Rao, Association of Exploration Geophysicists, 1995, Remote Sensing for Earth Resources.
- L.R.A. Narayan, Remote Sensing and its Application, Universities Press, 1999.

MECHANICS OF SOLIDS LAB

Course Code: **BCE 322** **Credit Units: 01**

Course Contents:

List of Experiments

- Universal Testing Machine
- Tensile Test (MS)
- Double Shear Test (MS)
- Compression Test (CI)
- Brinell Hardness No.
- Izod Impact
- Testing Machine
- Rockwell Hardness Tester
- Spring Stiffness (Spring Compression Testing machine)
- Torsion testing machine

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

MECHANICS OF FLUID LAB

Course Code: **BCE 323** **Credit Units: 01**

List of Experiments

- Verification of Bernoulli's Theorem
- Experiment using Venturimeter
- Determination of coefficient of Discharge C_d, C_c, $C_!$ Using
- Circular/triangular/rectangular orifice
- To find major head losses in a pipe line
- To find minor head losses in a pipe line (sudden expansion/contraction/bend)

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

BUILDING DRAWING LAB

Course Code: BCE 324 **Credit Units: 01**

Course Contents:

1. Panelled doors, glazed windows and ventilators in wood.
2. Steel and aluminium windows.
3. Steel roof trusses.
4. Plan, Elevation & Sectional drawings of 1-BHK, 2-BHK, 3-BHK & 3-BHK with servant quarter.
5. Residential buildings with flat and pitched roof – RC and tiled.
6. Public buildings like office, dispensary, post office, bank etc.
7. Industrial buildings.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

Text & References:

- National Building Code of India
- Local Building Bye-laws
- Callender, John Hancock, Time Saver Standards for Architectural design Data, Tata McGraw Hill.
- Chiara, Callender, John Hancock, Time Saver Standards for Building Type, McGraw Hill
- Chiara, Joseph De, Time Saver Standards for Site Planning, McGraw Hill
- Ching, Francis D K, Architectural Graphics. .John Wiley

SURVEYING PRACTICAL - I

Course Code: **BCE 325** **Credit Units: 01**

List of Exercices:

1. Chain survey - Traversing and plotting of details.
2. Compass survey - Traversing with compass and plotting.
3. Plane table survey – Method of Radiation and Intersection.
4. Plane table survey - Solving three point problem.
5. Plane table survey – Solving two point problem
6. Plane table survey - Traverse.
7. Levelling Fly leveling – Plane of collimation method.
8. Levelling Fly leveling – Rise and Fall method.
9. Levelling Longitudinal and cross sectioning.
10. Levelling Contour surveying.
11. Theodolite surveying – Measurement of horizontal angle by method of repetition and reiteration.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva

COMMUNICATION SKILLS - I

Course Code: **BCS 301** **Credit Units: 01**

Course Objective:

To form written communication strategies necessary in the workplace

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Inculcating creative thinking skills
CLO 2	Construct and showcase their communication skills in a creative manner.
CLO 3	Comprehending and demonstrating ways of self-introduction
CLO 4	Outlining and illustrating presentation Skills

Course Contents:

Module I: Introduction to Writing Skills
Effective Writing Skills
Avoiding Common Errors
Paragraph Writing
Note Taking
Writing Assignments

Module II: Letter Writing
Types
Formats

Module III
Memo
Agenda and Minutes
Notice and Circulars

Module IV: Report Writing
Purpose and Scope of a Report
Fundamental Principles of Report Writing
Project Report Writing
Summer Internship Reports

Examination Scheme:

Components	**CT1**	**CT2**	**CAF**	**V**	**GD**	**GP**	**A**
Weightage (%)	20	20	25	10	10	10	5

CAF – Communication Assessment File
GD – Group Discussion
GP – Group Presentation

Text & References:

- Business Communication, Raman – Prakash, Oxford
- Creative English for Communication, Krishnaswamy N, Macmillan
- Textbook of Business Communication, Ramaswami S, Macmillan
- Working in English, Jones, Cambridge
- A Writer's Workbook Fourth edition, Smoke, Cambridge
- Effective Writing, Withrow, Cambridge
- Writing Skills, Coe/Rycroft/Ernest, Cambridge
- Welcome!, Jones, Cambridge

BEHAVIOURAL SCIENCE - III
(INTERPERSONAL COMMUNICATION)

Course Code: **BSS 304** **Credit Units: 01**

Course Objective:

This course provides practical guidance on

- Enhancing personal effectiveness and performance through effective interpersonal communication
- Enhancing their conflict management and negotiation skills

Course learning outcomes (CLOs):

At the successful completion of this course you (the student) should be able to:

1. Demonstrate knowledge of strategies for developing a healthy interpersonal communication.
2. Recognize the importance of transactional analysis, script analysis.
3. Identify the difference between healthy and unhealthy expression of emotions and develop emotional competence necessary for conflict resolution and impression management.
4. Enhance personal effectiveness and performance through effective interpersonal communication.

Course Contents:

Module I: Interpersonal Communication: An Introduction
Importance of Interpersonal Communication
Types – Self and Other Oriented
Rapport Building – NLP, Communication Mode
Steps to improve Interpersonal Communication

Module II: Behavioural Communication
Meaning and Nature of behavioural communication
Persuasion, Influence, Listening and Questioning
Guidelines for developing Human Communication skills
Relevance of Behavioural Communication for personal and professional development

Module III: Interpersonal Styles
Transactional Analysis
Life Position/Script Analysis
Games Analysis
Interact ional and Transactional Styles

Module IV: Conflict Management
Meaning and nature of conflicts
Styles and techniques of conflict management
Conflict management and interpersonal communication

Module V: Negotiation Skills
Meaning and Negotiation approaches (Traditional and Contemporary)
Process and strategies of negotiations
Negotiation and interpersonal communication

Module VI: End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

- Vangelist L. Anita, Mark N. Knapp, Inter Personal Communication and Human Relationships: Third Edition, Allyn and Bacon.

- Julia T. Wood. Interpersonal Communication everyday encounter
- Simons, Christine, Naylor, Belinda: Effective Communication for Managers, 1997 1st Edition Cassel
- Goddard, Ken: Informative Writing, 1995 1st Edition, Cassell
- Harvard Business School, Effective Communication: United States of America
- Foster John, Effective Writing Skills: Volume-7, First Edition 2000, Institute of Public Relations (IPR)
  Beebe, Beebe and Redmond; Interpersonal Communication, 1996; Allyn and Bacon Publishers

FRENCH - III

Course Code: FLF 301 **Credit Units: 02**

Course Objective:

To provide the students with the know-how

- To master the current social communication skills in oral and in written.
- To enrich the formulations, the linguistic tools and vary the sentence construction without repetition.

Course Learning Objective:

- Students will hone Basic language skills such as reading, writing, speaking, listening & interactive in the language
- Students will be able to read and interpret small texts .
- Students will be able to communicate in small sentences in writing, self introduction, family description etc.
- Students will be able to communicate in small sentences in oral, self introduction, family description etc

- To understand and present the time schedule and to tell the time
- To understand and draft a short biography and to present a scientist
- To understand an online conversation and read a program and the timings.
- To propose an outing and to accept an outing.
- To leave a message on the answering machine

Course Contents:

Module B: pp. 76 – 88 Unité 6

Module C: pp. 89 to103 Unité 7

Contenu lexical: **Unité 6: se faire plaisir**

1. acheter: exprimer ses choix, décrire un objet (forme, dimension, poids et matières) payer
2. parler de la nourriture, deux façons d'exprimer la quantité, commander un repas au restaurant
3. parler des différentes occasions de faire la fête

Unité 7: Cultiver ses relations

1. maîtriser les actes de la communication sociale courante (Salutations, présentations, invitations, remerciements)
2. annoncer un événement, exprimer un souhait, remercier, s'excuser par écrit.
3. caractériser une personne (aspect physique et caractère)

Contenu grammatical:

1. accord des adjectifs qualificatifs
2. articles partitifs
3. Négations avec de, ne…rien/personne/plus
4. Questions avec combien, quel…
5. expressions de la quantité
6. ne…plus/toujours - encore
7. pronoms compléments directs et indirects
8. accord du participe passé (auxiliaire « avoir ») avec l'objet direct
9. Impératif avec un pronom complément direct ou indirect
10. construction avec « que » - Je crois que/ Je pense que/ Je sais que

EXAMINATION SCHEME
Total: 100 marks

Continuous Evaluation (Total 50 Marks)					End Sem Evaluation (Total 50 Marks)
Quiz	**Mid Term Test**	**Presentation**	**Viva Voce**	**Attendance**	**End-Term Exam**
10	**15**	**10**	**10**	**5**	**50**

Text & References:

- le livre à suivre: Campus: Tome 1

GERMAN - III

Course Code: FLG 301 **Credit Units: 02**

Course Objective:

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.
To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany

Course Learning Objective :

- Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of advance level.
- Students will be able to communicate with complex sentences.

Course Contents:

Module I: Modal verbs
Modal verbs with conjugations and usage
Imparting the finer nuances of the language

Module II: Information about Germany (ongoing)
Information about Germany in the form of presentations or "Referat"– neighbors, states and capitals, important cities and towns and characteristic features of the same, and also a few other topics related to Germany.

Module III: Dative case
Dative case, comparison with accusative case
Dative case with the relevant articles
Introduction to 3 different kinds of sentences – nominative, accusative and dative

Module IV: Dative personal pronouns
Nominative, accusative and dative pronouns in comparison

Module V: Dative prepositions
Dative preposition with their usage both theoretical and figurative use

Module VI: Dialogues
In the Restaurant,
At the Tourist Information Office,
A telephone conversation

Module VII: Directions
Names of the directions
Asking and telling the directions with the help of a roadmap

Module VIII: Conjunctions
To assimilate the knowledge of the conjunctions learnt indirectly so far

EXAMINATION SCHEME
Total: 100 marks

Continuous Evaluation (Total 50 Marks)					End Sem Evaluation (Total 50 Marks)
Quiz	Mid Term Test	Presentation	Viva Voce	Attendance	End-Term Exam
10	15	10	10	5	50

Text & References:

- Wolfgang Hieber, Lernziel Deutsch

- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

SPANISH – III

Course Code: FLS 301 **Credit Units: 02**

Course Objective:

To enable students acquire knowledge of the Set/definite expressions (idiomatic expressions) in Spanish language and to handle some Spanish situations with ease.

Course Learning objective:

- Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of advance level.
- Students will be able to communicate with complex sentences
- To be able to write formal and informal, business letters/ E-mails
- Translating basic technical texts from Spanish to English
- Essay writing on different issues.
- Spanish for specific purposes

Course Contents:

Module I
Revision of earlier semester modules
Set expressions (idiomatic expressions) with the verb *Tener*, *Poner, Ir….*
Weather

Module II
Introduction to *Gustar*…and all its forms. Revision of *Gustar* and usage of it

Module III
Translation of Spanish-English; English-Spanish. Practice sentences.
How to ask for directions (using estar)
Introduction to IR + A + INFINITIVE FORM OF A VERB

Module IV
Simple conversation with help of texts and vocabulary
En el restaurante
En el instituto
En el aeropuerto

Module V
Reflexives

EXAMINATION SCHEME
Total: 100 marks

Continuous Evaluation (Total 50 Marks)					End Sem Evaluation (Total 50 Marks)
Quiz	Mid Term Test	Presentation	Viva Voce	Attendance	End-Term Exam
10	15	10	10	5	50

Text & References:

- Español, En Directo I A
- Español Sin Fronteras -Nivel Elemental

CHINESE – III

Course Code: FLC 301 **Credit Units: 02**

Course Objective:

Foreign words are usually imported by translating the concept into Chinese, the emphasis is on the meaning rather than the sound. But the system runs into a problem because the underlying name of personal name is often obscure so they are almost always transcribed according to their pronciation alone. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Learning Objectives:

- Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of advance level.
- Students will be able to communicate with complex sentences.

On the completion of third semester the students will be able to:

1. Communicate in Chinese at workplace.
2. Attend meeting and talk on telephone using Chinese language.
3. Understand official work and send emails in Chinese.
4. Communicate in Chinese while attending job interview and joining new post.

Course Contents:

Module I
Drills
Dialogue practice
Observe picture and answer the question.
Introduction of written characters.
Practice reading aloud
Practice using the language both by speaking and by taking notes.
Character writing and stroke order

Module II
Measure words
Position words e.g. inside, outside, middle, in front, behind, top, bottom, side, left, right, straight.
Directional words – beibian, xibian, nanbian, dongbian, zhongjian.
Our school and its different building locations.
What game do you like?
Difference between “hii” and “neng”, “keyi”.

Module III
Changing affirmative sentences to negative ones and vice versa
Human body parts.
Not feeling well words e.g.; fever, cold, stomach ache, head ache.
Use of the modal particle “le”
Making a telephone call
Use of “jiu” and “cal” (Grammar portion)
Automobiles e.g. Bus, train, boat, car, bike etc.
Traveling, by train, by airplane, by bus, on the bike, by boat.. etc.

Module IV
The ordinal number “di”
“Mei” the demonstrative pronoun e.g. mei tian, mei nian etc.
use of to enter to exit
Structural particle “de” (Compliment of degree).
Going to the Park.
Description about class schedule during a week in school.

Grammar use of “li” and “cong”.
Comprehension reading followed by questions.

Module V
Persuasion-Please don’t smoke.
Please speak slowly
Praise – This pictorial is very beautiful
Opposites e.g. Clean-Dirty, Little-More, Old-New, Young-Old, Easy-Difficult, Boy-Girl, Black-White, Big-Small, Slow-Fast … etc.
Talking about studies and classmates
Use of “it doesn’t matter”
Enquiring about a student, description about study method.
Grammar: Negation of a sentence with a verbal predicate.

EXAMINATION SCHEME
Total: 100 marks

Continuous Evaluation (Total 50 Marks)					End Sem Evaluation (Total 50 Marks)
Quiz	Mid Term Test	Presentation	Viva Voce	Attendance	End-Term Exam
10	15	10	10	5	50

Text & References:

- “Elementary Chinese Reader Part I, Part-2” Lesson 21-30

FOURTH SEMESTER

NUMERICAL ANALYSIS AND PROGRAMMING

Course Code: BCE 401 **Credit Units: 03**

Course Objective:

This course deals with the techniques of numerical analysis, which gives the solution to applied problem when ordinary analytical method fails. Emphasis is given on computer programming also so that the given techniques can be used in design of engineering and scientific problems.

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. use the solution to applied problem when ordinary analytical method fails
2. apply the techniques in design of engineering and scientific problems
3. find the solution of differential equation
4. fit different type of curves for given data.
5. Solve integration and differentiation numerically.

Course Contents:

Module I
Solution of Algebraic and Transcendental Equation
Error in a series approximation, Bisection Method, Iteration method, Method of false position, Newton-Raphson method
Solutions of Simultaneous equation
Gauss elimination method, Jacobi iteration method, Gauss Seidal method

Module II: Interpolation
Finite Differences, Difference tables
Polynomial Interpolation**:** Newton's forward and backward formula
Central Difference Formulae: Gauss forward and backward formula.
Interpolation with unequal intervals: Lagrange's Interpolation, Newton Divided difference formula

Module III: Numerical Integration and Differentiation
Introduction, Numerical differentiation Numerical Integration: Trapezoidal rule, Simpson's 1/3 and 3/8 rules.

Module IV: Solution of differential Equations
Euler's Method, Runga-Kutta Methods.

Module V: Statistical Computation
Frequency chart, Curve fitting by method of least squares, fitting of straight lines, polynomials, exponential curves etc, Data fitting with Cubic splines.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

Text:

- Rajaraman V, "Computer Oriented Numerical Methods", Pearson Education
- Gerald & Whealey, "Applied Numerical Analyses", AW
- Jain, Iyengar and Jain, "Numerical Methods for Scientific and Engineering Computations", New Age Int.
- Grewal B S, "Numerical methods in Engineering and Science", Khanna Publishers, Delhi

References:

- T Veerarajan, T Ramachandran, "Theory and Problems in Numerical Methods, TMH

- Pradip Niyogi, “Numerical Analysis and Algorithms”, TMH
- Francis Scheld,” Numerical Analysis”, TMH
- Sastry S. S, “Introductory Methods of Numerical Analysis”, Pearson Education.
- Gupta C.B., Vijay Gupta, “Introduction to Statistical Methods”, Vikas Publishing.
- Goyal, M, “Computer Based Numerical and Statistical Techniques”, Firewall Media, New Delhi.

STRUCTURAL ANALYSIS - I

Course Code: BCE 402 **Credit Units: 03**

Course Objective:

Structural Analysis, being the critical part in designing building and other structures, is important. Elastic theorems fixed and continuous beams, circular beams over simple support and theory of columns are covered in this course.

Course learning outcomes (CLO)

1. At the successful completion of this course you (the student) should be able to:
2. Investigate one dimensional structures using simple methods of structural analysis
3. Create his own judgement regarding analysis method required for specific type of problem.
4. Apply these methods to the real life structures
5. Develop his interest structural engineering designing field.

Course Contents:

Module I: Deflection of beams

Differential equation of the elastic curve - slope and deflection of beams by method of successive integration - Macaulay's method - Moment area method - Conjugate beam method - Deflection due to shear.

Module II: Elastic theorems and energy principles

Strain energy and complementary energy - review of strain energy due to axial load - bending, shear and torsion - principle of superposition - principle of virtual work - Castigliano's theorem for deflection - theorem of complementary energy - Betti's theorem - Maxwell's law of reciprocal deflections - application of method of virtual work (unit load method) and strain energy method for determination of deflections of statically determinate beams - pin-joined trusses and rigid frames - temperature effects.

Module III: Fixed and continuous beams

Statically indeterminate Structures - degree of static and kinematic indeterminacies Propped cantilever, fixed and continuous beams -– brief introduction to force and displacement methods - fixed and continuous beams - force method - analysis by consistent deformation method - application of moment area and conjugate beam methods for fixed beams - theorem of three moments for continuous beams - shear force and bending moment diagrams - deflection and support settlement.

Module IV:

Theory of columns

Axial loading of short strut - long columns - Euler's Formula - Rankine Formula – Secant Formula - eccentric loading - direct and bending stresses – Buckling Load as an eigen value problem.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Texts & References:

- R. Vaidyanathan, P. Perumal, Comprehensive Structural Analysis Vol. I & II, Laxmi Publications, New Delhi
- Reddy C.S., Basic Structural Analysis, 2nd ed., Tata McGraw Hill, New Delhi (2004).
- S.Ramamrutham, R.Narayanan, Theory of Structures Dhanpat Rai Publishing Company (P) Ltd New Delhi-2
- B.C.Punmia, Ashok Kumar Jain, Arun Kumar Jain, Mechanics of Materials Laxmi Publications, New Delhi
- S.P.TimoShenko, D.H.Young, Elements of Strength of Materials, Affiliated East-West Press (EWP) Limited.
- Timoshenko, S.P. and Gere, J.M. Mechanics of Materials, Tata McGraw Hill, 1992.
- Rajput.R.K., Strength of Materials, S. Chand & Co., Ltd., 1996.

Surveying –II (Domain Elective)

Course Code: **BCE 403** **Credits Units: 03**

Objective:

- To get introduced to different geodetic methods of survey such as triangulation, trigonometric leveling
- To learn about errors in measurements and their adjustments in a traverse
- To get introduced to modern advanced surveying techniques involved such as Remote sensing, Total station, GPS, Photogrammetry etc.

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. To define the hydro graphic routes.
2. To learn about errors in measurements and their adjustments in a traverse.
3. To get introduced to modern advanced surveying techniques involved such as Remote sensing, Total station, GPS, Photogrammetric etc.
4. Setting out of various curves for the construction of ways.
5. Identify and examine the suitable methods to execute surveying work.

Course Contents:

Module I

Triangulation - principle - reconnaissance - selection of site for base line - selection of stations - orders of triangulation - triangulation figures - scaffolds and signals - marking of stations - intervisibility and heights of stations - satellite stations - base line measurement - equipment and corrections - adjustment of observations.

Module II

Survey adjustments and theory of errors – introduction – laws of accidental errors –probability curve – principle of least squares – laws of weights – probable error – normal equation – most probable value – method of correlates – angle adjustment – station adjustment – figure adjustment – adjustment of triangles – adjustment of a geodetic quadrilateral.

Module III

Curves - types of curves - elements of a curve - simple curves - different methods of setting out – introduction to compound curves - reverse curves, transition curves, vertical curves -hydrographic survey - scope - shoreline survey - river survey - soundings – sounding equipment - methods - ranges - locating sounding - plotting - three point problem.

Module IV

Electromagnetic distance measurement (EDM) – Principle – Types – Total station -Photogrammetry – terrestrial and aerial photogrammetry – heights and distances from Photographs – flight planning – elements of stereoscopy – photo mosaic – photo interpretation – applications of photogrammetry. GNSS – GPS – differential GPS.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Texts & References:

References

1. Duggal, S.K. Surveying Vol. I and II, Tata McGraw Hill, 2004.
2. Punmia, B.C. Surveying Vol.I and II, Standard Publishers, 1994.
3. Arora, K. R. Surveying Vol. I and II, Standard Book House, 1996.

4. Satheesh Gopi. Advanced Surveying, Pearson Education, 2007.
5. Satheesh Gopi. The Global Positioning System and Surveying using GPS, Tata McGraw, 2005.

TRANSPORTATION ENGINEERING – I

Course Code: **BCE 404** **Credit Units: 03**

Course objectives:

- To understand the importance of transportation and characteristics of road transport.
- To know about the history of highway development, surveys and classification of roads.
- To study about the geometric design of highways & traffic characteristics and design of intersections
- To know about the pavement materials and design

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Identify and describe the basic modules of transportation system, their role, importance and characteristics.
2. Analyse and critically evaluate traffic surveys to collect road traffic data.
3. Identify and examine traffic related problems and propose long term solutions for it.
4. Understand the dynamic interaction of the driver, roadway, and vehicle.
5. Design transport system components, in particular geometric design of roads and intersections.

Course Content:

Module I: Highway Classification,

Introduction – Transportation Modes and their comparison, Importance of Highway Transportation, Highway development in India, Classification of roads, Road Patterns, Cross sections of roads in urban and rural area. Scope of highway and traffic engineering.

Module II: Alignment and Geometrical Design

Requirements and factors controlling alignment of roads, Engineering surveys for highway location, Pavement surface characteristics, Camber and width requirements, Sight distances, stopping and overtaking sight distances, overtaking zone requirements. **Design of horizontal alignment** - speed, radius, superelevation, methods of providing super elevation, extra widening of pavements, transition curves. **Design of vertical alignment** - gradient, grade compensation, summit curves and valley curves.

Module III: Traffic engineering

Introduction, Road user, vehicle and traffic characteristics, Speed and volume studies; Intersections – Types; Traffic signs and markings – Objective, classification and uses.

Module IV: Pavement Materials and Design

Desirable properties and testing of highway materials: subgrade soil, road aggregates, bituminous materials and Tar, fly-ash.

Design of Flexible pavements - CBR method and IRC guidelines

Design of Rigid pavements using IRC charts - worked out problems.

Module V: Pavement Construction and Maintenance

Historical development of road construction -Construction of earth roads, WBM roads, stabilized roads, bituminous pavements, cement concrete roads and joints in cement concrete roads - Types and causes of failures in flexible & rigid pavements.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Papacostas, C.S., Transportation Engineering and Planning, 3 rd ed., Pearson Education, New Delhi (2008)
- Khanna, S.K and Justo, C.E.G., Highway Engineering, Nem Chand and Bros.
- Kadiyali, L.R, Traffic Engineering and Transport Planning, Khanna Publishers, New Delhi
- Kadiyali, Principles of Highway Engineering, Khanna Publishers.

STRUCTURAL STEEL-I

Course Code: **BCE 405** **Credit Units: 03**

Course Objective:
After completion of the course on Structural Steel-I the student will be familiar with the behavior and design of steel structural elements and their connections in accordance with the latest code of practice IS 800-2007.

Objectives of the Course coverage would be:

- To learn IS 800-2007 code of practice for the design of Compression, Tension and Flexural members using various cross-sections
- To study the behaviour and design of compression and tension members using simple and built-up sections
- To understand behaviour of flexural members and the design laterally restrained and unrestrained beams
- To study the components of truss, loads on trusses, analysis and design of purlins and truss members
- To study the design of bolted and welded connections and arranging field visit to industries

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Investigate the strength and design capacity of various steel elements in structures.
2. Create his own judgement regarding analysis method required for specific type of problem.
3. Apply these methods to the real life structures
4. Develop his interest in design of steel structures field.

Module: I
Introduction to steel structures and IS 800: 2007- Working Stress Method and Limit State Method of Design-Loads Material specifications - Rolled sections – Section classifications - Permissible stresses in tension, compression, bending and shear. Compression members - Slenderness ratios and Structural Steel member properties.

Module: II Riveted and Welded Connections:
Design of Riveted Connections-Patterns of Riveted Connections-Failure of Riveted joint- Strength of Riveted joint-Tensile Strength of the Plate- Design of Riveted Joint-Efficiency of the joint. Riveted Joints subjected to moments.
Simple Welded Connections- Strength of Welded Joint-Design of Simple Welded Connections.

Module: III
Design of Tension Members- Compression Members:
Types of Tension Members-Strength of Tension Member- Design of Tension Member subjected to Axial Load.
Compression Members-types of Sections- Buckling of Compression Member- Design Strength- Design of Axially Loaded Compression Members- Built up Columns- Lacing and Battens.

Module: IV
Design of Roof Trusses- Purlins- Truss Members- Design of Beams-Built up Beams- Beam bearing Plates.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

1. Bhavikatti SS, Design of Steel Structures, 2nd Edition. I.K. International Pub. House Pvt. Ltd. February-2010.
2. Duggal SK, Design of Steel Structures, Tata McGraw Hill Publication, 2008.

3. Design of Steel Structures –LS Negi, Tata McGraw Hill Publication, 2008.
4. Subramanian N, Design of Steel Structures, Oxford University Press, New Delhi 2008.
5. IS 800 - 2007, Code of Practice for General Construction in Steel, Bureau of Indian Standards, 2007.

Fluid Mechanics and Hydraulic Machines

Course Code: BCE 406 **Credit Units: 02**

Course objectives:

- To classify the types of flows in open channel and also to design open channel sections in a most economical fashion with minimum wetted perimeter and learn about critical flows
- To study about non uniform flows in open channel and longitudinal slopes in open channel and also to learn about the characteristics of hydraulic jump
- To develop an understanding of fluid flow patterns and learns to use boundary layer theory and drag
- To provide insights to the open channel hydraulics and introduce dimensional analysis for fluid flow problems
- To study in detail about boundary layers theory

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

CO1 Able to explain the effect of fluid properties on a flow system.

CO2 . Able to identify type of fluid flow patterns and describe continuity equation

CO3 the effect of impact of jet on various vanes and to study the working of hydro electric power station

CO4 To select and analyse an appropriate turbine with reference to given situation in power plants

CO5 To estimate performance parameters of a given Centrifugal and Reciprocating pump.

Module-I

Ideal fluid flow- Uniform flow- source - sink- doublet - combination of flow patterns - uniform flow and source-flow around cylinder - flow with circulation - lift. Boundary layer - displacement and momentum thickness - development of flow in circular pipes - Von Karman momentum equation.

Module-II

Laminar and turbulent boundary layers on flat plates - Drag in flat plates, cylinders and spheres - Drag coefficients - Boundary layer control.

Module-III

Open Channel Flow - Classification - Terminology - velocity distribution in open channels - Chezy, Manning and other formulae - Best hydraulic section - specific energy - specific force - hydraulic jump and its characteristics - Gradually varied flow –Rapid varied flow- computation of surface profiles.

Module-IV

Velocity measurement with Pitot tube, Prandtl Pitot tube and current meter - discharge measurement in pipe flow - venturimeter, mouthpiece, orificemeter, nozzlemeter, bendmeter and rotameter - Discharge measurement in open channel flow - All types of notches and weirs, venturiflume - critical depth meter - basic principles.

Module-V

Introduction to CFD- Dimensional homogeneity - dimensional analysis - Rayleigh`s method - Buckingham Pi theorem - applications - significance

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

1. Streeter, V.L. Fluid Mechanics, Tata McGraw Hill, 1998.
2. Chow, V.T. Open Channel Hydraulics, Tata McGraw Hill, 1975.
3. Nagaratnam, S. Fluid Mechanics, Khanna Publishers, 1989.
4. Fluid Mechanics and Hydraulic Machines Modi and Seth

Numerical Analysis & Programming Lab - I

Course Code: **BCE 421** **Credit Units: 01**

Course Contents:

Assignments will be provided for the following:

- Analysis of various numerical and statistical techniques

Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

SURVEYING PRACTICAL - II

Course Code: **BCE 423** **Credit Units: 01**

Course Contents:

List of Exercises:

1. Determination of tacheometric constants.
2. Heights and distances by stadia tacheometry.
3. Heights and distances by tangential tacheometry.
4. Heights and distances by solution of triangles.
5. Setting out of simple curves – linear methods.
6. Setting out of simple curves – angular method.
7. Setting out of transition curve.
8. Permanent adjustments of theodolite.
9. Heights and distances by using subtense bar.
10. Study of modern instruments – Automatic levels and Total station.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

HIGHWAY MATERIAL TESTING LAB

Course Code: **BCE 424** **Credit Units: 01**

Course Contents:

List of Exercises:

1. Tests on aggregate for concrete
   (a) Grain size distribution
   (b) Specific gravity
   (c) Density
   (d) Voids
   (e) Bulking
   (f) Aggregate crushing value
   (g) Aggregate impact value
   (h) Flakiness Test
   (i) Elongation Test

2. Tests on cement
   (a) Fineness
   (b) Normal consistency
   (c) Setting time
   (d) Compressive strength

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

Fluid Mechanics and Hydraulic Machines Lab

Course Code: BCE 426 **Credit Units: 01**

Name of Experiments

1. To conduct a test on Centrifugal Pump and plot its characteristics.
2. To Plot the characteristics of Pelton turbine.
3. To conducts an experiment on Francis turbine.
4. To study the effect of a draft tube on reaction turbines.
5. To find the friction factor for flow through pipes.
6. To study the hydraulic controls rig.
7. To conduct an experiment for verifying model laws.
8. To study the cavitations phenomenon in turbines.
9. Study of hydraulic couplings and torque converters.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

COMPUTER AIDED ANALYSIS AND DESIGN IN CIVIL ENGINEERING (Domain Elective)

Course Code: BCE 408 **Credit Units: 02**

Course Objective:

The main objective of this programme is to train the student in the use of computers and creating a computer code as well as using commercially available software for the design of Civil Engineering structures.

Course Learning Outcome

On completion of this course, the students will be able to

A. Understand the details of STAAD.Pro software package.
B. To prepare input data of STAAD.Pro.
C. Run STAAD.Pro for analysis and desing of structures.
D. Design different components of structures.

Course Contents:

Module I: Introduction
Fundamentals of CAD - Hardware and software requirements -Design process – Applications and benefits.

Module II: Computer Graphics
Graphic primitives - Transformations -Wire frame modeling and solid modeling –Graphic standards –Drafting packages

Module III: Structural Analysis
Fundamentals of finite element analysis - Principles of structural analysis -Analysis packages and applications.

Module IV: Design & Optimisation
Principles of design of steel and RC Structures -Applications to simple design problems – Optimisation techniques - Algorithms - Linear Programming – Simplex method

Module V: Expert Systems
Introduction to artificial intelligence - Knowledge based expert systems -Rules and decision tables – Inference mechanisms - Simple applications.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

Groover M.P. and Zimmers E.W. Jr., “CAD/CAM, Computer Aided Design and Manufacturing”, Prentice Hall of India Ltd, New Delhi, 1993.
Krishnamoorthy C.S. Rajeev S., “Computer Aided Design”, Narosa Publishing House, New Delhi, 1993
Harrison H.B., “Structural Analysis and Design”, Part I and II Pergamon Press, Oxford, 1990.
Rao S.S., “Optimisation Theory and Applications”, Wiley Eastern Limited, New Delhi, 1977.
Richard Forsyth (Ed), “Expert System Principles and Case Studies”, Chapman and Hall, London, 1989.

COMMUNICATION SKILLS - II

Course Code: **BCS 401** **Credit Units: 01**

Course Objective:

To teach the participants strategies for improving academic reading and writing.
Emphasis is placed on increasing fluency, deepening vocabulary, and refining academic language proficiency.

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Identify steps to professional communication
CLO 2	Identify the key components of meeting, agendas and meeting minutes
CLO 3	Understand the key skills and behaviors required to facilitate a group discussion/presentation
CLO 4	Polish current affairs & rapport building

Course Contents:

Module I: Social Communication Skills
Small Talk
Conversational English
Appropriateness
Building rapport

Module II: Context Based Speaking
In general situations
In specific professional situations
Discussion and associated vocabulary
Simulations/Role Play

Module III: Professional Skills
Presentations
Negotiations
Meetings
Telephony Skills

Examination Scheme:

Components	**CT1**	**CT2**	**CAF**	**V**	**GD**	**GP**	**A**
Weightage (%)	20	20	25	10	10	10	5

CAF – Communication Assessment File
GD – Group Discussion
GP – Group Presentation

Text & References:

- Essential Telephoning in English, Garside/Garside, Cambridge
- Working in English, Jones, Cambridge
- Business Communication, Raman – Prakash, Oxford
- Speaking Personally, Porter-Ladousse, Cambridge
- Speaking Effectively, Jermy Comfort, et.al, Cambridge
- Business Communication, Raman – Prakash, Oxford

BEHAVIOURAL SCIENCE - IV
(RELATIONSHIP MANAGEMENT)

Course Code: BSS 404 **Credit Units: 01**

Course Objective:

To understand the basis of interpersonal relationship
To understand various communication style
To learn the strategies for effective interpersonal relationship

Course Learning Outcomes (CLOs)

At the successful completion of this course you (the student) would be able to:

1. Identify the basis of interpersonal relationship.
2. Describe the importance of interpersonal relationship and bridging individual differences.
3. Recognize the development and strategies for effective interpersonal relationship.

Explain and apply the theories of relationship concepts of impression management

Course Contents:

Module I: Understanding Relationships
Importance of relationships
Role and relationships
Maintaining healthy relationships

Module II: Bridging Individual Differences
Understanding individual differences
Bridging differences in Interpersonal Relationship – TA
Communication Styles

Module III: Interpersonal Relationship Development
Importance of Interpersonal Relationships
Interpersonal Relationships Skills
Types of Interpersonal Relationships

Module IV: Theories of Interpersonal Relationships
Theories: Social Exchange, Uncertainty Reduction Theory
Factors Affecting Interpersonal Relationships
Improving Interpersonal Relationships

Module V: Impression Management
Meaning & Components of Impression Management
Impression Management Techniques (Influencing Skills)
Impression Management Training-Self help and Formal approaches

Module VI: End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

- Vangelist L. Anita, Mark N. Knapp, Inter Personal Communication and Human Relationships: Third Edition, Allyn and Bacon
- Julia T. Wood. Interpersonal Communication everyday encounter
- Simons, Christine, Naylor, Belinda: Effective Communication for Managers, 1997 1st Edition Cassell
- Goddard, Ken: Informative Writing, 1995 1st Edition, Cassell

- Harvard Business School, Effective Communication: United States of America
- Foster John, Effective Writing Skills: Volume-7, First Edition 2000, Institute of Public Relations (IPR)
- Beebe, Beebe and Redmond; Interpersonal Communication, 1996; Allyn and Bacon Publishers.

FRENCH - IV

Course Code: FLF 401 **Credit Units: 02**

Course Objective:

To enable students:

- To develop strategies of comprehension of texts of different origin
- To present facts, projects, plans with precision

Course Learning Objective:

- Students will hone intermediate language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of intermediate level.
- Students will be able to communicate in small sentences in Simple Future and Past tenses .
- Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.

- To do the shopping
- To ask and express one's needs
- To present one's eating habits
- To understand a label
- To ask the price
- To order at the restaurant
- To organise a meeting
- To propose to someone to do an activity
- To understand the advertisement of a conference
- To understand the names of different stations
- To speak about ones schedule
- To express one's professional wish
- To formulate a project
- To read a notice board

Course Contents:

Module C: pp. 104 – 139: Unités 8, 9

Contenu lexical:

Unité 8: Découvrir le passé

1. parler du passé, des habitudes et des changements.
2. parler de la famille, raconter une suite d'événements/préciser leur date et leur durée.
3. connaître quelques moments de l'histoire

Unité 9: Entreprendre

1. faire un projet de la réalisation: (exprimer un besoin, préciser les étapes d'une réalisation)
2. parler d'une entreprise
3. parler du futur

Contenu grammatical:

1. Imparfait
2. Pronom « en »
3. Futur
4. Discours rapporté au présent
5. Passé récent
6. Présent progressif

EXAMINATION SCHEME

Total: 100 marks

Continuous Evaluation (Total 50 Marks)					End Sem Evaluation (Total 50 Marks)
Quiz	**Mid Term Test**	**Presentation**	**Viva Voce**	**Attendance**	**End-Term Exam**
10	**15**	**10**	**10**	**5**	**50**

Text & References:

- le livre à suivre: Campus: Tome 1

GERMAN - IV

Course Code: FLG 401 **Credit Units: 02**

Course Objective:

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.
To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany.
Introduction to Advanced Grammar Language and Professional Jargon

Course Learning Objective :

- Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of advance level.
- Students will be able to communicate with complex sentences.

After successful completion of this semester, students will be able to:

- Can make sentences in past present and future
- Talk about journey
- Express their assumption
- Plan and book the journey
- Express opposition(but) and alternative (or)

Course Contents:

Module I: Present perfect tense
Present perfect tense, usage and applicability
Usage of this tense to indicate near past
Universal applicability of this tense in German

Module II: Letter writing
To acquaint the students with the form of writing informal letters.

Module III: Interchanging prepositions
Usage of prepositions with both accusative and dative cases
Usage of verbs fixed with prepositions
Emphasizing on the action and position factor

Module IV: Past tense
Introduction to simple past tense
Learning the verb forms in past tense
Making a list of all verbs in the past tense and the participle forms

Module V: Reading a Fairy Tale
Comprehension and narration
- Rotkäppchen
- Froschprinzessin
- Die Fremdsprache

Module VI: Genitive case
Genitive case – Explain the concept of possession in genitive
Mentioning the structure of weak nouns

Module VII: Genitive prepositions
Discuss the genitive propositions and their usage: (während, wegen, statt, trotz)

Module VIII: Picture Description
Firstly recognize the persons or things in the picture and identify the situation depicted in the picture;
Secondly answer questions of general meaning in context to the picture and also talk about the personal experiences which come to your mind upon seeing the picture.

EXAMINATION SCHEME

Total: 100 marks

Continuous Evaluation (Total 50 Marks)					End Sem Evaluation (Total 50 Marks)
Quiz	**Mid Term Test**	**Presentation**	**Viva Voce**	**Attendance**	**End-Term Exam**
10	**15**	**10**	**10**	**5**	**50**

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

SPANISH - IV

Course Code: FLS 401 **Credit Units: 02**

Course Objective:

To enable students acquire working knowledge of the language; to give them vocabulary, grammar, voice modulations/intonations to handle everyday Spanish situations with ease.

Course Learning objective:

- Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of advance level.
- Students will be able to communicate with complex sentences
- To be able to write formal and informal, business letters/ E-mails
- Translating basic technical texts from Spanish to English
- Essay writing on different issues.
- Spanish for specific purposes

Course Contents:

Module I
Revision of earlier semester modules
Introduction to Present Continuous Tense (Gerunds)

Module II
Translation with Present Continuous Tense
Introduction to Gustar, Parecer, Apetecer, doler

Module III
Imperatives (positive and negative commands of regular verbs)

Module IV
Commercial/business vocabulary

Module V
Simple conversation with help of texts and vocabulary
En la recepcion del hotel
En el restaurante
En la agencia de viajes
En la tienda/supermercado

EXAMINATION SCHEME

Total: 100 marks

Continuous Evaluation (Total 50 Marks)					End Sem Evaluation (Total 50 Marks)
Quiz	**Mid Term Test**	**Presentation**	**Viva Voce**	**Attendance**	**End-Term Exam**
10	**15**	**10**	**10**	**5**	**50**

Text & References:

- Español Sin Fronteras (Nivel – Elemental)

CHINESE – IV

Course Code: FLC 401 **Credit Units: 02**

Course Objective:

How many characters are there? The early Qing dynasty dictionary included nearly 50,000 characters the vast majority of which were rare accumulated characters over the centuries. An educate person in China can probably recognize around 6000 characters. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Learning Objectives:

- Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of advance level.
- Students will be able to communicate with complex sentences.

On the completion of third semester the students will be able to:

5. Communicate in Chinese at workplace.
6. Attend meeting and talk on telephone using Chinese language.
7. Understand official work and send emails in Chinese.
8. Communicate in Chinese while attending job interview and joining new post.

Course Contents:

Module I
Dialogue Practice
Observe picture and answer the question
Pronunciation and intonation
Character writing and stroke order.
Electronic items

Module II
Traveling – The Scenery is very beautiful
Weather and climate
Grammar question with – "bu shi …. Ma?"
The construction "yao … le" (Used to indicate that an action is going to take place)
Time words "yiqian", "yiwai" (Before and after).
The adverb "geng".

Module III
Going to a friend house for a visit meeting his family and talking about their customs.
Fallen sick and going to the Doctor, the doctor examines, takes temperature and writes prescription.
Aspect particle "guo" shows that an action has happened some time in the past.
Progressive aspect of an actin "zhengzai" Also the use if "zhe" with it.
To welcome someone and to see off someone …. I cant go the airport to see you off… etc.

Module IV
Shipment. Is this the place to checking luggage?
Basic dialogue on – Where do u work?
Basic dialogue on – This is my address
Basic dialogue on – I understand Chinese
Basic dialogue on – What job do u do?
Basic dialogue on – What time is it now?

Module V
Basic dialogue on – What day (date) is it today?
Basic dialogue on – What is the weather like here.
Basic dialogue on – Do u like Chinese food?
Basic dialogue on – I am planning to go to China.

EXAMINATION SCHEME

Total: 100 marks

Continuous Evaluation (Total 50 Marks)					End Sem Evaluation (Total 50 Marks)
Quiz	**Mid Term Test**	**Presentation**	**Viva Voce**	**Attendance**	**End-Term Exam**
10	**15**	**10**	**10**	**5**	**50**

Text & References:

- "Elementary Chinese Reader, Part-2" Lesson 31-38

FIFTH SEMESTER

STRUCTURAL ANALYSIS - II

Course Code: BCE 501 **Credit Units: 03**

Course Objective:
The course builds upon the earlier course of Structural Analysis I and deals with more advanced methods.

Course learning outcomes (CLO)

CO1 Analyze one dimensional and two dimensional structures using advanced methods of structural analysis
CO2 Analyze the effect of rolling loads on bridges & girders
CO3 Analyze structures up to three degrees of indeterminacy
CO4 Analyze cables and suspension bridges
CO5 Understanding the methods for influence line diagrams of various structures

Course Contents:

Module I: Force method of analysis of indeterminate structures Analysis of rigid frames of different geometry by consistent deformation method – settlement effects - analysis of pin-jointed trusses by consistent deformation method - externally and internally redundant trusses - effects of settlement and pr-restrains.

Module II: Displacement method of analysis of indeterminate structures Slope deflection method - analysis of continuous beams - beams with overhang - analysis of rigid frames - frames with sloping legs - gabled frames - frames without sway and with sway - settlement effects - moment distribution method as successive approximation of slope deflection equations - analysis of beams and frames - non-sway and sway analyses - Kani's method as iterative method of analysis of frames (outline only)

Module III: Moving Loads & Influence Lines
Introduction to moving loads - concept of influence lines - influence lines for reaction, shear force and bending moment in simply supported beams - influence lines for forces in trusses – analysis for different types of moving loads - single concentrated load - several concentrated loads - uniformly distributed load shorter and longer than the span.

Module IV: Cables, suspension bridges and arches
Analysis of forces in cables - suspension bridges with three-hinged and two-hinged stiffening girders - theory of arches - Eddy's theorem - analysis of three-hinged and two-hinged arches - settlement and temperature effects.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Wang C.K., Statically Indeterminate Structures, McGraw Hill, New York, 1983.
- Wilbur J.B. & Norris C.H., Elementary Structural Analysis, McGraw Hill, 1960.
- Wang C.K., Intermediate Structural Analysis, McGraw Hill, 1983.
- Timoshenko S.P. & Young D.H., Theory of Structures, McGraw Hill, 1965.
- Kinney S.J., Indeterminate Structural Analysis, Oxford & IBH, 1985.
- Matheson J.A.L., Hyperstatic Structures, John Wiley and Sons, 1996.
- Reddy C.S., Basic Structural Analysis, Tata McGraw Hill
- Negi L.S. & Jangid R.S, Structural Analysis, Tata McGraw Hill
- Rajasekaran S. & Sankarasubramanian G., Computational Structural Mechanics, PHI

STRUCTURAL CONCRETE DESIGN-I (LSM)

Course Code: **BCE 502** **Credit Units: 04**

Course objectives:

- To study the stress strain behavior of steel and concrete
- To understand the concept of limit state method
- To gain the knowledge of limit state design for flexure, shear, torsion, bond and anchorage
- To understand the behavior of columns subjected to eccentric load and use of interaction diagrams and also to study the design of footings

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:
CO1 Understand the properties and role of various constituent materials used in concrete making.
CO2. Understand the properties of concrete and various design mix techniques for concrete
CO3 Apply the fundamental concepts, techniques in analysis and design of reinforced concrete elements i.e. beam & slab
CO4 Apply the various codal requirements related to RC members i.e. slab & beam

Course Contents:

Module I: Introduction to limit state method of design
Review of partial safety factors. Limit state of collapse. Limit state of serviceability.

Limit State of Collapse: Flexure. Limit state of collapse for flexure as per IS. Assumptions. Stress Block Parameters. Moment capacity of rectangular and flanged sections. Singly and doubly reinforced sections. Design tables and charts.
Design of structural sections in bending Singly Reinforced Beam, Doubly Reinforced Beams,T-Beams, L-Beams One Way Slabs, Two way Slabs.

Module II: Shear and Torsion
Limit State of Collapse: Shear. Nominal shear stress. Design shear strength of concrete. Design of shear reinforcement. Use of SP16 for shear design. Critical sections for shear in important structural elements such as slabs, beams, footings etc. Design project for the design and detailing the beams of a framed system.
Limit State of Collapse: Torsion. General. Critical section. Shear and torsion. Equivalent . Reinforcement for torsion. Equivalent longitudinal moment.

Module III: Compression
Limit State of Collapse: Compression. Analysis and design of columns of rectangular and circular cross sections. Axially loaded columns Columns with uni-axial and biaxial eccentricity using SP 16 design charts. Short and slender columns. Design project for the design and detailing the columns of a framed system and isolated and combined footings.
Design of Footing: Design of Rectangular-Square Isolated footings and Design of combined footings

Module IV: Limit State of Serviceability
Deflection. Short term deflection. Long term deflection. Cracking. Control of cracking. Estimation of width of cracks.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Pillai S.U. & Menon D., Reinforced Concrete Design Tata McGraw Hill, 2003
- Design of Reinforced Concrete Structures N.Subramanian Oxford University Press

- Varghese P.C., Limit State Design of Reinforced Concrete, Prentice Hall of India, 2003
- Jain A.K., Reinforced Concrete - Limit State Design, Standard Book House, 1998
- Punmia B.C., Reinforced Concrete Structures Vol. I, Standard Book House,2005
- Jain & Jaikrishna, Plain & Reinforced Concrete Vol. I, Nemchand, 2000
- Sinha S.N., Reinforced Concrete Design, Tata McGraw Hill, 2005
- BIS codes (IS 456, SP 16, SP 24, SP 34)

GEOTECHNICAL ENGINEERING - I

Course Code: **BCE 503** **Credit Units: 03**

Course Objective:
Soil mechanics and related topics are important areas in Civil Engineering and the first part of Geotechnical Engineering deals with soils and their characteristics. Objectives of the course are:

- To explain what Geotechnical Engineering is and how it is important to civil engineering
- To explain how three phase system is used in soil and how are soil properties estimated using three phase system
- To explain role of water in soil behavior and how soil stresses, permeability and quantity of seepage including flow net are estimated. To determine the compaction characteristics of soil.
- To determine shear parameters and stress changes in soil due to foundation loads
- To estimate the magnitude and time-rate of settlement due to consolidation

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

5. To understand the soil formation (i.e. Science) and determination of its physical and engineering properties using mathematical and engineering knowledge.Establishing the points on ground which are predetermined on paper.
6. To identify problems involving complex soil behavior and understanding the complex phenomenon using basic principles of mathematics, natural sciences and engineering sciences.
7. Figure out solution of soil related problems faced by the engineering society using both theoretical knowledge and soil testing.
8. Use existing knowledge/experimental setup for understanding the complex mechanisms within the soil.
9. Develop an understanding regarding responsibilities of professional engineers at the site and dealing with expected legal and cultural issues at the site.

Course contents:

Module I: Nature of soil and functional relationships
Soil type -Concepts of single grained, honey combed and flocculent structure and their effects on the basic soil properties - 3 phase system - void ratio - specific gravity - dry density - porosity - water content - saturated unit weight - submerged unit weight - degree of saturation. Laboratory and field identification of soils: Determination of water content by oven drying -Specific gravity using pycnometer and specific gravity bottle - Grain size analysis by sieve analysis, hydrometer analysis and pipette analysis - Atterberg limits and indices – Visual identification by simple field tests - Field density by core cutter, sand replacement and wax coating methods. Classification of soils: Necessity -Principles of classification - I.S. classification – Plasticity charts - Group index.

Module II: Soil Water, Permeability and Stress Distribution
Soil water: Types - Effective stress - Total stress - Pore pressure - Pressure diagrams. Permeability: Definition - Darcy's law - Factors affecting permeability – Laboratory determination - Stratified soils: average permeability. Stress distribution: Boussinesq's equations for vertical pressure due to point loads- Assumptions and limitations - pressure bulb – Influence diagram - Vertical pressure due to uniformly distributed loads, line loads and strip loads - Newmark charts and their use - Westergaard's solution.

Module III: Consolidation and Compaction
Consolidation: Definition - Concepts of coefficient of compressibility - Coefficient of volume change and compression index - e-log p curves - Terzaghi's theory of one dimensional consolidation – Determination of coefficient of consolidation- pre-consolidation pressure, Difference between consolidation and compaction. Compaction: Definition and objectives of compaction - Proctor test and modified proctor test - Concept of OMC and maximum dry density - Zero air voids line -Factors influencing compaction.- Effect of compaction on soil properties - Field compaction methods - Proctor needle for field control.

Module IV: Shear Strength and Stability of Slopes
Shear Strength: Definition - Mohr's strength and stress circles - origin of planes - Mohr's envelope - Mohr-Coulomb strength theory -Direct, tri axial and UCC tests - Drainage conditions - Measurement of pore pressure - Vane shear tests -Total and effective stress -strength parameters – Stress path, Liquefaction of sand - Choice of test conditions for field problems. Stability of slopes: Slope failure, base failure and toe failure - Swedish circle method - $\varphi=0$ analysis and $c=0$ analysis - Friction circle method - Taylor's stability number -Stability charts - Sliding block analysis.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Gopal Ranjan and Rao, P. Basic and Applied Soil Mechanics, New Age International Pvt. Limited, New Delhi, 2002
- Alam Singh, Soil Engineering-Theory and Practice, Asia Pub, 1967.
- Punmia B.C., Soil Mechanics and Foundations, Saurabh,1992.
- Murthy V.N.S., Soil Mechanics and Foundation Engineering, Dhanpat Rai, 1984
- Khan I.H., Text Book of Geotechnical Engineering, Prentice Hall of India

TRANSPORTATION ENGINEERING - II

Course Code: BCE 504 **Credit Units: 03**

Course Objective:
- To know about the basics and design of various components of railway engineering
- To study about the types and functions of track, junctions and railway stations
- To learn about the aircraft characteristics, planning and components of airport
- To study about the types and components of docks and harbours

Course Learning Outcomes:

- To impart knowledge of various components of railway engineering in a broader context.
- To study about the types and functions of track, junctions and railway stations
- To learn about the aircraft characteristics, planning and components of airport
- To study about the types and components of docks and harbours

Course Contents:

Module I: Components & Geometric Design of Railways

Introduction, Typical cross-sections. Various gauges. Coning of wheels and tilting of rails. Functions and requirements of component parts of a railway track. Creep of rails. Geometrical design of railway track. Horizontal curves, radius, superelevation, cant deficiency, transition curves, safe speed on curves, different types of gradients, grade compensation.

Module II: Railway Operation and Control

Points and crossings and their design. Track junctions and simple track layouts. Details of different types of stations and yards. Signaling and interlocking. Control of train movements. Absolute block. Automatic block system and CTC system.

Railway Construction and Maintenance: Construction of railway track: earthwork, plate laying and packing. Maintenance of track-alignment, gauge, renewal of component parts and drainage, modern methods of track maintenance.

Module III: Airport planning and Design

Introduction, Aircraft characteristics and their influence on planning of airports. Airport obstructions and zoning. Component parts of airport and site selection. Runway design: Orientation, basic runway length, corrections and geometric. Design of taxiways and aprons - Terminal area planning. Facilities in terminal area and their planning concepts, Aircraft parking configurations. Airport drainage system. Surface and sub-surface drainage systems and their design.

Module IV: Harbour Engineering:

Docks and Harbours: Role of water transportation, Basic consideration- Ocean Winds, Waves, Tides, Wharf, Pier, Harbour, Port, Layout of Harbour, Port entrance, Construction and operation of Lock gates,

Dock: Wet, dry and floating docks, Break water-different types, dredging,

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Agarwal M.M., Railway Engineering, Prabha and Co
- Khanna S.K & Arora M.G., Airport Planning and Design, Nemchand & Bros.
- Horonjeff R., Planning and Design of Airports, Mc Graw Hill
- Oza and Oza, Elements of Dock and Harbour Engineering, Charotar Publishing House, 1996.
- Airport Engineering, Rangwala, Charotar Publishing House, Anand
- Harbour, Dock and Tunnel Engineering. Srinivasan, R Charotar Publishing House, Anand.

IRRIGATION STRUCTURES AND WATER RESOURCES ENGINEERING

Course Code: BCE 505 **Credit Units: 03**

Course Objective:

This course deals with various concepts of water resources engineering. The course introduces the concept of hydrology, ground water and then deals with irrigation engineering. It also deals with design of dam.

Course Learning Outcomes:

CO1 Plan an Irrigation System
CO2 Design irrigation canals and canal network
CO3 Plan and design diversion head works
CO4 Design irrigation canal structures
CO5 Analyze gravity and earth dams

Course Contents:

Module I: Necessity of irrigation
Necessity of irrigation and type of irrigation systems.-Total planning concept-Water requirements of crops-Command area-duty-delta. Consumptive use of water –Irrigation efficiency-Irrigation requirement of crops-Reservoir planning-Site investigation-Zones of storage-Reservoir yield-Reservoir losses and Control-Life of reservoir

Module II: Diversion head works, Dams, Spillways and Wells
Diversion head works-Location – Essential components of Weir and Barrage-Weirs on permeable foundations-Blighs and khoslas seepage theories - Design procedure.
Dams - Types of dams and their selection-Gravity dam-Analysis and design. Elementary concepts of masonry, concrete, earthen, butteress and arch dams.
Spillways-Different types and suitability.
Wells-construction and maintenance of wells.

Module III: Rivers and Reservoirs
Rivers – types – characteristics – Indian rivers and their classification – Straight reaches – Bends – Meanders – Cutoff Control.
Reservoirs – Definition – Types – Storage capacity of reservoir – Storage zones – Determining reservoir capacity for a given yield – Determining yield from a reservoir of a given capacity – Reservoir Losses – Reservoir sedimentation – Silt control.

Module IV: Distribution works
Distribution works - Classification of canals, Canal alignment, Considerations for fixing longitudinal slope, Typical canal cross sections in embankment and filling, Cross sections of irrigation canals as per BIS codes, Maintenance of canals, Canals in alluvial soils – Regime Theory - Kennedy's and Lacey's Theories, Silting in canals, Scour and protection against scour. Canal lining - losses in irrigation canals, Advantages and disadvantages of lining, Types of lining. Water logging- Causes & preventive measures. Drainage – Open and Closed Drains.

Module V: Components of a distribution system
Components of a distribution system (no detailed design) - Head and Cross Regulator, Canal Falls, Canal Outlets, Cross Drainage Works, Canal Escapes- Surplussing arrangements in minor irrigation tanks.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Irrigation Engg. and Hydraulic Structures by S.K. Garg, Khanna Publishers.
- Irrigation, Water Resources, and Water power Engineering By Dr P.N.Modi, Standard Book House 1990
- Engineering Hydrology by K. Subramanya, TMH.

WEB DEVELOPMENT

Course Code: BCS 510 **Credit Units: 02**

Course Objective:

To design web base and context aware systems to acquire, organize process, share and use the knowledge of web sites**.** The field of web site is multidisciplinary as web sites are amazingly complex systems**.** The major objective of this course is to provide a sound foundation to the students on the concepts, percepts and practices in a field that is of immense concern to the industry and business**.**

Course Contents:

Module I: Overview of Internet

Introduction to Internet and WWW, Concept of Networking and Layers of OSI Model, Internet protocols like TCP/IP, http, telnet and ftp, URL, email, domain name, Web Browsers.

Module II: Principles of Web Design

Key issues to be considered in web site design. Structure of a Web Page: Introduction to HTML, Elements of HTML syntax, Head and Body sections, Building HTML documents, Inserting text, images, hyperlinks, Backgrounds and Color Control, HTML Editors & Tools: Use of different HTML editors and tools like Netscape Communicator and Microsoft Front Page etc

Module III: HTML Tags

Use of Different HTML tags in web pages. Table Handling: Table layout & presentation, constructing tables in a web page, developing a web page in a table. Ordered and unordered lists. Frames: Developing Web pages using frames. Advantages and disadvantages of frames. Creating forms, Role of Databases in web applications. Use of at least one graphical and animation tools like Adobe Fireworks, Abode Photoshop, Gif Animator, Gimp etc.

Module IV: Cascading style-sheet (CSS) in HTML

Introduction to Cascading Style Sheets (CSS), Types of Style Sheets (Inline, Internal and External), CSS for Website Layout and Print Layout.

Types of various CSS Selectors, CSS properties: Type Properties, Background Properties, Block Properties, Box Model Properties, List Properties, Border Properties, Positioning Propeties.

Module V: Introduction to Java Script

Role of java script in a web page, Script writing basics, Adding interactivity to a web page, creating dynamic web pages,

Similarities to java, embedding JavaScript code, embedding java applets in a web page**,** Form validation using java script

Projects:

Creating a discussion form, creating an online store, creating a job site**.**

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

Text:

- Ramesh Bangia, “Web Technology”, Firewall media
- C. Xavier, “World Wide Web Design with HTML”, Tata McGraw Hill.
- Unleashed ASP, Techmedia

References:

- Rick Dranell, “HTML4 unleashed”, Techmedia Publication.
- Shelly Powers, “Dynamic Web Publishing Unleashed”, Techmedia.
- Don Gosselin, “JavaScript”, Vikas Publication
- Mark Swank & Drew Kittel, “World Wide Web Database”, Sams net.

ARCHITECTURE AND TOWN PLANNING (Domain Elective)

Course Code: BCE 507 **Credit Units: 02**

Course Objective:

To provide the basic knowledge on the principles of design of buildings relating to the environment and climate.

Course Learning Outcomes:

1) To know the basic concept Architecture design

2) To assess the site planning and layout regulations/concepts

3) To assess various different type of buildings residential/ institutional/ commercial/ industrial

4) To find various environment friendly/ green building concepts

5) To know the concept of Urban planning and zoning regulations

6) To assess the conservation-principles of landscape designs

Course Contents:

Module I: Architectural Design
Architectural Design – an analysis – integration of function and aesthetics – Introduction to basic elements and principles of design.

Module II: Site Planning
Surveys – Site analysis – Development Control – Layout regulations- Layout design concepts.

Module III: Building Types
Residential, institutional, commercial and Industrial – Application of anthropometry and space standards-Inter relationships of functions – Safety standards – Building rules and regulations – Integration of building services – Interior design

Module IV: Climate and Environmental Responsive Design
Man and environment interaction- Factors that determine climate – Characteristics of climate types – Design for various climate types – Passive and active energy controls – Green building concept

Module V: Town Planning
Planning – Definition, concepts and processes- Urban planning standards and zoning regulations- Urban renewal – Conservation – Principles of Landscape design

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Francis D.K. Ching, “Architecture: Form, Space and Order”, VNR, N.Y., 1999.
- Givoni B., “Man Climate and Architecture”, Applied Science, Barking ESSEX, 1982
- Edward D.Mills, “Planning and Architects Handbook”, Butterworth London, 1995.
- Gallian B.Arthur and Simon Eisner, “The Urban Pattern – City Planning and Design”, Affiliated Press Pvt. Ltd., New Delhi, 1995.
- Margaret Robert, “An Introduction to Town Planning Techniques”, Hutchinso London, 1990.

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Analysis of Hydrologic Cycle, Water budget equation and water balance studies.
2. Computation of average rainfall and depth-area-duration relationship,
3. Calculation of infiltration, infiltration capacity values and infiltration indices. Methods of Evaporation estimation and Measurements of reservoir evaporation. Computation of Evapotranspiration
4. Development of flow duration curve and flow mass curve. Estimation of Direct Runoff and Direct Runoff hydrograph. Derivation of Unit Hydrograph

Course Learning Outcomes:

1) To know the basic concept Architecture design
2) Site planning and layout regulations/concepts
3) Different type of building residential/institutional/commercial/industrial
4) Environment friendly/ green building concepts
5) Concept of Urban planning and zoning regulations
6) Conservation-principles of landscape designs

Course Contents:

Module I: Hydrology

Introduction hydrologic cycle, water budget equations, Hydrometeorology, world water balance, application in engineering.

Module II: Precipitation, Evaporation and Infiltration

Precipitation – Types – Measurement – Raingauge density – Estimate of missing data – Optimum rain gauge network –DAD curves & intensity- duration- frequency relationships, probable maximum precipitation– Analysis of rainfall data. Evaporation –Transpiration – process, measurement and estimation; Evapotranspiration measurement and estimation; Initial Losses- Interception & Depression storage; Infiltration- process, capacities, indices, measurement & estimation, ϕ□ index, W index, Horton's model.

Module III: Runoff and Hydrographs

Hydrograph, runoff characteristics of stream, Catchment characteristics – Factors affecting runoff – Estimation of runoff –Rainfall- runoff modeling, Yield, Rainfall-runoff correlations, flow duration curve, mass curve, droughts and floods. Factors affecting flood hydrographs, unit hydrograph and its analysis, s-curve hydrograph, synthetic and instantaneous unit hydrographs.

Module IV: Flood

Rational method, empirical formulae, unit hydrograph method, flood frequency studies, statistical analysis, regional flood frequency analysis, design storm & design flood, risk/reliability and safety factor; Flood Routing: Basic equation, hydrologic storage routing & attenuation, hydrologic channel routing, flood forecasting & control, hydraulic method of flood routing.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- 'Hydrology for Engineers' by Linsley R. K., Kohler M. A. and Paulhus J. L. H.
- 'Engineering Hydrology' by K. Subramanya
- 'Hydrology: Principles. Analysis. Design' by Raghunath H. M.

- 'Handbook of Applied Hydrology' by Chow V. T.
- 'Irrigation: Theory & Practice' by Michael A. M.

WEB WEVELOPMENT LAB

Course Code: BCS 530 **Credit Units: 01**

Software Required: Java

List of Assignment:

1. Design a HTML page using all the basic tags.
2. Design a page containing your educational qualification in a table.
3. Design a page containing an ordered list/unordered list.
4. Design a HTML page for your resume.
5. Design a form in HTML to enter different attribute of student information.
6. Design a home page for ASE using Frame.
7. Design another page and connect these to the home page.
8. Write a function in Javascript for input validation.
9. Write a function in Javascript to calculate monthly installation of the loan.
10. Write an input form and save its data in a database using ASP.
11. Display the data stored in database in tabular form on the page.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note**:** IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva**.**

GEOTECHNICAL ENGINEERING LAB

Course Code: BCE 523 **Credit Units: 01**

Course Contents:

1. Specific gravity of coarse and fine grained soils.
2. Grain size analysis (a) Sieve analysis (b) Pipette analysis
3. Atterberg's limits and indices
4. Determination of field density (a) sand replacement method (b) core cutter method
5. Determination of coefficient of permeability by
   (a) Constant head method (b) Variable head method
6. Consolidation test
7. Compaction test (a) IS light compaction test (b) IS heavy compaction test
8. California Bearing Ratio test
9. Direct shear test
10. Triaxial shear test
11. Unconfined compressive strength test
12. Laboratory vane shear test

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

COMMUNICATION SKILLS - III

Course Code: **BCS 501** **Credit Units: 01**

Course Objective:

To equip the participant with linguistic skills required in the field of science and technology while guiding them to excel in their academic field.

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Create right selection of words and ideas while also choosing the appropriate channelof formalcommunication.
CLO 2	Demonstrate the ability to analyse a problem and devise a solution in a group.
CLO 3	Demonstrate proficiency in the use of written communication.
CLO 4	Recognize the mannerisms and methodology of Interview and GD to become more expressive in their body language and verbal performance.

Course Contents:

Module I
Reading Comprehension
Summarising
Paraphrasing

Module II
Essay Writing
Dialogue Report

Module III
Writing Emails
Brochure
Leaflets

Module IV: Introduction to Phonetics
Vowels
Consonants
Accent and Rhythm
Accent Neutralization
Spoken English and Listening Practice

Examination Scheme:

Components	CT1	CT2	CAF	V	GD	GP	A
Weightage (%)	20	20	25	10	10	10	5

CAF – Communication Assessment File
GD – Group Discussion
GP – Group Presentation

Text & References:

- Effective English for Engineering Students, B Cauveri, Macmillan India
- Creative English for Communication, Krishnaswamy N, Macmillan
- A Textbook of English Phonetics, Balasubramanian T, Macmillan

BEHAVIOURAL SCIENCE - V
(GROUP DYNAMICS AND TEAM BUILDING)

Course Code: BSS 504 **Credit Units: 01**

Course Objective:

To inculcate in the students an elementary level of understanding of group/team functions.
To develop team spirit and to know the importance of working in teams.

Course learning outcomes (CLOs)

At the successful completion of this course you (the student) should be able to:

1. Recognize their personality and individual differences and identify its importance of diversity at workplace and ways to enhance it.
2. Recognize effective socialization strategies and importance of patriotism and taking accountability of integrity.
3. Recognize different types of human rights and its importance.
4. Identify Indian values taught by different religions.

Course Contents:

Module I: Group formation
Definition and Characteristics
Importance of groups
Classification of groups
Stages of group formation
Benefits of group formation

Module II: Group Functions
External Conditions affecting group functioning: Authority, Structure, Org. Resources, Organizational policies etc.
Internal conditions affecting group functioning: Roles, Norms, Conformity, Status, Cohesiveness, Size, Inter group conflict.
Group Cohesiveness and Group Conflict
Adjustment in Groups

Module III: Teams
Meaning and nature of teams
External and internal factors effecting team
Building Effective Teams
Consensus Building
Collaboration

Module IV: Leadership
Meaning, Nature and Functions
Self leadership
Leadership styles in organization
Leadership in Teams

Module V: Power to empower: Individual and Teams
Meaning and Nature
Types of power
Relevance in organization and Society

Module VI: End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

- Organizational Behaviour, Davis, K.
- Hoover, Judhith D. Effective Small Group and Team Communication, 2002, Harcourt College Publishers.
- Dick, Mc Cann & Margerison, Charles: Team Management, 1992 Edition, viva books.
- Bates, A. P. and Julian, J.: Sociology - Understanding Social Behaviour.
- Dressers, David and Cans, Donald: The Study of Human Interaction.
- Lapiere, Richard. T – Social Change.
- Lindzey, G. and Borgatta, E: Sociometric Measurement in the Handbook of Social Psychology, Addison – Welsley, US.
- Rose, G.: Oxford Textbook of Public Health, Vol.4, 1985.
- LaFasto and Larson: When Teams Work Best, 2001, Response Books (Sage), New Delhi
- J William Pfeiffer (ed.) Theories and Models in Applied Behavioural Science, Vol 2, Group (1996); Pfeiffer & Company.
- Smither Robert D.; The Psychology of Work and Human Performance, 1994, Harper Collins College Publishers.

FRENCH - V

Course Code: FLF 501 **Credit Units: 02**

Course Objective:
To furnish some basic knowledge of French culture and civilization for understanding an authentic document and information relating to political and administrative life

Course Learning Objective:

· Students will hone intermediate language skills such as reading, writing, speaking, listening & interactive) in the language

· Students will be able to read and interpret small texts of intermediate level.

· Students will be able to communicate in small sentences in Simple Future and Past tenses .

· Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.

Course Contents:

Module D: pp. 131 – 156 Unités 10, 11

Contenu lexical:

Unité 10: Prendre des décisions

1. Faire des comparaisons
2. décrire un lieu, le temps, les gens, l'ambiance
3. rédiger une carte postale

Unité 11: faire face aux problèmes

1. Exposer un problème.
2. parler de la santé, de la maladie
3. interdire/demander/donner une autorisation
4. connaître la vie politique française

Contenu grammatical:

1. comparatif - comparer des qualités/ quantités/actions
2. supposition: Si + présent, futur
3. adverbe - caractériser une action
4. pronom "Y"

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- le livre à suivre: Campus: Tome 1

GERMAN - V

Course Code: FLG 501 **Credit Units: 02**

Course Objective:

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.
To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany
Introduction to Advanced Grammar and Business Language and Professional Jargon.

Course Learning Objective :

· Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language

· Students will be able to read and interpret small texts of advance level.

· Students will be able to communicate with complex sentences.

Course Contents:

Module I: Genitive case
Genitive case – Explain the concept of possession in genitive
Mentioning the structure of weak nouns

Module II: Genitive prepositions
Discuss the genitive propositions and their usage: (während, wegen, statt, trotz)

Module III: Reflexive verbs
Verbs with accusative case
Verbs with dative case
Difference in usage in the two cases

Module IV: Verbs with fixed prepositions
Verbs with accusative case
Verbs with dative case
Difference in the usage of the two cases

Module V: Texts
A poem 'Maxi'
A text Rocko

Module VI: Picture Description
Firstly recognize the persons or things in the picture and identify the situation depicted in the picture;
Secondly answer questions of general meaning in context to the picture and also talk about the personal experiences which come to your mind upon seeing the picture.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer

- P.L Aneja, Deutsch Interessant - 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

SPANISH - V

Course Code: FLS 501 **Credit Units: 02**

Course Objective:
To enable students acquire working knowledge of the language; to give them vocabulary, grammar, voice modulations/intonations to handle everyday Spanish situations with ease.

Course Learning objective:

· Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language

· Students will be able to read and interpret small texts of advance level.

· Students will be able to communicate with complex sentences

· To be able to write formal and informal, business letters/ E-mails

· Translating basic technical texts from Spanish to English

· Essay writing on different issues.

· Spanish for specific purposes

Course Contents:

Module I
Revision of earlier semester modules

Module II
Future Tense

Module III
Presentations in English on
Spanish speaking countries'
Culture
Sports
Food
People
Politics
Society
Geography

Module IV
Situations:
En el hospital
En la comisaria
En la estacion de autobus/tren
En el banco/cambio

Module V
General revision of Spanish language learnt so far.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español Sin Fronteras, Greenfield

CHINESE – V

Course Code: FLC 501 **Credit Units: 02**

Course Objective:

What English words come from Chinese? Some of the more common English words with Chinese roots areginseng, silk, dim sum, fengshui, typhoon, yin and yang, T'al chi, kung-fu. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Learning Objectives:

· Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language

· Students will be able to read and interpret small texts of advance level.

· Students will be able to communicate with complex sentences.

Course Contents:

Module I
Drills
Dialogue practice
Observe picture and answer the question.
Pronunciation and intonation.
Character writing and stroke order

Module II
Intonation
Chinese foods and tastes – tofu, chowmian, noodle, Beijing duck, rice, sweet, sour….etc. Learning to say phrases like – Chinese food, Western food, delicious, hot and spicy, sour, salty, tasteless, tender, nutritious, god for health, fish, shrimps, vegetables, cholesterol is not high, pizza, milk, vitamins, to be able to cook, to be used to, cook well, once a week, once a month, once a year, twice a week……
Repetition of the grammar and verbs taught in the previous module and making dialogues usingit.
Compliment of degree "de".

Module III
Grammar the complex sentence "suiran … danshi…."
Comparison – It is colder today than it was yesterday…..etc.
The Expression "chule….yiwai". (Besides)
Names of different animals.
Talking about Great Wall of China
Short stories

Module IV
Use of "huozhe" and "haishi"
Is he/she married?
Going for a film with a friend.
Having a meal at the restaurant and ordering a meal.

Module V
Shopping – Talking abut a thing you have bought, how much money you spent on it? How many kinds were there? What did you think of others?
Talking about a day in your life using compliment of degree "de". When you get up? When do you go for class? Do you sleep early or late? How is Chinese? Do you enjoy your life in the hostel?
Making up a dialogue by asking question on the year, month, day and the days of the week and answer them.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- “Elementary Chinese Reader ” Part-II Lesson 39-46

SIXTH SEMESTER

ENVIRONMENTAL ENGINERING - I

Course Code: BCE 601 **Credit Units: 03**

Course Objective:

Based on course Environmental studies, the water resources and their management for environmental suitability are studied in this course.

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Identify and describe the basic modules of drinking water system, its distribution and collection systems.
2. Analyse and critically evaluate basic quality issues associated with water and treatment process design characteristics.
3. Design and examine the operation of water distribution.
4. Understand the treatment options and principles of conventional treatment systems.
5. Design pipe system and its components, in particular meters, valves and hydrants in pipe networks.

Course Contents:

Module I: Scope of Environmental Engineering
Water Supply Engineering. Quantity of water. Design flow. Design periods. Design population. Types of water demand. Fluctuation in water demand. Factors affecting consumption. Forecasting population.

Module II: Sources of water
Surface water sources. Ground water Sources. Estimation of yield from various ground water sources. Quality of water. Drinking water standards – Water quality parameters- effects on human health- Methods of Physical, Chemical and Bacteriological analysis of water.

Module III: Treatment of water
Process details and design considerations. Aeration. Coagulation. Flocculation. Sedimentation. Filtration. Disinfection. Miscellaneous and advanced treatments. Iron and manganese removal. Fluoridation and defluoridation. Water Softening. Arsenic removal. Desalination. Membrane filtration.

Module IV: Water supply schemes
Gravitational, pumping and combined schemes. Pumps. Pumping stations. Transmission of water. Materials of water supply pipes. Design of gravity and pumping main. Distribution systems. Different layout of pipe networks.House connection from mains. Different valves, meters and hydrants. Storage reservoirs. Balancing reservoir. Detection and prevention of leaks in the distribution systems. Maintenance of distribution systems.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Garg S. K, Environmental Engineering, Vol. I, Khanna Publications, 2001, New Delhi.
- Birdie G.S & Birdie J.S, Water Supply and Sanitary Engineering, Dhanpat Rai & Sons, 1998, New Delhi.
- Duggal, K.N., Elements of Environmental Engineering, S Chand & Co. Ltd., 2000, New Delhi.

- Mark J. Hammer & Mark J. Hammer Jr., Water and Waste Water Technology, Prentice Hall of India Pvt. Ltd., 1998, New Delhi.
- Fair, Geyer & Okun, Water & Waste Water Engineering, John Wiley, 1966, New York.
- Ernest W. Steel & Terence J. Mc Ghee, Water Supply & Sewage, McGraw Hill, 1990, New York.
- Relevant BIS Codes.

Structural Concrete Design-II (SCD)

Course Code: BCE 602 **Credit Units: 03**

Course objectives:
To understand the design concept of various structures and detailing of reinforcements
To understand the design of underground and elevated water Tank structures
To study the design of material storage structures
To study the design of slab culvert and bridges subjected to IRC loading

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

CO1 Design various sub-structure components like isolated footing, combined footing, retaining walls, along with relevant IS code requirements.
CO2 . Design various sub and super-structure components like stairs, retaining wall, continuous beams, along with relevant IS code requirements.
CO3 Apply the concepts of structure design to special structural elements like curved beams, domes, water retaining structures, bridges along with relevant IS code requirements
CO4 Analyze and Design of slab culvert, box culvert and skew bridge

Course Content

Module: I
Foundations: Various types of RCC footings, Design of combined footings. Introduction to Raft foundations and design procedure.

Module:II
Retaining walls: Stability analysis of retaining walls, design of cantilever and counter-fort type RCC retaining walls

Module:III - Water retaining Structures:
Design underground and Elevated Water Tanks. Design of circular and rectangular water tanks with reference to IS:3370.

Module :IV
Material storage structures - Determination of lateral pressure on side walls of bunker - Rankine's theory - design of bunker - design of circular silo using Jansen's theory.

Module: V
Design Transportation structures - Bridges - Slab Culvert -bridge - Design of single span slab bridge - Tee beam bridge - Design of Tee beam bridge with stiffness - Tee beam bridge with cross girders

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Vazirani, V.N., and Ratwani, Concrete Structures, Vol. IV, Khanna Publishers, New Delhi, 1995.
- Dayaratnam, P., Design of Reinforced Concrete Structures, Oxford & IBH Publishers & Co., New Delhi, 2005.
- Victor, D.J., Essentials of Bridge Engineering, Oxford & IBH Publishers Co., Newdelhi, 1991.
- Pillai S.U. & Menon D., Reinforced Concrete Design Tata McGraw Hill, 2003
- Varghese P.C., Limit State Design of Reinforced Concrete, Prentice Hall of India, 2003
- Jain A.K., Reinforced Concrete - Limit State Design, Standard Book House, 1998
- Punmia B.C., Reinforced Concrete Structures Vol. I, Standard Book House,2005
- BIS codes (IS 456, SP 16, SP 24, SP 34)

STRUCTURAL STEEL DESIGN- II

Course Code: **BCE 603** **Credit Units: 03**

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Investigate complex steel structures using advanced methods of analysis & design.
2. Create his own judgement regarding optimum analysis method required for specific type of problem.
3. Apply these methods to the real life steel structures
4. Develop his interest structural engineering designing field.

Course objectives:

To introduce the concept of plastic analysis

To study the behaviour and design of compression member subjected to eccentric force and design of base plate

To study the design of Gantry girder, welded plate girder, stiffeners and connections

To calculate the wind forces on steel stacks as per IS 875 and design the self supporting steel stacks including base plate and anchor bolts

Module: I

Design of Plate Girder- Economical Depth of Plate Girder. Design of Flanges. Curtailment of Flanges. Design of Horizontal Stiffeners - Design of Vertical Stiffeners.

Module: II –

Analysis and Design of Gantry Girder.

Module: III

Design of Column Base: Types of Column Bases, Slab Base, Gusset Base Design of Column Base and Caps

Module IV: Plastic Analysis

Plastic theory: introduction - plastic hinge concept - plastic modulus - shape factor - redistribution of moments - collapse mechanism - plastic analysis of beams and portal frames by equilibrium and mechanism methods

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

Text & References:

- Arya and Ajamani, Design of Steel Structures, Nem Chand Bros, 2004.
- Limit State Design of Steel Structure: SK Duggal McGrawhill Education India Pvt Ltd 2014.
- Dr. B. C. Punmia, Ashok Kr. Jain, Arun Kr. Jain, Design of Steel Structure, 2nd Edition, Lakshmi Pub,1998.
- Ramachandra, Design of Steel Structures, 12th Edition, Standard Publishers, 2009.

CONCRETE TECHNOLOGY

Course Code: BCE 604 **Credit Units: 03**

Course Objective:

Types of concrete and their manufacture and applications are covered in this course.

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Understand & identify the properties of the constituent materials of concrete
2. Identify and demonstrate the behavior of fresh and hardened concrete.
3. Design concrete mixes as per IS and ACI codes
4. Identify, describe and carry out the main laboratory tests on concrete constituents.
5. Demonstrate recent advancements in concreting materials and procedures.

Course Contents:

Module I: Materials

Materials: cement - different types - chemical composition and physical properties - tests on cement - I.S. specifications - aggregates - classification - mechanical properties and tests as per I.S. - alkali aggregate reaction - grading requirements - heavy weight - light weight - normal weight - aggregate - sampling of aggregate - water - quality of water - permissible impurities as per I.S - admixtures - accelerators - retarders - water reducing agents – super plasticizers- use of silica fumes.

Module II: Manufacture

Manufacture of concrete - measurement of materials - storage and handling - batching plant and equipment - mixing - types of mixers - transportation of concrete - pumping of concrete - placing of concrete - under water concreting - compaction of concrete - curing of concrete - ready mixed concrete - mix design - nominal mixes - design mixes - factors influencing mix design - A.C.I method - I.S method - design for high strength mixes.

Module III: Properties of Concrete

Properties of concrete - fresh concrete - workability - factors affecting workability - tests for workability - segregation and bleeding - hardened concrete - factors affecting strength of concrete - strength of concrete in compression, tension and flexure - stress- strain characteristics and elastic properties - shrinkage and creep - durability of concrete - permeability - chemical attack - sulphate attack - resistance to abrasion and cavitaion - resistance to freezing and thawing - resistance to fire - marine atmosphere - quality control - frequency of sampling - test specimens - statistical analysis of test results - standard deviation - acceptance criteria

Module IV: Special Concretes

Special concrete - light weight concrete - high density concrete - vacuum concrete - shotcrete - Fibre reinforced concrete-polymer concrete - Ferrocement - high performance concrete - self compacting concrete - types of failure - diagnosis of distress in concrete - crack control - leak proofing - Guniting and Jacketing techniques.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Neville A.M., Properties of Concrete, Pitman
- Shetty M.S., Concrete Technology, S I Chand & Company, 1993.
- Gambhir M.L., Concrete Technology, Tata McGraw Hill, 1995.
- Orchard D.F., Concrete Technology Vol. I & II, 1968.
- Krishna Raju N., Design of Concrete Mixes, CBS publishers, 1988.
- Raina V.K., Concrete for Construction-Facts & Practices, Tata McGraw Hill publishing co. 1988.

- John. H. Bungey, The Testing of Concrete in Structures, Urrey University of Press Hall
- Akroyd T.N.W., Concrete: Properties & Manufacture, Pergamon Press, 1962.
- Murdock L.J., Concrete: Materials & Practice, Edward Arnold, 1968.

PROGRAMMING WITH PYTHON

Course Code: BCS 610 **Credit Units: 02**

Course Objective:

Objective: Python is next generation multi-purpose programming language that allows different users to create applications of various domains. Students will be able to learn primary fundamentals of python programming and potential of python is to achieve modern computing requirements

Course Learning Outcomes:

After completion of this course, student will be able to

- To learn basics of Python.
- To develop console application in python.
- To develop database application in python.
- To develop basic machine learning application.

Pre-requisite of course: Object oriented concepts, Programming fundamentals

Course Contents:

Module I: Basic of Python Programming

The concept of data types; variables, assignments; immutable variables; numerical types; arithmetic operators and expressions; comments in the program; understanding error messages.

Module II: Conditioning and looping in python

Conditions, Boolean logic, logical operators; ranges; Control statements: if-else, loops (for, while); lambda function in python.

Module III: String, List, Tuple, Set, Dictionary data structure

String manipulations: subscript operator, indexing, slicing a string; strings and number system: converting strings to numbers and vice versa. Lists, tuples, and dictionaries; basic list operators, replacing, inserting, removing an element; searching and sorting lists; dictionary literals, adding and removing keys, accessing and replacing values, traversing dictionaries.

Module IV: Function

Design with functions: hiding redundancy, complexity; arguments and return values; formal vs actual arguments, named arguments. Program structure and design. Recursive functions.

Module V: Basic Python Libraries

Pandas: creation of dataframe, Manipulation of dataframe, generation of series, iloc and loc function etc. NumPy: creation of arrays (1-D, 2-D and n-D array), random matrix, one's matrix, zero's matrix and all other operation over arrays, matplotlib: plotting of line graph, pi chart and box plot etc.

Projects:
Creating a discussion form, creating an online store, creating a job site.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

Text:

- Ramesh Bangia, “Web Technology”, Firewall media
- C. Xavier, “World Wide Web Design with HTML”, Tata McGraw Hill.
- Unleashed ASP, Techmedia

References:

- Rick Dranell, “HTML4 unleashed”, Techmedia Publication.
- Shelly Powers, “Dynamic Web Publishing Unleashed”, Techmedia.
- Don Gosselin, “JavaScript”, Vikas Publication
- Mark Swank & Drew Kittel, “World Wide Web Database”, Sams net.

GEOTECHNICAL ENGINEERING – II (Domain Elective)

Course Code: BTV 605 **Credit Units: 03**

Course Objective:

Advanced topics of soil mechanics and the design of foundations are covered in this course.

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. To understand the preesure exeted by the soil on retaining walls.
2. To identify problems involving complex soil behavior and understanding the complex phenomenon using basic principles of mathematics, natural sciences and engineering sciences.
3. Figure out solution of soil related problems faced by the engineering society using both theoretical knowledge and soil testing.
4. Use existing knowledge/experimental setup for understanding the complex mechanisms within the soil.
5. Develop an understanding regarding responsibilities of professional engineers at the site and dealing with expected legal and cultural issues at the site.

Course Contents:

Module I: Earth pressure

Earth pressure at rest. Active and passive earth pressure for cohesionless and cohesive soils. Coulomb's and Rankine's theories. Point of application of earth pressure for cases of with and without surcharge in cohesionless and cohesive soils. Culmann's and Rebhan's graphical construction for active earth pressure. Friction circle method for active earth pressure. **Site investigation and soil exploration:** Objectives. Planning. Reconnaissance. Depth of exploration. Methods of subsurface exploration. Test pits. Auger borings. Wash boring. Rotary drilling. Percussion drilling. Core drilling. Sampling. Types of soil samples. Splitspoon sampler. Thin walled sampler. Piston sampler. Denison sampler. Hand cut samples. Location of water table. S.P.T. Field vane shear test. Introduction to geophysical methods. Boring log. Soil profile.

Module II: Bearing capacity

Ultimate and allowable bearing capacity. Terzaghi's equation for bearing capacity for continuous circular and square footings. Types of shear failures. Bearing capacity factors and charts. Effect of water table on bearing capacity. Meyerhoff's bearing capacity heory. Skempton's formulae. Bearing capacity from field tests. Bearing capacity from building codes. Net bearing pressure. Methods of improvement of soil bearing capacity: vibro flotation and sand drains.

Settlement analysis: Distribution of contact pressure. Immediate and consolidation settlement. Estimation of initial and final settlement under building loads. Limitations in settlement computation. Causes of . Permissible, total and differential settlements. Cracks and effects of settlement.

Module III: Foundations

General considerations: Functions of foundations. Requisites of satisfactory foundations. Different types of foundations. Definition of shallow and deep foundation. Selection of type of foundation. Advantages and limitations of various types of foundations. Design considerations . Footings subjected to eccentric loading. Conventional procedure for proportioning footings for equal settlements.

Open excavation: Open foundation excavations with unsupported slopes. Supports for shallow and deep excavations. Stress distribution in sheeting and bracing of shallow and deep excavations. Stability of bottom of excavations. **Raft foundations**: Bearing capacity equations. Design considerations. Conventional design procedure for rigid mat. Uplift pressures. Methods of resisting uplift. Floating foundations.

Module IV: Pile foundations

Uses of piles. Classification of piles based on purpose and material. Determination of type and length of piles. Determination of bearing capacity of axially loaded. Single vertical pile. Static and dynamic formulae. Determination of bearing capacity by penetration tests and pile load tests (IS methods). Negative skin friction. Group action and pile spacing. Analysis of pile groups. Load distribution by Culmann's method. **Caissons and piers:** Open (well) caissons. Box (floating) caissons. Pneumatic caissons. Construction details and design considerations of well foundations. Drilled piers and their
construction details.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Joseph E. & Bowles, *Foundation Analysis & Design*, McGraw Hill
- Leonards G.A., *Foundation Engineering*, McGraw Hill
- Teng W.C., Foundation Design, PHI, 1984
- Tomlinson M.J., Foundation Design & Construction, Pitman, 1963.
- Terzaghi & Peck, Soil Mechanics in Engineering Practice, Asia Publishing
- Arora K.R., *Soil Mechanics & Foundation Engg.*, Standard Publications, 1987.
- Murthy V.N.S., Soil Mechanics & Foundations.
- Punmia B.C., Soil Mechanics & Foundations, Laxmi, 1988.

TRAFFIC ENGINEERING AND MANAGEMENT (Domain Elective)

Course Code: BCE 606 **Credit Units: 03**

Course Objective:

The students acquire comprehensive knowledge of traffic surveys and studies such as 'Volume Count', 'Speed and delay', 'Origin and destination', 'Parking', 'Pedestrian' and 'Accident surveys'. They achieve knowledge on design of 'at grade' and 'grade separated' intersections. They also become familiar with various traffic control and traffic management measures.

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Understand the concepts of traffic and transportation terminology, methodology & principles.

2. Analyse, predict, and formulate designs based upon technical data and standards thus providing solutions to transport and traffic problems.

3. Perform basic statistical analysis of traffic data with Use speed-flow relationships and conduct shockwave analysis.

4. Analyze capacity of different kinds of roads and intersections and Design traffic signal timing.

5. Develop and evaluate traffic systems on the basis of sustainability of the transportation and thereby deliver positive outcomes for the society.

Course Contents:

Module I: Introduction
Significance and scope, Characteristics of Vehicles and Road Users, Skid Resistance and Braking Efficiency (Problems), Components of Traffic Engineering- Road, Traffic and Land Use Characteristics

Module II: Traffic Surveys and Analysis
Surveys and Analysis - Volume, Capacity, Speed and Delays, Origin and Destination, Parking, Pedestrian Studies, Accident Studies and Safety Level of Services- Basic principles of Traffic Flow.

Module III: Traffic Control
Traffic signs, Road markings, Design of Traffic signals and Signal co-ordination (Problems), Traffic control aids and Street furniture, Street Lighting, Computer applications in Signal design

Module IV: Geometric Design of Intersections
Conflicts at Intersections, Classification of 'At Grade Intersections, - Channelized Intersections - Principles of Intersection Design, Elements of Intersection Design, Rotary design, Grade Separation and interchanges - Design principles.

Module V: Traffic Management
Traffic Management- Transportation System Management (TSM) - Travel Demand Management (TDM), Traffic Forecasting techniques, Restrictions on turning movements, One-way Streets, Traffic Segregation, Traffic Calming, Tidal flow operations, Exclusive Bus Lanes, Introduction to Intelligent Transportation System (ITS).

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Kadiyali L R, Traffic Engineering and Transport Planning, Khanna Technical Publications, Delhi, 2000.
- Khanna K and Justo C E G, Highway Engineering, Khanna Publishers, Roorkee, 2001.
- Indian Roads Congress (IRC) specifications: Guidelines and special publications on Traffic Planning and Management
- Guidelines of Ministry of Road Transport and Highways, Government of India.
- Subhash C. Saxena, A Course in Traffic Planning and Design, Dhanpat Rai Publications, New Delhi, 1989.
- Transportation Engineering – An Introduction, C.Jotin Khisty, B.Kent Lall, Prentice Hall of India Pvt Ltd, 2006.

COMPUTER APPLICATION IN HYDRO ENGINEERING (Domain Elective)

Course Code: BCE 607 **Credit Units: 03**

Course Objective:

This course deals with computer application in hydro engineering.

Course learning outcomes (CLO

1. Identify the operational features of computer program and their use in engineering computations
2. Learn how the potential for extreme hydrologic events (e.g. floods and droughts) are analyzed and quantified.
3. Understand the importance of insuring water resources that are adequate from both a quantitative and qualitative standpoint
4.Design and implement smart, intelligent, and user friendly interfaces for computer applications

Course Contents:

Module I

Review of Basic Hydraulic Principles – General flow characteristics, Energy and momentum principles and Equations, Pressure and free surface flows, HGL and TEL, Major and minor losses, Computer applications to simple flow problems, Introduction to SAP.

Storm Sewer Design and Gravity Piping Systems – Review of basic hydrologic principles, Gradually varied flow, Mixed flow profiles, Storm Sewer Applications.

Module II

Drainage Inlet Design, Culvert Hydraulics and Design.

Pressure Piping Systems & Water Quality Analysis – Analysis and design of water distribution systems

Introduction to Some Packages such as Flow Master, Storm CAD, Culvert Master, Water CAD, and Sewer CAD and EPANET.

Module III

Flow Routing - Hydrologic and hydraulic methods of routing, Sanitary sewer design including extended period simulation and routing.

Watershed modeling – Basic principles – Introduction to SWMM

Module IV

Water quality modeling in streams- Basic models, Introduction to software packages.
Ground water quality modeling
Introduction to remote sensing and GIS applications and web based applications

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Michael. M. Meadows & Thomas M Walski, Computer Applications in Hydraulic Engineering, Haestad Press, 2001.
- QIP short term course notes advanced IT applications in Civil Engineering: IIT, Kharagpur, 2001.
- L.W. Mays, Water Resources Engineering, John Wiley and Sons, 2001.
- S.C. Chapra, Surface Water Quality Modeling, McGraw Hill, Inc., 1997.

WATER RESOURCES SYSTEM PLANNING AND DESIGN (Domain Elective)

Course Code: BCE 608 **Credit Units: 03**

Course learning outcomes (CLO

1. Understand how water resources are developed and how needs are quantified.
2. Learn how the potential for extreme hydrologic events (e.g. floods and droughts) are analyzed and quantified.
3. Understand the importance of insuring water resources that are adequate from both a quantitative and qualitative standpoint

Course Objective:

This course deals with design and planning of water resources system.

Course Contents:

Module I
Introduction: Water systems engineering –scope and approach.
Issues and the systems planning approach- water system dynamics- water resource development alternatives – Water systems planning objectives- Constraints and Criteria – Economic and Econometric principles

Module II
Hydrologic input analysis, Demand analysis, System elements & Subsystem planning - Stochastic planning and management - Design and management issues.

Module III
Optimization methods and their application in W.R. systems. Linear programming and Dynamic programming models. Problem formulation for W.R systems – Multi objective planning – Large scale system analysis- Case studies.

Module IV
Ground water system planning – Conjunctive surface and G.W development- Hierarchical approach- Water quality management planning- Regional planning- Policy issues.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- M. C. Chathurvedi, W.R. Systems – Planning & Management, Tata McGarw Hill Publications, New Delhi
- Louks D P etal W.R System Planning & Analysis, Prentice Hall - 1981.
- Maass. A. etal – Design Water Resources Systems – Mc. Millan. 1968
- Goodman. A.S. Principles of Water Resources planning, Prentice – Hall, 1984

ADVANCED CONCRETE DESIGN (Domain Elective)

Course Code: **BCE 609** **Credit Units: 03**

Course Objective:
This course deals with advanced design of concrete structures.

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Investigate multi dimensional structures using advanced methods & software of structural analysis.

2. Create his own judgement regarding optimum analysis method required for specific type of problem.

3. Apply these methods to the real life structures.

4. Develop his interest in structural engineering designing field.

Course Contents:

Module I
Large span concrete roofs
Introduction– classification- behaviour of flat slabs - direct design and equivalent frame method- codal provisions - waffle slabs.
Shells and Folded plates
Forms of shells and folded plates- structural behaviour of cylindrical shell and folded plate- method of analysis- membrane analysis – beam arch approximation- codal provisions- design of simply supported circular cylindrical long shells and folded plates.
A design project involving the complete design of one of the above is envisaged at this stage

Module II
Deep beams
Analysis of deep beams- design as per BIS - design using strut and tie method.
Chimneys
Analysis of stresses in concrete chimneys - uncracked and cracked sections- codal provisions- design of chimney.
A project involving the design of a deep beam and concrete chimney is envisaged at this stage.

Module III: Water tanks
Introduction- rectangular and circular with flat bottom- spherical and conical tank roofs- staging- design as per BIS.
A project involving the design and detailing of a water tank is envisaged at this stage.

Module IV: Bridges
General – IRC Bridge code –loading standards–impact effect – wind load – longitudinal forces – centrifugal forces – force due to water currents – buoyancy effect – temperature effects – secondary stresses – erection – seismic force
Design of slab culvert – R.C box culverts –T-beam bridges – Concept on design of continuous bridges, balanced cantilever bridges, arch bridges and rigid frame bridges.
A project involving the design and detailing of a slab culvert/ T-beam bridge is envisaged at this stage.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Purushothaman. P, Reinforced Concrete Structural Elements-, Tata McGraw Hill, 1986
- G.S. Ramaswamy, Design and Construction of Concrete Shell Roofs-CBS publishers, 1986
- Ashok K Jain, Reinforced Concrete –Nem Chand Bros. Roorkee, 1998
- Jain & Jaikrishna, Plain and Reinforced Concrete – Vol I & II, Nem Chand Bros., Roorkee, 2000.
- Taylor C Pere, Reinforced Concrete Chimneys, Concrete publications, 1960
- Design of deep girders, Concrete Association of India, 1960
- Mallick & Gupta, Reinforced Concrete, - Oxford & IBH, 1982
- BIS codes (IS 456, IS 2210, IS 4998, IS 3370, SP 16, SP 24, SP 34).
- IRC Codes (IRC 5, IRC 6, IRC 21)

ENVIRONMENTAL ENGINEERING LAB

Course Code: BCE 621 **Credit Units: 01**

Course Contents:

1. Determination of total (solids, dissolved solids, organic solids, inorganic solids and settle-able solids) in the given sample of water
2. Determination of turbidity in the given sample of water
3. Determination the optimum coagulant dose of alum by Jar test
4. Determination of alkalinity, acidity and pH of the given sample of water
5. Determination of hardness and chlorides in the given sample of water
6. Determination of iron and manganese in the given sample of water
7. Determination of sulphates and sulphides in the given sample of water
8. Determination of D.O, C.O.D and B.O.D present in the given waste water
9. Determination of available chlorine in bleaching powder and the chlorine dose required to treat the given water sample
10. Determination of coliforms in water
11. Demonstration of Instrumental methods of pollutant analysis
12. To study various water supply Fittings.

Examination Scheme:

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

Text & References:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

- Standard method for the examination of water and waste water, 2005, APHA, AWWA, WPCF Publication

STRUCTURAL DETAILING LAB

Course Code: **BCE 622** **Credit Units: 01**

Course Contents:

Preparation of working drawings for the following using any drafting software:

RC Beams- Simply supported, Continuous, Cantilever

T – beam / L-beam floor

Slabs – Simply supported, Continuous, One way and two way slabs.

Columns – Tied Columns and Spirally reinforced columns.

Isolated footings for RC Columns.

Combined rectangular and trapezoidal footings.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

CONCRETE TECHNOLOGY LAB

Course Code: **BCE 624** **Credit Units: 01**

List of Exercises

1. Workability tests –
    1. Slump
    2. Compaction Factor Test
    3. V-bee Consistometer
    4. Flow

2. Compressive Strength Test on cubes and cylinders

3. Split test on concrete cylinders and flexure test on concrete.

4. Study of extensometers and strain gauges.

5. Bending test on reinforced concrete beams – under reinforced and over reinforced.

6. Demonstration of Non- Destructive Testing Equipment.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

PROGRAMMING WITH PYTHON LAB

Course Code: **BCS 630** **Credit Units: 01**

Software Required: Java

List of Assignment:

1. Write a program to demonstrate basic data type in python.
2. Write a program to compute distance between two points taking input from the user.
3. Write a program add.py that takes 2 numbers as command line arguments and prints its sum.
4. Write a Program for checking whether the given number is an even number or not. Using a for loop, write a program that prints out the decimal equivalents of1/2, 1/3, 1/4, . . . , 1/10.
5. Write a Program to demonstrate list and tuple in python.
6. Write a program using for loop that loops over a sequence.
7. Write a program using a while loop that asks the user for a number, and print countdown from that number to zero
8. WAP to find the sum of the even-valued terms.
9. Write a program to count the numbers of characters in the string and store them in a dictionary data structure.
10. Write a program to use split and join methods in the string and trace a birthday of a person with a dictionary data structure.
11. Write a program to print each line of a file in reverse order.
12. Write a program to compute the number of characters, words and lines in a file.
13. Write a function nearly equal to test whether two strings are nearly equal. Two strings a and b are nearly equal when a can be generated by a single mutation.
14. Write function to compute gcd, lcm of two numbers. Each function shouldn’texceed one line

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note**:** IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva**.**

COMMUNICATION SKILLS - IV

Course Code: **BCS 601** **Credit Units: 01**

Course Objective:

To enhance the skills needed to work in an English-speaking global business environment.

COURSE LEARNING OUTCOMES (CLO)

CLO 1	Demonstrate professional attitude needed for interview preparedness, power dressing, and respectful self orientation.
CLO 2	Showcase their leadership skills with effective team work.
CLO 3	Outline the basic etiquettes in expressing their personality individually and in group.

Course Contents:

Module I: Business/Technical Language Development
Advanced Grammar: Syntax, Tenses, Voices
Advanced Vocabulary skills: Jargons, Terminology, Colloquialism
Individualised pronunciation practice

Module II: Social Communication
Building relationships through Communication
Communication, Culture and Context
Entertainment and Communication
Informal business/ Technical Communication

Module III: Business Communication
Reading Business/ Technical press
Listening to Business/ Technical reports (TV, radio)
Researching for Business /Technology

Module IV: Presentations
Planning and getting started
Design and layout of presentation
Information Packaging
Making the Presentation

Examination Scheme:

Components	**CT1**	**CT2**	**CAF**	**V**	**GD**	**GP**	**A**
Weightage (%)	20	20	25	10	10	10	5

CAF – Communication Assessment File
GD – Group Discussion
GP – Group Presentation

Text & References:

- Business Vocabulary in Use: Advanced Mascull, Cambridge
- Business Communication, Raman – Prakash, Oxford
- Business Communications, Rodgers, Cambridge
- Working in English, Jones, Cambridge
- New International Business English, Jones/Alexander, Cambridge

BEHAVIOURAL SCIENCE - VI
(STRESS AND COPING STRATEGIES)

Course Code: **BSS 604** **Credit Units: 01**

Course Objective:

To develop an understanding the concept of stress its causes, symptoms and consequences.
To develop an understanding the consequences of the stress on one's wellness, health, and work performance.

Course learning outcomes (CLOs)

At the successful completion of this course you (the student) would be able to:

1. Identify stress and that an individual come across.
2. Recognize the causes of stress in their lives.
3. Analyze symptoms and how they are affecting lives.
4. Create ways to effectively cope with it.

Course Contents:

Module I: Stress
Meaning & Nature
Characteristics
Types of stress

Module II: Stages and Models of Stress
Stages of stress
The physiology of stress
Stimulus-oriented approach.
Response-oriented approach.
The transactional and interact ional model.
Pressure – environment fit model of stress.

Module III: Causes and symptoms of stress
Personal
Organizational
Environmental

Module IV: Consequences of stress
Effect on behaviour and personality
Effect of stress on performance
Individual and Organizational consequences with special focus on health

Module V: Strategies for stress management
Importance of stress management
Healthy and Unhealthy strategies
Peer group and social support
Happiness and well-being

Module VI: End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

- Blonna, Richard; Coping with Stress in a Changing World: Second edition
- Pestonjee, D.M, Pareek, Udai, Agarwal Rita; Studies in Stress And its Management

- Pestonjee, D.M.; Stress and Coping: The Indian Experience
- Clegg, Brian; Instant Stress Management – Bring calm to your life now

FRENCH - VI

Course Code: FLF 601 **Credit Units: 02**

Course Learning Outcomes

To strengthen the language of the students both in oral and written so that they can:
i) express their sentiments, emotions and opinions, reacting to information, situations;
ii) narrate incidents, events;
iii) perform certain simple communicative tasks.

Course Contents:

Module D: pp. 157 – 168 – Unité 12

Unité 12: s'évader

1. présenter, caractériser, définir
2. parler de livres, de lectures
3. préparer et organiser un voyage
4. exprimer des sentiments et des opinions
5. téléphoner
6. faire une réservation

Contenu grammatical:

1. proposition relative avec pronom relatif "qui", "que", "où" - pour caractériser
2. faire + verbe

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- le livre à suivre: Campus: Tome 1

GERMAN - VI

Course Code: FLG 601 **Credit Units: 02**

Course Objective:

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.
To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany
Introduction to Advanced Grammar and Business Language and Professional Jargon

Course Learning objective:

· Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language

· Students will be able to read and interpret small texts of advance level.

· Students will be able to communicate with complex sentences

· To be able to write formal and informal, business letters/ E-mails

· Translating basic technical texts from Spanish to English

· Essay writing on different issues.

· Spanish for specific purposes

Course Contents:

Module I: Adjective endings
Adjective endings in all the four cases discussed so far
Definite and indefinite articles
Cases without article

Module II: Comparative adverbs
Comparative adverbs as and like

Module III: Compound words
To learn the structure of compound words and the correct article which they take
Exploring the possibility of compound words in German

Module IV: Infinitive sentence
Special usage of 'to' sentences called zu+ infinitive sentences

Module V: Texts
A Dialogue: 'Ein schwieriger Gast'
A text: 'Abgeschlossene Vergangenheit'

Module VI: Comprehension texts
Reading and comprehending various texts to consolidate the usage of the constructions learnt so far in this semester.

Module VII: Picture Description
Firstly recognize the persons or things in the picture and identify the situation depicted in the picture;
Secondly answer questions of general meaning in context to the picture and also talk about the personal experiences which come to your mind upon seeing the picture.

Examination Scheme:

Components	CT1	CT2	C	I	V	A

Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

SPANISH – VI

Course Code: FLS 601 **Credit Units: 02**

Course Objective:

To enable students acquire working knowledge of the language; to give them vocabulary, grammar, voice modulations/intonations to handle everyday Spanish situations in Present as well as in Present Perfect Tense with ease.

Course Contents:

Module I
Revision of the earlier modules

Module II
Present Perfect Tense

Module III
Commands of irregular verbs

Module IV
Expressions with **Tener que** and **Hay que**

Module V
En la embajada
Emergency situations like fire, illness, accident, theft

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español, En Directo I A
- Español Sin Fronteras

CHINESE – VI

Course Code: FLC 601 **Credit Units: 02**

Course Objective:

Chinese emperor Qin Shi Huang – Ti who built the great wall of China also built a network of 270 palaces, linked by tunnels, and was so afraid of assassination that he slept in a different palace each night. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Learning Objectives:

· Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language

· Students will be able to read and interpret small texts of advance level.

· Students will be able to communicate with complex sentences.

Course Contents:

Module I
Drills
Dialogue practice
Observe picture and answer the question.
Pronunciation and intonation.
Character writing and stroke order.

Module II
Going out to see a science exhibition
Going to the theatre.
Train or Plane is behind schedule.
Indian Economy-Chinese Economy
Talking about different Seasons of the Year and Weather conditions. Learning to say phrases like-spring, summer, fall, winter, fairly hot, very cold, very humid, very stuffy, neither hot nor cold, most comfortable, pleasant …. etc.

Module III
Temperature – how to say – What is the temperature in May here?
- How is the weather in summer in your area?
- Around 30 degrees
- Heating, air-conditioning
- Is winter is Shanghai very cold?

Talking about birthdays and where you were born?
The verb "shuo" (speak) saying useful phrases like speak very well, do not speak very well, if speak slowly then understand if speak fast then don't understand, difficult to speak, difficult to write, speak too fast, speak too slow, listen and can understand, listen and cannot understand … etc.
Tell the following in Chinese – My name is …. I was born in … (year). My birthday is …… Today is … (date and day of the week). I go to work (school) everyday. I usually leave home at. (O'clock). In the evening, I usually ……. (do what)? At week end, I ……. On Sundays I usually …… It is today….. It will soon be my younger sisters birthday. She was born in ….. (year). She lives in ……. (where). She is working (or studying)…… where… She lives in …….. (where.)

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

Text & References:

- Elementary Chinese Reader Part-2, 3; Lesson 47-54

SEVENTH SEMESTER

ENVIRONMENTAL ENGINEERING - II

Course Code: BCE 701 **Credit Units: 03**

Course Objective:

This course deals with advanced environmental engineering concepts. It explains the design of various plumbing, treatment plant and solid waste management.

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Identify and describe types of sewage and sewerage systems used.
2. Design, analyse and critically evaluate various types of sewers and their hydraulic design.
3. Identify and examine various types of sewage treatment processes like preliminary, biological, etc.
4. Understand the critical nature of wastewater disposal and reuse, plumbing design of building, layout of house drainage.
5. Identify and examine sources, effect and control techniques of air pollution

Course Contents:

Module I: Collection of Sewage

General Terms: sewerage, domestic sewage, sewage treatment, disposal, scope, Role of an Environmental engineer Sanitary plumbing – sanitary fixtures – systems of piping – house drainage– connection of house drains and street sewers.

Collection of Sewage: Systems of sewerage– Separate, combined, and partially separate, components of sewerage systems, systems of layout, quantity of sanitary sewage and variations, quantity of storms water, rational method, shapes of sewer, Hydraulic design of sewers: diameter self-cleansing velocity and slopes, construction and testing of sewer line, Sewer materials, joints Dry weather flow and wet weather flow– sewers and sewer appurtenances – sewage pumping – maintenance of sewers.

Module II: Sewage Treatment

Sewage Treatment: Waste water- Characteristics– sampling – population equivalent — preliminary treatment of waste water – screens – grit chamber – detritus tank – Sedimentation tank.

Biological treatment (process details and design considerations) - Aerobic- Activated Sludge Process- Trickling Filter- Oxidation Ponds. Anaerobic treatment- Anaerobic digesters- Septic Tanks- Soak pits

Module III: Wastewater Disposal and Reuse

Wastewater Disposal and Reuse: Disposal of sewage by dilution, self-purification of streams, sewage disposal by irrigation sewage farming, waste waters reuse, sludge treatment and disposal.

Plumbing for Design of Buildings: Various systems of plumbing – one pipe, two pipes, single stack, traps, layout of house drainage.

Module IV: Air pollution

Air pollution and control – sources –pollutants and their health effects– particulate and gaseous pollution control devices (fundamentals)-Settling chambers- Electrostatic precipitators- Cyclones- Wet Collectors-Gas absorption by tray and packed towers.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Birdie G. S and Birdie J.S, Water Supply and Sanitary Engineering, Dhanpat Rai and Sons (1998), New Delhi
- Duggal K.N., Elements of Environmental Engineering, S. Chand and Co. Ltd. (2000), New Delhi
- Garg S.K, Environmental Engineering Vol. II¸ Khanna Publications (2001) New Delhi
- Ehlers VM & Steel EW, Municipal & Rural Sanitation, 6th Edn.(1965)McGraw Hill.
- Sawyer and McCarte, Chemistry for Environmental Engineering, Tata McGraw-Hill, (2003) New Delhi,.
- Fair, Geyer & Okun, Water and Waste water Engineering, John Wiley & sons, Inc (1966)
- Metcalf & Eddy, Waste Water Engineering Treatment, Disposal & Reuse, Tata McGraw Hill (1

QUANTITY SURVEY AND ESTIMATION

Course Code: BCE 702 **Credit Units: 03**

3 Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. To recognize and understand engineering drawing and graphics as a language of communication.
2. To gain concept of broader aspect of civil engineering drawing and also to understand the fundamentals of architectural, structural, plumbing and electrical drawings,
3. To design and construct the individual ideas of products in the form of a complete engineering drawing
4. To effectively read, detailed estimation of common items of work in building construction and of some simple buildings. Also to understand and reproduce engineering drawing
5. Have skills to architectural, structural, plumbing, electrical, hydraulic structures and highway/motorway drawings

Course objectives:

- To know the importance of preparing the types of estimates under different conditions
- To know about the rate analysis and bill preparations
- To study about the specification writing
- To understand the valuation of land and buildings

Module: I

Estimates –Types of Estimate- Individual Wall method and Center line method of Estimation. Detailed Estimate. Introduction to Terminology Lead and Lift. Measurements M Book. Roles and Responsibilities of Engineer and Contractor. Contract and Types of Contracts.

Module: II

Preparation of Detailed Estimate for one Room Building-Two Room Building- Structure with load bearing walls. Frame Structure Building with column and Footings. Road Estimate and preparation of Detailed Estimate for industrial buildings-canals-Slab Bridge.

Module: III

Standard Schedule of Rates Standards Data Book, , Specification of Brick Work, CC and RCC works and other components of Building works. Rate analysis for various materials and labour. Rate analysis for various building Works

Module: IV
Costing of Building and other Civil Works. – Earnest money deposit – security deposit – contract – contract documents – measurements – completion certificate – inspection and quality control – standardization – organizations at national and international level (BIS & ISO) – role of certification. Preparation of a Tender, Types of Tenders Notice Inviting Tender.

Module: V
Valuation of Properties: Values and its kinds - Valuation - purpose- scope - methods - land and building method - Factors affecting the value of plot and building - Depreciation – Sinking fund – methods of Valuation of residential building with case study.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- B.N Dutta, Estimating and Costing in Civil Engineering, S. Datta & Co, 2002.
- Bhasin, P.L., Quantity Surveying, 2nd Edition, S.Chand & Co., 2000.

INDUSTRIAL TRAINING

Course Code: BCE 750 **Credit Units: 06**

Methodology:
Practical training is based on the theoretical subjects studied by students. An industry visit will be planned for each student and on-site practical training will be imparted with the help of the industry guide. The students are to learn various industrial, technical and administrative processes followed in the industry. On completion of the practical training the students are to present a report covering various aspects learnt by them and give a presentation on same.

Examination Scheme:

Feedback from industry/work place	20
Training Report	40
Viva	15
Presentation	25
Total	**100**

SEMINAR

Course Code: BCE 760 **Credit Units: 03**

Methodology

The topic for the project work can be a design/experimental/field surveying/ analytical/simulation project in any topic of Civil Engineering arena. The work can be done individually or by a group of students under the guidance of a faculty of the Department. On completion of the project, the students are to present a report covering various aspects learnt by them and give a presentation on same.

Examination Scheme:

Literature study/ Fabrication/ Experimentation	40
Written Report	20
Viva	15
Presentation	25
Total	**100**

ADVANCED PROGRAMMING WITH PYTHON

Course Code: BCS 710 **Credit Units: 02**

Course Objective:

The course should enable the students:

- Describe the semantics of Python programming language and illustrate the process of structuring the data using lists, dictionaries, tuples, strings and sets.
- Illustrate the Object-oriented Programming concepts in Python.
- Demonstrate the basic database design for storing data as part of a multi-step data gathering, analysis, and processing.
- Familiarize the basics of machine learning using an approachable, and also understand the advantage of using Python libraries for implementing Machine Learning models Course Outcomes: After completion of this course, student will be able to:

Course Outcomes:

- Interpret the basic principles of Python programming language.
- Articulate the Object-Oriented Programming concepts such as encapsulation, inheritance and polymorphism as used in Python.
- Identify the commonly used operations involving file systems and regular expressions.
- Implement Machine Learning algorithms.

Course Contents:

UNIT-I:

Introduction to Python, use IDLE to develop programs, Basic coding skills, working with data types and variables, working with numeric data, working with string data, Python functions, Boolean expressions, selection structure, iteration structure, working with lists, work with a list of lists, work with tuples, work with dates and times, get started with dictionaries

Learning Outcome:

At the end of this Unit the student will be able to

- Solve, test and debug basic problems using python script.
- Manipulate python programs by using the python data structures like lists, dictionaries, tuples, strings and sets.

UNIT-II

Classes in Python: OOPS Concepts,Classes and objects ,Classes in Python, Constructors, Datahiding, Creating Classes, Instance Methods, Special Methods, Class Variables, Inheritance, Polymorphism, Type Identification, Custom Exception Classes, Iterators, generators and decorators.

Learning Outcome:At the end of this Unit the student will be able to

- Design object-oriented programs with Python classes.
- Usage of inheritance and polymorphism for reusability.

UNIT-III

I/O and Error Handling In Python :Introduction, Data Streams, Creating Your Own Data Streams, Access Modes, Writing Data to a File, Reading Data From a File, Additional File Methods, Handling IO Exceptions, Errors, Run Time Errors, The Exception Model, Exception Hierarchy, Handling Multiple Exceptions, Working with Directories.

Learning Outcome: At the end of this Unit the student will be able to

- Identify the commonly used operation involved in files for I/O processing.
- Familiarize the handling of I/O Exception sand usage of Directories.

UNIT-IV

Implement Machine Learning algorthims:Usage of Numpy for numerical Data,Usage of Pandas for Data Analysis, Matplotlib for Python plotting, Seaborn for Statically plots, interactive Dynamic visualizations, SciKit for Machine learning.

Learning Outcome: At the end of this Unit the student will be able to
Understand the advantage of using Python libraries for implementing Machine Learning models.

Projects:

Creating a discussion form, creating an online store, creating a job site.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

1. Michael Urban and Joel Murach, Python Programming, Shroff/Murach, 2016.
2. Haltermanpython.
3. Mark Lutz, Programming Python, O`Reilly, 4th Edition, 2010ONLINE

RESOURCES:
https://www.w3schools.com/python.
https://docs.python.org/3/tutorial/index.html.
https://www.python-course.eu/advanced_topics.ph

ADVANCED PROGRAMMING WITH PYTHON LAB

Course Code: **BCS730** **Credit Units: 01**

List of Assignment:

- Practice Assignment based on string data, Python functions, and Boolean expressions.
- Practical based on iteration, working with lists, tuples and dictionaries.
- Practical based on class, objects, constructor, method in side class.
- Practical questions based on Inheritance, Polymorphism, Type Identification, Custom Exception Classes.
- Handling Errors using Python.
- Practical Assignment based on Usage of Numpy for numerical Data,
- Practical Assignment based on Usage of Usage of Pandas for Data Analysis.
- Practical Assignment based on Usage of Matplotlib for Python plotting.
- Practical Assignment based on Usage of Seaborn for Statically plots.
- Practical Assignment based on Usage of Interactive Dynamic visualizations.
- Practical Assignment based on Usage of SciKit for Machine learning.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**

5	20	20	5	25	25

Note**:** IA –Internal Assessment, EE- External Exam, PR- Performance, LR **–** Lab Record, V **–** Viva**.**

Pavement Analysis & Design (Domain Elective)

Course Code: BCE 707 **Credit Units: 03**

Course Objective:
This course deals with pavement analysis & design related concepts.

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Apply concepts of pavement performance by characterizing traffic loads for pavement design and analysis.

2. Understand and account for climatic factors in pavement design and analysis by understanding the strength and durability of pavement materials.

3. Understand pavement construction procedures for flexible and rigid pavements using standard methods.

4. Understand mechanisms of pavement deterioration and identify distress types and provide pavement condition assessments of drainage in road pavements.

5. Recommend pavement preservation techniques by conducting mechanistic analyses of pavement structures using computer software.

Course Contents:

Module I Principles of Pavement Design:
Types of Pavements. Concept of pavement performance. Structural and Functional failures of pavements. Different types of pavement performance criteria. Different pavement design approaches. General framework for pavement design.

Module II Traffic Considerations in Pavement Design:
Vehicle types. Axle configurations. Contact shapes and contact stress distributions. Concept of standard axle load. Vehicle damage factor. Axle load surveys. Lateral placement characteristics of wheels. Estimation of design traffic.

Module III Flexible Pavement Design Methods:
Detailed discussion of different methods of design of flexible pavements. Indian Roads Congress guidelines. IRC:37, American Association of State High and Transport Officials (AASHTO) – 1993 method, TRRL Design method. Brief discussion of salient features of the AASHTO 2002 draft design guidelines for flexible pavements. Comparison of design concepts adopted in different approaches.

Module IV Analysis of Concrete Pavements:
Discussion of different theoretical models for analysis of different types of concrete pavements. Analysis of wheel load stresses, curling/warping stresses due to temperature differential. Critical stress combinations. Discussion of the need for use of advanced analytical techniques for concrete pavements. Discussion of different software packages available for analysis of concrete pavements.

Module V Pavement Evaluation Techniques:
Functional and Structural Evaluation of pavements. Concept of roughness, International Roughness Index. Measurement of Roughness using different types of equipment. Structural evaluation of in-service pavements using Benkelman beam and Falling Weight Deflectometer methods.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Michael. M. Meadows & Thomas M Walski, Computer Applications in Hydraulic Engineering, Haestad Press, 2001.
- QIP short term course notes advanced IT applications in Civil Engineering: IIT, Kharagpur, 2001.
- L.W. Mays, Water Resources Engineering, John Wiley and Sons, 2001.
- S.C. Chapra, Surface Water Quality Modeling, McGraw Hill, Inc., 1997.

PRESTRESSED CONCRETE (Domain Elective)

Course Code: BCE 708 **Credit Units: 03**

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Investigate the principles, materials, methods and systems of prestressing
2. Create the different types of losses and deflection of prestressed members Apply these methods to the real life structures
3. Develop the design of prestressed concrete beams for flexural, shear and tension and to calculate ultimate flexural strength of beam
4. To apply the design of anchorage zones, composite beams, analysis and design of continuous beam

Course Objective:

- To learn the principles, materials, methods and systems of prestressing
- To know the different types of losses and deflection of prestressed members
- To learn the design of prestressed concrete beams for flexural, shear and tension and to calculate ultimate flexural strength of beam
- To learn the design of anchorage zones, composite beams, analysis and design of continuous beam

Course Contents:

Module I: Materials for prestressed concrete and prestressing systems

High strength concrete and high tensile steel – tensioning devices – pretensioning systems – post-tensioning systems. Anchorage Zone: end block stresses.

Module II: Analysis of prestress and bending stresses

Analysis of prestress – resultant stresses at a sector – pressure line or thrust line and internal resisting couple – Concept of load balancing – losses of prestress – deflection of beams.

Module III: Strength of prestressed concrete sections in flexure, shear and torsion

Types of flexural failure – strain compatibility method – IS code procedure – design for limit state of shear and torsion.

Module IV: Design of prestressed concrete beams and slabs
Transfer of prestress in pre tensioned and post tensioned members – design of anchorage zone reinforcement – design of simple beams – cable profiles – design of slabs. Partial Prestressing: Principles and advantages, methods, practices and design.

A design project for the design and detailing of a large span beam is envisaged at this stage.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- N. Krishna Raju, Prestressed concrete, Tata McGraw Hill, 2000
- T.Y. Lin, Ned H. Burns, Design of Prestressed Concrete Structures, John Wiley & Sons, 2004.
- P. Dayaratnam, Prestressed Concrete, Oxford & IBH, 1982
- R. Rajagopalan, Prestressed Concrete, Narosa publishers, 2004.
- BIS codes (IS 1343)

COMMUNICATION SKILLS - V

Course Code: **BCS 701** **Credit Units: 01**

Course Objective:
To facilitate the learner with Academic Language Proficiency and make them effective users of functional language to excel in their profession.

COURSE LEARNING OUTCOMES (CLO)

CLO 1	Investigate their personal strengths and insights to be revealed in a Formal Setup of Communication.
CLO 2	Create right selection of words and ideas while choosing the appropriate channel of formal communication
CLO 3	Apply acquired knowledge with the appropriate selection of channel of formal communication.

CLO 4	Develop and empower self with the ease of using appropriate medium of communication.

Course Contents:

Module I
Introduction to Public Speaking
Business Conversation
Effective Public Speaking
Art of Persuasion

Module II: Speaking for Employment
Types of Interview
Styles of Interview
Facing Interviews-Fundamentals and Practice Session
Conducting Interviews- Fundamentals and Practice Session
Question Answer on Various Dimensions

Module III
Resume Writing
Covering Letters
Interview Follow Up Letters

Module IV: Basic Telephony Skills
Guidelines for Making a Call
Guidelines for Answering a Call

Module V: Work Place Speaking
Negotiations
Participation in Meetings
Keynote Speeches

Examination Scheme:

Components	**CT1**	**CT2**	**CAF**	**V**	**GD**	**GP**	**A**
Weightage (%)	20	20	25	10	10	10	5

CAF – Communication Assessment File
GD – Group Discussion
GP – Group Presentation

Text & References:

Jermy Comfort, Speaking Effectively, et.al, Cambridge
Krishnaswamy, N, Creative English for Communication, Macmillan
Raman Prakash, Business Communication, Oxford.
Taylor, Conversation in Practice,

BEHAVIOURAL SCIENCE - VII
(INDIVIDUAL, SOCIETY AND NATION)

Course Code: **BSS 704** **Credit Units: 01**

Course learning outcomes (CLOs)

At the successful completion of this course you (the student) should be able to:

1. Recognize their personality and individual differences and identify its importance of diversity at workplace and ways to enhance it.
2. Recognize effective socialization strategies and importance of patriotism and taking accountability of integrity.
3. Recognize different types of human rights and its importance.
4. Identify Indian values taught by different religions. Identify long term goals and recognize their talent, strengths and styles to achieve them

Course Objective:

This course aims at enabling students towards:
Understand the importance of individual differences
Better understanding of self in relation to society and nation
Facilitation for a meaningful existence and adjustment in society
Inculcating patriotism and national pride

Course Contents:

Module I: Individual differences & Personality
Personality: Definition& Relevance
Importance of nature & nurture in Personality Development
Importance and Recognition of Individual differences in Personality
Accepting and Managing Individual differences (adjustment mechanisms)
Intuition, Judgment, Perception & Sensation (MBTI)
BIG5 Factors

Module II: Managing Diversity
Defining Diversity
Affirmation Action and Managing Diversity
Increasing Diversity in Work Force
Barriers and Challenges in Managing Diversity

Module III: Socialization
Nature of Socialization
Social Interaction
Interaction of Socialization Process
Contributions to Society and Nation

Module IV: Patriotism and National Pride
Sense of pride and patriotism
Importance of discipline and hard work
Integrity and accountability

Module V: Human Rights, Values and Ethics
Meaning and Importance of human rights
Human rights awareness
Values and Ethics- Learning based on project work on Scriptures like- Ramayana, Mahabharata, Gita etc.

Module VI: End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

- Davis, K. Organizational Behaviour,
- Bates, A. P. and Julian, J.: Sociology - Understanding Social Behaviour
- Dressler, David and Cans, Donald: The Study of Human Interaction
- Lapiere, Richard. T – Social Change
- Lindzey, G. and Borgatta, E: Sociometric Measurement in the Handbook of Social Psychology, Addison – Welsley, US.
- Rose, G.: Oxford Textbook of Public Health, Vol.4, 1985.
- Robbins O.B.Stephen;. Organizational Behaviour

FRENCH - VII

Course Code: **FLF 701** **Credit Units: 02**

Course Objective:
Revise the portion covered in the first volume, give proper orientation in communication and culture.

Course Learning Objective:

· Students will hone intermediate language skills such as reading, writing, speaking, listening & interactive) in the language

· Students will be able to read and interpret small texts of intermediate level.

· Students will be able to communicate in small sentences in Simple Future and Past tenses .

· Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.

Course Contents:

Module A: Unités 1 – 3: pp. 06 - 46

Contenu lexical:

Unité 1: Rédiger et présenter son curriculum vitae
Exprimer une opinion
Caractériser, mettre en valeur
Parler des rencontres, des lieux, des gens

Unité 2: Imaginer - Faire des projets
Proposer - conseiller
Parler des qualités et des défauts
Faire une demande écrite
Raconter une anecdote
Améliorer son image

Unité 3: Exprimer la volonté et l'obligation
Formuler des souhaits
Exprimer un manque/un besoin
Parler de l'environnement, des animaux, des catastrophes naturelles

Contenu grammatical:

1. Le passé: passé composé/imparfait
2. Pronoms compléments directs/indirects, y/en (idées/choses)
3. Propositons relatives introduites par qui, que, où
4. Comparatif et superlatif
5. Le conditionnel présent
6. Situer dans le temps
7. Féminin des adjectifs
8. La prise de paroles: expressions
9. Le subjonctif: volonté, obligation

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- le livre à suivre: Campus: Tome 2

GERMAN - VII

Course Code: FLG 701 **Credit Units: 02**

Course Objective:

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.
To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany
Introduction to Advanced Grammar and Business Language and Professional Jargon

Course Learning Objective :

· Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language

· Students will be able to read and interpret small texts of advance level.

· Students will be able to communicate with complex sentences.

Course Contents:

Module I: Dass- Sätze
Explain the use of the conjunction "-that", where verb comes at the end of the sentence

Module II: Indirekte Fragesätze
To explain the usage of the "Question Pronoun" as the Relative Pronoun in a Relative Sentence, where again the verb falls in the last place in that sentence.

Module III: Wenn- Sätze
Equivalent to the conditional "If-" sentence in English. Explain that the verb comes at the end of the sentence.

Module IV: Weil- Sätze
Explain the use of the conjunction "because-" and also tell that the verb falls in the last place in the sentence.

Module V: Comprehension texts
Reading and comprehending various texts to consolidate the usage of the constructions learnt so far in this semester.

Module VI: Picture Description
Firstly recognize the persons or things in the picture and identify the situation depicted in the picture;
Secondly answer questions of general meaning in context to the picture and also talk about the personal experiences which come to your mind upon seeing the picture.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant - 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

SPANISH - VII

Course Code: **FLS 701** **Credit Units: 02**

Course Objective:
To enable students acquire working knowledge of the language; to give them vocabulary, grammar, expressions used on telephonic conversation and other situations to handle everyday Spanish situations with ease.

Course Learning objective:

· Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language

· Students will be able to read and interpret small texts of advance level.

· Students will be able to communicate with complex sentences

· To be able to write formal and informal, business letters/ E-mails

· Translating basic technical texts from Spanish to English

· Essay writing on different issues.

· Spanish for specific purposes

Course Contents:

Module I
Revision of earlier semester modules

Module II
Zodiac signs. More adjectives…to describe situations, state of minds, surroundings, people and places.

Module III
Various expressions used on telephonic conversation (formal and informal)

Module IV
Being able to read newspaper headlines and extracts (Material to be provided by teacher)

Module V
Negative commands (AR ending verbs)

Module VI
Revision of earlier sessions and introduction to negative ER ending commands, introduction to negative IR ending verbs

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español En Directo I A, 1B
- Español Sin Fronteras

- Material provided by the teacher from various sources

CHINESE – VII

Course Code: FLC 701 **Credit Units: 02**

Course Objective:

The story of Cinderella first appears in a Chinese book written between 850 and 860 A.D. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Learning Objectives:

· Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language

· Students will be able to read and interpret small texts of advance level.

· Students will be able to communicate with complex sentences.

Course Contents:

Module I
Drills
Dialogue practice
Observe picture and answer the question.
About china part –I Lesson 1, 2.

Module II
Pronunciation and intonation
Character Writing and stroke order.

Module III
Ask someone what he/she usually does on weekends?
Visiting people, Party, Meeting, After work….etc.

Module IV
Conversation practice
Translation from English to Chinese and vise-versa.
Short fables.

Module V
A brief summary of grammar.
The optative verb "yuanyi".
The pronoun "ziji".

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- "Kan tu shuo hua" Part-I Lesson 1-7

EIGHT SEMESTER

ENGINEERING ECONOMICS AND MANAGEMENT

Course Code: BCE 801 **Credit Units: 03**

Course Objective:

The main objective of this course is to train the student construction management and quantity surveying

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Apply understanding of mathematics, economics, and engineering principles to solve civil engineering problems.

2. Identify and understand cost elements of the product and its effect on decision making.

3. Understand the implications of taxes, depreciation, and inflation and its impact on the company.

4. Apply engineering economic techniques on solving engineering problems by using computer tools such as MS Excel.

5. Develop the ability to interpret time value of money using engineering economics factors and formulas.

Course Contents:

Module I: Organisations and their Economic Environment
Definition of Economics and Managerial Economics – Nature and Scope – Definition and Concept of Good, Want, Value, Wealth, Utility – Utility and Demand – Law of Diminishing Marginal Utility – Assumptions and Importance. Demand and Supply – Law of Demand and Law of Supply. Market price and natural price. Standard market forms- Monopoly, Perfect competition. Organisational forms- Proprietorship, partnership, Joint Stock Company – Cooperative organisation.

Module II: Macroeconomics
Money- nature and functions – Inflation and Deflation – Kinds of Banking - commercial banks – Central banking – Credit instrument - Monetary Policy – International trade – Balance of trade and Balance of Payments – taxation – Direct and Indirect taxes – Impact and Incidence of tax- Concept of National Income – Features with reference to developing countries.

Module III: Introduction to Management
Management Theory- Characteristics of management – Systems Approach to management – Concepts of goal, objective, strategies, programmes. Decision making under certainty, uncertainty and risk – Introduction to functional areas of management – Operations management, Human resources management, marketing management.

Module IV: Financial and Inventory Management
Need for Financial Management – Types of financing – Short term and long term Borrowing – Equity financing – Analysis of Financial Statement – balance sheet – Profit and Loss account – Fund flow statement – Ratio Analysis . Investment and Financial decision – Financial control and Job control.
Functions and objectives of Inventory management – Decision models – Economic Order Quantity (EOQ) model – sensitivity analysis of EOQ model, Economic production lot size model – inventory model with planned shortages – Periodic order quantity – single period Inventory models – Simulation model for inventory analysis.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Konni, Donnel C.O. and Weighnrich. H., Management, Eight Edition, McGraw Hill International Book Company, 1997.
- Philip Kotler, Marketing Management, Prentice-Hall of India, Edition 1998.
- G.W. Plossl, Production and inventory control by, Prentice Hall.
- Paul A Samuelson and William D Nardhaus, Economics, McGraw Hill International Edition.
- Barthwal R R, Industrial Economics – An Introductory Text Book, New Age International Pvt Ltd, 2000.
- Aninnya Sen, Microeconomics – Theory and Applications, OUP.
- Sharma J.L., Construction management and accounts, Sathya Prakashan, New Delhi, 1994.
- Srinath,L.S. An Introduction to Project Management, Tata McGraw Hill publications, 1995.

CONSTRUCTION EQUIPMENT AND PROJECT MANAGEMENT

Course Code: BCE 802 **Credit Units: 03**

Course Objective:
The main objective of this course is to train the students in construction technology and equipment and project management techniques.

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:
CO1 Understand the roles and responsibilities of a project manager
CO2 Prepare schedule of activities in a construction project
CO3 Prepare tender and contract document for a construction project
CO4 Understand safety practices in construction industry
CO5 Identify the equipment used in construction

Course Contents:

Module: I
Organization Management - Project planning techniques-Bar charts - Networks Principles of PERT/CPM, Time Estimates - Float and Slack and Critical Path Method.

Module: II
Time Estimates-Probability of completion of Project, updating – crashing – resource smoothing – resource leveling.

Module: III
Construction planning: Preparation of job layout – labour schedule – material schedule – equipment schedule

Module: IV
Operating characteristics of construction equipment, hoists, mixers, conveyors vibrators, scaffolding, shuttering etc., their characteristics, performance and applications to Civil Engineering Projects.

Module: V
Planning of construction facilities – Earthwork construction - Cement concrete construction- Construction of Piles - Construction of Cofferdams - Construction of Tunnels.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Vazirani V.N. & Chandola S.P., Heavy Construction, 1978.
- Jha J. & Sinha S.K., Construction & Foundation Engineering, Khanna Publications
- Peurifoy R.L., & Ledbetter W.B., Construction Planning Equipment & Methods,McGraw Hill, 1956.

PROJECT

Course Code: BCE 860 Credit Units: 12

Methodology

Topics of project are to be based on the latest trends, verifying engineering concepts /principals and should involve elementary research work. The projects may involve design, fabrications, testing, computer modeling, and analysis of any engineering problem. On completion of the project, the students are to present a report covering various aspects learnt by them and give a presentation on same.

Examination Scheme:

Literature study/ Fabrication/ Experimentation	40
Written Report	20
Viva	15
Presentation	25
Total	**100**

FINITE ELEMENT METHOD (Domain Elective)

Course Code: BCE 803 **Credit Units: 03**

Course Objective:

At the end of this course the student shall have a basic knowledge of finite element method and shall be able to analyse linear elastic structures, that he has studied about in core courses, using finite element method.

Course learning outcomes (CLO)

1. To learn basic principles of finite element analysis procedure .
2. To learn the theory and characteristics of finite elements that represent engineering structures
3. To learn and apply finite element solutions to structural, thermal, dynamic problem to develop the knowledge and skills needed to effectively evaluate finite element analyses.

Course Contents:

Module I: Boundary value problems and the need for numerical discretisation
Introduction, examples of continuum problems, history of finite element method.
Weighted residual methods
Approximation by trial functions, weighted residual forms, piecewise trial functions, weak formulation, Galerkin method, examples of one-, two- and three-dimensional problems.

Module II: Higher order finite element approximation
Degree of polynomial in trial functions and rate of convergence, the patch test, shape functions for $C0$ and $C1$ continuity, one-, two- and three-dimensional shape functions.
Isoparametric formulation
The concept of mapping, isoparametric formulation, numerical integration, mapping and its use in mesh generation.

Module III: Variational methods
Variational principles, establishment of natural variational principles, approximate solution of differential equations by Rayleigh-Ritz method, the use of Lagrange multipliers, general variational principles, penalty functions, least-square method.
Partial discretisation and time-dependent problems
Partial discretisation applied to boundary value problems, time-dependent problems via partial discretisation, analytical solution procedures, finite element solution procedures in time domain.

Module IV: Generalised finite elements and error estimates
The generalised finite element method, the discretisation error in a numerical solution, measure of discretisation error, estimate of discretisation error.
Coordinate Transformation: Transformation of vectors and tensors, transformation of stiffness matrices, degree of freedom within elements, condensation, condensation and recovery algorithm, substructuring, structural symmetry.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Zienkiewicz, O.C., and Morgan, K., Finite Element Approximation, John Wiley & Sons, 1983.
- Reddy, J.N., An Introduction to the Finite Element Method, McGraw Hill, 2006.
- Huebner, K.H., Thornton, E.A., and Byrom, T.G., The Finite Element Method for Engineers, John Wiley & Sons, 1995.
- Hutton, D.V., Fundamentals of Finite Element Analysis, McGraw Hill, 1991.
- Kikuchi, N., Finite Element Methods in Mechanics, Cambridge University Press, 1986.
- Cook, R.D., Malkus, D.S., Plesha, M.E., and Witt, R.J., Concepts and Applications of Finite Element Analysis, John Wiley & Sons, 2003.
- Zienkiewicz, O.C., and Taylor, R.L., The Finite Element Method, Vols I to III, McGraw Hill, 1999.

ADVANCED STRUCTURAL ANALYSIS (Domain Elective)

Course Code: BCE 804 **Credit Units: 03**

Course Objective:

This course deals with advanced concept of structural concrete design.

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Investigate multi dimensional structures using advanced methods & software of structural analysis.

2. Create his own judgement regarding optimum analysis method required for specific type of problem.

3. Apply these methods to the real life structures.

4. Develop his interest in structural engineering designing field.

Course Contents:

Module I: Approximate methods of analysis of multi-storey frames
Analysis for vertical load - substitute frames - loading condition for maximum positive and negative bending moment in beams and maximum bending moment in column - analysis for lateral load - portal method - cantilever method and factor method
Matrix analysis of structures
Static and kinematic indeterminacy - force and displacement methods of analysis - definition of flexibility and stiffness influence coefficients - development of flexibility matrices by physical approach

Module II
Flexibility method: flexibility matrices for truss and frame elements - load transformation matrix - development of total flexibility matrix of the structure - analysis of simple structures - plane truss and plane frame - nodal loads and element loads - lack of fit and temperature effects
Stiffness method: development of stiffness matrices by physical approach - stiffness matrices for truss and frame elements - displacement transformation matrix - development of total stiffness matrix - analysis of simple structures - plane truss and plane frame - nodal loads and element loads - lack of fit and temperature effects

Module III: Direct stiffness method
Introduction - element stiffness matrix - rotation transformation matrix - transformation of displacement and load vectors and stiffness matrix - equivalent nodal forces and load vectors - assembly of stiffness matrix and load vector - determination of nodal displacements and element forces - analysis of plane truss - plane frame (with numerical examples) - analysis of grid - space-truss and space-frame (without numerical examples)

Module IV
Computer Implementation
A project on development of an analysis program using some of the above method is envisaged at this stage
Introduction to Analysis Packages
The numerical examples solved using the analysis program developed in the above to be verified using common commercial packages.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Wang C.K., Matrix Methods of Structural Analysis, International Textbook Company, 1970.
- Przemeineicki J.S., Theory of Matrix Structural Analysis, McGraw Hill, New York, 1985.

Bachelor of Technology
(Chemical Engineering)

Programme Code: BTH

Duration – 4 Years Full Time

Programme Structure

And

Curriculum & Scheme of Examination

AMITY UNIVERSITY

RAJASTHAN

PREAMBLE

Amity University aims to achieve academic excellence by providing multi-faceted education to students and encourage them to reach the pinnacle of success. The University has designed a system that would provide rigorous academic programme with necessary skills to enable them to excel in their careers.

This booklet contains the Programme Structure, the Detailed Curriculum and the Scheme of Examination. The Programme Structure includes the courses (Core and Elective), arranged semester wise. The importance of each course is defined in terms of credits attached to it. The credit units attached to each course has been further defined in terms of contact hours i.e. Lecture Hours (L), Tutorial Hours (T), Practical Hours (P). Towards earning credits in terms of contact hours, 1 Lecture and 1 Tutorial per week are rated as 1 credit each and 2 Practical hours per week are rated as 1 credit. Thus, for example, an L-T-P structure of 3-0-0 will have 3 credits, 3-1-0 will have 4 credits, and 3-1-2 will have 5 credits.

The Curriculum and Scheme of Examination of each course includes the course objectives, course contents, scheme of examination and the list of text and references. The scheme of examination defines the various components of evaluation and the weightage attached to each component. The different codes used for the components of evaluation and the weightage attached to them are:

Components	Codes	Weightage (%)
Case Discussion/ Presentation/ Analysis	C	05 - 10
Home Assignment	H	05 - 10
Project	P	05 - 10
Seminar	S	05 - 10
Viva	V	05 - 10
Quiz	Q	05 - 10
Class Test	CT	10 - 15
Attendance	A	05
End Semester Examination	EE	50

It is hoped that it will help the students study in a planned and a structured manner and promote effective learning. Wishing you an intellectually stimulating stay at Amity University.

Program Learning Outcomes – PLO

- Graduates are able to apply the technical knowledge and skills required to solve real-world chemical engineering problems within their organizations.
- To enable graduates to undertake design development, production, managerial activities in the areas of chemical engineering.
- Excel in careers in the chemical, petroleum, petrochemical, pharmaceutical, food, energy, materials processing or other related industries/organizations.
- Pursue advanced degrees for a career in engineering, academia, business, or research and development.
- Demonstrate high-level of professionalism, ethical and social responsibility, independent learning, and desire for life-long learning.

Credits Summary

B.Tech Chemical Engineering (04 Years/ 08 Semesters)						
Semester	**Core Course (CC)**	**Domain Electives (DE)**	**Value Added Course (VAC)**	**Open Electives (OE)**	**Non-Teaching Credit Courses (NTCC)**	**Total**
I	24	-	4	-	2	**30**
II	19	-	8	3	2	**32**
III	16	4	4	3	-	**27**
IV	13	4	4	3	-	**24**
V	21	3	4	3	3	**34**
VI	21	3	4	3	-	**31**
VII	14	-	4	3	6	**27**
VIII	10	-	-	-	12	**22**
Total	**138**	**14**	**32**	**18**	**25**	**227**

CC = Core Course

DE = Domain Elective

OE = Open Elective

VA = Value Added Course

NTCC = Non – Teaching Credit Courses (NTCC)

AMITY SCHOOL OF ENGINEERING & TECHNOLOGY (ASET)

Program Name: B.Tech – Chemical Engineering

FIRST SEMESTER

Course Code	Course Title	Category	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits
Core Courses						
AM-101	Applied Mathematics – I	CC	3	1	-	4
AP-102	Applied Physics – I – Fields & Waves	CC	2	1	-	3
AC- 103	Applied Chemistry	CC	2	1	-	3
BME-104	Element of Mechanical Engineering	CC	2	1	-	3
BCS- 105	Introduction to Computers & Programming in C	CC	2	1	-	3
BEE-106	Basic Electrical Engineering	CC	2	1	-	3
AP-122	Applied Physics – I – Fields & Waves	CC			2	1
AC-123	Applied Chemistry Lab	CC			2	1
BME- 124	Element of Mechanical Engineering Lab	CC			2	1
BCS- 125	Programming in C Lab	CC			2	1
BEE-126	Basic Electrical Engineering Lab	CC			2	1
Value Added Courses						
BCS 101	English	VA	1	-	-	1
BSS 104	Behavioral Science-I Understanding Self For Effectiveness- I	VA	1	-	-	1
FLT 101 FLG 101 FLS 101 FLC 101	Foreign Language – I French German Spanish Chinese	VA	2	-	-	2
Non-Teaching Credit Course (NTCC)						
AND001	Anandam-I	NTCC	-	-	-	2
	TOTAL					**30**

AMITY SCHOOL OF ENGINEERING & TECHNOLOGY (ASET)

Program Name: B.Tech –Chemical Engineering

SECOND SEMESTER

Course Code	Course Title	Category	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits
Core Courses						
AM- 201	Applied Mathematics – II	CC	3	1	-	4
AP-202	Applied Physics – II – Modern Physics	CC	2	1	-	3
BCS- 203	Object Oriented Programming in C^{++}	CC	2	1	-	3
BME-204	Engineering Mechanics	CC	2	1	-	3
BME-205	Engineering Graphics	CC	1	-	-	1
BME 206	Domain Workshop	CC	1	-	-	1
AP- 222	Applied Physics – II – Modern Physics	CC	-	-	2	1
BCS- 223	Object Oriented Programming in C^{++} Lab	CC	-	-	2	1
BME-224	Engineering Mechanics Lab	CC	-	-	2	1
BME-225	Engineering Graphics Lab	CC	-	-	2	1
	Open Elective-1	OE	3	-	-	3
Value Added Courses						
BCS 201	English	VA	1	-	-	1
BSS 204	Behavioral Science – II Problem Solving & Creative Thinking	VA	1	-	-	1
FLT 201 FLG 201 FLS 201 FLC 201	Foreign Language – II French German Spanish Chinese	VA	2	-	-	2
EVS-001	**Environmental Studies**	VA	4			4
Non-Teaching Credit Course (NTCC)						
AND002	Anandam-II	NTCC	-	-	2	2
	TOTAL					**32**

AMITY SCHOOL OF ENGINEERING & TECHNOLOGY (ASET)

Program Name: B.Tech –Chemical Engineering

THIRD SEMESTER

Course Code	Course Title	Category	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits
Core Courses						
AM- 301	Applied Mathematics – III	CC	3	1	-	4
BTH- 302	Fluid and Particle Mechanics	CC	3	1	-	4
BTH- 303	Chemical Process Calculations	CC	3	1	-	4
BTH-304	Chemical Technology-I	CC	2	1	-	3
BTH- 322	Fluid Mechanics Lab	CC	-	-	2	1
Domain Elective-I : Choose any one from the following courses						
BTH- 305	Material Science	DE	3	1	-	4
BTH-306	Polymer Technology	DE	3	1	-	4
	Open Elective –II	OE				3
Value Added Course						
BCS 301	Communication Skills – I	VA	1	-	-	1
BSS 304	Behavioral Science-III (Interpersonal Communication)	VA	1	-	-	1
FLT 301 FLG 301 FLS 301 FLC 301	Foreign Language – III French German Spanish Chinese	VA	2	-	-	2
	TOTAL					**27**

AMITY SCHOOL OF ENGINEERING & TECHNOLOGY (ASET)

Program Name: B.Tech –Chemical Engineering

FOURTH SEMESTER

Course Code	Course Title	Category	Lecture (L) Hours Per week	Tutorial (T) Hours Per	Practical (P) Hours Per week	Total Credits
Core Courses						
BTH-401	Chemical Technology-II	CC	2	1	-	3
BTH-402	Chemical Engineering Thermodynamics-I	CC	3	1	-	4
BTH- 403	Mechanical Operations	CC	3	1	-	4
BTH- 421	Chemical Technology Lab	CC	-	-	2	1
BTH- 423	Mechanical Operation Lab	CC	-	-	2	1
Domain Elective-II : Choose any one from the following courses						
BTH- 404	Numerical Analysis	DE	2	1	-	3
BTH- 424	Numerical Analysis Lab (DE-II)	DE	-	-	2	1
BTH- 405	Corrosion Science and Engg.	DE	3	1	-	4
	Open Elective –III	OE				**3**
Value AddedCourses						
BCS 401	Communication Skills - II	VA	1	-	-	1
BSS 404	Behavioral Science – IV, Relationship Management	VA	1	-	-	1
FLT 401 FLG 401 FLS 401 FLC 401	Foreign Language – IV French German Spanish Chinese	VA	2	-	-	2
	TOTAL					**24**

Note: -Industrial Training completed during summer vacations and will be evaluated in fifth Semester.

AMITY SCHOOL OF ENGINEERING & TECHNOLOGY (ASET)

Program Name: B.Tech –Chemical Engineering

FIFTH SEMESTER

Course Code	Course Title	Category	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits
Core Courses						
BTH- 501	Chemical Reaction Engineering –I	CC	3	1	-	4
BTH- 502	Chemical Engineering Thermodynamics-II	CC	3	1	-	4
BTH-503	Heat Transfer	CC	3	1	-	4
BTH- 504	Mass Transfer-I	CC	3	1	-	4
BTH- 521	Chemical Reaction Engineering Lab	CC			2	1
BTH- 523	Heat Transfer Lab	CC			2	1
BCS-510	Web Development	CC	2	-	-	2
BCS-530	Web Development Lab	CC	-	-	2	1
Domain Elective-III : Choose any one from the following courses						
BTH- 505	Process Instrumentation	DE	3	-	-	3
BTH- 506	Piping Design	DE	3	-	-	3
	Open Elective -IV	OE				**3**
Non-Teaching Credit Course (NTCC)						
BTH- 550	Practical Training Evaluation	NTCC	-	-	-	3
Value Added Courses						
BCS 501	Communication Skills – III	VA	1	-	-	1
BSS 504	Behavioral Science –V Group Dynamics & Team Building	VA	1	-	-	1
FLT 501 FLG 501 FLS 501 FLC 501	Foreign Language – V French German Spanish Chinese	VA	2	-	-	2
	TOTAL					**34**

AMITY SCHOOL OF ENGINEERING & TECHNOLOGY (ASET)

Program Name: B.Tech –Chemical Engineering

SIXTH SEMESTER

Course Code	Course Title	Category	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits
Core Courses						
BTH- 601	Process Dynamics and Control	CC	3	1	-	3
BTH- 602	Chemical Reaction Engineering-II	CC	3	1	-	3
BTH- 603	Mass Transfer-II	CC	3	1	-	4
BTH- 604	Equipment Design	CC	3	1	-	3
BTH- 605	Environmental Pollution and Control	CC	2		-	2
BTH- 621	Process Dynamics and Control Lab	CC			2	1
BTH- 623	Mass Transfer Lab	CC			2	1
BTH- 625	Environmental Pollution and Control Lab	CC			2	1
BCS-610	Programming with Python	CC	2	-	-	2
BCS-630	Programming with Python Lab	CC	-	-	2	1
Domain Elective-IV : Choose any one from the following courses						
BTH- 606	Energy Management	DE	3	--	--	3
BTH-607	Energy Resources &Utilization	DE	3	-	-	3
	Open Elective –V	OE				3
Value Added Courses						
BCS 601	Communication Skills – IV	VA	1	-	-	1
BSS 604	Behavioral Science – VI, Stress & Coping Strategies	VA	1	-	-	1
FLT 601 FLG 601 FLS 601 FLC 601	Foreign Language – VI French German Spanish Chinese	VA	2	-	-	2
	TOTAL	OE				**31**

Note: -Industrial Training completed during summer vacations and will be evaluated in seventh Semester.

AMITY SCHOOL OF ENGINEERING & TECHNOLOGY (ASET)

Program Name: B.Tech –Chemical Engineering

SEVENTH SEMESTER

Course Code	Course Title	Category	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits
Core Courses						
BTH- 701	Modeling & Simulation	CC	3	1		4
BTH - 702	Petroleum Refining	CC	2	1	-	3
BTH- 703	Transport Phenomena	CC	3	1	-	4
BCS-710	Advanced Programming with Python	CC	2	-	-	2
BCS-730	Advanced Programming with Python Lab	CC	-	-	2	1
	Open Elective –VI	OE	-	-	-	3
Non-Teaching credit course (NTCC)						
BTH-750	Industrial Training Evaluation	NTCC	-	-	-	3
BTH-760	Seminar	NTCC	-	-	-	3
Value Added Courses						
BCS 701	Communication Skills – V	VA	1	-	-	1
BSS 704	Behavioral Science – VII, Individual Society & Nation	VA	1	-	-	1
FLT 701 FLG 701 FLS 701 FLC 701	Foreign Language – VII French German Spanish Chinese	VA	2	-	-	2
	TOTAL					**27**

Program Name: B.Tech –Chemical Engineering

EIGHT SEMESTER

Course Code	Course Title	Category	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits
Core Courses						
BTH- 801	Plant Design & Economics	CC	3	1	-	4
BTH- 802	Safety and Hazard Analysis	CC	2	1		3
BTH- 803	New Separation Processes	CC	2	1		3
BTH- 860	Project	NTCC	-	-	-	12
	TOTAL					**22**

Total Credits (30+32+27+24+34+31+27+22) = 227

Curriculum & Scheme of Examination

APPLIED MATHEMATICS – I

Course Code: **AM 101** **Credit Units: 04**

Course Objective:

The knowledge of Mathematics is necessary for a better understanding of almost all the Engineering and Science subjects. Here our intention is to make the students acquainted with the concept of basic topics from Mathematics, which they need to pursue their Engineering degree in different disciplines.

Course Learning Outcome: At the successful completion of this course you (the student) should be able to:

1. Investigate the basic concept about Calculus and differential equations.
2. Create an interest in finding the solution of problem, length, area, volume etc of the curve and application of Vector calculus.
3. Apply the basic concepts of Calculus to find Asymptotes, curvature, tangents & normal's, maxima & minima, partial derivatives and approximate calculation of a function.
4. Develop the formulation of the problem and differential equation, define its nature by using the fundamental of calculus and its applications.

Course Contents:

Module I: Differential Calculus

Successive differentiation, Leibnitz's theorem (without proof), Mean value theorem, Taylor's theorem (proof), Remainder terms, Asymptote & Curvature, Partial derivatives, Chain rule, Differentiation of Implicit functions, Exact differentials, Tangents and Normals, Maxima, Approximations, Differentiation under integral sign, Jacobians and transformations of coordinates.

Module II: Integral Calculus

Fundamental theorems, Reduction formulae, Properties of definite integrals, Applications to length, area, volume, surface of revolution, improper integrals, Multiple Integrals-Double integrals, Applications to areas, volumes.

Module III: Ordinary Differential Equations

Formation of ODEs, Definition of order, degree & solutions, ODE of first order : Method of separation of variables, homogeneous and non homogeneous equations, Exactness & integrating factors, Linear equations & Bernoulli equations, General linear ODE of n^{th} order, Solution of homogeneous equations, Operator method, Method of undetermined coefficients, Solution of simple simultaneous ODE.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

Text:

- Differential Calculus by Shanti Narain
- Integral Calculus by Shanti Narain

References:

- Differential Equation by A.R. Forsyth
- Higher Engineering Mathematics by H.K. Dass

APPLIED PHYSICS - I - FIELDS AND WAVES

Course Code: AP 102 Credit Units: 03

Course Objective:
Aim of this course is to introduce the students to fundamentals of graduate level physics, which form the basis of all applied science and engineering.

Course Learning Outcome:
At the successful completion of this course you (the student) should be able to:
1. develop an understanding of the various concepts of simple harmonic motion for with and without damping.
2. solve simple problems on simple harmonic motion and related topics.
3. explain and interpret the wave nature of light.
4. solve simple problems on the applications of wave nature of light
5. define and understand vector calculus and electromagnetics.
6. solve numerical problems on vector calculus and electromagnetic

Course Contents:

Module I: Oscillations & Waves
Oscillations: Introduction to S.H.M. Damped Oscillations: Differential Equation and its solution, logarithmic decrement, Quality Factor, Different conditions of damping of harmonic oscillations. Forced oscillations: Amplitude and Frequency Response, Resonance, Sharpness of Resonance
Plane Progressive Waves: Differential Equation and Solution, Superposition of Progressive Waves stationary waves.
Ultrasonics: Generation and application of ultrasonicwaves.

Module II: Wave Nature of Light
Interference: Coherent Sources, Conditions of interference, Interference due to division of wavefront, Fresnels biprism Interference due to division of amplitude, Newton's rings, Interference due to thin films, .
Diffraction: Fresnel and Fraunhofer diffraction, Fraunhofer diffraction at a single slit, double slit, N Slits, Transmission grating, Rayleigh criterion and Resolving power of grating.
Polarization: Birefringence, Nicol prism, Production and analysis of plane, circularly and elliptically polarized light, Half and quarter wave plates, Optical rotation, Polarimeter.

Module III: Electromagnetics
Scalar and vector fields, gradient of a scalar field, physical significance of gradient, equipotential surface. Line, surface and volume integrals, Divergence and curl of vector field and mathematical analysis physical significance, Electric flux, Gauss' law, Proof and Applications, Gauss divergence and Stokes theorems.
Differential form of Gauss' Law, Amperes' Law, Displacement current, Faradays Law, Maxwell equations in free space & isotropic media (Integral form & differential form), EM wave propagation in free space, Poynting vector.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Waves & oscillation, A. P. French
- Physics of waves, W. C. Elmore & M. A. Heald
- Introduction to Electrodynamics, D. J. Griffith
- Electrodynamics, Gupta, Kumar & Singh
- Optics, A. K. Ghatak
- Engineering Physics, Satya Prakash

APPLIED CHEMISTRY

Course Code: AC 103 Credit Units: 03

Course Objective:

Four basic sciences, Physics, Chemistry, Mathematics and Biology are the building blocks in engineering and technology. Chemistry is essential to develop analytical capabilities of students, so that they can characterize, transform and use materials in engineering and apply knowledge in their field. All engineering fields have unique bonds with chemistry whether it is Aerospace, Mechanical, Environmental and other fields the makeup of substances is always a key factor, which must be known. For electronics and computer science engineering, apart from the material, computer modeling and simulation knowledge can be inherited from the molecule designing. The upcoming field of technology like Nanotechnology and Biotechnology depends fully on the knowledge of basic chemistry. With this versatile need in view, course has been designed in such a way so that the student should get an overview of the whole subject.

Course learning outcomes (CLO).

At the successful completion of this course you (the student) should be able to:

1. Understand the structure and chemical transformations of molecules.
2. Understand the application of chemical process in industries.
3. Basic idea about water treatment, lubrication, corrosion, fuel, spectroscopy etc

Course Contents:

Module I: Water Technology

Introduction and specifications of water, Hardness and its determination (EDTA method only), Alkalinity, Boiler feed water, boiler problems – scale, sludge, priming & foaming: causes & prevention, Boiler problems – caustic embitterment & corrosion: causes & prevention, Carbonate & phosphate conditioning, colloidal conditioning & calgon treatment Water softening processes: Lime – soda process, Ion exchange method, Water for domestic use.

Module II: Fuels

Classification, calorific value of fuel, (gross and net), Determination of calorific value of fuels, bomb calorimeter, Solid fuels - Proximate and ultimate analysis, Octane & Cetane No. and its significance. Numericals on combustion

Module III: Instrumental Methods of analysis

Introduction; Principles of spectroscopy; Laws of absorbance IR : Principle, Instrumentation, Application UV : Principle, Instrumentation, Application, NMR : Principle, Instrumentation, Application

Module III: Lubricants

Introduction; Mechanism of Lubrication; Types of Lubricants; Chemical structure related to Lubrication; Properties of lubricants; Viscosity and Viscosity Index; Iodine Value; Aniline Point; Emulsion number; Flash Point; Fire Point; Drop Point; Cloud Point; Pour Point. Selection of Lubricants.

Module VI: Corrosion

Introduction, Mechanism of dry and wet corrosion, Types of corrosion-Galvanic, Concentration cell, soil, pitting, intergranular, waterline. Passivity. Factors influencing corrosion. Corrosion control.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

Text:

- Engineering Chemistry- Jain and Jain
- Engineering Chemistry - Sunita Rattan
- Engineering Chemistry - Shashi Chawla

References:

- Engineering Chemistry – Dara and Dara
- Spectroscopy- Y.R Sharma
- Corrosion Engineering – Fontenna and Greene

ELEMENT OF MECHANICAL ENGINEERING

Course Code: BME 104 Credit Units: 03

Course Objective:

The objective of this course is to impart the basic knowledge of thermodynamics, stress- strain, materials & their properties and various manufacturing processes to the students of all engineering discipline.

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Investigate – Basic machines used in the field of mechanical engineering
2. Create – Mathematical models of fundamental physical phenomenon and apply them to predict the behaviour of engineering systems
3. Apply – this knowledge to analyse the working of IC Engines, Steam Turbines, Lathe machines etc.
4. Develop – Ability to perform and conduct basic experiments and evaluate the results of the same.

Course Contents:

Module I: Fundamental Concepts

Definition of thermodynamics, system, surrounding and universe, phase, concept of continuum, macroscopic & microscopic point of view, Thermodynamic equilibrium, property, state, path, process, cyclic process, Zeroth, first and second law of thermodynamics, Carnot Cycle, Introduction to I.C. Engines-two &four stoke S.I. and C.I. engines. Otto cycle. Diesel cycle.

Module II: Stress And Strain Analysis

Simple stress and strain: introduction, normal shear, and stresses-strain diagrams for ductile and brittle materials. Elastic constants, one-dimensional loadings of members of varying cross-section, Strain Energy, Properties of material-strength, elasticity, stiffness, malleability, ductility, brittleness, hardness and plasticity etc; Concept of stress and strain stress strain diagram, tensile test, impact test and hardness test.

Module III: Casting & Forging

Introduction of casting, pattern, mould making procedures, sand mould casting, casting defects, allowances of pattern. Forging-introduction, upsetting & drawing out, drop forging, press forging & m/c forging

Module IV: Welding & Sheet metal working

Introduction of welding processes, classification, gas welding, arc welding, resistance welding. Introduction to sheet metal shop, Shearing, trimming, blanking, piercing, shaving, notching, stretch forming, nibbling coining, embossing and drawing.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Engineering thermodynamics, by P.K. Nag, Tata McGraw Hill.
- Thermal Engineering, by D.S. Kumar. S.K. Kataria and Sons.
- Thermal Engineering by PL Ballaney; Khanna Publishers, Delhi.
- Engineering Thermodynamics: Work and Heat Transfer, by Rogers and Mayhew, ELBS Publications
- Heine, R.W. C.R. Loper and P.C. Rosenthal, Principles of metal casting McGraw Hill
- Welding Technology by R.S. Parmar, Khanna Publishers.
- Thermodynamics and Heat Engines Volume-I, by R. Yadav: Central Publications.
- Ganesan, V. Internal Combustion Engine, Tata McGraw-Hill.
- Mathur, M.L. and Sharma, R.P. Internal Combustion Engine. Dhanpat Rai Publication

INTRODUCTION TO COMPUTERS AND PROGRAMMING IN C

Course Code: BCS 105 Credit Units: 03

Course Objective:

The objective of this course module is to acquaint the students with the basics of computers system, its components, data representation inside computer and to get them familiar with various important features of procedure oriented programming language i.e. C.

Course learning outcomes (CLO)

CLO1: Able to figure out the basic architecture and components of computers
CLO 2: Will be able to understand the syntax of programs in C language
CLO 3: Build C language programs and projects.

Course Contents:

Module I: Introduction
Introduction to computer, history, von-Neumann architecture, memory system (hierarchy, characteristics and types), H/W concepts (I/O Devices), S/W concepts (System S/W & Application S/W, utilities). Data Representation: Number systems, character representation codes, Binary ,octal, hexadecimal and their interconversions. Binary arithmetic, floating point arithmetic, signed and unsigned numbers, Memory storage unit.

Module II: Programming in C
History of C, Introduction of C, Basic structure of C program, Concept of variables, constants and data types in C, Operators and expressions: Introduction, arithmetic, relational, Logical, Assignment, Increment and decrement operator, Conditional, bitwise operators, Expressions, Operator precedence and associativity. Managing Input and output Operation, formatting I/O.

Module III: Fundamental Features in C
C Statements, conditional executing using if, else, nesting of if, switch and break Concepts of loops, example of loops in C using for, while and do-while, continue and break. Storage types (automatic, register etc.), predefined processor, Command Line Argument.

Module IV: Arrays and Functions
One dimensional arrays and example of iterative programs using arrays, 2-D arrays Use in matrix computations. Concept of Sub-programming, functions Example of user defined functions. Function prototype, Return values and their types, calling function, function argument, function with variable number of argument, recursion.

Module V: Advanced features in C
Pointers, relationship between arrays and pointers Argument passing using pointers, Array of pointers. Passing arrays as arguments.
Strings and C string library.
Structure and Union. Defining C structures, Giving values to members, Array of structure, Nested structure, passing strings as arguments.
File Handling.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

Text:

- "ANSI C" by E Balagurusamy
- Yashwant Kanetkar, "Let us C", BPB Publications, 2nd Edition, 2001.
- Herbert Schildt, "C:The complete reference", Osbourne Mcgraw Hill, 4th Edition, 2002.
- V. Raja Raman, "Computer Programming in C", Prentice Hall of India, 1995.

References*:*

- ***Kernighan & Ritchie, "C Programming Language", The (Ansi C Version), PHI, 2nd Edition.***
- ***J. B Dixit, "Fundamentals of Computers and Programming in 'C'.***
- P.K. Sinha and Priti Sinha, "Computer Fundamentals", BPB publication.

BASIC ELECTRICAL ENGINEERING

Course Code: BEE 106 Credit Units: 03

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Develop a practical approach for analysis of resistive circuits and solution of resistive circuits with independent sources.
2. Able to apply two terminal element relationships for inductors and capacitors in an electrical network.
3. Capable of analysis of single phase AC circuits, the representation of alternating quantities and determining the power in these circuits.
4. To acquire the knowledge about the constructional concepts & working principles for the applications of DC machines, AC machines & measuring instruments.
5. Able to identify, formulate, and solve the electrical engineering problems.

Course Objective:

The objective of the course is to provide a brief knowledge of Electrical Engineering to students of all disciplines. This Course includes some theorems related to electrical, some law's related to flow of current, voltages, basic knowledge of Transformer, basic knowledge of electromagnetism, basic knowledge of electrical network.

Course Contents:

Module I: Basic Electrical Quantities

Basic Electrical definitions-Energy, Power, Charge, Current, Voltage, Electric Field Strength, Magnetic Flux Density, etc., Resistance, Inductance and Capacitance. Ideal Source, Independent Source and Controlled Source

Module II: Network Analysis Techniques & Theorems

Circuit Principles: Ohm's Law, Kirchoff's Current Law, Kirchoff's Voltage Law Network Reduction: Star–Delta Transformation, Source Transformation, Nodal Analysis, Loop analysis. Superposition theorem Thevenin's Theorem, Norton's theorem and Reciprocity theorem.,practical application

Module III: Alternating Current Circuits

Peak, Average and RMS values for alternating currents, Power calculation:
reactive power, active power, Complex power, power factor, impedance, reactance, conductance, susceptance Resonance: series Resonance, parallel resonance, basic definition of Q factor & Band-width.

Module IV: Transformers

Basic Transformer Operation principle, Construction, Voltage relations, Current relations, Linear circuit models, Open circuit test, Short circuit test, Transformer Efficiency.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- R.J. Smith, R.C. Dorf: Circuits, devices and Systems
- B.L. Thareja: Electrical Technology : Part -1 & 2
- V. Deltoro: Electrical Engineering fundamentals
- Schaum's Series: Electrical Circuits

APPLIED PHYSICS LAB

Course Code: AP 122 Credit Units: 01

Course Learning Objective:

It is expected that by the end of the course, students will be comfortable in –
1. To gain practical knowledge by applying the experimental methods to correlate with the Physics theory.
2. To learn the usage of electrical and optical systems for various measurements.
3. Apply the analytical techniques and graphical analysis to the experimental data.
4. To develop intellectual communication skills and discuss the basic principles of scientific concepts in a group.

List of Experiments:

1. To determine the wavelength of sodium light by Newton's rings method.
2. To determine the dispersive power of the material of prism with the help of a spectrometer.
3. To determine the specific rotation of sugar by Bi-quartz or Laurent half shade polarimeter.
4. To determine the speed of ultrasonic waves in liquid by diffraction method.
5. To determine the width of a narrow slit using diffraction phenomena.
6. To determine the temperature coefficient of platinum wire, using a platinum resistance thermometer and a Callender & Griffth's bridge.
7. To determine the value of specific charge (ratio of e/m) of an electron by Thomson method.
8. To determine the internal resistance of Leclanche cell with the help of Potentiometer.
9. To determine the resistance per unit length of a Carey Foster's bridge wire and also to find out the specific resistance of a given wire.
10. To plot graph showing the variation of magnetic field with distance along the aixs of a circular coil carrying current, and hence estimate the radius of the coil.
11. To determine the value of acceleration due to gravity ('g') in the laboratory using bar pendulum.
12. To determine the moment of inertia of a flywheel about its own axis of rotation.
13. To determine the density of material of the given wire with the help of sonometer.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	15	15	15	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

APPLIED CHEMISTRY LAB

Course Code: AC 123 Credit Units: 01

Course Contents:

LIST OF EXPERIMENTS

(Any 10 Experiments)

1. To determine the ion exchange capacity of a given cation exchanger.

2. To determine the temporary, permanent and total hardness of a sample of water by complexometric titration method.

3. To determine the type and extent of alkalinity of given water sample.

4. To determine the number of water molecules of crystallization in Mohr's salt (ferrous ammonium sulphate) provided standard potassium dichromate solution (0.1N) using diphenylamine as internal indicator.

5. To determine the ferrous content in the supplied sample of iron ore by titrimetric analysis against standard $K_2Cr_2O_7$ solution using potassium ferricyanide $[K_3Fe(CN)_6]$ as external indicator.

6. (a) To determine the surface tension of a given liquid by drop number method.
   (b) To determine the composition of a liquid mixture A and B (acetic acid and water) by surface tension method.

7. To prepare and describe a titration curve for phosphoric acid – sodium hydroxide titration using pH-meter.

8. (a) To find the cell constant of conductivity cell.
   (b) Determine the strength of hydrochloric acid solution by titrating it against standard sodium hydroxide solution conductometrically

9. Determination of Dissolved oxygen in the given water sample.

10. To determine the total residual chlorine in water.

11. Determination of amount of oxalic acid and H_2SO_4 in 1 L of solution using N/10 NaOH and N/10 $KMnO_4$ solution.

12. Determination of viscosity of given oil by means of Redwood viscometer I.

13. To determine flash point and fire point of an oil by Pensky Martin's Apparatus

14. To determine the Iodine value of the oil.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	15	15	15	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

ELEMENT OF MECHANICAL ENGINEERING LAB

Course Code: BME 124 Credit Units: 01

1. Welding

   (a) Arc Welding
   - Butt Joint
   - Lap Joint
   - T Joint

   (b) Gas Welding
   - Butt Joint
   - Lap Joint
   - Brazing of Broken pieces

2. Foundry
   - Sand mould casting by single piece pattern& Split pattern bracket with cores

3. Sheet Metal
   - Dust Bin
   - Mug
   - Funnel
   - Cylindrical Mug with handle-Rectangular

4. Fitting Shop
   - Male – Female Joint
   - Rectangular piece
   - Filing the job

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	15	15	15	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

PROGRAMMING IN C LAB

Course Code: BCS 125 Credit Units: 01

Software Required: Turbo C

Course Contents:

- C program involving problems like finding the nth value of cosine series, Fibonacci series. Etc.
- C programs including user defined function calls
- C programs involving pointers, and solving various problems with the help of those.
- File handling

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	15	15	15	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

BASIC ELECTRICAL ENGINEERING LAB

Course Code: BEE 126 Credit Units: 01

List of Experiments:

1. To verify KVL & KCL in the given network.
2. To verify Superposition Theorem.
3. To verify Maximum Power Transfer Theorem.
4. To verify Reciprocity Theorem.
5. To determine and verify R_{Th}, V_{Th}, R_N, I_N in a given network.
6. To perform open circuit & short circuit test on a single-phase transformer.
7. To study transient response of a given RLC Circuit.
8. To perform regulation, ratio & polarity test on a single-phase transformer.
9. To measure power & power factor in a three phase circuit by two wattmeter method.
10. To measure power & power factor in a three phase load using three ammeter & three voltmeter method.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	15	15	15	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

ENGLISH

Course Code: BCS 101 Credit Unit: 01

Course Objective:

The course is intended to give a foundation of English Language. The literary texts are indented to help students to inculcate creative & aesthetic sensitivity and critical faculty through comprehension, appreciation and analysis of the prescribed literary texts. It will also help them to respond form different perspectives.

COURSE LEARNING OUTCOMES (CLO)

CLO 1 Identify the basic elements of grammar required for good and effective communication.

CLO 2 Interpret and discuss key ideas of grammar, diction and communication.

CLO 3 Develop Creative & Literary Sensitivity in all communication.

CLO 4 Design and create texts for a variety of purposes and audiences, evaluating and assessing the effectiveness of grammatical aspects.

Course Contents:

Module I: Vocabulary

Use of Dictionary, Use of Words: Diminutives, Homonyms & Homophones

Module II: Essentials of Grammar - I

Articles**,** Parts of Speech**,** Tenses

Module III: Essentials of Grammar - II

Sentence Structure, Subject -Verb agreement, Punctuation

Module IV: Communication

The process and importance, Principles & benefits of Effective Communication

Module V: Spoken English Communication

Speech Drills , Pronunciation and accent, Stress and Intonation

Module VI: Communication Skills - I

Developing listening skills, Developing speaking skills

Module VII: Communication Skills - II

Developing Reading Skills, Developing writing Skills

Module VIII: Written English communication

Progression of Thought/ideas, Structure of Paragraph, Structure of Essays

Module IX: Short Stories

Of Studies, by Francis Bacon, Dream Children, by Charles Lamb, The Necklace, by Guy de Maupassant
A Shadow, by R.K.Narayan, Glory at Twilight, Bhabani Bhattacharya

Module X: Poems

All the Worlds a Stage	Shakespeare
To Autumn	Keats
O! Captain, My Captain.	Walt Whitman
Where the Mind is Without Fear	Rabindranath Tagore
Psalm of Life	H.W. Longfellow

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

Text & References:

- Madhulika Jha, Echoes, Orient Long Man
- Ramon & Prakash, Business Communication, Oxford.
- Sydney Greenbaum Oxford English Grammar, Oxford.
- Successful Communications, Malra Treece (Allyn and Bacon)
- Effective Technical Communication, M. Ashraf Rizvi.

* 30 hrs Programme to be continued for Full year

BEHAVIOURAL SCIENCE - I
(UNDERSTANDING SELF FOR EFFECTIVENESS)

Course Code: BSS 104 Credit Units: 01

Course Objective:

This course aims at imparting:

- Understanding self & process of self exploration
- Learning strategies for development of a healthy self esteem
- Importance of attitudes and its effective on personality
- Building Emotional Competence

Course learning outcomes (CLOs)

At the successful completion of this course you (the student) should be able to:

1. Demonstrate awareness of self and the process of self-exploration.
2. Demonstrate knowledge of strategies for developing a healthy self-esteem.
3. Recognize the importance of attitudes and its effect on personality.
4. Identify the difference between healthy and unhealthy expression of emotions and develop emotional competence necessary for personal and professional life.

Course Contents:

Module I: Self: Core Competency
Understanding of Self
Components of Self – Self identity
Self concept
Self confidence
Self image

Module II: Techniques of Self Awareness
Exploration through Johari Window
Mapping the key characteristics of self
Framing a charter for self
Stages – self awareness, self acceptance and self realization

Module III: Self Esteem & Effectiveness
Meaning and Importance
Components of self esteem
High and low self esteem
Measuring your self esteem

Module IV: Building Positive Attitude
Meaning and nature of attitude
Components and Types of attitude
Importance and relevance of attitude

Module V: Building Emotional Competence
Emotional Intelligence – Meaning, components, Importance and Relevance
Positive and Negative emotions
Healthy and Unhealthy expression of emotions

Module VI: End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

- Organizational Behaviour, Davis, K.
- Hoover, Judhith D. Effective Small Group and Team Communication, 2002,Harcourt College Publishers
- Dick, Mc Cann & Margerison, Charles: Team Management, 1992 Edition, viva books
- Bates, A. P. and Julian, J.: Sociology - Understanding Social Behaviour
- Dressler, David and Cans, Donald: The Study of Human Interaction
- Lapiere, Richard. T – Social Change
- Lindzey, G. and Borgatta, E: Sociometric Measurement in the Handbook of Social Psychology, Addison – Welsley, US.
- Rose, G.: Oxford Textbook of Public Health, Vol.4, 1985.
- LaFasto and Larson: When Teams Work Best, 2001, Response Books (Sage), New Delhi
- J William Pfeiffer (ed.) Theories and Models in Applied Behavioural Science, Vol 2, Group (1996); Pfeiffer & Company
- Smither Robert D.; The Psychology of Work and Human Performance, 1994, Harper Collins College Publishers

FRENCH - I

Course Code: FLT 101 Credit Units: 02

Course Learning Objective:

- Students will hone Basic language skills such as reading, writing, speaking, listening & interactive in the language
- Students will be able to read and interpret small texts.
- Students will be able to communicate in small sentences in writing, self introduction, family description etc.
- Students will be able to communicate in small sentences in oral, self introduction, family description etc.

Course Objective:

To familiarize the students with the French language

- with the phonetic system
- with the syntax
- with the manners
- with the cultural aspects

Course Contents:

Module A: pp. 01 to 37: Unités 1, 2, Unité 3 Objectif 1, 2
Only grammar of Unité 3: objectif 3, 4 and 5

Contenu lexical: Unité 1 : Découvrir la langue française : (oral et écrit)

1. se présenter, présenter quelqu'un, faire la connaissance des autres, formules de politesse, rencontres
2. dire/interroger si on comprend
3. Nommer les choses

Unité 2: Faire connaissance

1. donner/demander des informations sur une personne, premiers contacts, exprimer ses goûts et ses préférences
2. Parler de soi: parler du travail, de ses activités, de son pays, de sa ville.

Unité 3: Organiser son temps

1. dire la date et l'heure

Contenu grammatical:

1. organisation générale de la grammaire
2. article indéfini, défini, contracté
3. nom, adjectif, masculin, féminin, singulier et pluriel
4. négation avec « de », "moi aussi", "moi non plus"
5. interrogation : Inversion, est-ce que, qui, que, quoi, qu'est-ce que, où, quand, comment, quel(s), quelle(s)
   Interro-négatif : réponses : oui, si, non
6. pronom tonique/disjoint- pour insister après une préposition
7. futur proche

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- le livre à suivre : Campus: Tome 1

GERMAN - I

Course Code: FLG 101 Credit Units: 02

Course Objective:

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.
To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany.

Course learning Outcome: -

- Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of advance level.
- Students will be able to communicate with complex sentences.

After successful completion of this semester, students will be able to:

- able to form dialogue between doctor and patient.
- give order, request, suggestions and commands in positive and negative both.(formal and informal)
- use of imperative in different types of situation: In a bar/ Classroom/ Market etc. and express prohibitions and permissions
- make a curriculum vitae.
- write job letters/formal letters and deal typical question answer preparation of a job interview.

Course Contents:

Module I: Introduction
Self introduction: heissen, kommen, wohnwn, lernen, arbeiten, trinken, etc.
All personal pronouns in relation to the verbs taught so far.
Greetings: Guten Morgen!, Guten Tag!, Guten Abend!, Gute Nacht!, Danke sehr!, Danke!, Vielen Dank!, (es tut mir Leid!), Hallo, wie geht's?: Danke gut!, sehr gut!, prima!, ausgezeichnet!, Es geht!, nicht so gut!, so la la!, miserabel!

Module II: Interviewspiel
To assimilate the vocabulary learnt so far and to apply the words and phrases in short dialogues in an interview – game for self introduction.

Module III: Phonetics
Sound system of the language with special stress on Dipthongs

Module IV: Countries, nationalities and their languages
To make the students acquainted with the most widely used country names, their nationalitie and the language spoken in that country.

Module V: Articles
The definite and indefinite articles in masculine, feminine and neuter gender. All Vegetables, Fruits, Animals, Furniture, Eatables, modes of Transport

Module VI: Professions
To acquaint the students with professions in both the genders with the help of the verb "sein".

Module VII: Pronouns
Simple possessive pronouns, the use of my, your, etc.
The family members, family Tree with the help of the verb "to have"

Module VIII: Colours
All the color and color related vocabulary – colored, colorful, colorless, pale, light, dark, etc.

Module IX: Numbers and calculations – verb "kosten"
The counting, plural structures and simple calculation like addition, subtraction, multiplication and division to test the knowledge of numbers.
"Wie viel kostet das?"

Module X: Revision list of Question pronouns

W – Questions like who, what, where, when, which, how, how many, how much, etc.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

C – Project + Presentation

I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach , Deutsche Sprachlehre für Ausländer
- P.L Aneja , Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

SPANISH – I

Course Code: FLS 101 Credit Units: 02

Course Learning objective:

- Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of advance level.
- Students will be able to communicate with complex sentences

To familiarize the students of Spanish Language with

- To talk about incidents in past
- To narrate your past habits, childhood experiences etc.
- To describe major historical & cultural events.
- To familiarize students with important Hispanic personalities
- Typical question/Answer preparation for a job interview & CV

Course Objective:

To enable students acquire the relevance of the Spanish language in today's global context, how to greet each other. How to present / introduce each other using basic verbs and vocabulary

Course Contents:

Module I
A brief history of Spain, Latin America, the language, the culture…and the relevance of Spanish language in today's global context.
Introduction to alphabets

Module II
Introduction to '*Saludos*' (How to greet each other. How to present / introduce each other).
Goodbyes (despedidas)
The verb *llamarse* and practice of it.

Module III
Concept of Gender and Number
Months of the years, days of the week, seasons. Introduction to numbers 1-100, Colors, Revision of numbers and introduction to ordinal numbers.

Module IV
Introduction to *SER* and *ESTAR* (both of which mean To Be).Revision of '*Saludos*' and '*Llamarse*'. Some adjectives, nationalities, professions, physical/geographical location, the fact that spanish adjectives have to agree with gender and number of their nouns. Exercises highlighting usage of *Ser* and *Estar*.

Module V
Time, demonstrative pronoun (Este/esta, Aquel/aquella etc)

Module VI
Introduction to some key AR /ER/IR ending regular verbs.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español, En Directo I A
- Español Sin Fronteras

CHINESE – I

Course Code: FLC 101 Credit Units: 02

Course Objective:

There are many dialects spoken in China, but the language which will help you through wherever you go is Mandarin, or Putonghua, as it is called in Chinese. The most widely spoken forms of Chinese are Mandarin, Cantonese, Gan, Hakka, Min, Wu and Xiang. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Learning Objectives:

- Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of advance level.
- Students will be able to communicate with complex sentences.

To familiarize the students of Chinese language with:

1. Shopping at Chinese shops/stores.
2. Using public transportation.
3. Taking medical assistance
4. Talk in Chinese on such topics as sports and entertainment
5. Conversation at hotel.

Course Contents:

Module I
Show pictures, dialogue and retell.
Getting to know each other.
Practicing chart with Initials and Finals. (CHART – The Chinese Phonetic Alphabet Called "Hanyu Pinyin" in Mandarin Chinese.)
Practicing of Tones as it is a tonal language.
Changes in 3rd tone and Neutral Tone.

Module II
Greetings
Let me Introduce
The modal particle "ne".
Use of Please 'qing" – sit, have tea …….. etc.
A brief self introduction – Ni hao ma? Zaijian!
Use of "bu" negative.

Module III
Attributives showing possession
How is your Health? Thank you
Where are you from?
A few Professions like – Engineer, Businessman, Doctor, Teacher, Worker.
Are you busy with your work?
May I know your name?

Module IV
Use of "How many" – People in your family?
Use of "zhe" and "na".
Use of interrogative particle "shenme", "shui", "ma" and "nar".
How to make interrogative sentences ending with "ma".
Structural particle "de".
Use of "Nin" when and where to use and with whom. Use of guixing.

Use of verb “zuo” and how to make sentences with it.

Module V
Family structure and Relations.
Use of “you” – “mei you”.
Measure words
Days and Weekdays.
Numbers.
Maps, different languages and Countries.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- “Elementary Chinese Reader Part I” Lesson 1-10

ANANDAM-I

Course Code: AND001 Credit Units: 02

Course Objective:
Aanandam is a credited subject that aims to instill the **joy of giving** and sharing in young people through community participation, helping them to be responsible citizens and be initiators of change for a healthy society. A daily act of goodness and charity will infuse the habit of community service in students. The faculty will emphasize shift in focus-Happiness is not in acquiring things, but permanent happiness comes from giving, sharing, and caring for someone. The faculty will inspire students for Individual Social Responsibility (ISR) and will inculcate the qualities of compassion, an open mind, a willingness to do whatever is needed and positive attitude in students. Imagination and Creativity are to be appreciated. An aim and a vision are to be developed in students.

OUTCOME OF AANANDAM COURSE

The student should develop:
• Awareness and empathy regarding community issues
• Interaction with the community and impact on society
• Interaction with mentor and development of Student teacher relationship
• Interaction among students, enlarge social network
• Cooperative and Communication skills and leadership qualities
• Critical thinking, Confidence and Efficiency

AANANDAM: COMMUNITY SERVICE

• Community service programs are very effective for students' personal and social, ethical, and academic development. These effects depend on the characteristics of the programs chosen
• Involvement of students in community work has an impact on development of student skills, creativity, critical thinking, and innovative powers. Passion and Positivity are basic requirements for Community service
• They would examine social challenges /problems, assess the needs of the community, evaluate previous implemented projects, and think of further solutions
• They would learn to cooperate and collaborate with other agencies and inculcate leadership qualities.

APPLIED MATHEMATICS – II

Course Code: AM 201 Credit Units: 04

Course Objective:

The knowledge of Mathematics is necessary for a better understanding of almost all the Engineering and Science subjects. Here our intention is to make the students acquainted with the concept of basic topics from Mathematics, which they need to pursue their Engineering degree in different disciplines.

Course Learning Outcome: -

At the successful completion of this course you (the student) should be able to:

1. Solve system of linear equations; be familiar with the definition and properties of matrix; find the eigenvalues and eigenvectors of a square matrix.
2. Investigate the convergence of infinite series using different tests.
3. Calculate the measure of central tendency, moments, skewness and kurtosis.
4. Develop knowledge of basic discrete and continuous distributions (Binomial, Poisson, Normal) and how to work with them.
5. Apply the method to use complex variable and complex valued functions and able to perform their differentiation and integration.

Course Contents:

Module I: Linear Algebra

Hermitian and Skew Hermitian Matrix, Unitary Matrix, Orthogonal Matrix, Elementary Row Transformation, Reduction of a Matrix to Row Echelon Form, Rank of a Matrix, Consistency of Linear Simultaneous Equations, Gauss Elimination Method, Gauss-Jordan Method, Eigen Values and Eigen Vectors of a Matrix, Caley-Hamilton Theorem, Diagonalization of a Matrix, Vector Space, Linear Independence and Dependence of Vectors, Linear Transformations.

Module II: Infinite Series

Definition of Sequence, Bounded Sequence, Limit of a Sequence, Series, Finite and Infinite Series, Convergence and Divergence of Infinite series, Cauchy's Principle of Convergence, Positive Term Infinite Series, Comparison test, D'Alembert's Ratio test. Raabe's Test, Cauchy's nth root Test. Logarithmic Test, Alternating Series, Leibnitz's Test, Absolute and conditioinal convergence, Uniform Convergence, Power Series and its Interval of Convergence.

Module III: Complex Analysis

De Moivre's Theorem and Roots of Complex Numbers, Logarithmic Functions, Circular, Hyperbolic Functions and their Inverses.

Functions of a Complex Variables, Limits, Continuity and Derivatives, Analytic Function, Cauchy-Riemann Equations (without proof), Harmonic Function, Harmonic Conjugates, Conformal Mapping, Bilinear Transformations, Complex Line Integral, Cauchy Integral Theorem, Cauchy Integral Formula, Derivative of Analytic Function, Power Series, Taylor Series, Laurent Series, Zeroes and Singularities, Residues, Residue Theorem, Evaluation of Real Integrals of the Form $\int_0^{2\pi} F(\cos\theta, \sin\theta)\, d\theta$ and $\int_{-\infty}^{\infty} \frac{f(x)}{F(x)}\, dx$.

Module IV: Statistics and Probability

Moments, Skewness, Kurtosis, Random Variables and Probability Distribution, Mean and Variance of a Probability Distribution, Binomial Distribution, Poisson Distribution and Normal Distribution.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Engineering Mathematics by Erwin Kreyszig.
- Engineering Mathematics by R.K. Jain and S.R.K. Iyengar.
- Higher Engineering Mathematics by H.K. Dass.
- Engineering Mathematics by B.S. Grewal.
- Differential Calculus by Shanti Narain.
- Integral Calculus by Shanti Narain.
- Linear Algebra- Schaum Outline Series

APPLIED PHYSICS - II - MODERN PHYSICS

Course Code: AP- 202 Credit Units: 03

Course Objective:

Aim of this course is to introduce the students to fundamentals of graduate level physics which form the basis of all applied science and engineering.

Course Learning Outcome: -At the successful completion of this course you (the student) should be able to:
1) Define and understand space and time and the variations in other related fundamental quantities such as mass, velocity and force.
2) Solve simple problems relating to the above concepts.
3) Explain by extending the understanding as laid down in Quantum theory to other phenomenon as observed in sub-atomic Physics and also to solve simple problems in
Quantum Theory
4) Appreciate and understand the various spectra as observed during electronic transitions
5) Understand the way nature has endowed properties to materials.

Course Contents:

Module I: Special Theory of Relativity
Michelson-Morley experiment, Importance of negative result, Inertial & non-inertial frames of reference, Einstein's postulates of Special theory of Relativity, Space-time coordinate system, Relativistic Space Time transformation (Lorentz transformation equation), Transformation of velocity, Addition of velocities, Length contraction and Time dilation, Mass-energy equivalence (Einstein's energy mass relation) & Derivation of Variation of mass with velocity,

Module II: Wave Mechanics
Wave particle duality, De-Broglie matter waves, phase and group velocity, Heisenberg uncertainty principle, wave function and its physical interpretation, Operators, expectation values. Time dependent & time independent Schrödinger wave equation for free & bound states, square well potential (rigid wall), Step potential.

Module III: Atomic Physics
Vector atom model, LS and j-j coupling, Zeceman effect (normal & anomalous), Paschen-Bach effect, X-ray spectra and energy level diagram, Moseleys Law, Lasers – Einstein coefficients, conditions for light amplification, population inversion, optical pumping, three level and four level lasers, He-Ne and Ruby laser, Properties and applications of lasers.

Module IV: Solid State Physics
Sommerfield's free electron theory of metals, Fermi energy, Introduction to periodic potential & Kronig-Penny model (Qualitative) Band Theory of Solids, Semi-conductors: Intrinsics and Extrinsic Semiconductors, photoconductivity and photovotaics, Basic aspects of Superconductivity, Meissner effect.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Concept of Modern Physics, A. Beiser
- Applied Physics II, Agarawal & Goel
- Solid State Physics, S. O. Pallai
- Physics of Atom, Wehr & Richards

ENVIRONMENT STUDIES

Course Code: EVS 001 Credit Units: 04

Course Objective:

The term environment is used to describe, in the aggregate, all the external forces, influences and conditions, which affect the life, nature, behaviour and the growth, development and maturity of living organisms. At present a great number of environment issues, have grown in size and complexity day by day, threatening the survival of mankind on earth. A study of environmental studies is quite essential in all types of environmental sciences, environmental engineering and industrial management. The objective of environmental studies is to enlighten the masses about the importance of the protection and conservation of our environment and control of human activities which has an adverse effect on the environment.

Course Contents:

Module I: The multidisciplinary nature of environmental studies
Definition, scope and importance, Need for public awareness

Module II: Natural Resources
Renewable and non-renewable resources:
Natural resources and associated problems, Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.
Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems., Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, case studies., Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

- Role of an individual in conservation of natural resources.
- Equitable use of resources for sustainable lifestyles.

Module III: Ecosystems
Concept of an ecosystem, Structure and function of an ecosystem, Producers, consumers and decomposers
Energy flow in the ecosystem, Ecological succession, Food chains, food webs and ecological pyramids
Introduction, types, characteristic features, structure and function of the following ecosystem:
Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems (ponds, streams, lakes, rivers, ocean estuaries)

Module IV: Biodiversity and its conservation
Introduction – Definition: genetic, species and ecosystem diversity, Biogeographical classification of India
Value of biodiversity: consumptive use, productive use, social, ethical aesthetic and option values
Biodiversity at global, national and local levels, India as a mega-diversity nation, Hot-spots of biodiversity
Threats to biodiversity: habitat loss, poaching of wildlife, man wildlife conflicts
Endangered and endemic species of India, Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity

Module V: Environmental Pollution
Definition, Causes, effects and control measures of:
Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear pollution, Solid waste management: Causes, effects and control measures of urban and industrial wastes.
Role of an individual in prevention of pollution., Pollution case studies.
Disaster management: floods, earthquake, cyclone and landslides.

Module VI: Social Issues and the Environment
From unsustainable to sustainable development, Urban problems and related to energy, Water conservation, rain water harvesting, watershed management, Resettlement and rehabilitation of people; its problems and concerns. Case studies., Environmental ethics: Issues and possible solutions
Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.
Wasteland reclamation, Consumerism and waste products, Environmental Protection Act
Air (Prevention and Control of Pollution) Act, Water (Prevention and control of Pollution) Act
Wildlife Protection Act, Forest Conservation Act, Issues involved in enforcement of environmental legislation
Public awareness

Module VII: Human Population and the Environment
Population growth, variation among nations
Population explosion – Family Welfare Programmes
Environment and human health
Human Rights
Value Education
HIV / AIDS
Women and Child Welfare
Role of Information Technology in Environment and Human Health
Case Studies

Module VIII: Field Work
Visit to a local area to document environmental assets-river / forest/ grassland/ hill/ mountain.
Visit to a local polluted site – Urban / Rural / Industrial / Agricultural
Study of common plants, insects, birds
Study of simple ecosystems-pond, river, hill slopes, etc (Field work equal to 5 lecture hours)

Examination Scheme:

Components	CT	HA	S/V/Q	A	EE
Weightage (%)	15	15	15	5	50

Text & References:

- Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
- Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad 380 013, India, Email:mapin@icenet.net (R)
- Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p
- Clark R.S., Marine Pollution, Clanderson Press Oxford (TB)
- Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Publ. House, Mumabai, 1196p
- De A.K., Environmental Chemistry, Wiley Eastern Ltd.
- Down to Earth, Centre for Science and Environment (R)
- Gleick, H.P. 1993. Water in Crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute Oxford Univ. Press. 473p
- Hawkins R.E., Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay (R)
- Heywood, V.H & Waston, R.T. 1995. Global Biodiversity Assessment. Cambridge Univ. Press 1140p.
- Jadhav, H & Bhosale, V.M. 1995. Environmental Protection and Laws. Himalaya Pub. House, Delhi 284 p.
- Mckinney, M.L. & School, R.M. 1996. Environmental Science Systems & Solutions, Web enhanced edition. 639p.
- Mhaskar A.K., Matter Hazardous, Techno-Science Publication (TB)
- Miller T.G. Jr. Environmental Science, Wadsworth Publishing Co. (TB)
- Odum, E.P. 1971. Fundamentals of Ecology. W.B. Saunders Co. USA, 574p
- Rao M N. & Datta, A.K. 1987. Waste Water treatment. Oxford & IBH Publ. Co. Pvt. Ltd. 345p.
- Sharma B.K., 2001. Environmental Chemistry. Geol Publ. House, Meerut
- Survey of the Environment, The Hindu (M)
- Townsend C., Harper J, and Michael Begon, Essentials of Ecology, Blackwell Science
- Trivedi R.K., Handbook of Environmental Laws, Rules Guidelines, Compliances and Standards, Vol I and II, Enviro Media (R)
- Trivedi R. K. and P.K. Goel, Introduction to air pollution, Techno-Science Publication (TB)
- Wanger K.D., 1998 Environnemental Management. W.B. Saunders Co. Philadelphia, USA 499p

OBJECT ORIENTED PROGRAMMING USING C++

Course Code: BCS 203 **Credit Units: 03**

Course Objective:

The objective of this module is to introduce object oriented programming. To explore and implement the various features of OOP such as inheritance, polymorphism, Exceptional handling using programming language C++. After completing this course student can easily identify the basic difference between the programming approaches like procedural and object oriented.

Course learning outcomes (CLO)

At the successful completion of this course you should be able to:
1. Interpret the characteristics of an object-oriented programming language in a program and advanced features of the C++ programming language as a continuation of the previous course.
2. Define classes and objects using C++ language to solve real world problems
3. Apply inheritance and polymorphism through programming
4. Conclude methods of handling files and strings using C++ and apply exception handling in real world applications.

Course Contents:

Module I: Introduction

Review of C, Difference between C and C++, Procedure Oriented and Object Oriented Approach. Basic Concepts: Objects, classes, Principals like Abstraction, Encapsulation, Inheritance and Polymorphism. Dynamic Binding, Message Passing. Characteristics of Object-Oriented Languages. Introduction to Object-Oriented Modeling techniques (Object, Functional and Dynamic Modeling).

Module II: Classes and Objects

Abstract data types, Object & classes, attributes, methods, C++ class declaration, Local Class and Global Class, State identity and behaviour of an object, Local Object and Global Object, Scope resolution operator, Friend Functions, Inline functions, Constructors and destructors, instantiation of objects, Types of Constructors, Static Class Data, Array of Objects, Constant member functions and Objects, Memory management Operators.

Module III: Inheritance

Inheritance, Types of Inheritance, access modes – public, private & protected, Abstract Classes, Ambiguity resolution using scope resolution operator and Virtual base class, Aggregation, composition vs classification hiérarchies, Overriding inheritance methods, Constructors in derived classes, Nesting of Classes.

Module IV: Polymorphism

Polymorphism, Type of Polymorphism – Compile time and runtime, Function Overloading, Operator Overloading (Unary and Binary) Polymorphism by parameter, Pointer to objects, this pointer, Virtual Functions, pure virtual functions.

Module V: Strings, Files and Exception Handling

Manipulating strings, Streams and files handling, formatted and Unformatted Input output. Exception handling, Generic Programming – function template, class Template Standard Template Library: Standard Template Library, Overview of Standard Template Library, Containers, Algorithms, Iterators, Other STL Elements, The Container Classes, General Theory of Operation, Vectors.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

Text:

- A.R. Venugopal, Rajkumar, T. Ravishanker “Mastering C++”, TMH, 1997
- R. Lafore, “Object Oriented Programming using C++”, BPB Publications, 2004.
- “Object Oriented Programming with C++” By E. Balagurusamy.
- Schildt Herbert, “C++: The Complete Reference”, Wiley DreamTech, 2005.

References:

- Parasons, “Object Oriented Programming with C++”, BPB Publication, 1999.
- Steven C. Lawlor, “The Art of Programming Computer Science with C++”, Vikas Publication, 2002.
- Yashwant Kanethkar, “Object Oriented Programming using C++”, BPB, 2004

ENGINEERING MECHANICS

Course Code: BME 204 Credit Units: 03

Course Objective:

Objective of this course is to provide fundamental knowledge of force system and its effect on the behaviour of the bodies that may be in dynamic or in static state. It includes the equilibrium of different structures like beams, frames, truss etc and the force transfer mechanism in the different components of a body under given loading condition.

Course learning outcomes (CLO)

CLO1: Able to analyse the force system and its effects.
CLO 2: Explain the nature of forces acting upon a system.
CLO 2: Evaluate the static and dynamic system's problem

Course Contents:

Module I: Force system & Structure
Free body diagram, Equilibrium equations and applications. Plane truss, perfect and imperfect truss, assumption in the truss analysis, analysis of perfect plane trusses by the method of joints, method of section.

Module II: Friction
Static and Kinetic friction, laws of dry friction, co-efficient of friction, angle of friction, angle of repose, cone of friction, friction lock, efficiency of screw jack, transmission of power through belt

Module III: Distributed Force
Determination of center of gravity, center of mass and centroid by direct integration and by the method of composite bodies, mass moment of inertia and area moment of inertia by direct integration and composite bodies method, radius of gyration, parallel axis theorem, Pappus theorems and its application, polar moment of inertia.

Module IV: Work -Energy
Work energy equation, conservation of energy, Virtual work, impulse, momentum conservation, impact of bodies, co-efficient of restitution, loss of energy during impact, D'alembert principle

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- S.S. Bhavikatti, Engineering Mechanics, New Age International Ltd
- Timoshenko, Engineering Mechanics, McGraw Hill
- R. S. Khurmi, Engineering Mechanics, S. Chand Publication
- I. H. Shames & G. K. M. Rao, Engineering Mechanics, Pearson Education, 2006

ENGINEERING GRAPHICS

Course Code: BME 205 Credit Units: 01

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Describe the theory of scales, engineering curves, different Projection used in engineering drawing.
2. Draw the different engineering curves, maps and projection of planes and solid accurately.
3. Identify different geometrical shape and their application used in engineering application.

Course Contents:

Module 1: Scales & Curves

Representative factor, Plain Scales, Diagonal Scales, Comparative Scales and Scale of chords. Construction of ellipse, Parabola, Hyperbola, Cycloid, Epicycloid, Hypocycloid, Involutes and Spirals by various methods.

Module 2: Projection of Points & Straight lines

Projection of points, Projection of straight lines. True inclinations and true length of straight lines.

Module 3: Projection of planes and solids

Projection of circle, triangle, polygons, polyhedrons, pyramids, cylinders and cones in different positions.

Module 4: Section of solids and Isometric projections

Section of right solids by normal and inclined planes, Orthographic projection, first angle & third angle projection. Isometric scale, Isometric axes, Isometric projection from orthographic drawing.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Engineering Graphics – Basant Agrawal and Dr. C. M. Agrawal, Tata McGraw-Hill Publishing Company Ltd.
- Engineering Drawing – by N. D. Bhatt
- Engineering Drawing and Graphics – by Veenugopal
- Engineering Drawing – by T. Jeyopoovan

APPLIED PHYSICS LAB - II

Course Code: AP 222 Credit Units: 01

Course Learning Objective:

It is expected that by the end of the course, students will be comfortable in –

1. To gain practical knowledge by applying the experimental methods to correlate with the Physics theory.

2. To learn the usage of electrical and optical systems for various measurements.

3. Apply the analytical techniques and graphical analysis to the experimental data.

4. To develop intellectual communication skills and discuss the basic principles of scientific concepts in a group.

List of Experiments:

1. To determine the wavelength of prominent lines of mercury spectrum using plane transmission grating.
2. To determine the thickness of a given wire by Wedge method.
3. To determine the wavelength of He-Ne laser light using single slit.
4. To determine the frequency of an electrically maintained tunning fork by Melde's method.
5. To study the variation of magnetic field along the axis of Helmholtz coil and to find out reduction factor.
6. To draw the V – I characteristics of a forward and reverse bias PN junction diode.
7. To determine the frequency of AC mains using sonometer.
8. To determine the energy band-gap of Germanium crystal using four probes method.
9. To draw V – I characteristics of a photocell and to verify the inverse square law of radiation.
10. To determine the acceleration due to gravity ('g') using Keter's reversible pendulum.
11. To study the characteristics of photo voltaic cell (solar cell).

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	15	15	15	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

OBJECT ORIENTED PROGRAMMING USING C++ LAB

Course Code: BCS 223 **Credit Units: 01**

Software Required: Turbo C++

Course Contents:

- Creation of objects in programs and solving problems through them.
- Different use of private, public member variables and functions and friend functions.
- Use of constructors and destructors.
- Operator overloading
- Use of inheritance in and accessing objects of different derived classes.
- Polymorphism and virtual functions (using pointers).
- File handling.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	15	15	15	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

ENGINEERING MECHANICS LAB

Course Code: BME 224 **Credit Units: 01**

Course Contents:

Engineering Mechanics:

- To verify the law of Force Polygon
- To verify the law of Moments using Parallel Force apparatus. (Simply supported type)
- To determine the co-efficient of friction between wood and various surface (like
- Leather, Wood, Aluminum) on an inclined plane.
- To find the forces in the members of Jib Crane.
- To determine the mechanical advantage, Velocity ratio and efficiency of a screw jack.
- To determine the mechanical advantage, Velocity ratio and Mechanical efficiency of the
- Wheel and Axle
- To determine the MA, VR, η of Worm Wheel (2-start)
- Verification of force transmitted by members of given truss.
- To verify the law of moments using Bell crank lever
- To find CG and moment of Inertia of an irregular body using Computation method

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	15	15	15	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

ENGINEERING GRAPHICS LAB

Course Code: BME 225 **Credit Units: 01**

Course Objective:

This course will provide students concepts on the drawings of different curves like straight line, parabola, ellipse etc. After completion of this course, students will be able to draw different figures manually and will be capable of using various instruments involved in drawings.

Course Contents:

Module I: General
Importance, Significance and scope of engineering drawing, Lettering, Dimensioning, Scales, Sense of proportioning, Different types of projections, Orthographic Projection, B.I.S. Specifications.

Module II: Projections of Point and Lines
Introduction of planes of projection, Reference and auxiliary planes, projections of points and Lines in different quadrants, traces, inclinations, and true lengths of the lines, projections on Auxiliary planes, shortest distance, intersecting and non-intersecting lines.

Module III: Planes other than the Reference Planes
Introduction of other planes (perpendicular and oblique), their traces, inclinations etc., Projections of points and lines lying in the planes, conversion of oblique plane into auxiliary Plane and solution of related problems.

Module IV: Projections of Plane Figures
Different cases of plane figures (of different shapes) making different angles with one or both reference planes and lines lying in the plane figures making different given angles (with one of both reference planes). Obtaining true shape of the plane figure by projection.

Module V: Projection of Solids
Simple cases when solid is placed in different positions, Axis faces and lines lying in the faces of the solid making given angles.

Module VI: Development of Surface
Development of simple objects with and without sectioning. Isometric Projection

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	15	15	15	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

Text & References:

- M.B. Shah & B.C. Rana, Engineering Drawing, Pearson Education, 2007
- PS Gill, Engineering Drawing, Kataria Publication
- ND Bhatt, Engineering Drawing, Charotar publications
- N Sidheshwar, Engineering Drawing, Tata McGraw Hill
- CL tanta, Mechanical Drawing, “Dhanpat Rai”

ENGLISH

Course Code: BCS 201 **Credit Units: 01**

Course Objective:

The course is intended to give a foundation of English Language. The literary texts are indented to help students to inculcate creative & aesthetic sensitivity and critical faculty through comprehension, appreciation and analysis of the prescribed literary texts. It will also help them to respond form different perspectives.

COURSE LEARNING OUTCOMES (CLO)

CLO 1 Participate in conversation and in small- and whole-group discussion

CLO 2 Explore and use English as medium of communication in real life situation

CLO 3 Discuss topics and themes of a reading, using the vocabulary and grammar of the lesson

CLO 4 Identify features of a reading textbook and utilize them as needed

CLO 5 Prepare and deliver organized presentations in small groups and to whole class

CLO 6 Apply sentence mechanics and master spelling of high frequency words

Course Contents:

Module I: Vocabulary

Use of Dictionary, Use of Words: Diminutives, Homonyms & Homophones

Module II: Essentials of Grammar - I

Articles**,** Parts of Speech, Tenses

Module III: Essentials of Grammar - II

Sentence Structure, Subject -Verb agreement, Punctuation

Module IV: Communication

The process and importance, Principles & benefits of Effective Communication

Module V: Spoken English Communication

Speech Drills , Pronunciation and accent, Stress and Intonation

Module VI: Communication Skills - I

Developing listening skills, Developing speaking skills

Module VII: Communication Skills - II

Developing Reading Skills, Developing writing Skills

Module VIII: Written English communication

Progression of Thought/ideas, Structure of Paragraph, Structure of Essays

Module IX: Short Stories

Of Studies, by Francis Bacon, Dream Children, by Charles Lamb, The Necklace, by Guy de Maupassant
A Shadow, by R.K.Narayan, Glory at Twilight, Bhabani Bhattacharya

Module X: Poems

All the Worlds a Stage	Shakespeare
To Autumn	Keats
O! Captain, My Captain.	Walt Whitman
Where the Mind is Without Fear	Rabindranath Tagore
Psalm of Life	H.W. Longfellow

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

Text & References:

- Madhulika Jha, Echoes, Orient Long Man
- Ramon & Prakash, Business Communication, Oxford.
- Sydney Greenbaum Oxford English Grammar, Oxford.
- Successful Communications, Malra Treece (Allyn and Bacon)
- Effective Technical Communication, M. Ashraf Rizvi.

BEHAVIOURAL SCIENCE - II
(PROBLEM SOLVING AND CREATIVE THINKING)

Course Code: BSS 204 **Credit Units: 01**

Course Objective:

To enable the students:

- Understand the process of problem solving and creative thinking.
- Facilitation and enhancement of skills required for decision-making.

Course learning outcomes (CLOs)

At the successful completion of this course you (the student) would be able to:

1. Recognize the relation critical thinking with various mental processes.
2. Identify hindrance to problem solving processes.
3. Analyze the steps in problem-solving process.
4. Create plan of action applying creative thinkings.

Course Contents:

Module I: Thinking as a tool for Problem Solving
What is thinking: The Mind/Brain/Behaviour
Critical Thinking and Learning: Making Predictions and Reasoning , Memory and Critical Thinking
Emotions and Critical Thinking , Thinking skills

Module II: Hindrances to Problem Solving Process
Perception, Expression, Emotion, Intellect, Work environment

Module III: Problem Solving
Recognizing and Defining a problem, Analyzing the problem (potential causes), Developing possible alternatives, Evaluating Solutions, Resolution of problem, Implementation , Barriers to problem solving: Perception, Expression, Emotion, Intellect, Work environment

Module IV: Plan of Action
Construction of POA, Monitoring, Reviewing and analyzing the outcome

Module V: Creative Thinking
Definition and meaning of creativity, The nature of creative thinking, Convergent and Divergent thinking
Idea generation and evaluation (Brain Storming), Image generation and evaluation, Debating
The six-phase model of Creative Thinking: ICEDIP model

Module VI: End-of-Semester Appraisal
Viva based on personal journal, Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

- Michael Steven: How to be a better problem solver, Kogan Page, New Delhi, 1999
- Geoff Petty: How to be better at creativity; Kogan Page, New Delhi, 1999
- Richard Y. Chang and P. Keith, Kelly: Wheeler Publishing, New Delhi, 1998.
- Phil Lowe Koge Page: Creativity and Problem Solving, New Delhi, 1996
- J William Pfeiffer (ed.) Theories and Models in Applied Behavioural Science, Vol 3, Management (1996); Pfeiffer & Company
- Bensley, Alan D.: Critical Thinking in Psychology – A Unified Skills Approach, (1998), Brooks/Cole Publishing Company.

FRENCH - II

Course Code: FLT 201 **Credit Units: 02**

Course Objective:

To enable the students to overcome the fear of speaking a foreign language and take position as a foreigner speaking French.

To make them learn the basic rules of French Grammar.

Course Learning Objective:

- Students will hone Basic language skills such as reading, writing, speaking, listening & interactive in the language
- Students will be able to read and interpret small texts .
- Students will be able to communicate in small sentences in writing, self introduction, family description etc.
- Students will be able to communicate in small sentences in oral, self introduction, family description etc
- To speak about the activities and hobbies
- To express ones tastes
- To excuse oneself
- To understand a mail
- To ask ones way
- To indicate the direction
- To express a wish
- To ask for information
- To give an order or a suggestion
- To read a plan of metro and RER.

Course Contents:

Module A: pp.38 – 47: Unité 3 : Objectif 3, 4, 5. 6

Module B: pp. 47 to 75 Unité 4, 5

Contenu lexical:

Unité 3: Organiser son temps

1. donner/demander des informations sur un emploi du temps, un horaire SNCF – Imaginer un dialogue
2. rédiger un message/ une lettre pour …
   i) prendre un rendez-vous/ accepter et confirmer/ annuler
   ii) inviter/accepter/refuser
3. Faire un programme d'activités
   imaginer une conversation téléphonique/un dialogue
   Propositions- interroger, répondre

Unité 4: Découvrir son environnement

1. situer un lieu
2. s'orienter, s'informer sur un itinéraire.
3. Chercher, décrire un logement
4. connaître les rythmes de la vie

Unité 5 : s'informer

1. demander/donner des informations sur un emploi du temps passé.
2. donner une explication, exprimer le doute ou la certitude.
3. découvrir les relations entre les mots
4. savoir s'informer

Contenu grammatical:

1. Adjectifs démonstratifs
2. Adjectifs possessifs/exprimer la possession à l'aide de :
   i. « de » ii. A+nom/pronom disjoint
3. Conjugaison pronominale – négative, interrogative -

construction à l'infinitif

4. Impératif/exprimer l'obligation/l'interdiction à l'aide de « il faut…. »/ «il ne faut pas… »
5. passé composé
6. Questions directes/indirectes

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- le livre à suivre : Campus: Tome 1

GERMAN – II

Course Code: FLG 201 **Credit Units: 02**

Course Objective:

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.
To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany. Introduction to Grammar to consolidate the language base learnt in Semester I

Course Learning Objective :

- Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of advance level.
- Students will be able to communicate with complex sentences.
- Modal verb to allow and should
- Personal pronoun in accusative
- Comparative and superlative

Course Contents:

Module I: Everything about Time and Time periods
Time and times of the day.
Weekdays, months, seasons.
Adverbs of time and time related prepositions

Module II: Irregular verbs
Introduction to irregular verbs like to be, and others, to learn the conjugations of the same, (fahren, essen, lessen, schlafen, sprechen und ähnliche).

Module III: Separable verbs
To comprehend the change in meaning that the verbs undergo when used as such
Treatment of such verbs with separable prefixes

Module IV: Reading and comprehension
Reading and deciphering railway schedules/school time table
Usage of separable verbs in the above context

Module V: Accusative case
Accusative case with the relevant articles
Introduction to 2 different kinds of sentences – Nominative and Accusative

Module VI: Accusative personal pronouns
Nominative and accusative in comparison
Emphasizing on the universal applicability of the pronouns to both persons and objects

Module VII: Accusative prepositions
Accusative propositions with their use
Both theoretical and figurative use

Module VIII: Dialogues
Dialogue reading: 'In the market place'
'At the Hotel'

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach , Deutsche Sprachlehre für Ausländer
- P.L Aneja , Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

SPANISH – II

Course Code: **FLS 201** **Credit Units: 02**

Course Objective:

To enable students acquire more vocabulary, grammar, Verbal Phrases to understand simple texts and start describing any person or object in Simple Present Tense.

Course Learning objective:

- Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of advance level.
- Students will be able to communicate with complex sentences
- Narrating actions and incidents in past.
- Pluscuamperfecto Tense
- To be able to write job letters/formal letters.
- Typical Questions/answers for job interview preparation
- Spanish Food habits and culinary traditions

Course Contents:

Module I
Revision of earlier modules.

Module II
Some more AR/ER/IR verbs. Introduction to root changing and irregular AR/ER/IR ending verbs

Module III
More verbal phrases (eg, Dios Mio, Que lastima etc), adverbs *(bueno/malo, muy, mucho, bastante, poco).*
Simple texts based on grammar and vocabulary done in earlier modules.

Module IV
Possessive pronouns

Module V
Writing/speaking essays like my friend, my house, my school/institution, myself….descriptions of people, objects etc, computer/internet related vocabulary

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español, En Directo I A
- Español Sin Fronteras

CHINESE – II

Course Code: FLC 201 **Credit Units: 02**

Course Objective:

Chinese is a tonal language where each syllable in isolation has its definite tone (flat, falling, rising and rising/falling), and same syllables with different tones mean different things. When you say, "ma" with a third tone, it mean horse and "ma" with the first tone is Mother. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Learning Objectives:

- Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of advance level.
- Students will be able to communicate with complex sentences.

On the completion of second semester the students will be able to:

1. Engage in conversation at Chinese restaurant.
2. Express Simple Emotions and Ideas in Chinese.
3. Seek opinion of others, make suggestions, do comparison and explain reason in Chinese language

Course Contents:

Module I
Drills**,** Practice reading aloud Observe Picture and answer the question.
Tone practice. Practice using the language both by speaking and by taking notes.
Introduction of basic sentence patterns. Measure words. Glad to meet you.

Module II
Where do you live? Learning different colors. Tones of "bu"
Buying things and how muchit costs? Dialogue on change of Money.
More sentence patterns on Days and Weekdays.
How to tell time. Saying the units of time in Chinese. Learning to say useful phrases like – 8:00, 11:25, 10:30 P.M. everyday, afternoon, evening, night, morning 3:58, one hour, to begin, to end ….. etc.
Morning, Afternoon, Evening, Night.

Module III
Use of words of location like-li, wais hang, xia, Furniture – table, chair, bed, bookshelf,.. etc.
Description of room, house or hostel room.. eg what is placed where and how many things are there in it?
Review Lessons – Preview Lessons. Expression 'yao", "xiang" and "yaoshi" (if).
Days of week, months in a year etc. I am learning Chinese. Is Chinese difficult?

Module IV
Counting from 1-1000, Use of "chang-chang".
Making an Inquiry – What time is it now? Where is the Post Office?
Days of the week. Months in a year. Use of Preposition – "zai", "gen".
Use of interrogative pronoun – "duoshao" and "ji". "Whose"??? Sweater etc is it?
Different Games and going out for exercise in the morning.

Module V
The verb "qu"
- Going to the library issuing a book from the library
- Going to the cinema hall, buying tickets
- Going to the post office, buying stamps
- Going to the market to buy things.. etc
- Going to the buy clothes …. Etc.

Hobby. I also like swimming.
Comprehension and answer questions based on it.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE

Weightage (%)	5	15	15	15	50

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- "Elementary Chinese Reader Part I" Lesson 11-20

ANANDAM-II

Course Code: AND002 **Credit Units: 02**

Course Objective:
Aanandam is a credited subject that aims to instill the **joy of giving** and sharing in young people through community participation, helping them to be responsible citizens and be initiators of change for a healthy society. A daily act of goodness and charity will infuse the habit of community service in students. The faculty will emphasize shift in focus-Happiness is not in acquiring things, but permanent happiness comes from giving, sharing, and caring for someone. The faculty will inspire students for Individual Social Responsibility (ISR) and will inculcate the qualities of compassion, an open mind, a willingness to do whatever is needed and positive attitude in students. Imagination and Creativity are to be appreciated. An aim and a vision are to be developed in students.

OUTCOME OF AANANDAM COURSE

The student should develop:
• Awareness and empathy regarding community issues
• Interaction with the community and impact on society
• Interaction with mentor and development of Student teacher relationship
• Interaction among students, enlarge social network
• Cooperative and Communication skills and leadership qualities
• Critical thinking, Confidence and Efficiency

AANANDAM: COMMUNITY SERVICE

• Community service programs are very effective for students' personal and social, ethical, and academic development. These effects depend on the characteristics of the programs chosen
• Involvement of students in community work has an impact on development of student skills, creativity, critical thinking, and innovative powers. Passion and Positivity are basic requirements for Community service
• They would examine social challenges /problems, assess the needs of the community, evaluate previous implemented projects, and think of further solutions
• They would learn to cooperate and collaborate with other agencies and inculcate leadership qualities.

APPLIED MATHEMATICS – III

Course Code: AM 301 Credit Units: 04

Course Objective:

The knowledge of Mathematics is necessary for a better understanding of almost all the Engineering and Science subjects. Here our intention is to make the students acquainted with the concept of basic topics from Mathematics, which they need to pursue their Engineering degree in different disciplines.

Course Learning Objective:

1.Investigate the basic concept about partial differential equations.

2.Create an interest in finding the solution by Fourier Series and Fourier Transforms.

3.Apply basic concepts of Laplace Transformation.

4.Develop the physical problems using optimization techniques

Course Contents:

Module I: Partial Differential Equations
Formation of PDE, Equations solvable by direct integration, Linear equations of the first order, Non-linear equations of the first order, Charpit's method, Homogeneous linear equations with constant coefficients, Non homogeneous linear equations.

Module II: Fourier Series
Periodic Functions, Fourier Series, Functions having points of discontinuity, Even or Odd Functions, Change of Interval, Half-range series, , Parseval's Formula, Complex form of Fourier series, Practical Harmonic Analysis, Fourier Transforms, Sine and Cosine Transforms.

Module III: Laplace Transformation
Definition, Transforms of elementary functions, Properties of Laplace transforms, Existence conditions, Transforms of derivatives, Transforms of integrals, Evaluation of integrals by Laplace transform, Inverse transforms, Other methods of finding inverse transforms, Convolution theorem, Application to differential equations, Simultaneous linear equations with constant coefficients, Unit step functions, Periodic functions.

Module IV: Linear Programming
Formulation of the problem, Graphical method, Canonical and Standard forms of L.P.P. Simplex Method, Artificial variable Techniques-M-method, Two phase method, Degeneracy, Dual simplex method.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

Text:

- Differential Calculus by Shanti Narain
- Integral Calculus by Shanti Narain
- Higher Engineering Mathematics by B.S. Grewal

References:

- Differential Equations by A.R. Forsyth
- Partial Differential Equations by I.N. Snedon
- Higher Engineering Mathematics by H.K. Dass

FLUID AND PARTICLE MECHANICS

Course Code: BTH 302 Credit Units: 04

Course learning outcomes (CLO): - At the successful completion of this course you (the student) should be able to:

1. Identify and obtain the values of fluid properties and relationship between them and understand the principles of continuity, momentum, and energy as applied to fluid motions.
2. The student will understand stress-strain relationship in fluids, classify their behaviour and also establish force balance in static systems.
3. Students will be able to apply continuity equation, Bernoulli's principle and compute pressure drop in flow systems of different configurations.
4. Estimate the friction and measure the frictional losses in fluid flow.
5. Determine and analyze the performance aspects of fluid machinery specifically for centrifugal pump and reciprocating pump.

Course Objective:

The objective of Fluid Mechanics subject is that students should understand the, properties of fluids, pressure measurement devices, hydraulic forces on surfaces, bouncy and flotation in fluids, kinematics and static behaviour of fluids, dimension and model analysis, laminar and turbulent flow, flow through pipes and orifices, boundary layer theory.

Course Contents:

Module I: Fluid Properties and Fluid Statics

Newtonian and Non-Newtonian Fluids; Viscosity; Incompressible and compressible fluids, compressibility. Forces on plane surfaces, forces on curved surfaces, buoyant forces, and stability of floating bodies, metacentre and metacentre height.

Module II: Kinematics of Fluid Motion

Steady and unsteady flow; uniform and non-uniform flow; Laminar and turbulent flow; streamline, path line and streak line; continuity equation, irrotational and rotational flow, velocity potential and stream function, vortex flow, free and forced vortex.

Module III: Dynamics of Fluid Flow

Euler's equation of motion and its integration to yield Bernoulli's equation, its practical applications – Pilot tube, Venturi meter; steady flow momentum equation, force exerted on a pipe bend.

Module IV: Dimensional Analysis and Principles of Similarity

Buckingham π-Theorem and its applications, Geometric, Kinematics and Dynamic similarity; Dimensionless numbers-Reynolds, Froude, Euler, Mach, Weber Number and their significance.

Module V: Laminar and Turbulent Flow

Reynold's experiment, critical velocity, steady laminar flow through a circular tube, flow between parallel plates. Transition from laminar to turbulent flow, courses of turbulence, velocity distribution law near a solid boundary, velocity distribution in rough pipes, Hazen – Williams's formula.

Module VI: Analysis of Pipe Flow

Energy losses, minor losses in pipe lines, concept of equivalent length, flow between two reservoirs, and multiple pipe systems – in series and parallel, siphon.

Module VII: Flow Measurements

Measurement of flow using Venturi meter, orifice meter, Pitot tube, measurement of flow in open channels – rectangular, triangular, trapezoidal weir, Cipoeletti weir.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE

Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text:

- Bansal, R.K.. "Fluid Mechanics & Hydraulic Machines", Laxmi Publications (P) Ltd., 2002.
- Kumar, D.S., "Fluid Mechanics and Fluid Power Engineering", S.K. Kataria & Sons, 2000.

References:

- White, F. M., Introduction to Fluid Mechanics, McGraw Hill
- Shames, I.H. "Mechanics of Fluids", Tata McGraw Hill
- Douglas, J. F., Gasiorek, J.M. and Swaffield, J., Fluid Mechanics, Pearson Education, 4/e, 2006
- Streeter, V.L and Wylie,E. B. "Fluid Mechanics", Tata McGraw Hill
- De Nevers N H-Fluid Mechanics for Chemical Engineers, McGraw Hill, NY(1991)

CHEMICAL PROCESS CALCULATIONS

Course Code: BTH 303 Credit Units: 04

Course learning outcomes (CLO): - At the successful completion of this course you (the student) should be able to:

1. Identify common processes in chemical and biochemical engineering.
2. Recognize the key process parameters in engineering design problems.
3. Carry out material and energy balance calculations separation processes by hand and using a computer package.
4. Analyse the behaviour of recycle processes, performing approximate material balances by hand, and setting up calculations for rigorous solution by computer.

Course Objective:

The understanding of chemical process calculations will equip the students with basic quantitative skills applicable to various chemical and physical processes.

Module I: Introduction to Material balances
Overall and component material balances; Material balance with and without chemical r1eactions; Material balance involving multiple subsystems; Recycle, bypass and purge; Material balance involving phase change.

Module II: Energy Balances
Enthalpy changes; Energy balance with and without chemical reaction; reversible process and mechanical energy balance; Heats of solution and mixing; Humidity charts and their uses in solving humidification , dehumidification and water cooling problems.
Combustion ; Adiabatic flame temperature.

Module III: Simultaneous material and energy balances
Degrees of freedom in steady –state processes; Simultaneous material and energy balance problems using flow sheet codes; unsteady state material and energy balances.

Module IV: Applications
Material and energy balance calculations of some selected process plants such as sulfuric acid , ammonia, urea, caustic soda etc.

Examination Scheme:

Components	**A**	**CT**	**S/V/Q**	**HA**	**EE**
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text Books :

- Bhatt, B. L. and Vora, S. M., 'Stoichiometry', Tata McGraw-Hill Publishing Co., New Delhi.
- ' Process calculations for chemical engineering", Second Revised Edition, Chemical Engineering Education Development Centre, IIT, Madras.
- Himmelblau, D. M., " Basic Principles and Calculations in Chemical Engineering', Prentice hall, Inc.

References:

Hougen, O.A., Watson. K.M. and Ragatz, R.A. Chemical Process principles Part –I', John Wiley**& Sons,** (CBS Publishers & distributor, New Delhi).

CHEMICAL TECHNOLOGY-I

Course Code: BTH 304 Credit Units: 03

Course learning outcomes (CLO): -At the successful completion of this course you (the student) should be able to:

1) Ability to understand the process flow diagram and various process parameters.
2) Ability to clearly distinguish the functional role and importance of various processes and operations in the process plant.
3) Technical knowledge with respect to the selection of important parameters such as Temperature, Pressure and underlying physical principles of a process.
4) Ability to distinguish various process streams and their conditions of operation (Temperature, pressure and phases)
5) Basic knowledge for process troubleshooting and necessary safety precautions associated to a process/operation.

Course Objective:

This course would familiarize the students about the availability of raw materials to various industries and process technologies for the conversion of this into final products. Make them appreciate production trends and future prospects in various process industries It would also acquaint them in drawing flow diagrams for various manufacturing processes.

Module-1

Nitrogen Industries: Ammonia, nitric acid, ammonium sulphate, ammonium nitrate, urea, calcium ammonium nitrate.
Sulphur Industries: Sulphur dioxide, sulphuric acid, oleum
Phosphorus Industries: Phosphorus, phosphoric acid, phosphatic fertilizers.
Mixed Fertilizer: N.P.K. fertilizers, diammonium hydrogen phosphate.

Module-2
Chlor-Alkali Industries: Brine electrolysis, manufacture of caustic soda and chlorine in mercury cells, diaphragm cells, membrane cells, hydrochloric acid. Soda ash.
Industrial and Fuel Gases: Oxygen, nitrogen, hydrogen, carbon dioxide, natural gas, LPG, producer gas, water gas, carbureted water gas, coke oven gas, synthesis gas.

Module-3
Ceremic Industries: Portland cement, Other Cement, Lime, Gypsum.
Glass Industries: Methods of manufacture of glass and special glasses.
Metallurgical Industries: Iron and steel.

Module-4
Explosives, Propellants, and Toxic Chemical Agents: Types and characteristics of explosives, industrial explosives, propellants, rockets and Missiles, propellants for rockets.
Cryogenics in chemical industries

Text Books:-
1. Rao, M.G. and Sittig, M., Dryden's Outlines of Chemical Technology-for the 21st century, Affiliated East West Press (1998) 3rd ed.
2. Austin, G.T., Shreve's Chemical Process Industries, McGraw Hill (1998) 5th ed.
Reference Book:-
1. Faith, W.L., Keyes, D.B. and Clark, R.L, Industrial Chemicals, John Wiley (1980) 4th ed.
Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

Text:

1. Austin, G.T., "Shreve's Chemical Processes Industries", 5th Edn (1984) Mcgraw-Hill Book Co., Singapore.
2. Sittig M and Gopal Rao M, "Dryden's Outlines of Chemical Technology", 3rd Ed.., (1997) East -West Press, New Delhi .

References:

1 "Chemtech" VolI-IV, 1975-1978 Chemical Engineering Education Development centre, IIT

DOMAIN ELECTIVE-I
MATERIAL SCIENCE

Course Code: BTH 305 Credit Units: 04

COURSE LEARNING OUTCOME: -

At the end the course student will be able to:-

- explain importance of materials in materials science and engineering field.
- give information about atomic structure, atomic bonds, crystal structure, crystal geometry and crystal defects
- explain solidification, crystal defects and diffusion in solids
- give information about electrical properties of materials.
- give information about metal, polymer, ceramic and composite materials and their properties.
- give information about phase diagrams.

Course Objective:

Metallurgy and Materials deal with the structure and properties of all materials, which have engineering applications. Metallurgists and Materials Engineers are responsible for designing, producing, examining and testing materials as diverse as metallic engineering alloys, semiconductors and superconductors, ceramics, plastics and composites. This course will help students understand the properties of different types of materials and their applications.

Course Contents:

Module I

Atomic structure of metals crystal structure, crystal lattice of (i) Body centered cubic (ii) face centered cubic (iii) closed packed hexagonal, crystallographic notation of atomic planes, polymorphism and allotropy, solidification of crystallization (i) nuclear formation (crystal growth) (ii) crystal imperfection Elementary treatment of theories of plastic deformation, phenomenon of slip twinning, dislocation, identification of crystallographic possible slip planes and direction in FCC, BCC, C.P., recovery, re-crystallization, preferred orientation causes and effects on the property of metals.

Module II

Introduction to Engineering materials, their mechanical behaviour, testing and manufacturing properties of materials, physical properties of materials, classification of engineering materials.

Module III

General principles of phase transformation in alloys, phase rule and equilibrium diagrams, Equilibrium diagrams of Binary system in which the components form a mechanical mixture of crystals in the solid state and are completely mutually soluble in both liquid state. Equilibrium diagrams of a systems whose components have complete mutual solubility in the liquid state and limited solubility in the solid state in which the solid state solubility deceases with temperature. Equilibrium diagram of alloys whose components have complete mutual solubility in the liquid state and limited solubility in solid state (Alloy with a peritectic transformation) Equilibrium diagrams of a system whose components are subject to allotropic change.

Module IV

Principles and applications of heat treatment processes viz. annealing, normalizing hardening, tempering; harden ability & its measurement, surface hardening processes. Defects in heat treatment and their remedies; effects produced by alloying elements on the structures and properties of steel. Distribution of alloying elements (Si, Mn. Ni. Cr. Mo. TL. Al) in steel.

Module V

Ceramic:Structure ; application and processing; Clays; Refractories; Abrasives; cement

Introduction to nano-materials and structure sensitive materials

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att:

Attendance

Text Books:

- V. Raghavan, “Material Science & Engineering”, Prentice Hall India Ltd., 2001.
- Shackelford, J.F. and Muralidhara, M.K., Introduction to Material Science for Engineers (6/e), Pearson Education, 2007
- S.K. Hazra Chaudhuri, “Material Science & Processes”, Indian Book Publishers, Calcutta, 1983.
- R.B. Gupta, “Material Science Processes”, Satya Prakashan, New Delhi, 2000.

References:

- Raymond A Higgim., “Engineering Metallurgy Part 1”, Prentice Hall India, New Delhi, 1998.
- Buduisky et al, “Engineering Materials & Properties”, Prentice Hall India, New Delhi, 2004.
- Peter Haasten, “Physical Metallurgy”, Cambridge Univ. Press, 1996.

DOMAIN ELECTIVE-III
POLYMER TECHNOLOGY

Course Code: BTH 306 Credit Units: 04

Course learning outcomes (CLO): - At the successful completion of this course you (the student) should be able to:

- . Understand the techniques and their characteristics/limitations of synthesis of polymers.
- Understand the structure-processing-property relationship of polymers.
- Understand and apply the various processing and manufacturing techniques.
- Understand the basic issues involved in polymer blends, composites & nano-composites
- Professionally skilled for higher studies in research institutions and to work in polymer industries.

Unit -I

Introduction: Concepts of polymers, Classification of polymers based on: structures, configuration, application, tacticity, crystallinity, mode of formation, molecular weight distribution, Concept of Mn, Mz, Mv and Mz and measurement techniques, Functionality principle, Glass transition temperature and its measurement, Theory of polymer solutions: solubility parameter, Mark-Houwink-Sakurda equation.

Unit –II

Techniques Of Polymerization: Bulk polymerization, Solution polymerization, Suspension polymerization, Emulsion polymerization and its kinetics, Comparison of bulk, solution, emulsion and suspension polymerization techniques. Chain growth polymerization: mechanism and kinetics of free radical, anionic, cationic and co-ordination polymerization, Comparison between addition and condensation polymerization, Co polymerization: Types of co polymers, monomer reactivity ratio, block and graft copolymers.

Unit-III

Polymer Material:-

Fibers: Properties and applications of fibers: Cellulosic, Nylons, Acrylic, Vinyl and Vinyledene Glass fiber, Carbon fiber, Aramid fiber.

Plastics: Synthesis, properties and applications of LDPE, HDPE, LLDPE, PP, PS, PVC, PMMA, ABS, Nylons (6, 66), PF, UF, MF, Epoxy Resins, Silicon, Poly acetal, Polycarbonate, Poly urethane, Poly ethylene Terephthalate (PET), PTFE, Cellulose Acetate, Cellulose Nitrate, and Furan resins

Rubbers: Structure, properties and applications of Natural Rubber, Latex and its uses in manufacturing of articles), Poly chloroprene, Silicon rubber, SBR, Nitrile rubber, Butyl rubber, EPDM, Poly isobutylene rubber.

Miscellaneous: Biodegradable polymers, Conductive polymers, Heat resistance polymers

Unit –IV

Polymer Technology:-

Curing of polymer, polymer processing such as injection moulding, compression moulding, blow moulding, extruders, rotational moulding, thermoforming, calandering, spinning.

Text Books:-

Polymer Science & Technology by Joel R. Fried, PHI Publication.

Polymer Science by Gowariker, Wiley Eastern Publication

Recommended Books;-

Polymer Science & Technology Plastics and Rubbers by P Ghosh, Tata McGraw Hill Publication.
Principles of Polymer Systems by Ferdinand Rodriguez, Tata McGraw Hill Publication.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

FLUID MECHANICS LAB

Course Code: BTH 322 Credit Units: 01

1 .Measurement of viscosity and surface tension-Reynolds Experiment
2. Verification of Bernoulli's Theorem
3. Experiment using Venturimeter
4. Determination of coefficient of Discharge C_d, C_c, $C_!$ Using
5. Circular/triangular/rectangular orifice
6. To find major head losses in a pipe line
7. To find minor head losses in a pipe line (sudden expansion/contraction/bend)

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	15	15	15	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

COMMUNICATION SKILLS - I

Course Code: BCS 301 Credit Units:01

Course Objective:
To form written communication strategies necessary in the workplace

COURSE LEARNING OUTCOMES (CLO)

CLO 1 Inculcating creative thinking skills

CLO 2 Construct and showcase their communication skills in a creative manner.

CLO 3 Comprehending and demonstrating ways of self-introduction

CLO 4 Outlining and illustrating presentation Skills

Course Contents:

Module I: Introduction to Writing Skills
Effective Writing Skills
Avoiding Common Errors
Paragraph Writing
Note Taking
Writing Assignments

Module II: Letter Writing
Types
Formats

Module III
Memo
Agenda and Minutes
Notice and Circulars

Module IV: Report Writing
Purpose and Scope of a Report
Fundamental Principles of Report Writing
Project Report Writing
Summer Internship Reports

Examination Scheme:

Components	CT1	CT2	CAF	V	GD	GP	A
Weightage (%)	20	20	25	10	10	10	5

CAF – Communication Assessment File
GD – Group Discussion
GP – Group Presentation

Text & References:

- Business Communication, Raman – Prakash, Oxford
- Creative English for Communication, Krishnaswamy N, Macmillan
- Textbook of Business Communication, Ramaswami S, Macmillan
- Working in English, Jones, Cambridge
- A Writer's Workbook Fourth edition, Smoke, Cambridge
- Effective Writing, Withrow, Cambridge
- Writing Skills, Coe/Rycroft/Ernest, Cambridge
- Welcome!, Jones, Cambridge

BEHAVIOURAL SCIENCE - III
(INTERPERSONAL COMMUNICATION)

Course Code: BSS 304 Credit Units: 01

Course Objective:
This course provides practical guidance on

- Enhancing personal effectiveness and performance through effective interpersonal communication
- Enhancing their conflict management and negotiation skills

Course learning outcomes (CLOs):
At the successful completion of this course you (the student) should be able to:

1. Demonstrate knowledge of strategies for developing a healthy interpersonal communication .
2. Recognize the importance of transactional analysis, script analysis .
3. Identify the difference between healthy and unhealthy expression of emotions and develop emotional competence necessary for conflict resolution and impression management.
4. Enhance personal effectiveness and performance through effective interpersonal communication .

Course Contents:

Module I: Interpersonal Communication: An Introduction
Importance of Interpersonal Communication
Types – Self and Other Oriented
Rapport Building – NLP, Communication Mode
Steps to improve Interpersonal Communication

Module II: Behavioural Communication
Meaning and Nature of behavioiural communication
Persuasion, Influence, Listening and Questioning
Guidelines for developing Human Communication skills
Relevance of Behavioural Communication for personal and professional development

Module III: Interpersonal Styles
Transactional Analysis
Life Position/Script Analysis
Games Analysis
Interactional and Transactional Styles

Module IV: Conflict Management
Meaning and nature of conflicts
Styles and techniques of conflict management
Conflict management and interpersonal communication

Module V: Negotiation Skills
Meaning and Negotiation approaches (Traditional and Contemporary)
Process and strategies of negotiations
Negotiation and interpersonal communication

Module VI: End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

- Vangelist L. Anita, Mark N. Knapp, Inter Personal Communication and Human Relationships: Third Edition, Allyn and Bacon

- Julia T. Wood. Interpersonal Communication everyday encounter
- Simons, Christine, Naylor, Belinda: Effective Communication for Managers, 1997 1st Edition Cassel
- Goddard, Ken: Informative Writing, 1995 1st Edition, Cassell
- Harvard Business School, Effective Communication: United States of America
- Foster John, Effective Writing Skills: Volume-7, First Edition 2000, Institute of Public Relations (IPR)
- Beebe, Beebe and Redmond; Interpersonal Communication, 1996; Allyn and Bacon Publishers.

FRENCH-III

Course Code: FLT 301 Credit Units: 02

Course Objective:

To provide the students with the know-how

- To master the current social communication skills in oral and in written.
- To enrich the formulations, the linguistic tools and vary the sentence construction without repetition.

Course Learning Objective:

- Students will hone Basic language skills such as reading, writing, speaking, listening & interactive in the language
- Students will be able to read and interpret small texts .
- Students will be able to communicate in small sentences in writing, self introduction, family description etc.
- Students will be able to communicate in small sentences in oral, self introduction, family description etc
- To understand and present the time schedule and to tell the time
- To understand and draft a short biography and to present a scientist
- To understand an online conversation and read a program and the timings.
- To propose an outing and to accept an outing.
- To leave a message on the answering machine

Course Contents:

Module B: pp. 76 – 88 Unité 6
Module C: pp. 89 to103 Unité 7

Contenu lexical:

Unité 6: se faire plaisir

1. acheter : exprimer ses choix, décrire un objet (forme, dimension, poids et matières) payer
2. parler de la nourriture, deux façons d'exprimer la quantité, commander un repas au restaurant
3. parler des différentes occasions de faire la fête

Unité 7: Cultiver ses relations

1. maîtriser les actes de la communication sociale courante (Salutations, présentations, invitations, remerciements)
2. annoncer un événement, exprimer un souhait, remercier, s'excuser par écrit.
3. caractériser une personne (aspect physique et caractère)

Contenu grammatical:

1. accord des adjectifs qualificatifs
2. articles partitifs
3. Négations avec de, ne…rien/personne/plus
4. Questions avec combien, quel…
5. expressions de la quantité
6. ne…plus/toujours - encore
7. pronoms compléments directs et indirects
8. accord du participe passé (auxiliaire « avoir ») avec l'objet direct
9. Impératif avec un pronom complément direct ou indirect
10. construction avec « que » - Je crois que/ Je pense que/ Je sais que

Examination Scheme:

Components	A	V	H	CT	EE
Weightage (%)	5	15	15	15	50

Text & References:

- le livre à suivre : Campus: Tome 1

GERMAN - III

Course Code: FLG 301 Credit Units: 02

Course Objective:
To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.
To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany.

Course Learning Objective :

- Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of advance level.
- Students will be able to communicate with complex sentences.

Course Contents:

Module I: Modal verbs
Modal verbs with conjugations and usage
Imparting the finer nuances of the language

Module II: Information about Germany (ongoing)
Information about Germany in the form of presentations or "Referat"– neighbors, states and capitals, important cities and towns and characteristic features of the same, and also a few other topics related to Germany.

Module III: Dative case
Dative case, comparison with accusative case
Dative case with the relevant articles
Introduction to 3 different kinds of sentences – nominative, accusative and dative

Module IV: Dative personal pronouns
Nominative, accusative and dative pronouns in comparison

Module V: Dative prepositions
Dative preposition with their usage both theoretical and figurative use

Module VI: Dialogues
In the Restaurant,

At the Tourist Information Office,

A telephone conversation

Module VII: Directions
Names of the directions
Asking and telling the directions with the help of a roadmap
Module VIII: Conjunctions

Examination Scheme:

Components	A	V	H	CT	EE
Weightage (%)	5	15	15	15	50

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

SPANISH – III

Course Code: FLS 301 Credit Units: 02

Course Objective:

To enable students acquire knowledge of the Set/definite expressions (idiomatic expressions) in Spanish language and to handle some Spanish situations with ease.

Course Learning objective:

- Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of advance level.
- Students will be able to communicate with complex sentences
- To be able to write formal and informal, business letters/ E-mails
- Translating basic technical texts from Spanish to English
- Essay writing on different issues.
- Spanish for specific purposes

Course Contents:

Module I
Revision of earlier semester modules
Set expressions (idiomatic expressions) with the verb *Tener*, *Poner, Ir*….
Weather

Module II
Introduction to *Gustar*…and all its forms. Revision of *Gustar* and usage of it

Module III
Translation of Spanish-English; English-Spanish. Practice sentences.
How to ask for directions (using estar)
Introduction to IR + A + INFINITIVE FORM OF A VERB

Module IV
Simple conversation with help of texts and vocabulary
En el restaurante
En el instituto
En el aeropuerto

Module V
Reflexives

Examination Scheme:

Components	A	V	H	CT	EE
Weightage (%)	5	15	15	15	50

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español, En Directo I A
- Español Sin Fronteras -Nivel Elemental

CHINESE – III

Course Code: FLC 301 Credit Units: 02

Course Objective:

Foreign words are usually imported by translating the concept into Chinese, the emphasis is on the meaning rather than the sound. But the system runs into a problem because the underlying name of personal name is often obscure so they are almost always transcribed according to their pronciation alone. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Learning Objectives:

- Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of advance level.
- Students will be able to communicate with complex sentences.

On the completion of third semester the students will be able to:

1. Communicate in Chinese at workplace.
2. Attend meeting and talk on telephone using Chinese language.
3. Understand official work and send emails in Chinese.
4. Communicate in Chinese while attending job interview and joining new post.

Course Contents:

Module I

Drills
Dialogue practice
Observe picture and answer the question.
Introduction of written characters.
Practice reading aloud
Practice using the language both by speaking and by taking notes.
Character writing and stroke order

Module II

Measure words
Position words e.g. inside, outside, middle, in front, behind, top, bottom, side, left, right, straight.
Directional words – beibian, xibian, nanbian, dongbian, zhongjian.
Our school and its different building locations.
What game do you like?
Difference between “hii” and “neng”, “keyi”.

Module III

Changing affirmative sentences to negative ones and vice versa
Human body parts.
Not feeling well words e.g. ; fever, cold, stomach ache, head ache.
Use of the modal particle “le”
Making a telephone call
Use of “jiu” and “cal” (Grammar portion)
Automobiles e.g. Bus, train, boat, car, bike etc.
Traveling, by train, by airplane, by bus, on the bike, by boat.. etc.

Module IV

The ordinal number “di”
“Mei” the demonstrative pronoun e.g. mei tian, mei nian etc.
use of to enter to exit
Structural particle “de” (Compliment of degree).
Going to the Park.
Description about class schedule during a week in school.

Grammar use of “li” and “cong”.
Comprehension reading followed by questions.

Module V
Persuasion-Please don’t smoke.
Please speak slowly
Praise – This pictorial is very beautiful
Opposites e.g. Clean-Dirty, Little-More, Old-New, Young-Old, Easy-Difficult, Boy-Girl, Black-White, Big-Small, Slow-Fast … etc.
Talking about studies and classmates
Use of “it doesn’t matter”
Enquiring about a student, description about study method.
Grammar: Negation of a sentence with a verbal predicate.

Examination Scheme:

Components	**A**	**V**	**H**	**CT**	**EE**
Weightage (%)	5	15	15	15	50

Text & References:

- “Elementary Chinese Reader Part I, Part-2” Lesson 21-30

ANANDAM-III

Course Code: AND003 Credit Units: 02

Course Objective:
Aanandam is a credited subject that aims to instill the **joy of giving** and sharing in young people through community participation, helping them to be responsible citizens and be initiators of change for a healthy society. A daily act of goodness and charity will infuse the habit of community service in students. The faculty will emphasize shift in focus-Happiness is not in acquiring things, but permanent happiness comes from giving, sharing, and caring for someone. The faculty will inspire students for Individual Social Responsibility (ISR) and will inculcate the qualities of compassion, an open mind, a willingness to do whatever is needed and positive attitude in students. Imagination and Creativity are to be appreciated. An aim and a vision are to be developed in students.

OUTCOME OF AANANDAM COURSE

The student should develop:
• Awareness and empathy regarding community issues
• Interaction with the community and impact on society
• Interaction with mentor and development of Student teacher relationship
• Interaction among students, enlarge social network
• Cooperative and Communication skills and leadership qualities
• Critical thinking, Confidence and Efficiency

AANANDAM: COMMUNITY SERVICE

• Community service programs are very effective for students' personal and social, ethical, and academic development. These effects depend on the characteristics of the programs chosen
• Involvement of students in community work has an impact on development of student skills, creativity, critical thinking, and innovative powers. Passion and Positivity are basic requirements for Community service
• They would examine social challenges /problems, assess the needs of the community, evaluate previous implemented projects, and think of further solutions
• They would learn to cooperate and collaborate with other agencies and inculcate leadership qualities.

CHEMICAL TECHNOLOGY-II

Course code: BTH 401 Credit units: 03

Course learning outcomes (CLO): -

At the successful completion of this course you (the student) should be able to:

- Ability to understand the process flow diagram and various process parameters.
- Ability to clearly distinguish the functional role and importance of various processes and operations in the process plant.
- Technical knowledge with respect to the selection of important parameters such as Temperature, Pressure and underlying physical principles of a process.
- Ability to distinguish various process streams and their conditions of operation (Temperature, pressure and phases)
- Basic knowledge for process troubleshooting and necessary safety precautions associated to a process/operation.

Module-1

Petroleum and Petrochemical Industries: Origin and composition of petroleum, classification of petroleum, Manufacture of petroleum products and their uses and properties. Petroleum refining, physical and chemical conversion products, lubricating oils, petrochemical precursors, methane, olefines, acetylenes and aromatics.

Coal and Coal Chemicals: Types of coal, destructive distillation of coal, distillation of coal tar, chemicals from coal.

Module-2

Pulp and Paper Industries: Cellulose derivatives, pulp, paper and boards. Types of raw material for pulping, various pulping methods, recovery of chemicals from black liquor. Manufacture of paper, quality improvement of paper.

Soaps and Detergents: Types of soaps, soap manufacture, recovery and purification. Types of detergents, their cleansing action.

Surface Coating Industries: Paints, Pigments, Varnishes, Industrial coatings.

Module-3

Sugar and Starch Industries: Raw and refined sugar, byproducts of sugar industries, Starch and starch derivatives.

Food Industries: Food processing, Food additives and preservatives, food processing equipment's.

Fermentation and Enzyme Industries: Production of industrial alcohol, acetic acid, citric acid and lactic acid. Introduction to enzymes and their applications.

Oils and Fats: Types of oil, different fatty acids, extraction of oil from seeds, oil purification, hydrogenation of oil.

Module-4

Polymers: Monomers, Thermoplastic and Thermosetting materials (such as polythylene, polypropylene, polyvinyl chloride, polystyrene) and PF resins; Epoxy and polyesters - Natural rubber; Synthetic rubber such as SBR, NBR, CR - Fundamental methods of processing of synthetic Rubbers.

Pharmaceutical Industries: Introduction to pharmaceutical products - Synthesis and recovery,

Text Books:-

1. Rao, M.G. and, Sittig, M., Dryden's Outlines of Chemical Technology for the 21st century, Affiliated East West (1998) 3rd ed.
2. Austin, G.T., Shreve's Chemical Process Industries, McGraw Hill (1998) 5th ed.
3. Groggins, P.H., Unit Processes in Organic Synthesis, Tata McGraw Hill (2003) 5th ed.

Reference Book:-

1. Faith, W.L., Clark, R.L. and Keyes, D.B., Industrial Chemicals, John Wiley (1980) 4th ed.
2. Garry, James H., Handwerk, G. E. and Kaiser, M.J., Petroleum Refining Technology and Economics, Taylor & Francis (2007)

Examination Scheme:

Components	A	V	H	CT	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

CHEMICAL ENGINEERING THERMODYNAMICS-I

Course code: BTH 402 **Credit units: 04**

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

5. Investigate system, surrounding, closed and open system, extensive and intensive properties and other basic properties of thermodynamics.
6. Apply the first law of thermodynamics to the nozzles, diffusers, turbines, compressors, throttling valves, mixing chambers, heat exchangers, pipe and duct flow.
7. Formulate the first law of thermodynamics for closed systems and arrange the change in energy in the closed systems via heat and work transfer.
8. Judge the state of the pure substances such as compressed liquid, saturated liquid-vapor mixture and superheated vapor using property diagrams and tables.
9. Develop and discuss the second law of thermodynamics.
10. Analyse the Influence of temperature limit on performance of cycles.

Course Objective:

Objective of this course is to impart an understanding of the principles of thermodynamics and heat transfer. This course also helps students understand the application of, thermodynamics, and heat transfer principles and techniques, including the use of empirical data, to the analysis of representative fluid and thermal energy components and systems encountered in the practice of chemical engineering.

Course Contents:

Module I: Basic concepts
Thermodynamic system, intensive and extensive properties, cyclic process, Zeroth Law of Thermodynamics, Work and heat, Flow work, Conversion of heat into work by Power cycles-Refrigeration, Thermodynamic analysis of processes.

ModuleII: Applications of thermodynamics to flow processes
Thermodynamic properties of fluids and their inter relationships : PVT behaviour of pure substances , Equation of state, Generalized correlations and acentric factor, PVT behaviour of mixtures
Thermodynamic charts ; Estimation of thermodynamic properties

Module: III Solutions:
Partial molal properties , Chemical potential , Gibbs-Duhem equation, Ideal and non ideal solutions, Fugacity and fugacity coefficient, Activity and activity coefficient, Excess properties of mixtures.

Module IV: Phase Equilibria
General criterion for equilibrium and their application

Examination Scheme:

Components	A	V	H	CT	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text Books :

- Nag, P.K "Engineering Thermodynamics", Tata McGraw Hill
- Hougen, O.A., Watson, K.M., and Ragatz, R.A., " Chemical Process Principles Part II " John Willy & Sons, (CBS Publishers & Distributors, New Delhi).

References:

- Engel, T. and Reid, P., Thermodynamics, Statistical Thermodynamics & Kinetics, Pearson Education, 2006
- Cengel & Boles, "Thermodynamics", Tata McGraw Hill.

- Sonntag /Vanhylene, Fundamentals of Thermodynamics, Wiley
- Kyle, B.G., " Chemical and Process Thermodynamics' , Prentice Hall, Inc
- Y.V.C. Rao, Engineering Thermodynamics, Khanna Publications
- Onkar Singh, Applied Thermodynamics, New Age Publications.

MECHANICAL OPERATIONS

Course code: BTH 403 Credit units: 04

Course learning outcomes (CLO): - At the successful completion of this course you (the student) should be able to:

1) To impart the basic concepts of mechanical operations
2) To develop an understanding of size analysis, size reduction, and solid handling
3) Understand mechanical separation methods such as filtration, sedimentation, transportation of solids etc and associated equipment used for achieving these methods
4) The students are exposed to basic theory, calculations, and machinery involved in various solid handling operations

Course Objective:

This course would impart an understanding that the industrial processes contain a coordinated series of separation operations and thus enable them decide the best technique for a particular process

Course Contents:

Module I: Particle Size and shape
Measurement and Analysis, screening and screen analysis, screen effectiveness, Design of industrial screening equipment., Size Reduction

Module II: Particle separation
Sedimentation, Free and hindered settling , Thickeners and settling chambers, characteristics of rotating fluids, Centrifuges, cyclone separators , bag filters, Electrostatic precipitator

Module III: Flow through porous media
Consatant pressure and constant rate filtration, Compressible and incompressible cakes, Filteration rate calculation, Filteration equipment

Module IV: Flow through packed bed
Packing materials and their characteristics, Bed porosity and packing area., Pressure drop, Flooding and loading .

Module V: Fluidization
Pressure drop and minimum fluidization , Liquid and gas fluidization velocity

Module VI: Solid handling
Storage of solids-bins, cellos, hoppers, Transport of solids-screw and belt conveyors, pneumatic and hydraulic transport, Mixing of solids and pastes.

Examination Scheme:

Components	A	V	H	CT	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text Books:

- Brown, G.G.," Unit Operations" CBS Publishers & Distributors, New Delhi
- McCabe, W.L., Smith J.C. and Harriot, P.,, "Unit Operations in chemical engineering', Mcgraw-Hill Inc.

References:

- Coulson , J. M., and Richardson,J.F., 'Chemical Engineering, Volume 2", Pergamon Press.

DOMAIN ELECTIVE II
NUMERICAL ANALYSIS

Course Code: BTH 404 Credit Units: 03

Course Objective:
This course deals with the techniques of numerical analysis, which gives the solution to applied problem when ordinary analytical method fails. Emphasis is given on computer programming also so that the given techniques can be used in design of engineering and scientific problems.

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. use the solution to applied problem when ordinary analytical method fails
2. apply the techniques in design of engineering and scientific problems
3. find the solution of differential equation
4. fit different type of curves for given data.
5. Solve integration and differentiation numerically.

Course Contents:

Module I: Solution of Algebraic and Transcendental Equation

Error in a series approximation, Bisection Method, Iteration method, Method of false position, Newton-Raphson method, **Solutions of Simultaneous equation**
Gauss elimination method, Jacobi iteration method, Gauss Seidal method

Module II: Interpolation
Finite Differences, Difference tables
Polynomial Interpolation**:** Newton's forward and backward formula
Central Difference Formulae: Gauss forward and backward formula.
Interpolation with unequal intervals: Lagrange's Interpolation, Newton Divided difference formula

Module III: Numerical Integration and Differentiation
Introduction, Numerical differentiation Numerical Integration: Trapezoidal rule, Simpson's 1/3 and 3/8 rules.

Module IV: Solution of differential Equations
Euler's Method, Runga-Kutta Methods.

Module V: Statistical Computation
Frequency chart, Curve fitting by method of least squares, fitting of straight lines, polynomials, exponential curves etc, Data fitting with Cubic splines.

Examination Scheme:

Components	A	V	H	CT	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

Text:

- Rajaraman V, "Computer Oriented Numerical Methods", Pearson Education
- Gerald & Whealey, "Applied Numerical Analyses", AW
- Jain, Iyengar and Jain, "Numerical Methods for Scientific and Engineering Computations", New Age Int.
- Grewal B S, "Numerical methods in Engineering and Science", Khanna Publishers, Delhi

References:

- T Veerarajan, T Ramachandran, "Theory and Problems in Numerical Methods, TMH
- Pradip Niyogi, "Numerical Analysis and Algorithms", TMH
- Francis Scheld, " Numerical Analysis", TMH

- Sastry S. S, “Introductory Methods of Numerical Analysis”, Pearson Education.
- Gupta C.B., Vijay Gupta, “Introduction to Statistical Methods”, Vikas Publishing.
- Goyal, M, “Computer Based Numerical and Statistical Techniques”, Firewall Media, New Delhi.

DOMAIN ELECTIVE-I I
CORROSION SCIENCE AND ENGINEERING

Course Code: BTH 405 **Credit Units: 04**

COURSE LEARNING OUTCOME: -

At the end the course student will be able to:-

- understand the various corrosion processes, protection methods and materials selection.
- solve problems involving various types of corrosion.
- acquire knowledge on the electrochemical principles that govern the corrosion processes.
- select corrosion resistant materials for a given application.
- acquires knowledge of the effect of various environments on corrosion.
- Solve engineering problems using the scientific method combining expert knowledge from chemistry, environmental, and chemical engineering as well as material science and engineering.

Course Contents:

Module I: Introduction to Corrosion Science and Engineering

Basic aspects introduction, classification, economics and cost of corrosion. Emf series, Galvanic series,corrosion theories derivation of potential- current relationship of activation controlled and diffusion corrosion processes. Potential- pH diagrams Fe-H2O system, application and limitations. Passivation definition, anodic Passivation, theory of Passivation, oxidation laws, effects of oxygen and alloying on oxidation rates.

Module II: Corrosion, Definition and Types

Forms of corrosion-definition, factors and control methods of various forms of corrosion such as pitting, inter granular, crevice, stress corrosion, corrosion fatigue, hydrogen embrittlement, corrosion processes and control methods in fertilizers, petrochemical and petroleum refineries

Module III: Environmental Aspects on Corrosion

Environmental aspects: Atmospheric corrosion- classification, factors influencing atmospheric corrosion,temporary corrosion preventive methods, corrosion in immersed condition, effect of dissolved gases, salts, pH, temperature and flow rates on corrosion, Underground corrosion- corrosion process in the soil, factors influencing soil corrosion.

Module IV: Corrosion Control

Corrosion control aspects: Electrochemical methods of protection-theory of cathodic protection, design of cathodic protection, sacrificial anodes, anodic protection. Corrosion inhibitors for acidic, neutral and alkaline media, cooling water system-boiler water system. Organic coating-surface preparation, natural synthetic resin, paint formulation and applications. Design aspects in corrosion prevention, corrosion resistant materials.

Module V: Corrosion Testing and Monitoring

Corrosion Testing, monitoring and inspection, laboratory corrosion tests, accelerated chemical tests for studying different forms of corrosion. Electrochemical methods of corrosion rate measurements by DC and AC methods, corrosions monitoring methods, chemical and electrochemical removal of corrosion products,

Examination Scheme:

Components	**A**	**V**	**H**	**CT**	**EE**
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text Book:

1. S.N. Banerjee, An Introduction to Corrosion and Corrosion Inhibition,Oxonian Press Ltd., New Delhi.

Reference Books:

1. LL Shrier Corrosion Vol. I & II George Nownons Ltd., Southampton Street London Endn. II
2. M.G. Fontana & N.D. Greene,Corrosion Engineering, McGraw Hill, New York (3/e)
5. Jain & Jain, Engineering Chemistry, Dhanpat Rai & Sons, New Delhi

CHEMICAL TECHNOLOGY LAB

Course Code: BTH 421 Credit Units: 1

Course Contents:

List of Experiments:

1. Preparation of aspirin
2. Preparation of soap
3. Preparation of Methyl orange and Malachite green
4. Estimation of purity of Glycerol by dichromate method
5. Determination of acid value of an oil
6. Analysis of sugar
7. Analysis of urea
8. Determination of Calorific value of a fuel using Bomb calorimeter
9. Proximate analysis of fuel
10. Determination of aniline point of a given lubricant
11. Orsat analysis of flue gases

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	15	15	15	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

MECHANICAL OPERATION LAB

Course Code: BTH 423 Credit Units: 01

- To study the settling characteristics. (Free & Hindered settling) of a given suspension of particles.
- To study the filtration characteristics Plate and frame filter press.
- To carry out differential and cumulative screen analysis of given sample of solid particles.
- To study the pressure drop characteristics through packed beds.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	15	15	15	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

NUMERICAL ANALYSIS LAB

Course Code: BTH 424 Credit Units: 01

Use of following Techniques in C/C++ Language

1. Solution of single non-linear algebraic equations by Newton Raphson method.
2. Solution of single non-linear equations by Regular falsi method.
3. Solution of system of linear simultaneous by Gauss Elimination method.
4. Solution of system of linear simultaneous equation by gauss seidel method and successive over Relaxation method.
5. Solution of single first order ordinary differential equations by fourth order Runge-Kutta method.
6. Solution of Heat equations (Parabolic equations) by finite difference method.
7. Solution of Laplace equations (elliptic equation) by finite difference method.
8. Solution of wave equations (Hyperbolic equation) by finite difference method.
9. Finding Newton's interpolatory polynomial for n points.
10. Finding Newton's interpolatory polynomial based on finite difference table for n points.
11. Simpson's 3/8-rule.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	15	15	15	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

COMMUNICATION SKILLS - II

Course Code: BCS 401 Credit Units: 01

Course Objective:

To teach the participants strategies for improving academic reading and writing.
Emphasis is placed on increasing fluency, deepening vocabulary, and refining academic language proficiency.

COURSE LEARNING OUTCOMES (CLO)

CLO 1 Identify steps to professional communication

CLO 2 Identify the key components of meeting, agendas and meeting minutes

CLO 3 Understand the key skills and behaviors required to facilitate a group discussion/presentation

CLO 4 Polish current affairs & rapport building

Course Contents:

Module I: Social Communication Skills
Small Talk
Conversational English
Appropriateness
Building rapport

Module II: Context Based Speaking
In general situations
In specific professional situations
Discussion and associated vocabulary
Simulations/Role Play

Module III: Professional Skills
Presentations
Negotiations
Meetings
Telephony Skills

Examination Scheme:

Components	CT1	CT2	CAF	V	GD	GP	A
Weightage (%)	20	20	25	10	10	10	5

CAF – Communication Assessment File
GD – Group Discussion
GP – Group Presentation

Text & References:

- Essential Telephoning in English, Garside/Garside, Cambridge
- Working in English, Jones, Cambridge
- Business Communication, Raman – Prakash, Oxford
- Speaking Personally, Porter-Ladousse, Cambridge
- Speaking Effectively, Jermy Comfort, et.al, Cambridge
- Business Communication, Raman – Prakash, Oxford

BEHAVIOURAL SCIENCE - IV
(RELATIONSHIP MANAGEMENT)

Course Code: BSS 404 Credit Units: 01

Course Objective:

To understand the basis of interpersonal relationship
To understand various communication style
To learn the strategies for effective interpersonal relationship

Course Learning Outcomes (CLOs)

At the successful completion of this course you (the student) would be able to:

1. Identify the basis of interpersonal relationship.
2. Describe the importance of interpersonal relationship and bridging individual differences.
3. Recognize the development and strategies for effective interpersonal relationship.
4. Explain and apply the theories of relationship concepts of impression management.

Course Contents:

Module I: Understanding Relationships
Importance of relationships
Role and relationships
Maintaining healthy relationships

Module II: Bridging Individual Differences
Understanding individual differences
Bridging differences in Interpersonal Relationship – TA
Communication Styles

Module III: Interpersonal Relationship Development
Importance of Interpersonal Relationships
Interpersonal Relationships Skills
Types of Interpersonal Relationships

Module IV: Theories of Interpersonal Relationships
Theories: Social Exchange, Uncertainty Reduction Theory
Factors Affecting Interpersonal Relationships
Improving Interpersonal Relationships

Module V: Impression Management
Meaning & Components of Impression Management
Impression Management Techniques (Influencing Skills)
Impression Management Training-Self help and Formal approaches

Module VI: End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

- Vangelist L. Anita, Mark N. Knapp, Inter Personal Communication and Human Relationships: Third Edition, Allyn and Bacon
- Julia T. Wood. Interpersonal Communication everyday encounter
- Simons, Christine, Naylor, Belinda: Effective Communication for Managers, 1997 1st Edition Cassell
- Goddard, Ken: Informative Writing, 1995 1st Edition, Cassell
- Harvard Business School, Effective Communication: United States of America
- Foster John, Effective Writing Skills: Volume-7, First Edition 2000, Institute of Public Relations (IPR)
- Beebe, Beebe and Redmond; Interpersonal Communication, 1996; Allyn and Bacon Publishers.

FRENCH - IV

Course Code: FLT 401 Credit Units: 02

Course Objective:

To enable students:

- To develop strategies of comprehension of texts of different origin
- To present facts, projects, plans with precision

Course Learning Objective:

- Students will hone intermediate language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of intermediate level.
- Students will be able to communicate in small sentences in Simple Future and Past tenses .
- Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.
- To do the shopping
- To ask and express one's needs
- To present one's eating habits
- To understand a label
- To ask the price
- To order at the restaurant
- To organise a meeting
- To propose to someone to do an activity
- To understand the advertisement of a conference
- To understand the names of different stations
- To speak about ones schedule
- To express one's professional wish
- To formulate a project
- To read a notice board

Course Contents:

Module C: pp. 104 – 139: Unités 8, 9

Contenu lexical:

Unité 8: Découvrir le passé

1. parler du passé, des habitudes et des changements.
2. parler de la famille, raconter une suite d'événements/préciser leur date et leur durée.
3. connaître quelques moments de l'histoire

Unité 9: Entreprendre

1. faire un projet de la réalisation: (exprimer un besoin, préciser les étapes d'une réalisation)
2. parler d'une entreprise
3. parler du futur

Contenu grammatical:

1. Imparfait
2. Pronom « en »
3. Futur
4. Discours rapporté au présent
5. Passé récent
6. Présent progressif

Examination Scheme:

Components	A	V	H	CT	EE
Weightage (%)	5	15	15	15	50

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- le livre à suivre : Campus: Tome 1

GERMAN - IV

Course Code: FLG 401 Credit Units: 02

Course Objective:
To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.
To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany.
Introduction to Advanced Grammar Language and Professional Jargon

Course Learning Objective :

- Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of advance level.
- Students will be able to communicate with complex sentences.

After successful completion of this semester, students will be able to:

- Can make sentences in past present and future
- Talk about journey
- Express their assumption
- Plan and book the journey
- Express opposition(but) and alternative (or)

Course Contents:

Module I: Present perfect tense
Present perfect tense, usage and applicability
Usage of this tense to indicate near past
Universal applicability of this tense in German

Module II: Letter writing
To acquaint the students with the form of writing informal letters.

Module III: Interchanging prepositions
Usage of prepositions with both accusative and dative cases
Usage of verbs fixed with prepositions
Emphasizing on the action and position factor

Module IV: Past tense
Introduction to simple past tense
Learning the verb forms in past tense
Making a list of all verbs in the past tense and the participle forms

Module V: Reading a Fairy Tale
Comprehension and narration
- Rotkäppchen
- Froschprinzessin
- Die Fremdsprache

Module VI: Genitive case
Genitive case – Explain the concept of possession in genitive
Mentioning the structure of weak nouns

Module VII: Genitive prepositions
Discuss the genitive propositions and their usage: (während, wegen, statt, trotz)

Module VIII: Picture Description
Firstly recognize the persons or things in the picture and identify the situation depicted in the picture;
Secondly answer questions of general meaning in context to the picture and also talk about the personal experiences which come to your mind upon seeing the picture.

Examination Scheme:

Components	A	V	H	CT	EE
Weightage (%)	5	15	15	15	50

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant - 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

SPANISH - IV

Course Code: FLS 401 Credit Units: 02

Course Objective:

To enable students acquire working knowledge of the language; to give them vocabulary, grammar, voice modulations/intonations to handle everyday Spanish situations with ease.

Course Learning objective:

- Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of advance level.
- Students will be able to communicate with complex sentences
- To be able to write formal and informal, business letters/ E-mails
- Translating basic technical texts from Spanish to English
- Essay writing on different issues.
- Spanish for specific purposes

Course Contents:

Module I
Revision of eaSrlier semester modules
Introduction to Present Continuous Tense (Gerunds)

Module II
Translation with Present Continuous Tense
Introduction to Gustar, Parecer, Apetecer, doler

Module III
Imperatives (positive and negative commands of regular verbs)

Module IV
Commercial/business vocabulary

Module V
Simple conversation with help of texts and vocabulary
En la recepcion del hotel
En el restaurante
En la agencia de viajes
En la tienda/supermercado

Examination Scheme:

Components	A	V	H	CT	EE
Weightage (%)	5	15	15	15	50

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español Sin Fronteras (Nivel – Elemental)

CHINESE – IV

Course Code: FLC 401 Credit Units: 02

Course Objective:
How many characters are there? The early Qing dynasty dictionary included nearly 50,000 characters the vast majority of which were rare accumulated characters over the centuries. An educate person in China can probably recognize around 6000 characters. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Learning Objectives:

- Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of advance level.
- Students will be able to communicate with complex sentences.

On the completion of third semester the students will be able to:

- Communicate in Chinese at workplace.
- Attend meeting and talk on telephone using Chinese language.
- Understand official work and send emails in Chinese.
- Communicate in Chinese while attending job interview and joining new post

Course Contents:

Module I
Dialogue Practice
Observe picture and answer the question
Pronunciation and intonation
Character writing and stroke order.
Electronic items

Module II
Traveling – The Scenery is very beautiful
Weather and climate
Grammar question with – "bu shi …. Ma?"
The construction "yao … le" (Used to indicate that an action is going to take place)
Time words "yiqian", "yiwai" (Before and after).
The adverb "geng".

Module III
Going to a friend house for a visit meeting his family and talking about their customs.
Fallen sick and going to the Doctor, the doctor examines, takes temperature and writes prescription.
Aspect particle "guo" shows that an action has happened some time in the past.
Progressive aspect of an actin "zhengzai" Also the use if "zhe" with it.
To welcome someone and to see off someone …. I cant go the airport to see you off… etc.

Module IV
Shipment. Is this the place to checking luggage?
Basic dialogue on – Where do u work?
Basic dialogue on – This is my address
Basic dialogue on – I understand Chinese
Basic dialogue on – What job do u do?
Basic dialogue on – What time is it now?

Module V
Basic dialogue on – What day (date) is it today?
Basic dialogue on – What is the weather like here.
Basic dialogue on – Do u like Chinese food?
Basic dialogue on – I am planning to go to China.

Examination Scheme:

Components	A	V	H	CT	EE
Weightage (%)	5	15	15	15	50

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- "Elementary Chinese Reader, Part-2" Lesson 31-38

ANANDAM-VI

Course Code: AND004 Credit Units: 02

Course Objective:
Aanandam is a credited subject that aims to instill the **joy of giving** and sharing in young people through community participation, helping them to be responsible citizens and be initiators of change for a healthy society. A daily act of goodness and charity will infuse the habit of community service in students. The faculty will emphasize shift in focus-Happiness is not in acquiring things, but permanent happiness comes from giving, sharing, and caring for someone. The faculty will inspire students for Individual Social Responsibility (ISR) and will inculcate the qualities of compassion, an open mind, a willingness to do whatever is needed and positive attitude in students. Imagination and Creativity are to be appreciated. An aim and a vision are to be developed in students.

OUTCOME OF AANANDAM COURSE

The student should develop:
• Awareness and empathy regarding community issues
• Interaction with the community and impact on society
• Interaction with mentor and development of Student teacher relationship
• Interaction among students, enlarge social network
• Cooperative and Communication skills and leadership qualities
• Critical thinking, Confidence and Efficiency

AANANDAM: COMMUNITY SERVICE

• Community service programs are very effective for students' personal and social, ethical, and academic development. These effects depend on the characteristics of the programs chosen
• Involvement of students in community work has an impact on development of student skills, creativity, critical thinking, and innovative powers. Passion and Positivity are basic requirements for Community service
• They would examine social challenges /problems, assess the needs of the community, evaluate previous implemented projects, and think of further solutions
• They would learn to cooperate and collaborate with other agencies and inculcate leadership qualities.

CHEMICAL REACTION ENGINEERING – I

Course Code: BTH 501 Credit Units: 04

Course learning outcomes (CLO): -At the successful completion of this course you should be able to:

1. Develop an understanding of the basic concepts involved in using reaction rate equations and kinetic constants.
2. Perform derivations of rate equations for elementary reactions both in homogenous.
3. Perform derivations of design equations and calculations in batch, continuous CSTR and PFR reactors.
4. Identify the influence of temperature for irreversible and reversible reactions and the temperature influence on reactor performance and reactor stability.
5. Perform calculations of chemical reactors and network of chemical reactors.

Course Contents:

Module I: Kinetics of homogeneous reactions:
Rate of reaction, Elementary and non-elementary homogeneous reactions, Molecularity and Order of reaction , Thermodynamic formulations of rates, Mechanism of reaction, Temperature dependency from thermodynamics , Arrhenius collision and activated complex theories.

Module II: Introduction to Batch Reactor:
Integral and differential methods for analyzing kinetic data, Interpretation of constant volume batch reactor, data for zero, first, second and third order reactions, Half life period, Irreversible reaction in parallel and series, Auto catalytic reaction.

Module III: Interpretation of Reactor Data:
Interpretation of variable volume batch reactions data for zero, first and second order reactions, Design equations for batch, plug flow, back mix flow and semi batch reactors for isothermal, adiabatic homogeneous reaction.

Module IV: Introduction to Reactor Design:
Holding time and space-time for flow system, Design of batch, plug flow and mixed flow reactors for first and second order single reactions, Optimum reactor size, Plug flow reactors in series/parallel. Equal and different size of mixed reactors in series and finding the best system for the given conversion, Recycle reactor, Design of reactors for multiple reactions, parallel and series reaction, series-parallel reactions.

Module V: Compartment Models:
Temperature and pressure effects for single reaction, Optimal temperature progression for first order reactions. Residence time distribution of fluid in vessels, E , F and C curve, Dispersion models, Tanks in series model.

Examination Scheme:

Components	A	V	H	CT	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text Books

1.Levenspiel, O.. “Chemical Reaction Engineering”, 3rd ed. New York John Wiley (1998)

Reference Books

1. Fogler, H.S. “Elements of Chemical Reaction Engineering”, 4th ed. Prentice Hall (1997).
2. Smith, J. “Chemical Engineering Kinetics “, 3rd edition. McGraw-Hill, . (1990).

CHEMICAL ENGINEERING THERMODYNAMICS-II

Course Code : BTH 502 Credit Units: 04

Course learning outcomes (CLO): - At the successful completion of this course you (the student) should be able to:

1. Use activity coefficient models to calculate excess properties of liquids.
2. Use modified Raoult's law to calculate VLE of non-ideal mixtures.
3. Calculate chemical equilibrium in non-ideal mixtures.
4. Understand processes involving power production, refrigeration, and liquifaction, and be able to calculate relevant system efficiencies for these processes.
5. Understand the characteristics of chemical reactions, operating parameters and their impact on the conversion and yield.
6. Ability to estimate thermodynamic properties of substances in gas or liquid state of ideal and real mixture & also to predict intermolecular potential and excess property behavior of multi-component systems.

Course Contents:

Module I: Review of Basic Concepts

The first law and conservation of energy. Applications to steady , non-steady flow and other engineering problems. The second law, Applications to engineering problems relating to equilibrium, maximum and minimum work.

Module II: Properties of Pure Substances

Changes in thermodynamic properties and their inter-relationships. The ideal gas. Fugacity and Fugacity coefficients for real gases.

Module III: Multicomponent System

Partial molal properties. Mathematical models for the chemical potential. Ideal and non-ideal solutions. Activity and activity coefficients. The Gibbs Duhem equations. Excess properties of mixtures.

Module IV: Chemical Reaction Equilibrium

Chemical equilibrium in homogenous and heterogeneous chemical reactions. Combined chemical and phase equilibrium. Balance equation for Tank-type and Tubular reactors.

Module V: Thermodynamic Analysis of Processes

Work and energy functions, availability, heat exchange, mixing and separation processes.

Examination Scheme:

Components	A	V	H	CT	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text Books :

1. Smith, J.M., Van Ness, H.C. & Abbot, M.M. "Intro to Chemical Engineering
2. Nag, P.K "Engineering Thermodynamics", Tata McGraw Hill

References:

1. Engel, T. and Reid, P., Thermodynamics, Statistical Thermodynamics & Kinetics, Pearson Education, 2006
2. Cengel & Boles, "Thermodynamics", Tata McGraw Hill.
3. Sonntag /Vanhylene, Fundamentals of Thermodynamics, Wiley
4. Kyle, B.G., " Chemical and Process Thermodynamics' , Prentice Hall, Inc
5. Y.V.C. Rao, Engineering Thermodynamics, Khanna Publications

HEAT TRANSFER

Course Code: BTH 503 Credit Units: 04

Course learning outcomes (CLO): -
At the successful completion of this course you (the student) should be able to:

1. Understand the different forms of heat transfer.
2. Understand the relationship between the modes of heat transfer and various correlations.
3. Understand and apply the various numerical techniques to find out the heat transfer coefficient.
4. Understand the basic issues involved in design aspects of heat exchangers.
5. Professionally skilled for higher studies in research institutions and to work in process industries

Course Contents:

Module I: Introduction and Conduction

Introduction to heat transfer and general concepts of heat transfer by conduction, convection and radiation. Conduction: Basic concepts of conduction in solids, liquids and gases, steady state temperature fields and one dimensional conduction without heat generation, e.g., through plane walls, cylindrical and spherical surfaces, composite layers, etc. Insulation materials, critical and optimum insulation thickness, Extended surfaces, fins and their practical applications. Introduction to unsteady state heat transfer.

Module II: Convection

Fundamentals of convection, Basic concepts and definitions, natural and forced convection, hydrodynamic and thermal boundary layers, laminar and turbulent heat transfer inside and outside tubes, Dimensional analysis, determination of individual and overall heat transfer coefficients and their temperature dependence, heat transfer in molten metals.

Module III: Radiation

Basic laws of heat transfer by radiation, black body and gray body concepts, view factors, Kirchoff'ssz law, solar radiations, combined heat transfer coefficients by convection and radiation.

Module IV: Heat Transfer with Phase Change

Condensation of pure and mixed vapors, film wise and drop wise condensation, loading in condensers and basic calculation on condensers, heat transfer in boiling liquids, boiling heat transfer coefficients. Evaporation: Elementary principles, types of evaporators. Single and multiple effect evaporators and their calculation, thermo compression.

Module V: Heat Transfer Equipment

Classification, principles and design criteria, types of exchangers, viz., double pipe, shell and tube, plate type, extended surface, Furnaces and their classification and application.

Examination Scheme:

Components	**A**	**V**	**H**	**CT**	**EE**
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text Books
Holman, J.P.: "Heat Transfer" 9 th ed. McGraw Hill (1989).

MASS TRANSFER – I

Course Code: BTH 504 Credit Units: 04

Course learning outcomes (CLO): -At the successful completion of this course you (the student) should be able to:

- To learn the role and function of mass transfer in process industry
- To familiarize with unique risks, issues, and critical success factors associated with mass transfer operations
- To emphasize on advanced mass transfer technologies used in chemical industry.

Course Contents:

Module I: Diffusion

Molecular and turbulent diffusion, diffusion coefficient, Fick's Law of diffusion, Dependence of diffusion coefficient on temperature, pressure and composition; measurement and estimation of diffusivity. Diffusion in multi-component gas mixtures. Diffusion in Solids: Molecular, Knudsen & surface diffusion; Inter- phase mass transfer: Mass transfer coefficients, Diffusion between phases, Equilibrium solubility of gases in liquids, Mass transfer theories, Mass transfer in fluidized beds, Flow past solids and boundary layers, Simultaneous heat and mass transfer.

Module II: Absorption and Stripping

Equipments, Gas-liquid equilibrium, Henry's law, Selection of solvent, Absorption in tray column, Graphical and analytical methods, Absorption in packed columns, HTU, NTU &HETP concepts, Design equations for packed column, Absorption with chemical reaction and mass transfer.

Module III: Humidification and Dehumidification

Vapour liquid equilibrium and enthalpy for a pure substance, vapour pressure temperature curve, Vapour gas mixtures, Definition and derivations of relationships related with humidity Fundamental concept of humidification, Dehumidification and water cooling, Wet bulb temperature, Adiabatic and non-adiabatic operations, Evaporative cooling ,Classification and design of cooling towers.

Module IV: Drying

Solid-gas equilibrium, Different modes of drying operations, Definitions of moisture contents, Types of batch and continuous dryers, Rate of batch drying, Time of drying, Mechanism of batch drying, Continuous drying, Design of continuous dryers.

Module V: Crystallization

Equilibrium yield of crystallization Heat and mass transfer rates in crystallization, Theories of crystallization, Factors governing nucleation and crystal growth rates, Controlled growth of crystal., Classification and design of crystallizers.

Examination Scheme:

Components	A	V	H	CT	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text Books

1. Treybal, R "Mass Transfer Operations", 3rd ed. New York: McGraw-Hill, (1980).
2. Sherwood T. K., Pigford R. L. and ilke P. "Mass Transfer" McGraw Hill (1975).

Reference Books

1. Foust A. S. et.al., "Principles of Unit Operations" John Wiley (1980).
2. Geankoplis, C.J.. "Transport Processes and Unit Operations", 3rd ed. Prentice Hall. (1993)

WEB DEVELOPMENT

Course Code: BCS 510 **Credit Units: 03**

Course Objective:

To design web base and context aware systems to acquire, organize process, share and use the knowledge of web sites**.** The field of web site is multidisciplinary as web sites are amazingly complex systems**.** The major objective of this course is to provide a sound foundation to the students on the concepts, percepts and practices in a field that is of immense concern to the industry and business**.**

Course Contents:

Module I: Overview of Internet
Introduction to Internet and WWW, Concept of Networking and Layers of OSI Model, Internet protocols like TCP/IP, http, telnet and ftp, URL, email, domain name, Web Browsers.

Module II: Principles of Web Design
Key issues to be considered in web site design. Structure of a Web Page: Introduction to HTML, Elements of HTML syntax, Head and Body sections, Building HTML documents, Inserting text, images, hyperlinks, Backgrounds and Color Control, HTML Editors & Tools: Use of different HTML editors and tools like Netscape Communicator and Microsoft Front Page etc

Module III: HTML Tags
Use of Different HTML tags in web pages. Table Handling: Table layout & presentation, constructing tables in a web page, developing a web page in a table. Ordered and unordered lists. Frames: Developing Web pages using frames. Advantages and disadvantages of frames. Creating forms, Role of Databases in web applications. Use of at least one graphical and animation tools like Adobe Fireworks, Abode Photoshop, Gif Animator, Gimp etc.

Module IV: Cascading style-sheet (CSS) in HTML
Introduction to Cascading Style Sheets (CSS), Types of Style Sheets (Inline, Internal and External), CSS for Website Layout and Print Layout.
Types of various CSS Selectors, CSS properties: Type Properties, Background Properties, Block Properties, Box Model Properties, List Properties, Border Properties, Positioning Propeties.

Module V: Introduction to Java Script

Role of java script in a web page, Script writing basics, Adding interactivity to a web page, creating dynamic web pages,
Similarities to java, embedding JavaScript code, embedding java applets in a web page**,** Form validation using java script

Projects:
Creating a discussion form, creating an online store, creating a job site**.**

Examination Scheme:

Components	A	V	H	CT	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

Text:

- Ramesh Bangia, "Web Technology", Firewall media
- C. Xavier, "World Wide Web Design with HTML", Tata McGraw Hill.
- Unleashed ASP, Techmedia

References:

- Rick Dranell, "HTML4 unleashed", Techmedia Publication.
- Shelly Powers, "Dynamic Web Publishing Unleashed", Techmedia.
- Don Gosselin, "JavaScript", Vikas Publication
  - Mark Swank & Drew Kittel, "World Wide Web Database", Sams net.

DOMAIN ELECTIVE-III
PROCESS INSTRUMENTATION

Course Code: BTH 505 Credit Units: 03

Course learning outcomes (CLO): -At the successful completion of this course you (the student) should be able to:

. Understand the different measuring instruments used in process industries.
• Understand the basics of any instrument and its characteristics.
• Understand and apply the various processing instruments in chemical process industries.
• Understand the flow measuring devices, pressure and temperature measuring instruments.
* Professionally skilled for higher studies in research institutions and to work in chemical process industries.

Course Contents:

Module I: Introduction of Instruments

Importance of measuring of Instruments in Process Control, Classification of Instruments, Elements of an Instruments, Static & Dynamic Characterization of Instruments, Errors in measurements & Error Analysis, Selection of instrument for a particular Measurement, transducers.

Module II: Temperature sensing devices

Measurement of Temperature: Thermocouples, Resistance Thermometer, Expansion Thermometers, Pyrometers.

Module III: Pressure measuring instruments

Measurement of Pressure & Vacuum, Hydrostatic type, Elastic Element type, Electrical Type and other type of instruments like Neleod Gauge, Thermocouple gauge, Knudson Gauge, Ionization Gauge.

Module IV: Introduction to flow measuring instruments

Instruments for Measurement of Flow rate, level & Viscosity, Variable Area & variable head flow meters, Volumetric and Mass flow rate meters, Linear velocity measurement systems, Anemometers, Pressure type , Resistance & Capacitance type, Sonic & Ultrasonic, Thermal type Level meters. Viscometers: Redwood, Saybolt, Engler, Cup & Cone type, Rheo & other types of viscometers.

Examination Scheme:

Components	A	V	H	CT	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Books

1. Eckman, D.P., Industrial Instrumentation, Wiley Eastern Ltd., New York 1990.

2. Jain, R.K., Mechanical and Industrial Measurements, Khanna Publishers.

DOMAIN ELECTIVE-III
PIPING DESIGN

Course Code: BTH 506 Credit Units: 03

COURSE LEARNING OUTCOME: -

At the end the course student will be able to: -

- Understand the use of codes, regulations and standards are the basics for safety and practical engineering of piping systems in process plants.
- Develop and interpret process flow diagrams and process and instrumentation drawings.
- Select and specify pipework and fittings appropriate to the fluids they transport.
- Apply industry standard numerical techniques to solve well defined problems in pipe sizing and thermal expansion.
- Design piping layouts with due regard to space requirements for brackets, thermal expansion and equipment connection.

Course Contents:

Module 1: Introduction: - Introduction to Piping - Responsibilities of Piping Engineer and Designer - Scope of Piping, General: Process Diagrams (PFD, UFD, P&ID, Line List etc.) , Piping Fundamentals: - Definition Application - Codes and Standards

Module 2: Pipe Fittings, Pipe Flanges, Valves, Piping Special Items, Process Mechanical Equipments - Static equipments - Rotary equipments

Module 3: Layouts: - Preparation of Plot Plan - Preparation of Equipment Layouts - Preparation of Nozzle Orientation Drawings - Preparation of Piping General Arrangement Drawings - Preparation of Cross Sectional Drawings 10. Piping Isometric Drawings

Module 4: Pipe Supports: - Types of support - Support Selection - Support Location - Support Span Charts, Materials: - Reading Piping Material Specification - Basic material knowhow, Stress: - Types of Loop - Line flexibility, Typical piping configuration for commonly used equipments.

Examination Scheme: -

Components	A	V	H	CT	EE
Weightage (%)	5	15	15	15	50

Text Book:

1- Sahu G.K., Handbook of Piping Design, New Age International Publisher
2- Hunt Roger, Bausbacher Ed, Process Plant Layout and Piping Design, Pearson Prentice Hall

CHEMICAL REACTION ENGINEERING LAB

Course Code: BTH 521 Credit Units: 01

1. To determine the relative rates of reaction of iodide ion with hydrogen peroxide at room temperature using different concentrations of the iodide ion.
2. To separate Organic Compounds by Paper Chromatography.
3. To study the effect of temperature, concentration of the reactants and a catalyst on the rate of chemical reaction
4. To study the activity results or oxidation-reduction replacement reaction.
5. To purify water by ion -exchange.
6. To determine the order and rate constant of esterification reaction at room temperature.
7. To determine the order and rate constant of saponification reaction at room temperature.
8. To study the residence time distribution (R.T.D.) in a stirred tank reactor.
9. To study the residence time distribution (R.T.D.) in a plug flow reactor.
10. To study the decomposition of calcium carbonate
11. To determine the energy of activation of a given chemical reaction.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	15	15	15	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

HEAT TRANSFER LAB

Course code: BTH 523 Credit Units: 01

1. To find the thermal conductivity of metallic rod at different temperature and draw the temperature profile for steady and unsteady state conduction.
2. To find out the thermal conductivity of insulating powder.
3. To find the thermal conductivity of liquid / gases.
4. To find the emissivity of grey plate with respect to black plate
5. To study the critical heat flux behavior of a liquid
6. To find the heat transfer coefficient for parallel and counter current flow condition for a Double pipe Heat exchanger
7. To study the shell & Tube heat exchanger and find the heat duty and Over all heat transfer coefficient for parallel flow condition.
8. To study the shell & Tube heat exchanger and find the heat duty and Over all heat transfer coefficient for counter flow condition.
9. Compare the heat duty for parallel &Counter flow and find the energy saving.
10. To study the Plate heat exchanger and find the Overall heat transfer coefficient
11. To study the performance of heat pipe.
12. To find the heat transfer coefficient for open pan evaporator for steady and unsteady state condition.
13. To study Single/Double/Triple effect Evaporator and find its Steam economy

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	15	15	15	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

WEB WEVELOPMENT LAB

Course Code: BCS 530 Credit Units: 01

Software Required: Java

List of Assignment:

1. Design a HTML page using all the basic tags.
2. Design a page containing your educational qualification in a table.
3. Design a page containing an ordered list/unordered list.
4. Design a HTML page for your resume.
5. Design a form in HTML to enter different attribute of student information.
6. Design a home page for ASE using Frame.
7. Design another page and connect these to the home page.
8. Write a function in Javascript for input validation.
9. Write a function in Javascript to calculate monthly installation of the loan.
10. Write an input form and save its data in a database using ASP.
11. Display the data stored in database in tabular form on the page.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	15	15	15	25	25

Note**:** IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva**.**

COMMUNICATION SKILLS - III

Course Code: BCS 501 Credit Units: 01

Course Objective:

To equip the participant with linguistic skills required in the field of science and technology while guiding them to excel in their academic field.

COURSE LEARNING OUTCOMES (CLO)

CLO 1 Create right selection of words and ideas while also choosing the appropriate channelof formalcommunication

CLO 2 Demonstrate the ability to analyse a problem and devise a solution in a group.

CLO 3 Demonstrate proficiency in the use of written communication.

CLO 4 Recognize the mannerisms and methodology of Interview and GD to become more expressive in their body language and verbal performance.

Course Contents:

Module I
Reading Comprehension
Summarising
Paraphrasing

Module II
Essay Writing
Dialogue Report

Module III
Writing Emails
Brochure
Leaflets

Module IV: Introduction to Phonetics
Vowels
Consonants
Accent and Rhythm
Accent Neutralization
Spoken English and Listening Practice

Examination Scheme:

Components	CT1	CT2	CAF	V	GD	GP	A
Weightage (%)	20	20	25	10	10	10	5

CAF – Communication Assessment File
GD – Group Discussion
GP – Group Presentation

Text & References:

- Effective English for Engineering Students, B Cauveri, Macmillan India
- Creative English for Communication, Krishnaswamy N, Macmillan
- A Textbook of English Phonetics, Balasubramanian T, Macmillan

BEHAVIOURAL SCIENCE - V
(GROUP DYNAMICS AND TEAM BUILDING)

Course Code: BSS 504 Credit Units: 01

Course Objective:

To inculcate in the students an elementary level of understanding of group/team functions
To develop team spirit and to know the importance of working in teams

Course learning outcomes (CLOs)

At the successful completion of this course you (the student) should be able to:

1. Recognize their personality and individual differences and identify its importance of diversity at workplace and ways to enhance it.
2. Recognize effective socialization strategies and importance of patriotism and taking accountability of integrity.
3. Recognize different types of human rights and its importance.
4. Identify Indian values taught by different religions.
5. Identify long term goals and recognize their talent, strengths and styles to achieve them.

Course Contents:

Module I: Group formation
Definition and Characteristics
Importance of groups
Classification of groups
Stages of group formation
Benefits of group formation

Module II: Group Functions
External Conditions affecting group functioning: Authority, Structure, Org. Resources, Organizational policies etc.
Internal conditions affecting group functioning: Roles, Norms, Conformity, Status, Cohesiveness, Size, Inter group conflict.
Group Cohesiveness and Group Conflict
Adjustment in Groups

Module III: Teams
Meaning and nature of teams
External and internal factors effecting team
Building Effective Teams
Consensus Building
Collaboration

Module IV: Leadership
Meaning, Nature and Functions
Self leadership
Leadership styles in organization
Leadership in Teams

Module V: Power to empower: Individual and Teams
Meaning and Nature
Types of power
Relevance in organization and Society

Module VI: End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

- Organizational Behaviour, Davis, K.
- Hoover, Judhith D. Effective Small Group and Team Communication, 2002,Harcourt College Publishers
- Dick, Mc Cann & Margerison, Charles: Team Management, 1992 Edition, viva books
- Bates, A. P. and Julian, J.: Sociology - Understanding Social Behaviour
- Dressers, David and Cans, Donald: The Study of Human Interaction
- Lapiere, Richard. T – Social Change
- Lindzey, G. and Borgatta, E: Sociometric Measurement in the Handbook of Social Psychology, Addison – Welsley, US.
- Rose, G.: Oxford Textbook of Public Health, Vol.4, 1985.

FRENCH - V

Course Code: FLT 501 Credit Units: 02

Course Objective:

To furnish some basic knowledge of French culture and civilization for understanding an authentic document and information relating to political and administrative life.

Course Learning Objective:

· Students will hone intermediate language skills such as reading, writing, speaking, listening & interactive) in the language
· Students will be able to read and interpret small texts of intermediate level.
· Students will be able to communicate in small sentences in Simple Future and Past tenses .
· Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.
· To understand the TP
· To understand an experiment
· To read the chemical equations
· To identify the chemical formulas
· To understand the instructions of a project
· To express a desire
· To understand a testimony
· To understand and read an exercise of mathematics
· Read and note the equations

Course Contents:

Module D: pp. 131 – 156 Unités 10, 11

Contenu lexical:

Unité 10: Prendre des décisions

1. Faire des comparaisons
2. décrire un lieu, le temps, les gens, l'ambiance
3. rédiger une carte postale

Unité 11: faire face aux problèmes

1. Exposer un problème.
2. parler de la santé, de la maladie
3. interdire/demander/donner une autorisation
4. connaître la vie politique française

Contenu grammatical:

1. comparatif - comparer des qualités/ quantités/actions
2. supposition : Si + présent, futur
3. adverbe - caractériser une action
4. pronom "Y"

Examination Scheme:

Components	A	V	H	CT	EE
Weightage (%)	5	15	15	15	50

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- le livre à suivre : Campus: Tome 1

GERMAN - V

Course Code: FLG 501 Credit Units: 02

Course Objective:

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.
To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany
Introduction to Advanced Grammar and Business Language and Professional Jargon.

Course Learning Objective:

- Students will hone intermediate language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of intermediate level.
- Students will be able to communicate in small sentences in Simple Future and Past tenses .
- Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.
- After successful completion of this semester, students will be able to:
- tell where they work and live
- tell location of their offices and house
- explain, how they reach their work place
- ask and tell the location of thing or person in a house like behind, in front of etc.
- describe the office things like printer, files etc

Course Contents:

Module I: Genitive case
Genitive case – Explain the concept of possession in genitive
Mentioning the structure of weak nouns

Module II: Genitive prepositions
Discuss the genitive propositions and their usage: (während, wegen, statt, trotz)

Module III: Reflexive verbs
Verbs with accusative case
Verbs with dative case
Difference in usage in the two cases

Module IV: Verbs with fixed prepositions
Verbs with accusative case
Verbs with dative case
Difference in the usage of the two cases

Module V: Texts
A poem 'Maxi'
A text Rocko

Module VI: Picture Description
Firstly recognize the persons or things in the picture and identify the situation depicted in the picture;
Secondly answer questions of general meaning in context to the picture and also talk about the personal experiences which come to your mind upon seeing the picture.

Examination Scheme:

Components	A	V	H	CT	EE
Weightage (%)	5	15	15	15	50

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant - 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

SPANISH - V

Course Code: FLS 501 Credit Units: 02

Course Objective:

To enable students acquire working knowledge of the language; to give them vocabulary, grammar, voice modulations/intonations to handle everyday Spanish situations with ease.

Course Learning Objective:

- Students will hone intermediate language skills such as reading, writing, speaking, listening & interactive) in the language.
- Students will be able to read and interpret small texts of intermediate level.
- Students will be able to communicate in small sentences in Simple Future and Past tenses .
- Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.
- To talk about a pre decided plan
- To talk about a plan yet to materialize
- Topropose a plan
- To talk about what they have done today/during vacations etc.
- Reading texts about Spanish festivals
- Writing composition about Festivals

Course Contents:

Module I
Revision of earlier semester modules

Module II
Future Tense

Module III
Presentations in English on
Spanish speaking countries'
Culture
Sports
Food
People
Politics
Society
Geography

Module IV
Situations:
En el hospital
En la comisaria
En la estacion de autobus/tren
En el banco/cambio

Module V
General revision of Spanish language learnt so far.

Examination Scheme:

Components	A	V	H	CT	EE
Weightage (%)	5	15	15	15	50

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español Sin Fronteras, Greenfield

CHINESE – V

Course Code: FLC 501 Credit Units: 02

Course Objective:

What English words come from Chinese? Some of the more common English words with Chinese roots areginseng, silk, dim sum, fengshui, typhoon, yin and yang, T'al chi, kung-fu. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Learning Objectives:

- Students will hone intermediate language skills such as reading, writing, speaking, listening & interactive) in the language.
- Students will be able to read and interpret small texts of intermediate level.
- Students will be able to communicate in small sentences in Simple Future and Past tenses .
- Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.

Course Contents:

Module I
Drills
Dialogue practice
Observe picture and answer the question.
Pronunciation and intonation.
Character writing and stroke order

Module II
Intonation
Chinese foods and tastes – tofu, chowmian, noodle, Beijing duck, rice, sweet, sour….etc. Learning to say phrases like – Chinese food, Western food, delicious, hot and spicy, sour, salty, tasteless, tender, nutritious, god for health, fish, shrimps, vegetables, cholesterol is not high, pizza, milk, vitamins, to be able to cook, to be used to, cook well, once a week, once a month, once a year, twice a week……
Repetition of the grammar and verbs taught in the previous module and making dialogues usingit.
Compliment of degree "de".

Module III
Grammar the complex sentence "suiran … danshi…."
Comparison – It is colder today than it was yesterday…..etc.
The Expression "chule….yiwai". (Besides)
Names of different animals.
Talking about Great Wall of China
Short stories

Module IV
Use of "huozhe" and "haishi"
Is he/she married?
Going for a film with a friend.
Having a meal at the restaurant and ordering a meal.

Module V
Shopping – Talking abut a thing you have bought, how much money you spent on it? How many kinds were there? What did you think of others?
Talking about a day in your life using compliment of degree "de". When you get up? When do you go for class? Do you sleep early or late? How is Chinese? Do you enjoy your life in the hostel?
Making up a dialogue by asking question on the year, month, day and the days of the week and answer them.

Examination Scheme:

Components	A	V	H	CT	EE
Weightage (%)	5	15	15	15	50

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- “Elementary Chinese Reader ” Part-II Lesson 39-46

PRACTICAL TRAINING

Course Code: BTH 550 Credit Units: 03

Methodology

Practical training is based on the theoretical subjects studied by students. It can be arranged within the college or in any related industrial unit. The students are to learn various industrial, technical and administrative processes followed in the industry. In case of on-campus training the students will be given specific task of fabrication/assembly/testing/analysis. On completion of the practical training the students are to present a report covering various aspects learnt by them and give a presentation on same.

Examination Scheme:

Feedback from industry/work place	30
Training Report	30
Viva	15
Presentation	25
Total	**100**

ANANDAM-V

Course Code: AND005 Credit Units: 02

Course Objective:
Aanandam is a credited subject that aims to instill the **joy of giving** and sharing in young people through community participation, helping them to be responsible citizens and be initiators of change for a healthy society. A daily act of goodness and charity will infuse the habit of community service in students. The faculty will emphasize shift in focus-Happiness is not in acquiring things, but permanent happiness comes from giving, sharing, and caring for someone. The faculty will inspire students for Individual Social Responsibility (ISR) and will inculcate the qualities of compassion, an open mind, a willingness to do whatever is needed and positive attitude in students. Imagination and Creativity are to be appreciated. An aim and a vision are to be developed in students.

OUTCOME OF AANANDAM COURSE

The student should develop:
• Awareness and empathy regarding community issues
• Interaction with the community and impact on society
• Interaction with mentor and development of Student teacher relationship
• Interaction among students, enlarge social network
• Cooperative and Communication skills and leadership qualities
• Critical thinking, Confidence and Efficiency

AANANDAM: COMMUNITY SERVICE

• Community service programs are very effective for students' personal and social, ethical, and academic development. These effects depend on the characteristics of the programs chosen
• Involvement of students in community work has an impact on development of student skills, creativity, critical thinking, and innovative powers. Passion and Positivity are basic requirements for Community service
• They would examine social challenges /problems, assess the needs of the community, evaluate previous implemented projects, and think of further solutions
• They would learn to cooperate and collaborate with other agencies and inculcate leadership qualities.

PROCESS DYNAMICS AND CONTROL

Course Code: BTH 601 Credit Units: 03

Course learning outcomes (CLO): -At the successful completion of this course you (the student) should be able to:

1. Understand the importance of process dynamics (unsteady state operation).
2. Apply the Laplace and Inverse Laplace Transforms in order to obtain s-domain transfer functions and dynamic responses.
3. Understand the use and measurement of transfer functions (First order, Second Order, Higher Order) along with different forcing functions (step. Impulse, ramp, sinusoidal).
4. Distinguish P/I/D actions and be able to tune a PID controller.
5. Analyze the stability of system.
6. Develop block diagram description of processes and control loops

Course Contents:

Module I: Introduction to control systems

Introduction to Process control systems, Regulator & Servo control, Feed Forward & Feed backward control, Negative & Positive Feed back Control, variables & Physical Elements of a Control system, Physical, Block & Signal Flow Diagram. Use of Laplace & Inverse Laplace Transformation is study of Process Dynamics.

Module II: First Order Systems

Dynamic Modeling of a Process, Dynamic behavior of First order systems and First order systems in series. Dynamic behavior of second & higher order system for various kind of inputs, Linearization of nonlinear system, Transportation & Transfer Lag.

Module III: Introduction To Controller systems

Modes of control action, Controllers & Final control Elements, Reduction of Block & Signal Flow Diagrams, Closed loop transfer function and response of closed loop control system for various type of control actions.

Module IV: Stability of Controller Systems

Stability analysis, Rouths criterion, Root locus Analysis, Frequency Response Analysis & Design of Controllers for optimum Performance.

Module V: Advanced Controller Systems

Advanced control strategies, cascade control, Feed forward control, Tuning Rules for Feed Forward & Feed backward control, Ratio control, optimum controller Tuning, Ziegler Nichol & Cohen Coon settings.

Examination Scheme:

Components	A	V	H	CT	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text Book

1. Process system Analysis & Control, D.R. Coughanoowr, McGraw Hill Publication.

Reference Books

1. Process Control. Peter Harriot, Tata McGraw Hill.
2. Process control, Staphno polies, Prentic Hall India Ltd.

CHEMICAL REACTION ENGINEERING – II

Course Code : BTH 602 Credit Units: 03

Course learning outcomes (CLO): -

At the successful completion of this course you (the student) should be able to:

1. Describe the mass& heat transfer and reaction phenomena occurring in heterogeneous reactions and model.
2. Make informed choices of reactor types for heterogeneous reactions.
3. Write and simplify appropriately the overall rate and balance equations for multiphase reactions
4. Design reactors for heterogeneous reactions and optimise operating conditions
5. Use RTD methods to diagnose non-ideal flows in reactors and calculate conversions in non-ideal reactors

Course Contents:

Module I: Reactor Models

Design equations for batch, continuous and semi batch reactors, Selectivity and yield. Non-catalytic heterogeneous reactions ; Rate equations for heterogeneous reactions.

Module II: Heterogeneous Catalysis

Nature of catalysis, Adsorption isotherms, Mechanism of catalytic reactions, Physical properties of solid catalysts. Preparation testing and characterization of catalysts, Catalyst selection, Catalyst poisoning.

Module III: External Transport Process

Reaction and diffusion within porous catalysts, Effective diffusivity, Thermal conductivity and effectiveness factor. Reactor choice for single and multiple reactor system and recycle reactor
Stability of Reactors ,Non - isothermal design of ideal reactor, Hot spot in tubular reactor, Steady state multiplicity and effect of operating variables on the stability of C.S.T.R.

Module IV: Reactor Design

Progressive conversion and un-reacted core model, Determination of rate controlling step, application to design, fluidized bed reactions Design of solid catalytic reactor, batch, CSTR and tubular reactor. Design of fixed bed and fluidized bed reactors.

Module V: Non elementary reactions and reactor design

Biochemical reaction system, Enzyme, Fermentation, Microbial fermentation, polymerization reactors

Examination Scheme:

Components	A	V	H	CT	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text Book

1.Levenspiel, O.. “Chemical Reaction Engineering”, 3rd ed. New York John Wiley (1998)

Reference Books

1. Fogler, H.S. “Elements of Chemical Reaction Engineering”, 4th ed. Prentice Hall (1997).
2. Smith, J. “Chemical Engineering Kinetics “, 3rd edition. McGraw-Hill, . (1990).

MASS TRANSFER --II

Course Code: BTH 603 Credit Units: 04

Course learning outcomes (CLO): -

At the successful completion of this course you (the student) should be able to:

- Understand the different mass transfer operations such as Distillation, Absorption, Adsorption etc.
- Can explain the method for determination of number of plates in distillation column, absorption column.
- Explain the applications of various mass transfer operations.
- Professionally skilled for higher studies in research institutions and to work in chemical process industries.

Course Contents:

Module I: Distillation

Pressure-composition, Temperature-concentration, Enthalpy-concentration diagrams for ideal and non-ideal solutions, Raoults law and its application, Maximum and minimum boiling mixtures, concept of relative volatility, Single Stage Distillation Differential distillation, Flash vaporization, Vacuum, molecular and steam distillation.

Module II: Continuous Distillation of Binary Mixtures

Multistage contact operations, Characteristics of multistage tower, McCabe Thiele method, Ponchon Savarit method, Reflux, maximum, min. and optimum reflux, Use of open steam, Tray efficiency, Determination of height and column diameter, Multistage batch distillation; Principles of azeotropic and extractive distillation, Introduction to multicomponent distillation system.

Module III: Liquid-Liquid Extraction

Ternary liquid equilibria, Triangular graphical representation concept of theoretical or ideal stage, Equipment used for single stage and multistage continuous operation; Analytical and graphical solution of single and multistage operation Super critical fluid extraction.

Module IV: Solid /Liquid Extraction

Leaching, Solid liquid equilibrium, Equipment used in solid-liquid extraction,Single and multistage cross current contact and counter current operations. Concept of an ideal stage, Overall stage efficiency, Determination of number of stages.

Module V: Adsorption

Description of adsorption processes and their application, Types of adsorption, Nature of adsorbents adsorption equilibria and adsorption hysterises, Stage wise and continuous contact adsorption operations, Determination of number of stages, Equipments; Ion exchange, Equilibrium relationship, Principle of ion-exchange, techniques and applications, Principles and application of dialysis, osmosis reverse osmosis, thermal diffusion, sweep diffusion.

Examination Scheme:

Components	A	V	H	CT	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text Books

1. Treybal, R "Mass Transfer Operations", 3rd ed. New York: McGraw-Hill, (1980).
2. Sherwood T. K., Pigford R. L. and Wilke P. "Mass Transfer" McGraw Hill (1975).

Reference Books

1. Foust A. S. et.al., "Principles of Unit Operations" John Wiley (1980).
2. Geankoplis, C.J.. "Transport Processes and Unit Operations", 3rd ed. Prentice Hall. (1993)

EQUIPMENT DESIGN

Course Code: BTH 604 Credit Units: 03

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Understand the various color codes, symbol for valve, electricity line, chemical pipelines etc.
2. Understand the content of process flow diagrams (PFD and piping and instrument diagrams (P&ID)
3. Recognize the key process parameters in engineering design problems and safety aspects.
4. Understand heat exchanger sizing and develop a heat exchanger data sheet.
5. Carry out material and energy balance calculations separation processes by hand.
6. Understand distillation tray sizing and develop a distillation tray process data sheet.

Course Contents:

Module I: Introduction to construction materials

Introduction to various mechanical properties of materials to be used as material of construction, resistance of metals to corrosion under varying conditions of temperature and pressure etc. Application and use of various codes and standards in design.

Module II: Designing of process equipments I

Design of non-pressure storage vessel, tall vertical vessels, unfired pressure vessels with internal pressure ,Design of unfired pressure vessels with external pressures, end closures, flat plates, domed ends, torispherical, ellipsoidal, hemispherical and conical ends. Design of nozzles,openings and reinforcements, Bolts, flanges, gaskets .

Module III: Design of process equipments II

Bolted flanges, pipe line design and process design of a few equipments like heat exchangers, Evaporators, Distillation columns, Absorbers, Reactors and Dryers .

Module IV: Mechanical designs of process equipments:
Mechanical design of selected process equipments such as heat exchangers, Evaporators,

Examination Scheme:

Components	A	V	H	CT	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text Books:

1. Peters Max. S., Timmerhaus Klaus D.and Ronald E West “Plant Design and Economics for Chemical Engineers”.2003 V Edition McGraw Hill.
2. Coulson, J. M. and Richardson J. F. “Chemical Engineering”, vol. 6 Pargamon Press.(1989).
3. Brownel and Young, “Process Equipment Design ”.Wiley (1968).

Reference Books

1. Indian and American Codes Used in Designing of equipments (TEMA and IS Codes)
2. Evans, F. L., “Equipment Design Handbook”, Gulf Publishing Company.(1979).

ENVIRONMENTAL POLLUTION AND CONTROL

Course Code: BTH 605 Credit Units: 02

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

- Understand the environment, ecology, and different problems created by human being.
- Environmental degradation due to various industries.
- Different techniques and acts to control water, air, land, noise pollution and various industrial pollution.

Course Contents:

Module I: Introduction

Environment and environmental pollution from chemical process industries, characterization of emission and effluents, environmental Laws and rules, standards for ambient air, noise emission and effluents

Module II: Pollution Prevention

Process modification, alternative raw material, recovery of by co-product from industrial emission effluents, recycle and reuse of waste, energy recovery and waste utilization. Material and energy balance for pollution minimization. Water use minimization, Fugitive emission/effluents and leakages and their control-housekeeping and maintenance.

Module III: Air and Water Pollution Control

Air Particulate emission control by mechanical separation and electrostatic precipitation, wet gas scrubbing, gaseous emission control by adsorption and adsorption, Design of cyclones, ESP, fabric filters and absorbers. Water Physical treatment, pre-treatment, solids removal by setting and sedimentation, filtration centrifugation, coagulation and flocculation.

Module IV: Chemical Treatment

Anaerobic and aerobic treatment biochemical kinetics, trickling filter, activated sludge and lagoons, aeration systems, sludge separation and drying

Module V: Waste management

Characterization of wastes-hazardous and non-hazardous wastes. Waste disposal and management laws and guidelines. Non-hazardous industrial wastes-treatment, disposal, utilization and management. Value-extraction from the wastes. Handling, storage and disposal of hazardous wastes. Case studies of a few real scenarios of waste management – sugar, pulp and paper, and fertilizer units.

Examination Scheme:

Components	A	V	H	CT	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Suggested Books:

1. Pollution Control Acts, Rules and Notifications, CPCB, Delhi. 1995
2. Vallero D., “Fundamentals of Air Pollution”, 4th Ed., Academic Press, 2007
3. Eckenfelder W. W., “Industrial Water Pollution Control”, 2nd Ed., Mc Graw Hill, 1999
4. Kreith F. and Tchobanoglous G., “Handbook of Solid Waste Management”, 2nd Ed., Mc Graw Hill,2002
5. Pichtel J., “Waste Management Practices: Municipal, Hazardous and Industrial”, CRC, 2005
6. Conway R.A. & Ross R.D., “Handbook of Industrial Waste Disposal”, Van-Nostrand Reinhold, 1980
7. Tchobanoglous G., Theisen H. & Vigil S.A., “Integrated Solid Waste Management : Engineering Principles and Management Issues”, McGraw Hill, 1993

PROGRAMMING WITH PYTHON

Course Code: BCS 610 Credit Units: 03

Course Objective:
Objective: Python is next generation multi-purpose programming language that allows different users to create applications of various domains. Students will be able to learn primary fundamentals of python programming and potential of python is to achieve modern computing requirements

Course Outcomes:
After completion of this course, student will be able to

- To learn basics of Python.
- To develop console application in python.
- To develop database application in python.
- To develop basic machine learning application.

Pre-requisite of course: Object oriented concepts, Programming fundamentals

Course Contents:

Module I: Basic of Python Programming

The concept of data types; variables, assignments; immutable variables; numerical types; arithmetic operators and expressions; comments in the program; understanding error messages.

Module II: Conditioning and looping in python

Conditions, Boolean logic, logical operators; ranges; Control statements: if-else, loops (for, while); lambda function in python.

Module III: String, List, Tuple, Set, Dictionary data structure

String manipulations: subscript operator, indexing, slicing a string; strings and number system: converting strings to numbers and vice versa. Lists, tuples, and dictionaries; basic list operators, replacing, inserting, removing an element; searching and sorting lists; dictionary literals, adding and removing keys, accessing and replacing values, traversing dictionaries.

Module IV: Function

Design with functions: hiding redundancy, complexity; arguments and return values; formal vs actual arguments, named arguments. Program structure and design. Recursive functions.

Module V: Basic Python Libraries

Pandas: creation of dataframe, Manipulation of dataframe, generation of series, iloc and loc function etc. NumPy: creation of arrays (1-D, 2-D and n-D array), random matrix, one's matrix, zero's matrix and all other operation over arrays, matplotlib: plotting of line graph, pi chart and box plot etc.

Projects:
Creating a discussion form, creating an online store, creating a job site.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

Text:

- Ramesh Bangia, "Web Technology", Firewall media
- C. Xavier, "World Wide Web Design with HTML", Tata McGraw Hill.
- Unleashed ASP, Techmedia

References:

- Rick Dranell, "HTML4 unleashed", Techmedia Publication.
- Shelly Powers, "Dynamic Web Publishing Unleashed", Techmedia.
- Don Gosselin, "JavaScript", Vikas Publication
    - Mark Swank & Drew Kittel, "World Wide Web Database", Sams net.

PROCESS DYNAMICS & CONTROL LAB

Course Code: BTH 621 Credit Units: 01

Course Contents:

1. To study the response, time constant of thermocouple/ bimetallic thermometer.
2. To study the response of a liquid level tank system
3. To study the response of a two tank non-interacting system
4. To study the response of a two tank interacting system.
5. To study the response of a stirred tank heater system
6. To study the characteristics of an on-off controller.
7. To study the characteristics of a PI/PID pneumatic / electronic controller.
8. To study the performance of a closed loop control system containing controller,final control element, measuring element.
9. Calibration of temperature and pressure measuring instruments
10. Analysis of solution by UV/VIS spectrophotometer

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	15	15	15	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

MASS TRANSFER LAB

Course Code : BTH 623 Credit Units: 01

1. Study the performance and determination of Equilibrium relationships
2. Mass transfer coefficients,
3. Diffusion coefficients,
4. Separation factors of the experiments with differential distillation,
5. Flash vaporization, vapor liquid equilibrium,
6. Liquid – liquid extraction,
7. Solid –liquid extraction
8. Ion exchange and membrane separation.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	15	15	15	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

ENVIRONMENTAL POLLUTION and CONTROL LAB

Course Code: BTH 625 Credit Units: 01

1. Determination of Alkalinity in the water sample.
2. Determination of dissolved oxygen (DO) in the water sample.
3. Determination of Biological Oxygen Demand in the water sample.
4. Determination of chemical oxygen demand in the water sample.
5. Determination of turbidity in the water sample.
6. Determination of residual chlorine in the water sample.
7. Determination of pH and conductivity of sludge/water samples.
8. Determination of moisture content of sludge sample.
9. Determination of Total dissolved solids in water / effluent sample.
10. To conduct the Jar Test and also evaluate the coagulation efficiency.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	15	15	15	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

PROGRAMMING WITH PYTHON LAB

Course Code: BCS630 Credit Units: 01

Software Required: Java

List of Assignment:

1. Write a program to demonstrate basic data type in python.
2. Write a program to compute distance between two points taking input from the user.
3. Write a program add.py that takes 2 numbers as command line arguments and prints its sum.
4. Write a Program for checking whether the given number is an even number or not. Using a for loop, write a program that prints out the decimal equivalents of1/2, 1/3, 1/4, . . . , 1/10.
5. Write a Program to demonstrate list and tuple in python.
6. Write a program using for loop that loops over a sequence.
7. Write a program using a while loop that asks the user for a number, and print countdown from that number to zero
8. WAP to find the sum of the even-valued terms.
9. Write a program to count the numbers of characters in the string and store them in a dictionary data structure.
10. Write a program to use split and join methods in the string and trace a birthday of a person with a dictionary data structure.
11. Write a program to print each line of a file in reverse order.
12. Write a program to compute the number of characters, words and lines in a file.
13. Write a function nearly equal to test whether two strings are nearly equal. Two strings a and b are nearly equal when a can be generated by a single mutation.
14. Write function to compute gcd, lcm of two numbers. Each function shouldn’texceed one line

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	15	20	10	40	10

Note**:** IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva**.**

DOMAIN ELECTIVE-IV
ENERGY MANAGEMENT

Course Code- BTH 606 **Credit Unit:03**

COURSE LEARNING OUTCOME: -

At the end the course student will be able to: -

- know the energy demand and understand the production and consumption of primary energy resources.
- understand the industrial structure and energy consumption expressions.
- comprehend the importance of energy saving and to express the relationship between cost and energy consumption.
- Develop systems for comprehensive energy audits.
- Evaluate sustainable energy management practices
- Evaluate cleaner energy sources, technologies and management practices.

Module I Energy Scenario Commercial & Non commercial energy, primary energy resources, commercial energy production, final energy consumption, energy need of growing economy, long term energy scenario, energy pricing, energy sector reform, energy & environment, energy conservation and its importance, re- structuring of the energy supply sector, energy strategy for future, energy conservation act.

Module II Energy Management & Energy Planing Definition & significance, energy strategy, objective of energy management, hierarchical levels of supply side energy management, trade off b/w energy management, energy strategies & energy planning, energy & economy, essential imperatives & steps in supply side energy planning, energy planning flow for supply side, essential data for supply side energy planning, infrastructure planning, transportation of energy, per capita energy consumption, seven principal of energy management, energy policy of a supply organization & demand side organization,

Module III Energy Audit & Energy Monitoring, Targeting and Conservation Introduction, need, types & procedure of energy audits, modern techniques and instruments for energy audit. Defining monitoring & targeting, element of monitoring & targeting, data & information analysis, techniques- energy consumption, production & cumulative sum of differences (CUSUM). Energy conservation opportunity, electrical & thermodynamic ECOs, ECOs in chemical process industries, waste management & recycling of discard material and energy.

Module IV Advancement In Technologies & Future Energy Alternatives 23 Recent advancement in energy technology towards 21st century, transport of energy, ethanol as a fuel. Fusion – introduction potential, condition for fusion, magnetic confinement fusion reactor, cold fusion laser induced fusion. Biomass –introduction, municipal waste, biomass conversion, wood combustion Geothermal energy – introduction, origin, nature, resources and exploration, environment impact, low temperature geothermal resources.

Module V Case Studies Energy conservation in alcohol industry. Energy conservation in fertilizer industry and pulps & paper industry. Energy conservation in different units of refinery likes FCCU, HCU & ADU

Text Books 1. Murphy W.R. and Mckay G., Energy Management(BH)
2. Hinrich & Kleinbach "Energy : its use and the environment" III ed. Harcourt.
3. Boyle "Renewable Energy : Power for a sustainable future" Oxford.
4. Rao S. & Parulckar B.B. "Energy technology" khhanna publisher
5. Capenart & Turner " Guide to energy management " 6 ed. Keinnedu fairmant press.

Examination Scheme:

Components	A	V	H	CT	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

DOMAIN ELECTIVE-IV
ENERGY RESOURCES AND UTILIZATION

Course Code: BTH 607 **Credit Units: 03**

Course learning outcomes (CLO)

At the successful completion of this course you should be able to:

1. Knowledge of solid, liquid and gaseous fuels
2. To know the energy demand of world, nation and available resources to fulfil the demand
3. To know about the exploration of nonconventional energy resources and their effective tapping technologies
4. Effective utilization of available renewable energy resources
5. To acquire the knowledge of modern energy conversion technologies

Course Contents:

Module I: **Energy Scenario & Conservation**

Indian and global, energy crisis, Classification of various energy sources, Renewable and non-renewable energy sources, Remedial measures to some energy crisis.Biogas plants and their operation, Biomass and its conversion routes to gaseous and liquid fuels. Wind energy, its potential and generation by wind mills

Module II: Alternative Sources of Energy

Fuel cell, Solar Energy: Photo thermal and photovoltaic conversion and utilization methods , solar water heating , cooking , drying and its use for other industrial processes ,solar cells their material and mode of operation . direct and indirect methods solar energy storage , sensible heat and latent heat storage materials Solar ponds ,Bio energy, biogas plants and their operation biomass and its conversion roots to gaseous and liquid fuels ,wind energy , its potential and generation by wind mills,Hydroelectric potential, its utilization & production, Geothermal energy its potential status and production, Nuclear energy : Status, nuclear raw materials, nuclear reactors and other classification, Generation of Nuclear power, Nuclear installations in India and their capacity of generation, Limitations of nuclear energy, Reprocessing of spent nuclear fuel, Cogeneration of fuel and power, Energy from tidal and ocean thermal sources, MHD systems.

Module III: Fossil and Processed Fuel

Coal its origin and formation, Coal analysis, Coal classification, Coal preparation, Coal washing and coal blending, Coal carbonization, Treatment of coal gas and recovery of chemical from coal tar, Coal gasification, liquid fuel synthesis from coal, CBM. Petroleum crude, Types of crude ,emergence of petroleum products as energy, Gaseous Fuels: Natural gas, Water gas, producer gas, L.P.G., bio- gas, coke oven gas, blast furnace gas, LNG ,CNG,Gas hydrates ,GTL Technology (gas to liquid), Biodiesel.

Examination Scheme:

Components	A	V	H	CT	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text Books

1. Brame J.S.S. and King J.G., Edward Arnold “Fuel Solid, Liquid and Gases” Edward Arnold (1967).
2.Sukhatme S.P, "Solar Energy - Principles of Thermal Collection and Storage",2nd Ed.,Tata McGraw-Hill.,(1996).

COMMUNICATION SKILLS - IV

Course Code: BCS 601 Credit Units: 01

Course Objective:
To enhance the skills needed to work in an English-speaking global business environment.

COURSE LEARNING OUTCOMES (CLO)

CLO 1 Create right selection of words and ideas while also choosing the appropriate channelof formalcommunication.

CLO 2 Demonstrate the ability to analyse a problem and devise a solution in a group.

CLO 3 Demonstrate proficiency in the use of written communication.

CLO 4 Recognize the mannerisms and methodology of Interview and GD to become more expressive in their body language and verbal performance.

Course Contents:

Module I: Business/Technical Language Development
Advanced Grammar: Syntax, Tenses, Voices
Advanced Vocabulary skills: Jargons, Terminology, Colloquialism
Individualised pronunciation practice

Module II: Social Communication
Building relationships through Communication
Communication, Culture and Context
Entertainment and Communication
Informal business/ Technical Communication

Module III: Business Communication
Reading Business/ Technical press
Listening to Business/ Technical reports (TV, radio)
Researching for Business /Technology

Module IV: Presentations
Planning and getting started
Design and layout of presentation
Information Packaging
Making the Presentation

Examination Scheme:

Components	CT1	CT2	CAF	V	GD	GP	A
Weightage (%)	20	20	25	10	10	10	5

CAF – Communication Assessment File
GD – Group Discussion
GP – Group Presentation

Text & References:

- Business Vocabulary in Use: Advanced Mascull, Cambridge
- Business Communication, Raman – Prakash, Oxford
- Business Communications, Rodgers, Cambridge
- Working in English, Jones, Cambridge
- New International Business English, Jones/Alexander, Cambridge

BEHAVIOURAL SCIENCE - VI
(STRESS AND COPING STRATEGIES)

Course Code: BSS 604 Credit Units: 01

Course Objective:

To develop an understanding the concept of stress its causes, symptoms and consequences.
To develop an understanding the consequences of the stress on one's wellness, health, and work performance.

Course learning outcomes (CLOs)

At the successful completion of this course you (the student) would be able to:

1. Identify stress and that an individual come across.
2. Recognize the causes of stress in their lives.
3. Analyze symptoms and how they are affecting lives.
4. Create ways to effectively cope with it.

Course Contents:

Module I: Stress
Meaning & Nature
Characteristics
Types of stress

Module II: Stages and Models of Stress
Stages of stress
The physiology of stress
Stimulus-oriented approach.
Response-oriented approach.
The transactional and interact ional model.
Pressure – environment fit model of stress.

Module III: Causes and symptoms of stress
Personal
Organizational
Environmental

Module IV: Consequences of stress
Effect on behaviour and personality
Effect of stress on performance
Individual and Organizational consequences with special focus on health

Module V: Strategies for stress management
Importance of stress management
Healthy and Unhealthy strategies
Peer group and social support
Happiness and well-being

Module VI: End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

- Blonna, Richard; Coping with Stress in a Changing World: Second edition
- Pestonjee, D.M, Pareek, Udai, Agarwal Rita; Studies in Stress and its Management
- Pestonjee, D.M.; Stress and Coping: The Indian Experience
- Clegg, Brian; Instant Stress Management – Bring calm to your life now

FRENCH - VI

Course Code: FLT 601 Credit Units: 02

Course Objective:

To strengthen the language of the students both in oral and written so that they can:
i) express their sentiments, emotions and opinions, reacting to information, situations;
ii) narrate incidents, events;
iii) perform certain simple communicative tasks.

Course Learning Objective:

- Students will hone intermediate language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of intermediate level.
- Students will be able to communicate in small sentences in Simple Future and Past tenses .
- Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.
- To understand the essentials of an interview
- To present one research
- To present one university and professional course
- To speak about the professional projects
- To understand a remarkable topic
- To understand and ask questions
- To describe a person
- The content and the method of the report
- To make a plan of the report
- To write an introduction
- To understand a short technical message
- To reply to a survey

Course Contents:

Module D: pp. 157 – 168 – Unité 12

Unité 12: s'évader

1. présenter, caractériser, définir
2. parler de livres, de lectures
3. préparer et organiser un voyage
4. exprimer des sentiments et des opinions
5. téléphoner
6. faire une réservation

Contenu grammatical:

1. proposition relative avec pronom relatif "qui", "que", "où" - pour caractériser
2. faire + verbe

Examination Scheme:

Components	A	V	H	CT	EE
Weightage (%)	5	15	15	15	50

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- le livre à suivre: Campus: Tome 1

GERMAN - VI

Course Code: FLG 601 Credit Units: 02

Course Objective:

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.
To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany
Introduction to Advanced Grammar and Business Language and Professional Jargon

Course Learning Objective:

- Students will hone intermediate language skills such as reading, writing, speaking, listening & interactive) in the language**.**
- Students will be able to read and interpret small texts of intermediate level.
- Students will be able to communicate in small sentences in Simple Future and Past tenses .
- Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.

After successful completion of this semester, students will be able to:

- express their likes and dislikes (buying groceries)
- askprice and quantity
- express their likes and dislikes in terms of cloths
- buy cloths in the shopping mall

Course Contents:

Module I: Adjective endings
Adjective endings in all the four cases discussed so far
Definite and indefinite articles
Cases without article

Module II: Comparative adverbs
Comparative adverbs as and like

Module III: Compound words
To learn the structure of compound words and the correct article which they take
Exploring the possibility of compound words in German

Module IV: Infinitive sentence
Special usage of 'to' sentences called zu+ infinitive sentences

Module V: Texts
A Dialogue: 'Ein schwieriger Gast'
A text: 'Abgeschlossene Vergangenheit'

Module VI: Comprehension texts
Reading and comprehending various texts to consolidate the usage of the constructions learnt so far in this semester.

Module VII: Picture Description
Firstly recognize the persons or things in the picture and identify the situation depicted in the picture;
Secondly answer questions of general meaning in context to the picture and also talk about the personal experiences which come to your mind upon seeing the picture.

Examination Scheme:

Components	A	V	H	CT	EE
Weightage (%)	5	15	15	15	50

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

SPANISH – VI

Course Code: FLS 601 Credit Units: 02

Course Objective:

To enable students acquire working knowledge of the language; to give them vocabulary, grammar, voice modulations/intonations to handle everyday Spanish situations in Present as well as in Present Perfect Tense with ease.

Course Learning Objective:

- Students will hone intermediate language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of intermediate level.
- Students will be able to communicate in small sentences in Simple Future and Past tenses .
- Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.
- To express future plans and intentions
- To talk about tourist destination in Spain and India
- Reading texts about Spanish historical monuments
- To talk about dance and music.
- Reading text about Spanish Cities
- Writing email to your friend/family members

Course Contents:

Module I
Revision of the earlier modules

Module II
Present Perfect Tense

Module III
Commands of irregular verbs

Module IV
Expressions with **Tener que** and **Hay que**

Module V
En la embajada
Emergency situations like fire, illness, accident, theft

Examination Scheme:

Components	A	V	H	CT	EE
Weightage (%)	5	15	15	15	50

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español, En Directo I A
- Español Sin Fronteras

CHINESE – VI

Course Code: FLC 601 Credit Units: 02

Course Objective:

Chinese emperor Qin Shi Huang – Ti who built the great wall of China also built a network of 270 palaces, linked by tunnels, and was so afraid of assassination that he slept in a different palace each night. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Learning Objectives:

- Students will hone intermediate language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of intermediate level.
- Students will be able to communicate in small sentences in Simple Future and Past tenses .
- Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.

Course Contents:

Module I
Drills
Dialogue practice
Observe picture and answer the question.
Pronunciation and intonation.
Character writing and stroke order.

Module II
Going out to see a science exhibition
Going to the theatre.
Train or Plane is behind schedule.
Indian Economy-Chinese Economy
Talking about different Seasons of the Year and Weather conditions. Learning to say phrases like-spring, summer, fall, winter, fairly hot, very cold, very humid, very stuffy, neither hot nor cold, most comfortable, pleasant …. etc.

Module III
Temperature – how to say – What is the temperature in May here?
– How is the weather in summer in your area?
– Around 30 degrees
– Heating, air-conditioning
– Is winter is Shanghai very cold?
Talking about birthdays and where you were born?
The verb "shuo" (speak) saying useful phrases like speak very well, do not speak very well, if speak slowly then understand if speak fast then don't understand, difficult to speak, difficult to write, speak too fast, speak too slow, listen and can understand, listen and cannot understand … etc.
Tell the following in Chinese – My name is …. I was born in … (year). My birthday is …… Today is … (date and day of the week). I go to work (school) everyday. I usually leave home at . (O'clock). In the evening, I usually ……. (do what)? At week end, I ……. On Sundays I usually …… It is today….. It will soon be my younger sisters birthday. She was born in ….. (year). She lives in ……. (where). She is working (or studying)…… where… She lives in …….. (where.)

Examination Scheme:

Components	A	V	H	CT	EE
Weightage (%)	5	15	15	15	50

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Elementary Chinese Reader Part-2, 3; Lesson 47-54

ANANDAM-VI

Course Code: AND006 Credit Units: 02

Course Objective:
Aanandam is a credited subject that aims to instill the **joy of giving** and sharing in young people through community participation, helping them to be responsible citizens and be initiators of change for a healthy society. A daily act of goodness and charity will infuse the habit of community service in students. The faculty will emphasize shift in focus-Happiness is not in acquiring things, but permanent happiness comes from giving, sharing, and caring for someone. The faculty will inspire students for Individual Social Responsibility (ISR) and will inculcate the qualities of compassion, an open mind, a willingness to do whatever is needed and positive attitude in students. Imagination and Creativity are to be appreciated. An aim and a vision are to be developed in students.

OUTCOME OF AANANDAM COURSE

The student should develop:
• Awareness and empathy regarding community issues
• Interaction with the community and impact on society
• Interaction with mentor and development of Student teacher relationship
• Interaction among students, enlarge social network
• Cooperative and Communication skills and leadership qualities
• Critical thinking, Confidence and Efficiency

AANANDAM: COMMUNITY SERVICE

• Community service programs are very effective for students' personal and social, ethical, and academic development. These effects depend on the characteristics of the programs chosen
• Involvement of students in community work has an impact on development of student skills, creativity, critical thinking, and innovative powers. Passion and Positivity are basic requirements for Community service
• They would examine social challenges /problems, assess the needs of the community, evaluate previous implemented projects, and think of further solutions
• They would learn to cooperate and collaborate with other agencies and inculcate leadership qualities.

MODELLING & SIMULATION

Course Code: BTH 701 Credit Units: 04

Course learning outcomes (CLO): - At the successful completion of this course you should be able to:

1. Grasp modelling concepts with emphasis on performance analysis.
2. To understand the techniques of modelling in the context of hierarchy of knowledge about a system and develop the capability to apply the same to study systems through available software.
3. To learn different types of simulation techniques.
4. To simulate the models for the purpose of optimum control by using software.

Module I Introduction to mathematical modeling; Advantages and limitations of models and applications of process models of stand-alone unit operations and unit processes; Classification of models – Simple vs. rigorous, Lumped parameter vs. distributed parameter; Steady state vs. dynamic, Transport phenomena based vs. Statistical; Concept of degree of freedom analysis

Module II Simple examples of process models; Models giving rise to nonlinear algebraic equation (NAE) systems, - steady state models of flash vessels, equilibrium staged processes distillation columns, absorbers, strippers, CSTR, heat exchangers, etc.; Review of solution procedures and available numerical software libraries

Module III Steady state models giving rise to differential algebraic equation (DAE) systems; Rate based approaches for staged processes; Modeling of differential contactors - distributed parameter models of packed beds; Packed bed reactors; Modeling of reactive separation processes; Review of solution strategies for Differential Algebraic Equations (DAEs), Partial Differential Equations (PDEs), and available numerical software libraries

Module IV Unsteady state (time dependent) models and their applications; Simple dynamic models of Batch reactors, Adsorption columns, Multistage separation systems; Model reduction through orthogonal collocation; Review of solution techniques and available numerical software libraries

Module V Introduction to flow sheet simulation; Sequential modular approach; Equation oriented approach; partitioning and tearing; Recycle convergence methods; Review of thermodynamic procedures and physical property data banks

Text Books 1. Luyben W.L., “Process Modeling, Simulation, and Control for Chemical Engineering”, Wiley.
2. M.M. Denn, “Process Modelling”, Wiley, New York, (1990).

Reference Books

1. Hussain Asghar, “Chemical Process Simulation”, Wiley Eastern Ltd., New Delhi, (1986)
2. C.D. Holland and A.I. Liapis, “Computer Methods for Solving Dynamic Separation Problems”, McGraw Hill, (1983).
3. C.D. Holland, “Fundamentals of Modelling Separation Processes”, Prentice Hall, (1975)
4. S.M. Walas, “Modelling with Differential Equations in Chemical Engineering”, Butterworth, (1991)
5. M.E. Davis, “Numerical Methods and Modelling for Chemical Engineers”, Wiley, New York(1984)

Examination Scheme:

Components	A	V	H	CT	EE
Weightage (%)	5	15	15	15	50

PETROLEUM REFINING

Course Code: BTH 702 Credit Units: 03

Course learning outcomes (CLO): -At the successful completion of this course you (the student) should be able to:

- To understand the various feed stocks of refinery and petroleum products.
- Understand the market drivers and history of the refining industry.
- To get acquainted with basic separation and conversion processes used in refining of crude oil.
- To get familiarized with challenges involved in refining from viewpoint of environment.
- Understand the various feed stocks of petro-chemical and its products.

Course Contents:

Module I: **Introduction**

Petroleum Exploration Production and Refining of Crude oils Crude oils: Chemistry and composition Characteristics and constituents of crude oils, Classification of crude oils).

Module II: **Petroleum Properties & Products**

Quality Control of Petroleum Products Classification of laboratory tests, distillation, vapour pressure, flash and fire points, octane number, performance number, cetane number, aniline point, viscosity index, calorific value, smoke point, char value, viscosity, viscosity index, penetration tests, cloud and pour points, drop point of grease, melting and settling points of wax, softening point of Bitumen, induction period of gasoline, thermal stability of jet fuels, gum content, Total Sulphur, Acidity and Alkalinity,, Copper Strip Corrosion Test, Silver – Strip Corrosion Test for ATF, Ash, Carbon Residue (Conradson method, Ramsbottom method) Colour, Density and Specific gravity, Refractive index of hydrocarbon liquids, water separation index (modified) (WSIM), ductility. Composition, Properties & Specification of LPG, Naphthas, motor spirit, Kerosine, Aviation Turbine Fuels, Diesel Fuels, Fuel Oils, Petroleum Hydrocarbon Solvents, Lubricating oils (automotive engine oils, industrial lubricating oils electrical insulating oils, Jute Batching oils, white oils, steam turbine oils, metal working oils, etc.) Petroleum Waxes Bitumens, Petroleum coke.

Module III: **Crude Oil Distillation**

Desalting of crude oils, Atmospheric distillation of crude oil, Vacuum distillation of atmospheric residue. Thermal Conversion Process Thermal Cracking Reactions, Thermal Cracking, Visbreaking, (Conventional Visbreaking and Soaker Visbreaking) Coking (Delayed Coking, Fluid Coking, Flexicoking), Calcination of Green Coke.

Module IV: **Catalytic Conversion Process**

Fluid catalytic cracking; Catalytic reforming; Hydrocracking Catalytic Alkylation, Catalytic Isomerization; Catalytic Polymerization. Finishing Process Hydrogen sulphide removal processes; Sulphur conversion processes; Sweetening processes (Caustic treatment, Solutizer process; Doctor treating process; Copper chloride sweetening,; Hypochlorite sweetening ;Air and inhibitor treating process; Merox processes;Sulphuric acid treatment; Clay treatment); Solvent extraction processes (Edeleanu process, Udex process, Sulfolane process), Hydrotreating processes.

Module V: **Lube Oil Manufacturing Process**

Evaluation of crude oils for lube oil base stocks, Vacuum distillation, Solvent deasphalting Solvent extraction of lube oil fractions (Furfural, NMP and Phenol), Solvent dewaxing, Hydrofinshing, Manufacture of petroleum waxes (Wax sweating, Solvent deoiling) Manufacture of Bitumens Selection of crude oil, Methods of manufacture of bitumens, (Distillation, Solvent precipitation, Air blowing).

Examination Scheme:

Components	A	V	H	CT	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Books Recommended

1. Ram Prasad, Petroleum Refining Technology, Khanna Publication
2. Nelson, W.L., Petroleum Refining Engineering, McGraw Hill
3. Mall, I D, Petrochemical Process Technology, McMillan India

TRANSPORT PHENOMENA

Course Code: BTH 703 Credit Units: 04

Course learning outcomes (CLO): -At the successful completion of this course you (the student) should be able to:

. Understand the different transport phenomena such as momentum, heat and mass transport.
• Understand the momentum transport phenomena.
• Understand the energy transport phenomena.
• Understand the mass transport phenomena.

Course Contents:

Module I: **Introduction to Transport Phenomena**

Similarity between momentum, heat and mass transfer, The continuum hypothesis, Basic laws of fluid motion, Newton's second law of motion, principle of balance between momentum, heat and mass transfer,Principles of conservation of momentum, mass and energy.

Module II: **Momentum Transport Phenomena**

Momentum transport in laminar flow: Newton's law of viscosity, Science of rheology, Prediction of viscosity and its dependence on temperature, pressure and composition, Boundary conditions, Shell balance approach for stress distribution and velocity profiles. Introduction to time derivatives and vector analysis, Equation of continuity and equation of motion and their applications in fluid flow problems.

Module III: **Unsteady state momentum transport**

Flow near a wall suddenly set in motion, Momentum transport phenomena in turbulent flow. Definitions of friction factors, friction factor for flow in tubes, for flow around spheres, for packed bed column.

Module IV: **Energy Transport Phenomena**

Energy transport in laminar flow: Fourier's law of heat conduction, Prediction of thermal conductivities and its dependence on temperature, pressure and composition, Boundary conditions, shell balance approach. Types of heat sources, Principle of extended surfaces, types of cooling fans, free and forced convection. Unsteady state heat transport, Unsteady state heat conduction in solids, heating of semi-infinite slab, heating of finite slab.

Module V: Mass Transport Phenomena

Definitions of concentration, velocities and mass fluxes, Fick's law of diffusion, Prediction of diffusivity and its dependence on temperature, pressure and composition, Boundary conditions, Shell balance approach for mass transfer problems, Problems of diffusion with homogeneous and heterogeneous chemical reaction, Diffusion and chemical reaction in porous catalyst – the effectiveness factor. The equation of continuity for multi component mixtures.

Examination Scheme:

Components	A	V	H	CT	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text Books

1. **Bird, R. B., Stewart, W. E. and Lightfoot, E. N.,** "*Transport Phenomena*", 2nd edition John Wiley (1960).
2. **Bannet, C. O. and Myers J. E**., "*Momentum Heat and Mass Transfer*" Tata McGraw Hill, (1973)..

Reference Books

1. **Beck, W. J. and Muttzall, K.M.K**., "*Transport Phenomena*", John Wiley, (1975).
2. **Scissom, L. E. and Pitts, D. R.,** "*Elements of Transport Phenomena*", McGraw Hill, (1972).

ADVANCED PROGRAMMING WITH PYTHON

Course Code: BCS 710 Credit Units: 03

Course Learning Objective

- Interpret the basic principles of Python programming language.
- Articulate the Object-Oriented Programming concepts such as encapsulation, inheritance and polymorphism as used in Python.
- Identify the commonly used operations involving file systems and regular expressions.
- Implement Machine Learning algorithms.

Course Objective:

The course should enable the students:

- Describe the semantics of Python programming language and illustrate the process of structuring the data using lists, dictionaries, tuples, strings and sets.
- Illustrate the Object-oriented Programming concepts in Python.
- Demonstrate the basic database design for storing data as part of a multi-step data gathering, analysis, and processing.
- Familiarize the basics of machine learning using an approachable, and also understand the advantage of using Python libraries for implementing Machine Learning models Course Outcomes: After completion of this course, student will be able to:

Course Contents:

UNIT-I:

Introduction to Python, use IDLE to develop programs, Basic coding skills, working with data types and variables, working with numeric data, working with string data, Python functions, Boolean expressions, selection structure, iteration structure, working with lists, work with a list of lists, work with tuples, work with dates and times, get started with dictionaries

Learning Outcome:

At the end of this Unit the student will be able to

- Solve, test and debug basic problems using python script.
- Manipulate python programs by using the python data structures like lists, dictionaries, tuples, strings and sets.

UNIT-II

Classes in Python: OOPS Concepts,Classes and objects ,Classes in Python, Constructors, Datahiding, Creating Classes, Instance Methods, Special Methods, Class Variables, Inheritance, Polymorphism, Type Identification, Custom Exception Classes, Iterators, generators and decorators.

Learning Outcome:At the end of this Unit the student will be able to

- Design object-oriented programs with Python classes.
- Usage of inheritance and polymorphism for reusability.

UNIT-III

I/O and Error Handling In Python :Introduction, Data Streams, Creating Your Own Data Streams, Access Modes, Writing Data to a File, Reading Data From a File, Additional File Methods, Handling IO Exceptions, Errors, Run Time Errors, The Exception Model, Exception Hierarchy, Handling Multiple Exceptions, Working with Directories.

Learning Outcome: At the end of this Unit the student will be able to

- Identify the commonly used operation involved in files for I/O processing.
- Familiarize the handling of I/O Exception sand usage of Directories.

UNIT-IV

Implement Machine Learning algorthims:Usage of Numpy for numerical Data,Usage of Pandas for Data Analysis, Matplotlib for Python plotting, Seaborn for Statically plots, interactive Dynamic visualizations, SciKit for Machine learning.

Learning Outcome: At the end of this Unit the student will be able to
Understand the advantage of using Python libraries for implementing Machine Learning models.

Projects:
Creating a discussion form, creating an online store, creating a job site**.**

Examination Scheme:

Components	**A**	**CT**	**S/V/Q**	**HA**	**EE**
Weightage (%)	5	15	20	10	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

1. Michael Urban and Joel Murach, Python Programming, Shroff/Murach, 2016.
2. Haltermanpython.
3. Mark Lutz, Programming Python, O`Reilly, 4th Edition, 2010ONLINE

RESOURCES:
https://www.w3schools.com/python.
https://docs.python.org/3/tutorial/index.html.
https://www.python-course.eu/advanced_topics.ph

ADVANCED PROGRAMMING WITH PYTHON LAB

Course Code: BCS730 **Credit Units: 01**

List of Assignment:

- Practice Assignment based on string data, Python functions, and Boolean expressions.
- Practical based on iteration, working with lists, tuples and dictionaries.
- Practical based on class, objects, constructor, method in side class.
- Practical questions based on Inheritance, Polymorphism, Type Identification, Custom Exception Classes.
- Handling Errors using Python.
- Practical Assignment based on Usage of Numpy for numerical Data,
- Practical Assignment based on Usage of Usage of Pandas for Data Analysis.
- Practical Assignment based on Usage of Matplotlib for Python plotting.
- Practical Assignment based on Usage of Seaborn for Statically plots.
- Practical Assignment based on Usage of Interactive Dynamic visualizations.
- Practical Assignment based on Usage of SciKit for Machine learning.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	15	20	10	40	10

Note**:** IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva**.**

COMMUNICATION SKILLS - V

Course Code: BCS 701 Credit Units: 01

Course Objective:

To facilitate the learner with Academic Language Proficiency and make them effective users of functional language to excel in their profession.

COURSE LEARNING OUTCOMES (CLO)

CLO 1 Investigate their personal strengths and insights to be revealed in a Formal Setup of Communication.

CLO 2 Create right selection of words and ideas while choosing the appropriate channel of formal communication

CLO 3 Apply acquired knowledge with the appropriate selection of channel of formal communication.

CLO 4 Develop and empower self with the ease of using appropriate medium of communication.

Course Contents:

Module I
Introduction to Public Speaking
Business Conversation
Effective Public Speaking
Art of Persuasion

Module II: Speaking for Employment
Types of Interview
Styles of Interview
Facing Interviews-Fundamentals and Practice Session
Conducting Interviews- Fundamentals and Practice Session
Question Answer on Various Dimensions

Module III
Resume Writing
Covering Letters
Interview Follow Up Letters

Module IV: Basic Telephony Skills
Guidelines for Making a Call
Guidelines for Answering a Call

Module V: Work Place Speaking
Negotiations
Participation in Meetings
Keynote Speeches

Examination Scheme:

Components	CT1	CT2	CAF	V	GD	GP	A
Weightage (%)	20	20	25	10	10	10	5

CAF – Communication Assessment File
GD – Group Discussion
GP – Group Presentation

Text & References:

- Jermy Comfort, Speaking Effectively, et.al, Cambridge
- Krishnaswamy, N, Creative English for Communication, Macmillan
- Raman Prakash, Business Communication, Oxford.
- Taylor, Conversation in Practice,

BEHAVIOURAL SCIENCE - VII
(INDIVIDUAL, SOCIETY AND NATION)

Course Code: BSS 704 Credit Units: 01

Course Objective:

This course aims at enabling students towards:

- Understand the importance of individual differences
- Better understanding of self in relation to society and nation
- Facilitation for a meaningful existence and adjustment in society
- Inculcating patriotism and national pride

Course learning outcomes (CLOs)

At the successful completion of this course you (the student) would be able to:

1. Understand the basics of Excellence.
2. Understand the importance of personal and professional excellence.
3. Learn how to manage personal effectiveness.
4. Learn to build personal success strategies

Course Contents:

Module I: Individual differences & Personality
Personality: Definition& Relevance
Importance of nature & nurture in Personality Development
Importance and Recognition of Individual differences in Personality
Accepting and Managing Individual differences (adjustment mechanisms)
Intuition, Judgment, Perception & Sensation (MBTI)
BIG5 Factors

Module II: Managing Diversity
Defining Diversity
Affirmation Action and Managing Diversity
Increasing Diversity in Work Force
Barriers and Challenges in Managing Diversity

Module III: Socialization
Nature of Socialization
Social Interaction
Interaction of Socialization Process
Contributions to Society and Nation

Module IV: Patriotism and National Pride
Sense of pride and patriotism
Importance of discipline and hard work
Integrity and accountability

Module V: Human Rights, Values and Ethics
Meaning and Importance of human rights
Human rights awareness
Values and Ethics- Learning based on project work on Scriptures like- Ramayana, Mahabharata, Gita etc.

Module VI: End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

- Davis, K. Organizational Behaviour,

- Bates, A. P. and Julian, J.: Sociology - Understanding Social Behaviour
- Dressler, David and Cans, Donald: The Study of Human Interaction
- Lapiere, Richard. T – Social Change
- Lindzey, G. and Borgatta, E: Sociometric Measurement in the Handbook of Social Psychology, Addison – Welsley, US.
- Rose, G.: Oxford Textbook of Public Health, Vol.4, 1985.
- Robbins O.B.Stephen;. Organizational Behaviour

FRENCH - VII

Course Code: FLT 701 Credit Units: 02

Course Objective:
Revise the portion covered in the first volume, give proper orientation in communication and culture.

Course Learning Objective:

- Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of advance level.
- Students will be able to communicate with complex sentences.
- To express the obligation
- To suggest and give the advices
- To speak about the recycling
- To understand an interview and a project of research
- To make a survey
- To prepare for the oral communication
- To prepare the posters
- To understand and give the suggestions

Course Contents:

Module A: Unités 1 – 3: pp. 06 - 46

Contenu lexical:

Unité 1: Rédiger et présenter son curriculum vitae
Exprimer une opinion
Caractériser, mettre en valeur
Parler des rencontres, des lieux, des gens

Unité 2: Imaginer - Faire des projets
Proposer - conseiller
Parler des qualités et des défauts
Faire une demande écrite
Raconter une anecdote
Améliorer son image

Unité 3: Exprimer la volonté et l'obligation
Formuler des souhaits
Exprimer un manque/un besoin
Parler de l'environnement, des animaux, des catastrophes naturelles

Contenu grammatical:

1. Le passé : passé composé/imparfait
2. Pronoms compléments directs/indirects, y/en (idées/choses)
3. Propositons relatives introduites par qui, que, où
4. Comparatif et superlatif
5. Le conditionnel présent
6. Situer dans le temps
7. Féminin des adjectifs
8. La prise de paroles : expressions
9. Le subjonctif : volonté, obligation

Examination Scheme:

Components	A	V	H	CT	EE
Weightage (%)	5	15	15	15	50

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- le livre à suivre : Campus: Tome 2

GERMAN - VII

Course Code: FLG 701 Credit Units: 02

Course Objective:

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.
To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany
Introduction to Advanced Grammar and Business Language and Professional Jargon.

Course Learning Objective:

- Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of advance level.
- Students will be able to communicate with complex sentences.

After successful completion of this semester, students will be able to:

- describe their holidays or vacations (perfect tense)
- talk about past events – What did you do yesterday? etc.
- understand weather reports
- express their opinion about weather.

Course Contents:

Module I: Dass- Sätze
Explain the use of the conjunction "-that", where verb comes at the end of the sentence

Module II: Indirekte Fragesätze
To explain the usage of the "Question Pronoun" as the Relative Pronoun in a Relative Sentence, where again the verb falls in the last place in that sentence.

Module III: Wenn- Sätze
Equivalent to the conditional "If-" sentence in English. Explain that the verb comes at the end of the sentence.

Module IV: Weil- Sätze
Explain the use of the conjunction "because-" and also tell that the verb falls in the last place in the sentence.

Module V: Comprehension texts
Reading and comprehending various texts to consolidate the usage of the constructions learnt so far in this semester.

Module VI: Picture Description
Firstly recognize the persons or things in the picture and identify the situation depicted in the picture;
Secondly answer questions of general meaning in context to the picture and also talk about the personal experiences which come to your mind upon seeing the picture.

Examination Scheme:

Components	A	V	H	CT	EE
Weightage (%)	5	15	15	15	50

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3

- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

SPANISH - VII

Course Code: FLS 701 Credit Units: 02

Course Objective:

To enable students acquire working knowledge of the language; to give them vocabulary, grammar, expressions used on telephonic conversation and other situations to handle everyday Spanish situations with ease.

Course Learning Objective:

- Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of advance level.
- Students will be able to communicate with complex sentences.
- To be able to give order, command and make request. Formal and Informal
- Use of imperative in different types of situation: In a bar/ Classroom/ Market etc.
- To express prohibitions and permissions
- To be able to talk about actions in past indefinite tense
- Reading texts about Sports in Spain
- To be able to talk about past events – What did you do yesterday? Etc

Course Contents:

Module I
Revision of earlier semester modules

Module II
Zodiac signs. More adjectives…to describe situations, state of minds, surroundings, people and places.

Module III
Various expressions used on telephonic conversation (formal and informal)

Module IV
Being able to read newspaper headlines and extracts (Material to be provided by teacher)

Module V
Negative commands (AR ending verbs)

Module VI
Revision of earlier sessions and introduction to negative ER ending commands, introduction to negative IR ending verbs

Examination Scheme:

Components	A	V	H	CT	EE
Weightage (%)	5	15	15	15	50

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español En Directo I A, 1B
- Español Sin Fronteras
- Material provided by the teacher from various sources

CHINESE – VII

Course Code: FLC 701 Credit Units: 02

Course Objective:

The story of Cinderella first appears in a Chinese book written between 850 and 860 A.D. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Learning Objectives:

- Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language**.**
- Students will be able to read and interpret small texts of advance level.
- Students will be able to communicate with complex sentences.

Course Contents:

Module I
Drills
Dialogue practice
Observe picture and answer the question.
About china part –I Lesson 1,2.

Module II
Pronunciation and intonation
Character Writing and stroke order.

Module III
Ask someone what he/she usually does on weekends?
Visiting people, Party, Meeting, After work….etc.

Module IV
Conversation practice
Translation from English to Chinese and vise-versa.
Short fables.

Module V
A brief summary of grammar.
The optative verb "yuanyi".
The pronoun "ziji".

Examination Scheme:

Components	A	V	H	CT	EE
Weightage (%)	5	15	15	15	50

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- "Kan tu shuo hua" Part-I Lesson 1-7

ANANDAM-VII

Course Code: AND007 Credit Units: 02

Course Objective:
Aanandam is a credited subject that aims to instill the **joy of giving** and sharing in young people through community participation, helping them to be responsible citizens and be initiators of change for a healthy society. A daily act of goodness and charity will infuse the habit of community service in students. The faculty will emphasize shift in focus-Happiness is not in acquiring things, but permanent happiness comes from giving, sharing, and caring for someone. The faculty will inspire students for Individual Social Responsibility (ISR) and will inculcate the qualities of compassion, an open mind, a willingness to do whatever is needed and positive attitude in students. Imagination and Creativity are to be appreciated. An aim and a vision are to be developed in students.

OUTCOME OF AANANDAM COURSE

The student should develop:
• Awareness and empathy regarding community issues
• Interaction with the community and impact on society
• Interaction with mentor and development of Student teacher relationship
• Interaction among students, enlarge social network
• Cooperative and Communication skills and leadership qualities
• Critical thinking, Confidence and Efficiency

AANANDAM: COMMUNITY SERVICE

• Community service programs are very effective for students' personal and social, ethical,
and academic development. These effects depend on the characteristics of the programs
chosen
• Involvement of students in community work has an impact on development of student
skills, creativity, critical thinking, and innovative powers. Passion and Positivity are
basic requirements for Community service
• They would examine social challenges /problems, assess the needs of the community,
evaluate previous implemented projects, and think of further solutions
• They would learn to cooperate and collaborate with other agencies and inculcate leadership
qualities.

INDUSTRIAL TRAINING

Course Code: BTH 750 Credit Units: 03

Methodology:

Practical training is based on the theoretical subjects studied by students. It can be arranged within the college or in any related industrial unit. The students are to learn various industrial, technical and administrative processes followed in the industry. In case of on-campus training the students will be given specific task of fabrication/assembly/testing/analysis. On completion of the practical training the students are to present a report covering various aspects learnt by them and give a presentation on same.

Examination Scheme:

Feedback from industry/work place	30
Training Report	30
Viva	15
Presentation	25
Total	**100**

SEMINAR

Course Code: BTH 760 Credit Units: 03

The student would be allotted a project in the beginning of the VII semester itself. The project will be based on the industry where he/she has undergone in plant training in industry during summer vacations. He/She would be expected to submit a detailed plant design report later in the (VIII) semester. In this semester he/she will be assessed for the work that he/she does during the seventh semester under the supervision of a faculty of the department.

Examination Scheme:

Literature study/ Fabrication/ Experimentation	40
Written Report	20
Viva	15
Presentation	25
Total	100

PLANT DESIGN AND ECONOMICS

Course Code: BTH 801 Credit Units: 04

Course learning outcomes (CLO): - At the successful completion of this course you should be able to:

1. Understand concepts of process design and project management.
2. Synthesize feasible and optimum flow-sheet.
3. Estimate the capital investment, total product costs, and profitability.
4. Optimize the design of equipment's based on economics and process considerations.
5. Recognize the need for life-long learning to keep with the state-of-the-art for design, modifications and improvements in chemical processes.

Course Contents:

Module I: Process **Development**

Process selection, study of alternative processes, pilot plant, Scale up methods, Flow sheet preparation, sketching techniques, Equipment numbering, Stream designation, Material and energy balances.

Module II: Plant **Design**

Process selection -Selection of equipment, specification and design of equipment's, material of construction, Plant location, Plant layout and installation, Safety, Start up, Shutdown and Operating guidelines.

Module III: Process **Utility & Management**

Various process utilities, their role and importance in chemical plants.Water Sources Sources of water and their characteristics ;Treatment storage and distribution of water; water for use in boilers, cooling purposes, drinking and process; Reuse and conservation of water; Water resource management.

Module IV: **Steam Generation and Utilization**

Steam generation and its application in chemical process plants, distribution and utilization ;Design of efficient steam heating systems; steam economy, Steam condensers and condensate utilization Expansion joints ,flash tank design, steam traps their characteristics, selection and application, waste heat utilization.; Lagging, selection and
thickness .Selection and sizing of boilers; waste heat boilers.

Module V: **Compressors, blowers, Vacuum Pumps**

Compressors, blowers and vacuum pumps and their performance characteristics; Methods of developing vacuum and their limitations, material handling under vacuum, Piping systems; Lubrication and oil removal in compressors and pumps. Air filters, Air and gas leakage. Inert gas systems, compressed air for process, Instrument air.
Importance of insulation for meeting the process requirement, insulation materials and their effect on various material of equipment piping, fitting and valves etc. insulation for high intermediate, low and sub zero temperatures, including cryogenic insulation.

Examination Scheme:

Components	**A**	**V**	**H**	**CT**	**EE**
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Books Recommended

1.Peters M., Timmerhaus K. & Ronald W., Plant Design & Economics for Chemical Engineers, McGraw Hill
2.James R Couper, Process Engg. Economics (Chemical Industries) CRC Press
3. Aries & Newton, Chemical Engg. Cost Estimation, McGraw Hill

SAFETY AND HAZARDS ANALYSIS

Course Code: BTH 802 Credit Units: 03

Course learning outcomes (CLO): - At the successful completion of this course you should be able to:

1. Understand the various color codes, symbol for chemicals, valve, electricity line, chemical pipelines etc.
2. Define the hazard and risk.
3. Understand the various types of safety equipment and techniques.
4. Apply the 5-step model to risk assessment using case studies
5. State the steps involve in developing safe work procedure
6. Understand Industrial hygiene and safety aspects related to toxicity noise, radiation.

Course Contents:

Module I: **Introduction**

Types of Ecosystems, Factors responsible for the distribution on Hydrologic cycles, Nutrient cycles (carbon, nitrogen, phosphorous, sulfur). Introduction to ISO standards (ISO 14001) with reference to chemical industry. Industrial hygiene and safety aspects related to toxicity, noise, radiation: Identification, Evaluation, Control

Module II:**Fires and Explosions**

Flammability Characteristics of liquids & vapors, minimum oxygen concentration (MOC), Ignition Energy, Ignition sources, Explosions: Detonation & Deflagration, combined explosions, BLEVE, Blast Damage due to overpressure.

Hazard identification: Various Techniques, HAZOP.

Module III: **Consequence analysis and Hazards / Risk Assessment**

Flow of liquid/vapors through hole, flashing liquid, Pool evaporation. Design to prevent fire & explosions: Inerting, controlling static electricity, explosion proof equipments & instruments, ventilation, sprinkler systems. Event trees, fault trees, reliability, probability Emergency planning: Elements of emergency planning, on-site/ off-site emergency plans.

Module IV: **Case studies**

Bhopal Tragedy, Flixborough Disaster, Mexico Disaster

Examination Scheme:

Components	A	V	H	CT	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Books & References:

1. Chemical Process Safety Fundamentals with Applications: Daniel A Crowl, Joseph F. Lovvar, Prentice Hall Inc, U.S.A
2. Safety in Process Plant Design, Wells, G.L. Godwin, London (1980)
3. Safety for Chemical Engineers, A.I.Ch.E. Publications (1976-77)

NEW SEPARATION PROCESS

Course Code: BTH 803 Credit Units: 03

Course learning outcomes (CLO): - On completion of this course you (the student) will be able to:

1. Perform graphical or algebraic design calculations for different separation processes.
2. Select feasible solvent/stripping agent rates and reflux ratios.
3. Describe the principles by which economic reflux ratios are selected.
4. Determine the properties of humid air using a psychrometric chart.

Course Contents:

Module I: **Introduction to Separation Processes**

Uses and characterization of separation processes, equilibrium and rate governed multistage processes.

Module II: **Cascade and Interstage flows**

Ideal cascades total interstage flows, squared off cascades, seperative duty and potential, energy requirement for separation processes.

Module III: **Membrane Separation Processess**

Membrane characterization, Gas permeation through polymeric membranes, Liquid membrane separation processes, reverse osmosis , Concentration polarization.

Module IV: Types of Membrane Separation

Dialysis, Ultra filtration, Electro dialysis.

Module V: Advanced Separation Processes

Chromatographic separation, molecular sieve separations.

Examination Scheme:

Components	**A**	**V**	**H**	**CT**	**EE**
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Books Recommended

1.Geankoplis, C.J.. "Transport Processes and Unit Operations", 3rd ed. Prentice Hall. (1993)
2. Sun-Tak-Hwang and Karl Kammermeyer – Membranes in Separations – John Wiley & Sons, New York (1975)
3. J.M. Coulson and J.F. Richardson – Chemical Engineering: Particle Technology and Separation Processes, Vol. 2, 4th Edition, Asian Books Pvt. Ltd. New Delhi (1998)

PROJECT

Course Code: BTH 860 Credit Units: 12

This project course is in continuation of project course allotted in the beginning of the VII the semester Here the students are supposed to do the detail work as scheduled in the last semester. Finally he/she will be required to submit a detailed project report on which viva-voce examination will be conducted by a committee having one External Examiner.

Examination Scheme:

Literature study/ Fabrication/ Experimentation	40
Written Report	20
Viva	15
Presentation	25
Total	100

AMITY UNIVERSITY
RAJASTHAN

AMITY SCHOOL OF ENGINEERING &TECHNOLOGY (ASET)

PROGRAM STRUCTURE& SYLLABUS

B. Tech. (Electrical & Electronics Engineering)

Program Code: BEE

Duration – 4 Years Full Time

Program Learning Outcomes (PLOs)

B.Tech. (Electrical & Electronics Engineering)

PLO 1 Ability to apply the knowledge of mathematics, science and engineering principles inElectrical and Electronics Engineering systems.

PLO 2 Ability to provide solutions for EEE problems by designing and conducting experiments, interpreting and analyzing data, and reporting the results.

PLO 3 Develop a comprehensive understanding of the entire range of electronic devices, analog and digital circuits with added state-of art knowledge on advanced electronic systems.

PLO 4 Ability to design different power electronic circuits and drives for industrial applications.

PLO 5 Develop an in-depth knowledge in transmission and distribution systems, power system analysis and protection systems to pursue a career in the power sector.

PLO 6 Ability ofagood knowledge in microprocessors/microcontrollers, data structures, computer programming and simulation software.

PLO 7 Ability to develop mathematical modelling, analysis and design of control systems and associated instrumentation for EEE.

PLO 8 Ability to design and build renewable energy systems for developing clean energy and sustainable technologies.

Credit Summary

Semester	Core course (CC)	Domain Electives (DE)	Values Added (VAC)	Open Electives	NTCC	Total
I	24	-	4	-	2	30
II	19	-	8	3	2	32
III	21	3	4	3	---	31
IV	18	3	4	3	---	28
V	15	3	4	3	3	28
VI	17	3	4	3	--	27
VII	17	-	4	3	3	27
VIII	6	3	--	--	12	21
Total	**137**	**15**	**32**	**18**	**22**	**224**

SEMESTER I

Code	Course	Category	L	T	P	Credits
AM 101	Applied Mathematics – I	CC	3	1	-	4
AP 102	Applied Physics - I – Fields & Waves	CC	2	1		3
AC 103	Applied Chemistry	CC	2	1		3
BME 104	Element of Mechanical Engineering	CC	2	1		3
BCS 105	Introduction to Computers & Programming in C	CC	2	1		3
BEE 106	Basic Electrical Engineering	CC	2	1		3
Practical Courses						
AP 122	Applied Physics-I – Fields & Waves Lab	CC	-	-	2	1
AC 123	Applied Chemistry lab	CC	-	-	2	1
BME 124	Element of Mechanical Engineering lab	CC	-	-	2	1
BCS 125	Programming in C lab	CC	-	-	2	1
BEE 126	Basic Electrical Engineering lab	CC	-	-	2	1
Value Added						
BCS 101	English	VA	1	-	-	1
BSS 104	Behavioral Science-I Understanding Self For Effectiveness- I		1	-	-	1
FLT 101 FLG 101 FLS 101 FLC 101	Foreign Language – I French German Spanish Chinese		2	-	-	2
Non-Teaching Credit Course (NTCC)						
AND001	Anandam-I	NTCC	-	-	-	2
Total						**30**

SEMESTER II

Code	Course	Category	L	T	P	Credits
Core Courses						
AM 201	Applied Mathematics – II	CC	3	1	-	4
AP 202	Applied Physics - II – Modern Physics	CC	2	1		3
BCS 203	Object Oriented Programming using C++	CC	2	1		3
BME 204	Engineering Mechanics	CC	2	1		3
BME 205	Engineering Graphics	CC	1			1
BME 206	Domain Workshop	CC	1	-	-	1
Practical Courses						
AP 222	Applied Physics - II – Modern Physics lab	CC	-	-	2	1
BCS 223	Object Oriented Programming using C++lab	CC	-	-	2	1
BME 224	Engineering Mechanics lab	CC	-	-	2	1
BME 225	Engineering Graphics lab	CC	-	-	2	1
Open Elective						
	OPEN ELECTIVE – I	OE	3	-	-	3
Value AddedCourses						
BCS 201	English	VA	1	-	-	1
BSS 204	Behavioral Science-II (Problem Solving & Creation thinking)	VA	1	-	-	1
FLT 201 FLG 201 FLS 201 FLC 201	Foreign Language – II French German Spanish Chinese	VA	2	-	-	2
EVS 001	Environmental Studies	CC	4	-	-	4
Non-Teaching Credit Course (NTCC)						
AND002	Anandan-II	NTCC	-	-	2	2
Total						**32**

SEMESTER III

Code	Course	Category	L	T	P	Credit Units
Core Courses						
AM 301	Applied Mathematics – III	CC	3	-	-	3
BEC 302	Analog Electronics-I	CC	2	1	-	3
BEC 303	Circuits & Systems	CC	2	1	-	3
BEE 304	Electrical Machine-I	CC	2	1	-	3
BEC 305	Java Programming	CC	3	-	-	3
Practical Courses						
BEC 322	Analog Electronics-I Lab	CC	-	-	2	1
BEC 323	Circuits & Systems Lab	CC	-	-	2	1
BEE 324	Electrical Machine Lab-I	CC	-	-	2	1
BEC 325	Java Programming Lab	CC	-	-	2	1
Domain Electives: Student must select 1 course from following DE electives						
BEC 304	Signal & Systems	DE	2	1	-	3
BEC 307	Measurements & Instrumentation					
Open Elective 3		OE	-	-	-	3
Value addedCourses						
BCS 301	Communication Skills – I	VA	1	-	-	1
BSS 304	Behavioral Science-III (Interpersonal Communication)	VA	1	-	-	1
FLT 301 FLG 301 FLS 301 FLC 301	Foreign Language – III French German Spanish Chinese	VA	2	-	-	2
Non-Teaching Credit Course(NTCC)						
AND003	ANANDAM-III	NTCC	-	-	2	2

Total	**31**

SEMESTER IV

Code	Course	Category	L	T	P	Credit Units
Core Courses						
BEC401	Digital Circuits & Systems-I	CC	3	-	-	3
BEC 402	Analog Electronics-II	CC	3	-		3
BEE 403	Electric Machine – II	CC	2	1	-	3
BEE 404	Control System	CC	2	1	-	3
BEE 405	Power Plant Engineering	CC	1	1	-	2
Practical Courses						
BEE 421	Digital Circuits & Systems-I Lab	CC	-	-	2	1
BEC 422	Analog Electronics-II Lab	CC	-	-	2	1
BEE 423	Electric Machine Lab – II	CC	-	-	2	1
BEE 424	Control System Lab	CC	-	-	2	1
Domain Electives: Student must select 1 course from following DE electives						
BEC 406	Electromagnetic Field Theory	DE	2	-	-	3
BEE 406	Renewable Energy Technology					
Open Elective 3		OE	-	-	-	3
Value addedCourses						
BCS 401	Communication Skills – II	VA	1	-	-	1
BSS 404	Behavioral Science-IV (Relationship Management)	VA	1	-	-	1
FLT 401 FLG 401 FLS 401 FLC 401	Foreign Language – IV French German Spanish Chinese	VA	2	-	-	2
Non-Teaching Credit Course(NTCC)						

AND004	ANANDAM-IV	NTCC	-	2	-	2
Total						**28**

SEMESTER V

Code	Course	Category	L	T	P	Credit Units
Core Courses						
BEC 501	Microprocessor and Microcontroller Systems	CC	3	-	-	3
BEC 502	Digital Circuits & Systems-II	CC	2	1	-	3
BEE503	Modern & Digital Control Engineering	CC	2	1	-	3
BCS510	Web Development	CC	2	-	-	2
Practical Courses						
BEE 521	Microprocessor and Micro Controller Lab	CC	-	-	2	1
BEC522	Digital Circuits & Systems-II Lab	CC			2	1
BEE528	MATLAB theory and practices	CC	-	-	2	1
BCS530	Web Development Lab	CC	-	-	2	1
BEE 560	Practical Training (Evaluation)	CC	-	-	-	3
Domain Electives: Student must select 1 course from following DE electives						
BEE505	Computer System Architecture	DE	2	1	-	3
BEE506	Substation Engineering					
BEE507	Process Control Engineering					
Open Elective 4		OE	-	-	-	3
Value addedCourses						
BCS 501	Communication Skills – III	VA	1	-	-	1
BSS 504	Behavioral Science-V (Understanding self for effectiveness	VA	1	-	-	1
	Foreign Language – V	VA	2	-	-	2
FLT 501	French					
FLG 501	German					
FLS 501	Spanish					
FLC 501	Chinese					
Non-Teaching Credit Course(NTCC)						
AND005	ANADMAM-V	NTCC	-	2	-	2
Total						**28**

SEMESTER VI

Code	Course	Category	L	T	P	Credit Units
Core Courses						
BEE 601	Power Electronics	CC	3	-	-	3
BEE 602	Power System Analysis	CC	2	1	-	3
BEE 603	Transmission and Distribution System	CC	2	1	-	3
BEE 604	Utilization of Electric Power	CC	3	-	-	3
BCS 610	Programming with Python	CC	2	-	-	2
Practical Courses						
BEE 621	Power Electronics Lab	CC	-	-	2	1
BEE 622	Power System Lab	CC	-	-	2	1
BCS 630	Programming with Python Lab	CC	-	-	2	1
Domain Electives: Student must select 1 course from following DE electives						
BEC 606	Data Structures and IT	DE	3	-	-	3
BEE 606	Switch Mode Power Supplies					
BEE 607	Electrical Machine Design					
Open elective 5		OE	-	-	-	3
Value AddedCourses						
BCS 601	Communication Skills – IV	VA	1	-	-	1
BSS 604	Understanding self for effectiveness - VI	VA	1	-	-	1
	Foreign Language – VI	VA	2	-	-	2
FLT 601	French					
FLG 601	German					
FLS 601	Spanish					
FLC 601	Chinese					
Non-Teaching Credit Course(NTCC)						
AND006	ANANDAM-VI	NTCC	-	-	2	2
Total						**27**

SEMESTER VII

Course Code	Course	Category	L	T	P	Credit Units
Core Courses						
BEE 701	Power System Engineering	CC	2	1	-	3
BEE 703	Power System Protection	CC	3	-	-	3
BEE 704	Substation Engineering	CC	2	1	-	3
BCS 710	Advanced Programming with Python	CC	2	-	-	2
Practical Courses						
BEE 721	Power System Engg Lab	CC	-	-	2	1
BEE 725	Electrical Simulation Lab	CC	-	-	2	1
BCS 730	Advanced Programming with Python Lab	CC	-	-	2	1
BEE 750	Industrial Training (Evaluation)	NTCC				3
BEE 760	Seminar	CC	-	-	-	3
Open Elective 6		OE	-	-	-	3
Value addedCourses						
BCS 701	Communication Skills – V	VA	1	-	-	1
BSS 704	Behavioral Science – VII, Individual Society & Nation	VA	1	-	-	1
	Foreign Language – VII	VA	2	-	-	2
FLT701	French					
FLG 701	German					
FLS 701	Spanish					
FLC 701	Chinese					
Non-Teaching Credit Course(NTCC)						
AND007	ANANDAM-VII	NTCC	-	-	2	2
Total						**27**

SEMESTER VIII

Course Code	Course	Category	L	T	P	Credit Units
Core Courses						
BEE 801	Electrical Drives & Control	CC	2	1	-	3
BEE 802	Flexible AC Transmission Systems	CC	2	1	-	3
BEE 860	Major Project	CC	-	-	-	12
Domain Electives: Student must select 1 course from following DE electives						
BEE 803	Optimization Techniques and Algorithms	DE	2	1	-	3
BEE 804	Smart Grid Technology					
Non-Teaching Credit Course(NTCC)						
AND008	ANANDAM-VIII	NTCC	-	-	2	2
Total						**21**
Note: CC - Core Course, VA - Value Added Course, OE - Open Elective, DE - Domain Elective, FW - Field Work						
Total Credits						**224**

Course Name	Course Code	LTP	Credit	Semester
Applied mathematics – I	AM 101	4:0:0	4	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	1. Investigate the basic concept about Calculus and differential equations.
CLO 2	Create an interest in finding the solution of problem, length, area, volume etc of the curve and application of Vector calculus.
CLO 3	. Apply the basic concepts of Calculus to find Asymptotes, curvature, tangents & normal's, maxima & minima, partial derivatives and approximate calculation of a function
CLO 4	Develop the formulation of the problem and differential equation, define its nature by using the fundamental of calculus and its applications.

B. SYLLABUS

Module I: Differential Calculus
Successive differentiation, Leibnitz's theorem (without proof), Mean value theorem, Taylor's theorem (proof), Remainder terms, Asymptote & Curvature, Partial derivatives, Chain rule, Differentiation of Implicit functions, Exact differentials, Tangents and Normals, Maxima, Approximations, Differentiation under integral sign, Jacobians and transformations of coordinates.

Module II: Integral Calculus
Fundamental theorems, Reduction formulae, Properties of definite integrals, Applications to length, area, volume, surface of revolution, improper integrals, Multiple Integrals-Double integrals, Applications to areas, volumes.

Module III: Ordinary Differential Equations
Formation of ODEs, Definition of order, degree & solutions, ODE of first order : Method of separation of variables, homogeneous and non homogeneous equations, Exactness & integrating factors, Linear equations & Bernoulli equations, General linear ODE of n^{th} order, Solution of homogeneous equations, Operator method, Method of undetermined coefficients, Solution of simple simultaneous ODE.

Module IV: Vector Calculus
Scalar and Vector Field, Derivative of a Vector, Gradient, Directional Derivative, Divergence and Curl and their Physical Significance, Arc Length, Tangent, Directional Derivative, Evaluation of Line Integral, Green's Theorem in Plane (without proof), Representation of Surfaces, Tangent Plane and Surface Normal, Surface Integral, Stoke's Theorem (without proof), Gauss Divergence Theorem (without proof).

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance.

Text & References:

Text:

- Differential Calculus by Shanti Narain
- Integral Calculus by Shanti Narain

References:

- Differential Equation by A.R. Forsyth
- Higher Engineering Mathematics by H.K. Dass

APPLIED PHYSICS - I - FIELDS AND WAVES

Course Name	Course Code	LTP	Credit	Semester
Applied mathematics – i	AM 101	4:0:0	4	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	develop an understanding of the various concepts of simple harmonic motion for with and without damping.
CLO 2	solve simple problems on simple harmonic motion and related topics.
CLO 3	explain and interpret the wave nature of light.
CLO 4	solve simple problems on the applications of wave nature of light
CLO 5	define and understand vector calculus and electromagnetics
CLO 6	solve numerical problems on vector calculus and electromagnetic

B. SYLLABUS

Course Code: **AP 102** **CreditUnits: 03**

Course Objective:

Aim of this course is to introduce the students to fundamentals of graduate level physics, which form the basis of all applied science and engineering

Course Contents:

Module I: Oscillations & Waves Oscillations

Introduction to S.H.M. Damped Oscillations: Differential Equation and its solution, logarithmic decrement, Quality Factor, Different conditions of damping of harmonic oscillations. Forced oscillations: Amplitude and Frequency Response, Resonance, Sharpness of Resonance

Plane. Progressive Waves: Differential Equation and Solution, Superposition of Progressive Waves stationary waves. Ultrasonics: Generation and application of ultrasonicwaves.

Module II: Wave Nature of Light Interference:

Coherent Sources, Conditions of interference, Interference due to division of wavefront, Fresnels biprism Interference due to division of amplitude, Newton's rings, Interference due to thin films .Diffraction: Fresnel and Fraunhofer diffraction, Fraunhofer diffraction at a single slit, double slit, N Slits, Transmission grating, Rayleigh criterion and Resolving power of grating. Polarization: Birefringence, Nicol prism, Production and analysis of plane, circularly and elliptically polarized light, Half and quarter wave plates, Optical rotation, Polarimeter.

Module III: Electromagnetics

Scalar and vector fields, gradient of a scalar field, physical significance of gradient, equipotential surface. Line, surface and volume integrals, Divergence and curl of vector field and mathematical analysis physical significance, Electric flux, Gauss' law, Proof and Applications, Gauss divergence and Stokes theorems.

Differential form of Gauss' Law, Amperes' Law, Displacement current, Faradays Law, Maxwell equations in free space & isotropic media (Integral form & differential form), EM wave propagation in free space, Poynting vector.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance.

Text & References:

Text

- Waves & oscillation, A. P. French
- Physics of waves, W. C. Elmore & M. A. Heald
- Introduction to Electrodynamics, D. J. Griffith

Reference

- Electrodynamics, Gupta, Kumar & Singh
- Optics, A. K. Ghatak
- Engineering Physics, Satya Prakash

APPLIED CHEMISTRY

Course Name	Course Code	LTP	Credit	Semester
Applied mathematics – i	**AC 103**	2:1:0	3	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Understand the structure and chemical transformations of molecules.
CLO 2	Understand the application of chemical process in industries
CLO 3	Basic idea about water treatment, lubrication, corrosion, fuel, spectroscopy etc.

B. SYLLABUS

Course Objective:

Four basic sciences, Physics, Chemistry, Mathematics and Biology are the building blocks in engineering and technology. Chemistry is essential to develop analytical capabilities of students, so that they can characterize, transform and use materials in engineering and apply knowledge in their field. All engineering fields have unique bonds with chemistry whether it is Aerospace, Mechanical, Environmental and other fields the makeup of substances is always a key factor, which must be known. For electronics and computer science engineering, apart from the material, computer modeling and simulation knowledge can be inherited from the molecule designing. The upcoming field of technology like Nanotechnology and Biotechnology depends fully on the knowledge of basic chemistry. With this versatile need in view, course has been designed in such a way so that the student should get an overview of the whole subject.

Course Contents:

Module I: Water Technology

Introduction and specifications of water, Hardness and its determination (EDTA method only), Alkalinity, Boiler feed water, boiler problems – scale, sludge, priming & foaming: causes & prevention, Boiler problems – caustic embitterment & corrosion: causes &prevention, Carbonate& phosphate conditioning, colloidal conditioning &calgon treatment Water softening processes: Lime – soda process, Ion exchange method, Water for domestic use.

Module II: Fuels

Classification, calorific value of fuel, (gross and net), Determination of calorific value of fuels, bomb calorimeter, Solid fuels - Proximate and ultimate analysis, Octane & Cetane No. and its significance. Numericals on combustion.

Module III: Instrumental Methods of analysis

Introduction; Principles of spectroscopy; Laws of absorbance IR :Principle, Instrumentation, Application UV : Principle, Instrumentation, Application NMR : Principle, Instrumentation, Application

Module III: Lubricants

Introduction; Mechanism of Lubrication; Types of Lubricants; Chemical structure related to Lubrication; Properties of lubricants; Viscosity and Viscosity Index; Iodine Value; Aniline Point; Emulsion number; Flash Point; Fire Point; Drop Point; Cloud Point; Pour Point. Selection of Lubricants.

Module VI: Corrosion

Introduction, Mechanism of dry and wet corrosion, Types of corrosion-Galvanic, Concentration cell, soil, pitting, intergranular, waterline. Passivity. Factors influencing corrosion. Corrosion control.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance.

Text & References:

Text:

- Engineering Chemistry- Jain and Jain
- Engineering Chemistry - Sunita Rattan
- Engineering Chemistry - Shashi Chawla

References:

- Engineering Chemistry – Dara and Dara
- Spectroscopy- Y.R Sharma
- Corrosion Engineering – Fontenna and Greene

Course Name	Course Code	LTP	Credit	Semester
Element of mechanical engineering	**BME 104**	2:1:0	3	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Investigate – Basic machines used in the field of mechanical engineering
CLO 2	Create – Mathematical models of fundamental physical phenomenon and apply them to predict the behaviour of engineering systems
CLO 3	Apply – this knowledge to analyse the working of IC Engines, Steam Turbines, Lathe machines etc.
CLO 4	Develop – Ability to perform and conduct basic experiments and evaluate the results of the same.

B. SYLLABUS

Course Objective:

The objective of this course is to impart the basic knowledge of thermodynamics, stress- strain, materials & their properties and various manufacturing processes to the students of all engineering discipline.

Course Contents:

Module I:Fundamental Concepts
Definition of thermodynamics, system, surrounding and universe, phase, concept of continuum, macroscopic & microscopic point of view, Thermodynamic equilibrium, property, state, path, process, cyclic process, Zeroth, first and second law of thermodynamics, Carnot Cycle, Introduction to I.C. Engines-two &four stoke S.I. and C.I. engines. Otto cycle. Diesel cycle.

Module II: Stress And Strain Analysis
Simple stress and strain: introduction, normal shear, and stresses-strain diagrams for ductile and brittle materials. Elastic constants, one-dimensional loadings of members of varying cross-section, Strain Energy, Properties of material-strength, elasticity, stiffness, malleability, ductility, brittleness, hardness and plasticity etc; Concept of stress and strain stress strain diagram, tensile test, impact test and hardness test.

Module III:Casting& Forging
Introduction of casting, pattern, mould making procedures, sand mould casting, casting defects, allowances of pattern. Forging-introduction, upsetting & drawing out, drop forging, press forging & m/c forging

Module IV: Welding & Sheet metal working
Introduction of welding processes, classification, gas welding, arc welding, resistance welding. Introduction to sheet metal shop, Shearing, trimming, blanking, piercing, shaving, notching, stretch forming, nibbling coining, embossing and drawing.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance.

Text & References:

Text

- Engineering thermodynamics, by P.K. Nag, Tata McGraw Hill.
- Thermal Engineering, by D.S. Kumar. S.K. Kataria and Sons.
- Thermal Engineering by PL Ballaney; Khanna Publishers, Delhi.

- Engineering Thermodynamics: Work and Heat Transfer, by Rogers and Mayhew, ELBS Publications

Reference

- Heine, R.W. C.R. Loper and P.C. Rosenthal, Principles of metal casting McGraw Hill
- Welding Technology by R.S. Parmar, Khanna Publishers.
- Thermodynamics and Heat Engines Volume-I, by R. Yadav: Central Publications.
- Ganesan, V. Internal Combustion Engine, Tata McGraw-Hill.
- Mathur, M.L. and Sharma, R.P. Internal Combustion Engine. Dhanpat Rai Publication

Course Name	Course Code	LTP	Credit	Semester
Introduction to computers and programming in c	**BCS 104**	2:1:0	3	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Able to figure out the basic architecture and components of computers
CLO 2	Will be able to understand the syntax of programs in C language
CLO 3	Build C language programs and projects.

B. SYLLABUS

Course Objective:

The objective of this course module is to acquaint the students with the basics of computers system, its components, data representation inside computer and to get them familiar with various important features of procedure oriented programming language i.e. C.

Course Contents:

Module I: Introduction
Introduction to computer, history, von-Neumann architecture, memory system (hierarchy, characteristics and types), H/W concepts (I/O Devices), S/W concepts (System S/W & Application S/W, utilities). Data Representation: Number systems, character representation codes, Binary, octal, hexadecimal and their interconversions. Binary arithmetic, floating point arithmetic, signed and unsigned numbers, Memory storage unit.

Module II: Programming in C
History of C, Introduction of C, Basic structure of C program, Concept of variables, constants and data types in C, Operators and expressions: Introduction, arithmetic, relational, Logical, Assignment, Increment and decrement operator, Conditional, bitwise operators, Expressions, Operator precedence and associativity. Managing Input and output Operation, formatting I/O.

Module III: Fundamental Features in C
C Statements, conditional executing using if, else, nesting of if, switch and break Concepts of loops, example of loops in C using for, while and do-while, continue and break. Storage types (automatic, register etc.), predefined processor, Command Line Argument.

Module IV: Arrays and Functions
One dimensional arrays and example of iterative programs using arrays, 2-D arrays Use in matrix computations. Concept of Sub-programming, functions Example of user defined functions. Function prototype, Return values and their types, calling function, function argument, function with variable number of argument, recursion.

Module V: Advanced features in C
Pointers, relationship between arrays and pointers Argument passing using pointers, Array of pointers. Passing arrays as arguments. Strings and C string library. Structure and Union. Defining C structures, Giving values to members, Array of structure, Nested structure, passing strings as arguments. File Handling.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance.

Text & References:

Text:

- "ANSI C" by E Balagurusamy
- Yashwant Kanetkar, "Let us C", BPB Publications, 2nd Edition, 2001.
- Herbert Schildt, "C:The complete reference", Osbourne Mcgraw Hill, 4th Edition, 2002.
- V. Raja Raman, "Computer Programming in C", Prentice Hall of India, 1995.

References:

- **Kernighan & Ritchie, "C Programming Language", The (Ansi C Version), PHI, 2nd Edition.**
- **J. B Dixit, "Fundamentals of Computers and Programming in 'C'.**
- P.K. Sinha and Priti Sinha, "Computer Fundamentals", BPB publication.

Course Name	Course Code	LTP	Credit	Semester
Basic electrical engineering	**BEE 105**	2:1:0	3	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Develop a practical approach for analysis of resistive circuits and solution of resistive circuits with independent sources.
CLO 2	Able to apply two terminal element relationships for inductors and capacitors in an electrical network
CLO 3	Capable of analysis of single phase AC circuits, the representation of alternating quantities and determining the power in these circuits.
CLO 4	To acquire the knowledge about the constructional concepts & working principles for the applications of DC machines, AC machines & measuring instruments
CLO 5	Able to identify, formulate, and solve the electrical engineering problems.

B. SYLLABUS

Course Code: BEE 105 **CreditUnits: 03**

Course Objective:

The objective of the course is to provide a brief knowledge of Electrical Engineering to students of all disciplines. This Course includes some theorems related to electrical, some law's related to flow of current, voltages, basic knowledge of Transformer, basic knowledge of electromagnetism, basic knowledge of electrical network.

Course Contents:

Module I: Basic Electrical Quantities

Basic Electrical definitions-Energy, Power, Charge, Current, Voltage, Electric Field Strength, Magnetic Flux Density, etc., Resistance, Inductance and Capacitance. Ideal Source, Independent Source and Controlled Source

Module II: Network Analysis Techniques & Theorems

Circuit Principles: Ohm's Law, Kirchoff's Current Law, Kirchoff's Voltage Law Network Reduction: Star–Delta Transformation, Source Transformation, Nodal Analysis, Loop analysis. Superposition theorem Thevenin's Theorem, Norton's theorem and Reciprocity theorem.,practical application

Module III: Alternating Current Circuits

Peak, Average and RMS values for alternating currents, Power calculation: reactive power, active power, Complex power, power factor, impedance, reactance, conductance, susceptance Resonance: series Resonance,

parallel resonance, basic definition of Q factor & Band-width.

Module IV: Transformers
Basic Transformer Operation principle, Construction, Voltage relations, Current relations, Linear circuit models, Open circuit test, Short circuit test, Transformer Efficiency.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance.

Text & References:

Text
- R.J. Smith, R.C. Dorf: Circuits, devices and Systems
- B.L. Thareja: Electrical Technology : Part -1 & 2

Reference
- V. Deltoro: Electrical Engineering fundamentals
- Schaum's Series: Electrical Circuits

APPLIED PHYSICS LAB - I

Course Name	Course Code	LTP	Credit	Semester
APPLIED PHYSICS LAB - I	AP 122	0:0:2	1	1

List of Experiments:

1. To determine the wavelength of sodium light by Newton's rings method.
2. To determine the dispersive power of the material of prism with the help of a spectrometer.
3. To determine the specific rotation of sugar by Bi-quartz or Laurent half shade polarimeter.
4. To determine the speed of ultrasonic waves in liquid by diffraction method.
5. To determine the width of a narrow slit using diffraction phenomena.
6. To determine the temperature coefficient of platinum wire, using a platinum resistance thermometer and a Callender&Griffth's bridge.
7. To determine the value of specific charge (ratio of e/m) of an electron by Thomson method.
8. To determine the internal resistance of Leclanche cell with the help of Potentiometer.
9. To determine the resistance per unit length of a Carey Foster's bridge wire and also to find out the specific resistance of a given wire.
10. To plot graph showing the variation of magnetic field with distance along the aixs of a circular coil carrying current, and hence estimate the radius of the coil.
11. To determine the value of acceleration due to gravity ('g') in the laboratory using bar pendulum.
12. To determine the moment of inertia of a flywheel about its own axis of rotation.
13. To determine the density of material of the given wire with the help of sonometer.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

APPLIED CHEMISTRY LAB

Course Name	Course Code	LTP	Credit	Semester
Applied Chemistry Lab	AC 123	0:0:2	1	1

List of Experiments:

1. To determine the ion exchange capacity of a given cation exchanger.
2. To determine the temporary, permanent and total hardness of a sample of water by complexometric titration method.
3. To determine the type and extent of alkalinity of given water sample.
4. To determine the number of water molecules of crystallization in Mohr's salt (ferrous ammonium sulphate) provided standard potassium dichromate solution (0.1N) using diphenylamine as internal indicator.
5. To determine the ferrous content in the supplied sample of iron ore by titrimetric analysis against standard $K_2Cr_2O_7$ solution using potassium ferricyanide [$K_3Fe(CN)_6$] as external indicator.
6. (a) To determine the surface tension of a given liquid by drop number method.
   (b) To determine the composition of a liquid mixture A and B (acetic acid and water) by surface tension method.
7. To prepare and describe a titration curve for phosphoric acid – sodium hydroxide titration using pH-meter.
8. (a) To find the cell constant of conductivity cell.
   (b) Determine the strength of hydrochloric acid solution by titrating it against standard sodium hydroxide solution conductometrically
9. Determination of Dissolved oxygen in the given water sample.
10. To determine the total residual chlorine in water.
11. Determination of amount of oxalic acid and H_2SO_4 in 1 L of solution using N/10 NaOH and N/10 $KMnO_4$ solution.
12. Determination of viscosity of given oil by means of Redwood viscometer I.
13. To determine flash point and fire point of an oil by Pensky Martin's Apparatus
14. To determine the Iodine value of the oil.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

ELEMENT OF MECHANICAL ENGINEERING LAB

Course Name	Course Code	LTP	Credit	Semester
Element Of Mechanical Engineering Lab	**BME 124**	0:0:2	1	1

List of Experiments:

1. Welding

   (a) Arc Welding
   - Butt Joint
   - Lap Joint
   - T Joint

   (b) Gas Welding
   - Butt Joint
   - Lap Joint
   - Brazing of Broken pieces

2. Foundry
   - Sand mould casting by single piece pattern& Split pattern bracket with cores

3. Sheet Metal
   - Dust Bin
   - Mug
   - Funnel
   - Cylindrical Mug with handle-Rectangular

4. Fitting Shop
   - Male – Female Joint
   - Rectangular piece
   - Filing the job

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

PROGRAMMING IN C LAB

Course Name	Course Code	LTP	Credit	Semester
Applied mathematics – i	AM 101	4:0:0	4	1

Software Required: Turbo C

List of Experiments:

1. C program involving problems like finding the nth value of cosine series, Fibonacci series. Etc.
2. C programs including user defined function calls
3. C programs involving pointers, and solving various problems with the help of those.
4. File handling

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

BASIC ELECTRICAL ENGINEERING LAB

Course Name	Course Code	LTP	Credit	Semester
Applied mathematics – i	AM 101	4:0:0	4	1

List of Experiments:

1. To verify KVL & KCL in the given network.
2. To verify Superposition Theorem.
3. To verify Maximum Power Transfer Theorem.
4. To verify Reciprocity Theorem.
5. To determine and verify R_{Th}, V_{Th}, R_N, I_N in a given network.
6. To perform open circuit & short circuit test on a single-phase transformer.
7. To study transient response of a given RLC Circuit.
8. To perform regulation, ratio & polarity test on a single-phase transformer.
9. To measure power & power factor in a three phase circuit by two wattmeter method.
10. To measure power & power factor in a three phase load using three ammeter & three voltmeter method.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

Course Name	Course Code	LTP	Credit	Semester
English	**BCS 101**	1:0:0	1	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	**Identify** the basic elements of grammar required for good and effective communication.
CLO 2	**Interpret and discuss** key ideas of grammar, diction and communication.
CLO 3	**Develop** Creative & Literary Sensitivity in all communication.
CLO 4	**Design** and create texts for a variety of purposes and audiences, evaluating and assessing the effectiveness of grammatical aspects.

B. SYLLABUS

Course Objective:

The course is intended to give a foundation of English Language. The literary texts are indented to help students to inculcate creative & aesthetic sensitivity and critical faculty through comprehension, appreciation and analysis of the prescribed literary texts. It will also help them to respond form different perspectives.

Course Contents:

Module I: Vocabulary
Use of Dictionary
Use of Words: Diminutives, Homonyms & Homophones

Module II: Essentials of Grammar - I
Articles
Parts of Speech
Tenses

Module III: Essentials of Grammar - II
Sentence Structure
Subject -Verb agreement
Punctuation

Module IV: Communication
The process and importance
Principles & benefits of Effective Communication

Module V: Spoken English Communication
Speech Drills
Pronunciation and accent
Stress and Intonation

Module VI: Communication Skills - I
Developing listening skills
Developing speaking skills

Module VII: Communication Skills - II
Developing Reading Skills
Developing writing Skills

Module VIII: Written English communication
Progression of Thought/ideas
Structure of Paragraph
Structure of Essays

Module IX: Short Stories

Of Studies, by Francis Bacon
Dream Children, by Charles Lamb
The Necklace, by Guy de Maupassant
A Shadow, by R.K.Narayan
Glory at Twilight, Bhabani Bhattacharya

Module X: Poems

All the Worlds a Stage	Shakespeare
To Autumn	Keats
O! Captain, My Captain.	Walt Whitman
Where the Mind is Without Fear	Rabindranath Tagore
Psalm of Life	H.W. Longfellow

Examination Scheme:

Components	**A**	**CT**	**HA**	**EE**
Weightage (%)	05	15	10	70

Text & References:

Text

- Madhulika Jha, Echoes, Orient Long Man
- Ramon & Prakash, Business Communication, Oxford.

Reference

Sydney Greenbaum Oxford English Grammar, Oxford.

- Successful Communications, MalraTreece (Allyn and Bacon)
- Effective Technical Communication, M. Ashraf Rizvi.

BEHAVIOURAL SCIENCE
- I
(UNDERSTANDING SELF FOR EFFECTIVENESS)

Course Name	Course Code	LTP	Credit	Semester
Applied mathematics – i	AM 101	4:0:0	4	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Demonstrate awareness of self and the process of self-exploration..
CLO 2	Demonstrate knowledge of strategies for developing a healthy self-esteem
CLO 3	Recognize the importance of attitudes and its effect on personality.
CLO 4	Identify the difference between healthy and unhealthy expression of emotions and develop emotional competence necessary for personal and professional life.

B. SYLLABUS

Course Code: BSS 104 **CreditUnits: 01**

Course Objective:

This course aims at imparting:

- Understanding self & process of self exploration
- Learning strategies for development of a healthy self esteem
- Importance of attitudes and its effective on personality
- Building Emotional Competence

Course Contents:

Module I: Self: Core Competency
Understanding of Self
Components of Self – Self identity
Self concept
Self confidence
Self image

Module II: Techniques of Self Awareness
Exploration through Johari Window
Mapping the key characteristics of self
Framing a charter for self
Stages – self awareness, self acceptance and self realization

Module III: Self Esteem & Effectiveness
Meaning and Importance
Components of self esteem
High and low self esteem
Measuring your self esteem

Module IV: Building Positive Attitude
Meaning and nature of attitude
Components and Types of attitude
Importance and relevance of attitude

Module V: Building Emotional Competence
Emotional Intelligence – Meaning, components, Importance and Relevance
Positive and Negative emotions
Healthy and Unhealthy expression of emotions

Module VI:End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

Text

- Organizational Behaviour, Davis, K.
- Hoover, Judhith D. Effective Small Group and Team Communication, 2002,Harcourt College Publishers
- Dick, Mc Cann&Margerison, Charles: Team Management, 1992 Edition, viva books
- Bates, A. P. and Julian, J.: Sociology - Understanding Social Behaviour
- Dressler, David and Cans, Donald: The Study of Human Interaction
- Lapiere, Richard. T – Social Change

Reference

- Lindzey, G. and Borgatta, E: Sociometric Measurement in the Handbook of Social Psychology, Addison – Welsley, US.
- Rose, G.: Oxford Textbook of Public Health, Vol.4, 1985.
- LaFasto and Larson: When Teams Work Best, 2001, Response Books (Sage), New Delhi
- J William Pfeiffer (ed.) Theories and Models in Applied Behavioural Science, Vol 2, Group (1996); Pfeiffer & Company
- Smither Robert D.; The Psychology of Work and Human Performance, 1994, Harper Collins College Publishers

FRENCH

Course Name	Course Code	LTP	Credit	Semester
Applied mathematics – i	AM 101	4:0:0	4	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of advance level.
CLO 3	Students will be able to communicate with complex sentences sentences in writing, self introduction, family description etc.
CLO 4	Students will be able to communicate in small sentences in oral, self introduction, family description etc.

B. SYLLABUS

Course Code: FLT 101 **Credit Units: 02**

Course Objective:

To familiarize the students with the French language

- with the phonetic system
- with the syntax
- with the manners
- with the cultural aspects

Course Contents:

Module A: pp. 01 to 37: Unités 1, 2, Unité 3 Objectif 1, 2
Only grammar of Unité 3: objectif 3, 4 and 5

Contenu lexical:Unité 1 : Découvrir la langue française : (oral et écrit)

1. se présenter, présenter quelqu'un, faire la connaissance des autres, formules de politesse, rencontres
2. dire/interroger si on comprend
3. Nommer les choses

Unité 2: Faire connaissance

1. donner/demander des informations sur une personne, premiers contacts, exprimer ses goûts et ses préférences
2. Parler de soi: parler du travail, de ses activités, de son pays, de sa ville.

Unité 3:Organiser son temps

1. dire la date et l'heure

Contenu grammatical:

1. organisation générale de la grammaire
2. article indéfini, défini, contracté
3. nom, adjectif, masculin, féminin, singulier et pluriel
4. négation avec « de », "moi aussi", "moi non plus"
5. interrogation : Inversion, est-ce que, qui, que, quoi, qu'est-ce que, où, quand, comment, quel(s), quelle(s)
   Interro-négatif : réponses : oui, si, non
6. pronom tonique/disjoint- pour insister après une préposition
7. futurproche

Examination Scheme:

Components	CT1	CT2	C	I	V	A

Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- le livre à suivre : Campus: Tome 1

GERMAN

Course Name	Course Code	LTP	Credit	Semester
Applied mathematics – i	AM 101	4:0:0	4	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone Basic language skills such as reading, writing, speaking, listening & interactive in the language
CLO 2	Students will be able to read and interpret small texts
CLO 3	Students will be able to communicate in small sentences in writing, self introduction, family description etc.
CLO 4	Students will be able to communicate in small sentences in oral, self introduction, family description etc.

B. SYLLABUS

Course Objective:

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.
To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany

Course Contents:

Module I: Introduction
Self introduction: heissen, kommen, wohnwn, lernen, arbeiten, trinken, etc.
All personal pronouns in relation to the verbs taught so far.
Greetings: Guten Morgen!, Guten Tag!, Guten Abend!, Gute Nacht!, Danke sehr!, Danke!, Vielen Dank!, (es tut mir Leid!),
Hallo, wie geht's?: Danke gut!, sehr gut!, prima!, ausgezeichnet!,
Es geht!, nicht so gut!, so la la!, miserabel!

Module II: Interviewspiel
To assimilate the vocabulary learnt so far and to apply the words and phrases in short dialogues in an interview – game for self introduction.

Module III: Phonetics
Sound system of the language with special stress on Dipthongs

Module IV: Countries, nationalities and their languages
To make the students acquainted with the most widely used country names, their nationalitie and the language spoken in that country.

Module V: Articles
The definite and indefinite articles in masculine, feminine and neuter gender. All Vegetables, Fruits, Animals, Furniture, Eatables, modes of Transport

Module VI: Professions
To acquaint the students with professions in both the genders with the help of the verb "sein".

Module VII: Pronouns
Simple possessive pronouns, the use of my, your, etc.
The family members, family Tree with the help of the verb "to have"

Module VIII: Colours
All the color and color related vocabulary – colored, colorful, colorless, pale, light, dark, etc.

Module IX: Numbers and calculations – verb "kosten"
The counting, plural structures and simple calculation like addition, subtraction, multiplication and division to test the knowledge of numbers.
"Wie viel kostet das?"

Module X: Revision list of Question pronouns
W – Questions like who, what, where, when, which, how, how many, how much, etc.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

Text
- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer

Reference
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

SPANISH

Course Name	Course Code	LTP	Credit	Semester
Applied mathematics – i	AM 101	4:0:0	4	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of advance level.
CLO 3	Students will be able to communicate with complex sentences in writing, self introduction, family description etc.
CLO 4	Students will be able to communicate in small sentences in oral, self introduction, family description etc.

B. SYLLABUS

Course Objective:

To enable students acquire the relevance of the Spanish language in today's global context, how to greet each other. How to present / introduce each other using basic verbs and vocabulary

Course Contents:

Module I
A brief history of Spain, Latin America, the language, the culture…and the relevance of Spanish language in today's global context.
Introduction to alphabets

Module II
Introduction to '*Saludos*' (How to greet each other. How to present / introduce each other).
Goodbyes (despedidas)
The verb *llamarse* and practice of it.

Module III
Concept of Gender and Number
Months of the years, days of the week, seasons. Introduction to numbers 1-100, Colors, Revision of numbers and introduction to ordinal numbers.

Module IV
Introduction to *SER* and *ESTAR* (both of which mean To Be).Revision of '*Saludos*' and '*Llamarse*'. Some adjectives, nationalities, professions, physical/geographical location, the fact that spanish adjectives have to agree with gender and number of their nouns. Exercises highlighting usage of *Ser* and *Estar*.

Module V
Time, demonstrative pronoun (Este/esta, Aquel/aquella etc)

Module VI
Introduction to some key AR /ER/IR ending regular verbs.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

Text
- Español, EnDirecto I A

Reference
- Español Sin Fronteras

CHINESE

Course Name	Course Code	LTP	Credit	Semester
Applied mathematics – I	AM 101	4:0:0	4	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	To produce global citizens speaking an International language in keeping with the institutional vision
CLO 2	To give students a platform to understand Culture and Society of a different world.
CLO 3	To enhance the possibilities of jobs in MNCs established in/outside the country
CLO 4	To enhance the possibilities of Studying Abroad

B. SYLLABUS

Course Objective:

There are many dialects spoken in China, but the language which will help you through wherever you go is Mandarin, or Putonghua, as it is called in Chinese. The most widely spoken forms of Chinese are Mandarin, Cantonese, Gan, Hakka, Min, Wu and Xiang. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I
Show pictures, dialogue and retell.
Getting to know each other.
Practicing chart with Initials and Finals. (CHART – The Chinese Phonetic Alphabet Called "Hanyu Pinyin" in Mandarin Chinese.)
Practicing of Tones as it is a tonal language.
Changes in 3rd tone and Neutral Tone.

Module II
Greetings
Let me Introduce
The modal particle "ne".
Use of Please 'qing" – sit, have tea …….. etc.
A brief self introduction – Ni hao ma? Zaijian!
Use of "bu" negative.

Module III
Attributives showing possession
How is your Health? Thank you
Where are you from?
A few Professions like – Engineer, Businessman, Doctor, Teacher, Worker.
Are you busy with your work?
May I know your name?

Module IV
Use of "How many" – People in your family?
Use of "zhe" and "na".
Use of interrogative particle "shenme", "shui", "ma" and "nar".
How to make interrogative sentences ending with "ma".
Structural particle "de".
Use of "Nin" when and where to use and with whom. Use of guixing.
Use of verb "zuo" and how to make sentences with it.

Module V

Family structure and Relations.
Use of "you" – "mei you".
Measure words
Days and Weekdays.
Numbers.
Maps, different languages and Countries.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- "Elementary Chinese Reader Part I" Lesson 1-10

Type: Compulsory

ANANDAM

Course Name	Course Code	LTP	Credit	Semester
Applied mathematics – i	AND001	2:0:0	2	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Awareness and empathy regarding community issues
CLO 2	Interaction with the community and impact on society
CLO 3	Interaction with mentor and development of Student teacher relationship

CLO 4	Interaction among students, enlarge social network
CLO 5	Cooperative and Communication skills and leadership qualities
CLO 6	Critical thinking, Confidence and Efficiency

B. SYLLABUS

Course Objectives:

After the completion of this course, students will be able to:

- apply their knowledge and skills to solve specific community problem
- learn to plan, lead, and organize community events have a sense of belonging to their college campus and community and find something they are interested in doing during their free time
- make new friends, expand social network, and boost social skills and mental health.
- be useful to society as it will protect them against stress, frustration, and depression

Course Contents:

The project report should be guided by the mentor and shall contain:

- **Synopsis**: clearly stating objectives and activities to be undertaken. Problem identifying and problem-solving projects to be taken up.
- Details of the **Mentor and the Participants are to** be given (name of mentor, name of participants, phone number/mobile no, email, and address)
- Location / community where the work was carried out
- Details of Activities performed are to be given with date
- Number of beneficiaries and impact on the society (the object should be to empower the community and make them self-reliant)
- Photographs taken for documentation of work should be submitted
- Media coverage of the projects should be attached if any
- The Group Community Service Project Report will be submitted by the Student group leader under the guidance of the mentor to the Director/HoIs of the Department.
- The Director/HoIs should get the best report (more than one if required) of the Group Community Service Project uploaded on the HTE website and on the University page
- The Director/HoIs will forward the best report of the department to the Nodal Officer of the University.
- University will forward the report to the state level committee.

GUIDELINES FOR GCSP (Group Community Service Project)
ASSIGNMENT OF ANANDAM FOR SOCIAL AWARENESS (for students)

1. Each member of the group shall write one blog about the decided topic of 500 words (minimum) along with any relevant photos/diagrams/statistical data (with reference).
2. The group member shall write his/her name at the end of the blog.
3. The blog shall be posted on Instagram and Facebook (apart from these any other website wherever the group seems necessary).
4. Print out of the blog where date of when the content is posted, number of followers, comments, name of the writer shall be visible will be taken and file will be maintained for the same.
5. In the cover page of the project mention heading **"Group Community Service Project"**, and the filled format of final project report given by Anandam Scheme.
6. For the topic chosen by the group, students are recommended to cover the following points:

a) Current scenario (Regional, national and international level as applicable)
b) Future predictions
c) Duty of the government
d) Government policies (related to the topic), if any
e) Duty of public
f) Conclusion

Evaluation Scheme:

Project Participation: 2 hours X 8 days (per month) X 4 months = 64 hours

- **C grade =32 hrs (Below 20 marks)**
- **B grade >32 hrs to <=44hrs (20-30 marks)**
- **A grade >44 hrs to<=54hrs (30-40 marks)**
- **O grade >54 hrs to<=64hrs (40-50 marks)**

Evaluation Criteria:

Respective Departmental Anandam mentors are requested to evaluate the project (out of 50) as per the following criteria:

1. Position and exceptions, if any, are clearly stated. The organization of the blog is completely and clearly outlined and implemented.
2. The body of the blog is coherently organized, original and the logic is easy to follow. There is no spelling or grammatical errors and terminology is clearly defined. Writing is clear, concise, and persuasive.
3. Conclusion is clearly stated. The underlying logic is explicit.

APPLIED MATHEMATICS – II

Course Name	Course Code	LTP	Credit	Semester
Applied mathematics – i	AM 101	4:0:0	4	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	. Solve system of linear equations; be familiar with the definition and properties of matrix; find the eigenvalues and eigenvectors of a square matrix.
CLO 2	Investigate the convergence of infinite series using different tests.
CLO 3	Calculate the measure of central tendency, moments, skewness and kurtosis.
CLO 4	Develop knowledge of basic discrete and continuous distributions (Binomial, Poisson, Normal) and how to work with them.
CLO 5	Apply the method to use complex variable and complex valued functions and able to perform their differentiation and integration.

B. SYLLABUS

Course Objective:

The knowledge of Mathematics is necessary for a better understanding of almost all the Engineering and Science subjects. Here our intention is to make the students acquainted with the concept of basic topics from Mathematics, which they need to pursue their Engineering degree in different disciplines.

Course Contents:

Module I: Linear Algebra

Hermitian and Skew Hermitian Matrix, Unitary Matrix, Orthogonal Matrix, Elementary Row Transformation, Reduction of a Matrix to Row Echelon Form, Rank of a Matrix, Consistency of Linear Simultaneous Equations, Gauss Elimination Method, Gauss-Jordan Method, Eigen Values and Eigen Vectors of a Matrix, Caley-Hamilton Theorem, Diagonalization of a Matrix, Vector Space, Linear Independence and Dependence of Vectors, Linear Transformations.

Module II: Infinite Series

Definition of Sequence, Bounded Sequence, Limit of a Sequence, Series, Finite and Infinite Series, Convergence and Divergence of Infinite series, Cauchy's Principle of Convergence, Positive Term Infinite Series, Comparison test, D'Alembert's Ratio test. Raabe's Test, Cauchy's nth root Test. Logarithmic Test, Alternating Series, Leibnitz's Test, Absolute and conditioinal convergence, Uniform Convergence, Power Series and its Interval of Convergence.

Module III: Complex Analysis

De Moivre's Theorem and Roots of Complex Numbers, Logarithmic Functions, Circular, Hyperbolic Functions and their Inverses.

Functions of a Complex Variables, Limits, Continuity and Derivatives, Analytic Function, Cauchy-Riemann Equations (without proof), Harmonic Function, Harmonic Conjugates, Conformal Mapping, Bilinear Transformations, Complex Line Integral, Cauchy Integral Theorem, Cauchy Integral Formula, Derivative of Analytic Function, Power Series, Taylor Series, Laurent Series, Zeroes and Singularities, Residues, Residue Theorem, Evaluation of Real Integrals of the Form $\int_0^{2\pi} F(\cos\theta, \sin\theta)\, d\theta$ and $\int_{-\infty}^{\infty} \frac{f(x)}{F(x)}\, dx$.

Module IV: Statistics and Probability

Moments, Skewness, Kurtosis, Random Variables and Probability Distribution, Mean and Variance of a Probability Distribution, Binomial Distribution, Poisson Distribution and Normal Distribution.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance.

Text & References:

Text

- Engineering Mathematics by Erwin Kreyszig.
- Engineering Mathematics by R.K. Jain and S.R.K. Iyengar.
- Higher Engineering Mathematics by H.K. Dass.

Reference

- Engineering Mathematics by B.S. Grewal.
- Differential Calculus by Shanti Narain.
- Integral Calculus by Shanti Narain.
- Linear Algebra- Schaum Outline Series.

Course Name	Course Code	LTP	Credit	Semester
APPLIED PHYSICS - II - MODERN PHYSICS	**AP 202**	2:1:0	3	2

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Define and understand space and time and the variations in other related fundamental quantities such as mass, velocity and force.
CLO 2	Solve simple problems relating to the above concepts
CLO 3	Explain by extending the understanding as laid down in Quantum theory to other phenomenon as observed in sub-atomic Physics and also to solve simple problems in Quantum Theory
CLO 4	Appreciate and understand the various spectra as observed during electronic transitions
CLO 5	Understand the way nature has endowed properties to materials.

B. SYLLABUS

Course Objective:

Aim of this course is to introduce the students to fundamentals of graduate level physics which form the basis of all applied science and engineering

Course Contents:

Module I: Special Theory of Relativity

Michelson-Morley experiment, Importance of negative result, Inertial & non-inertial frames of reference, Einstein's postulates of Special theory of Relativity, Space-time coordinate system, Relativistic Space Time transformation (Lorentz transformation equation), Transformation of velocity, Addition of velocities, Length contraction and Time dilation, Mass-energy equivalence (Einstein's energy mass relation) & Derivation of Variation of mass with velocity,

Module II: Wave Mechanics

Wave particle duality, De-Broglie matter waves, phase and group velocity, Heisenberg uncertainty principle, wave function and its physical interpretation, Operators, expectation values. Time dependent & time independent Schrödinger wave equation for free & bound states, square well potential (rigid wall), Step potential.

Module III: Atomic Physics

Vector atom model, LS and j-j coupling, Zeceman effect (normal & anomalous), Paschen-Bach effect, X-ray spectra and energy level diagram, Moseleys Law, Lasers – Einstein coefficients, conditions for light amplification, population inversion, optical pumping, three level and four level lasers, He-Ne and Ruby laser, Properties and applications of lasers.

Module IV: SolidState Physics

Sommerfield's free electron theory of metals, Fermi energy, Introduction to periodic potential &Kronig-Penny model (Qualitative) Band Theory of Solids, Semi-conductors: Intrinsics and Extrinsic Semiconductors, photoconductivity and photovotaics, Basic aspects of Superconductivity, Meissner effect.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance.

Text & References:

Text

- Concept of Modern Physics, A. Beiser
- Applied Physics II, Agarawal& Goel

Reference

- Solid State Physics, S. O. Pallai
- Physics of Atom, Wehr& Richards

Course Name	Course Code	LTP	Credit	Semester
Object oriented programming using c++	**BCS 203**	2:1:0	3	2

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Interpret the characteristics of an object-oriented programming language in a program and advanced features of the C++ programming language as a continuation of the previous course.
CLO 2	Define classes and objects using C++ language to solve real world problems
CLO 3	Apply inheritance and polymorphism through programming
CLO 4	Conclude methods of handling files and strings using C++ and apply exception handling in real world applications

B. SYLLABUS

Course Objective:

The objective of this module is to introduce object oriented programming. To explore and implement the various features of OOP such as inheritance, polymorphism, Exceptional handling using programming language C++. After completing this course student can easily identify the basic difference between the programming approaches like procedural and object oriented.

Course Contents:

Module I: Introduction

Review of C, Difference between C and C++, Procedure Oriented and Object Oriented Approach. Basic Concepts: Objects, classes, Principals like Abstraction, Encapsulation, Inheritance and Polymorphism. Dynamic Binding, Message Passing. Characteristics of Object-Oriented Languages. Introduction to Object-Oriented Modeling techniques (Object, Functional and Dynamic Modeling).

Module II: Classes and Objects

Abstract data types, Object & classes, attributes, methods, C++ class declaration, Local Class and Global Class, State identity and behaviour of an object, Local Object and Global Object, Scope resolution operator, Friend Functions, Inline functions, Constructors and destructors, instantiation of objects, Types of Constructors, Static Class Data, Array of Objects, Constant member functions and Objects, Memory management Operators.

Module III: Inheritance

Inheritance, Types of Inheritance, access modes – public, private & protected, Abstract Classes, Ambiguity resolution using scope resolution operator and Virtual base class, Aggregation, composition vs classification hiérarchies, Overriding inheritance methods, Constructors in derived classes, Nesting of Classes.

Module IV: Polymorphism

Polymorphism, Type of Polymorphism – Compile time and runtime, Function Overloading, Operator Overloading (Unary and Binary) Polymorphism by parameter, Pointer to objects, this pointer, Virtual Functions, pure virtual functions.

Module V: Strings, Files and Exception Handling

Manipulating strings, Streams and files handling, formatted and Unformatted Input output. Exception handling, Generic Programming – function template, class Template Standard Template Library: Standard Template Library, Overview of Standard Template Library, Containers, Algorithms, Iterators, Other STL Elements, The Container Classes, General Theory of Operation, Vectors.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance.

Text & References:

Text:

- A.R. Venugopal, Rajkumar, T. Ravishanker "Mastering C++", TMH, 1997
- R. Lafore, "Object Oriented Programming using C++", BPB Publications, 2004.
- "Object Oriented Programming with C++" By E. Balagurusamy.
- Schildt Herbert, "C++: The Complete Reference", Wiley DreamTech, 2005.

References:

- Parasons, "Object Oriented Programming with C++", BPB Publication, 1999.
- Steven C. Lawlor, "The Art of Programming Computer Science with C++", Vikas Publication, 2002.
- Yashwant Kanethkar, "Object Oriented Programming using C++", BPB, 2004

Course Name	Course Code	LTP	Credit	Semester
Engineering Mechanics	**BME 204**	3:0:0	3	2

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Able to analyse the force system and its effects.
CLO 2	Explain the nature of forces acting upon a system.

CLO 3	Evaluate the static and dynamic system's problem

B. SYLLABUS

Course Objective:

Objective of this course is to provide fundamental knowledge of force system and its effect on the behaviour of the bodies that may be in dynamic or in static state. It includes the equilibrium of different structures like beams, frames, truss etc and the force transfer mechanism in the different components of a body under given loading condition.

Course Contents:

Module I: Force system & Structure
Free body diagram, Equilibrium equations and applications. Plane truss, perfect and imperfect truss, assumption in the truss analysis, analysis of perfect plane trusses by the method of joints, method of section.

Module II:Friction
Static and Kinetic friction, laws of dry friction, co-efficient of friction, angle of friction, angle of repose, cone of friction, friction lock, efficiency of screw jack, transmission of power through belt

Module III: Distributed Force
Determination of center of gravity, center of mass and centroid by direct integration and by the method of composite bodies, mass moment of inertia and area moment of inertia by direct integration and composite bodies method, radius of gyration, parallel axis theorem, Pappus theorems and its application, polar moment of inertia.

Module IV: Work -Energy
Work energy equation, conservation of energy, Virtual work, impulse, momentum conservation, impact of bodies, co-efficient of restitution, loss of energy during impact, D'alembert principle

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance.

Text & References:

Text

- S.S. Bhavikatti, Engineering Mechanics, New Age International Ltd
- Timoshenko, Engineering Mechanics, McGraw Hill

Reference

- R. S. Khurmi, Engineering Mechanics, S. Chand Publication
- I. H. Shames & G. K. M. Rao, Engineering Mechanics, Pearson Education, 2006

Course Name	Course Code	LTP	Credit	Semester
ENGINEERING GRAPHICS	**BME 205**	1:0:0	1	2

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Describe the theory of scales, engineering curves, different Projection used in engineering drawing.
CLO 2	Draw the different engineering curves, maps and projection of planes and solid accurately.
CLO 3	Identify different geometrical shape and their application used in engineering application.

B. SYLLABUS

Course Contents:

Module 1:
Scales &Curves:Representative factor, Plain Scales, Diagonal Scales, Comperative Scales and Scale of chords. Construction of ellipse, Parabola, Hyperbola, Cycloid, Epicycloid, Hypocycloid, Involutes and Spirals by various methods.

Module 2:
Projection of Points & Straight lines:Projection of points, Projection of straight lines. True inclinations and true length of straight lines.

Module 3:
Projection of planes and solids:Projection of circle, triangle, polygons, polyhedrons, pyramids, cylinders and cones in different positions.

Module 1:
Section of solids and Isometric projections:Section of right solids by normal and inclined planes, Orthographic projection, first angle & third angle projection. Isometric scale, Isometric axes, Isometric projection from orthographic drawing.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance.

Text & References:

Text

- Engineering Graphics – Basant Agrawal and Dr. C. M. Agrawal, Tata McGraw-Hill Publishing Company Ltd.
- Engineering Drawing – by N. D. Bhatt

Reference

- Engineering Drawing and Graphics – by Veenugopal
- Engineering Drawing – by T. Jeyopoovan

Course Name	Course Code	LTP	Credit	Semester
ENVIRONMENTAL STUDIES	**EVS 001**	4:0:0	4	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	
CLO 2	
CLO 3	

B. SYLLABUS

Course Objective:

The term environment is used to describe, in the aggregate, all the external forces, influences and conditions, which affect the life, nature, behaviour and the growth, development and maturity of living organisms. At present a great number of environment issues, have grown in size and complexity day by day, threatening the survival of mankind on earth. A study of environmental studies is quite essential in all types of environmental sciences, environmental engineering and industrial management. The objective of environmental studies is to enlighten the masses about the importance of the protection and conservation of our environment and control of human activities which has an adverse effect on the environment.

Course Contents:

Module I: The multidisciplinary nature of environmental studies
Definition, scope and importance
Need for public awareness

Module II: Natural Resources
Renewable and non-renewable resources:
Natural resources and associated problems

Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.
Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, case studies.
Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

- Role of an individual in conservation of natural resources.
- Equitable use of resources for sustainable lifestyles.

Module III: Ecosystems
Concept of an ecosystem
Structure and function of an ecosystem
Producers, consumers and decomposers
Energy flow in the ecosystem
Ecological succession
Food chains, food webs and ecological pyramids
Introduction, types, characteristic features, structure and function of the following ecosystem:

a. Forest ecosystem
b. Grassland ecosystem
c. Desert ecosystem
d. Aquatic ecosystems (ponds, streams, lakes, rivers, ocean estuaries)

Module IV: Biodiversity and its conservation
Introduction – Definition: genetic, species and ecosystem diversity
Biogeographical classification of India
Value of biodiversity: consumptive use, productive use, social, ethical aesthetic and option values
Biodiversity at global, national and local levels
India as a mega-diversity nation
Hot-spots of biodiversity
Threats to biodiversity: habitat loss, poaching of wildlife, man wildlife conflicts
Endangered and endemic species of India
Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity

Module V: Environmental Pollution
Definition
Causes, effects and control measures of:

a. Air pollution
b. Water pollution
c. Soil pollution
d. Marine pollution
e. Noise pollution
f. Thermal pollution
g. Nuclear pollution

Solid waste management: Causes, effects and control measures of urban and industrial wastes.
Role of an individual in prevention of pollution.
Pollution case studies.
Disaster management: floods, earthquake, cyclone and landslides.

Module VI: Social Issues and the Environment
From unsustainable to sustainable development
Urban problems and related to energy
Water conservation, rain water harvesting, watershed management
Resettlement and rehabilitation of people; its problems and concerns. Case studies.
Environmental ethics: Issues and possible solutions
Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.
Wasteland reclamation
Consumerism and waste products
Environmental Protection Act
Air (Prevention and Control of Pollution) Act
Water (Prevention and control of Pollution) Act
Wildlife Protection Act

Forest Conservation Act
Issues involved in enforcement of environmental legislation
Public awareness

Module VII: Human Population and the Environment
Population growth, variation among nations
Population explosion – Family Welfare Programmes
Environment and human health
Human Rights
Value Education
HIV / AIDS
Women and Child Welfare
Role of Information Technology in Environment and Human Health
Case Studies

Module VIII: Field Work
Visit to a local area to document environmental assets-river / forest/ grassland/ hill/ mountain.
Visit to a local polluted site – Urban / Rural / Industrial / Agricultural
Study of common plants, insects, birds
Study of simple ecosystems-pond, river, hill slopes, etc (Field work equal to 5 lecture hours)

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text

- Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
- BharuchaErach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad 380 013, India
- Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p
- Clark R.S., Marine Pollution, Clanderson Press Oxford (TB)
- Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Publ. House, Mumabai, 1196p
- De A.K., Environmental Chemistry, Wiley Eastern Ltd.
- Down to Earth, Centre for Science and Environment (R)
- Gleick, H.P. 1993. Water in Crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute Oxford Univ. Press. 473p
- Hawkins R.E., Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay (R)
- Heywood, V.H &Waston, R.T. 1995. Global Biodiversity Assessment. Cambridge Univ. Press 1140p.
- Jadhav, H & Bhosale, V.M. 1995. Environmental Protection and Laws. Himalaya Pub. House, Delhi 284 p.
- Mckinney, M.L. & School, R.M. 1996. Environmental Science Systems & Solutions, Web enhanced edition. 639p.

Reference

- Mhaskar A.K., Matter Hazardous, Techno-Science Publication (TB)
- Miller T.G. Jr. Environmental Science, Wadsworth Publishing Co. (TB)
- Odum, E.P. 1971. Fundamentals of Ecology. W.B. Saunders Co. USA, 574p
- Rao M N. & Datta, A.K. 1987. Waste Water treatment. Oxford & IBH Publ. Co. Pvt. Ltd. 345p.
- Sharma B.K., 2001. Environmental Chemistry. Geol Publ. House, Meerut
- Survey of the Environment, The Hindu (M)
- Townsend C., Harper J, and Michael Begon, Essentials of Ecology, Blackwell Science
- Trivedi R.K., Handbook of Environmental Laws, Rules Guidelines, Compliances and Standards, Vol I and II, Enviro Media (R)
- Trivedi R. K. and P.K. Goel, Introduction to air pollution, Techno-Science Publication (TB)
- Wanger K.D., 1998 Environnemental Management. W.B. Saunders Co. Philadelphia, USA 499p

Course Name	Course Code	LTP	Credit	Semester
APPLIED PHYSICS – II- MODERN PHYSICS LAB	**AP 222**	0:0:2	1	2

List of Experiments:

1. To determine the wavelength of prominent lines of mercury spectrum using plane transmission grating.
2. To determine the thickness of a given wire by Wedge method.
3. To determine the wavelength of He-Ne laser light using single slit.
4. To determine the frequency of an electrically maintained tunning fork by Melde's method.
5. To study the variation of magnetic field along the axis of Helmholtz coil and to find out reduction factor.
6. To draw the V – I characteristics of a forward and reverse bias PN junction diode.
7. To determine the frequency of AC mains using sonometer.

8. To determine the energy band-gap of Germanium crystal using four probes method.
9. To draw V – I characteristics of a photocell and to verify the inverse square law of radiation.
10. To determine the acceleration due to gravity ('g') using Keter's reversible pendulum.
11. To study the characteristics of photo voltaic cell (solar cell).

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

Course Name	Course Code	LTP	Credit	Semester
OBJECT ORIENTED PROGRAMMING USING C++ LAB	**BCS 223**	0:0:2	1	2

Software Required: Turbo C++

List of Experiments:

1. Creation of objects in programs and solving problems through them.
2. Different use of private, public member variables and functions and friend functions.
3. Use of constructors and destructors.
4. Operator overloading
5. Use of inheritance in and accessing objects of different derived classes.
6. Polymorphism and virtual functions (using pointers).
7. File handling.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

ENGINEERING MECHANICS LAB

Course Name	Course Code	LTP	Credit	Semester
ENGINEERING MECHANICS LAB	**BME 224**	0:0:2	1	2

List of Experiments:

1. To verify the law of Force Polygon
2. To verify the law of Moments using Parallel Force apparatus. (Simply supported type)
3. To determine the co-efficient of friction between wood and various surface (like
4. Leather, Wood, Aluminum) on an inclined plane.
5. To find the forces in the members of Jib Crane.
6. To determine the mechanical advantage, Velocity ratio and efficiency of a screw jack.
7. To determine the mechanical advantage, Velocity ratio and Mechanical efficiency of the Wheel and Axle
8. To determine the MA, VR, η of Worm Wheel (2-start)
9. Verification of force transmitted by members of given truss.
10. To verify the law of moments using Bell crank lever
11. To find CG and moment of Inertia of an irregular body using Computation method

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

Course Name	Course Code	LTP	Credit	Semester
ENGINEERING GRAPHICS LAB	**BME 225**	0:0:2	1	2

List of Experiments:

12. Sketching and drawing of scale & Curve.
13. Sketching and drawing of Cycloidal Curve.
14. Sketching and drawing of Involute & Spirals.
15. Sketching and drawing of points & line.
16. Sketching and drawing of projection of planes.
17. Sketching and drawing of projection of solids.
18. Sketching and drawing of intersection of surfaces.
19. Sketching and drawing of development of surfaces.
20. Sketching and drawing of orthographic and isometric projection.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

Course Name	Course Code	LTP	Credit	Semester
ENGLISH	**BCS 201**	1:0:0	1	2

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Participate in conversation and in small- and whole-group discussion
CLO 2	Explore and use English as medium of communication in real life situation
CLO 3	Discuss topics and themes of a reading, using the vocabulary and grammar of the lesson
CLO 4	Identify features of a reading textbook and utilize them as needed
CLO 5	Prepare and deliver organized presentations in small groups and to whole class
CLO 6	Apply sentence mechanics and master spelling of high frequency words

Course Objective:

The course is intended to give a foundation of English Language. The literary texts are indented to help students to inculcate creative & aesthetic sensitivity and critical faculty through comprehension, appreciation and analysis of the prescribed literary texts. It will also help them to respond form different perspectives.

Course Contents:

Module I: Vocabulary
Use of Dictionary
Use of Words: Diminutives, Homonyms & Homophones

Module II: Essentials of Grammar - I
Articles
Parts of Speech
Tenses

Module III: Essentials of Grammar - II
Sentence Structure
Subject -Verb agreement
Punctuation

Module IV: Communication
The process and importance
Principles & benefits of Effective Communication

Module V: Spoken English Communication
Speech Drills
Pronunciation and accent
Stress and Intonation

Module VI: Communication Skills - I
Developing listening skills
Developing speaking skills

Module VII: Communication Skills - II
Developing Reading Skills
Developing writing Skills

Module VIII: Written English communication
Progression of Thought/ideas
Structure of Paragraph
Structure of Essays

Module IX: Short Stories
Of Studies, by Francis Bacon
Dream Children, by Charles Lamb
The Necklace, by Guy de Maupassant
A Shadow, by R.K.Narayan
Glory at Twilight, Bhabani Bhattacharya

Module X: Poems

All the Worlds a Stage	Shakespeare
To Autumn	Keats
O! Captain, My Captain.	Walt Whitman
Where the Mind is Without Fear	Rabindranath Tagore
Psalm of Life	H.W. Longfellow

Examination Scheme:

Components	**A**	**CT**	**HA**	**EE**
Weightage (%)	05	15	10	70

Text & References:

Text
- Madhulika Jha, Echoes, Orient Long Man
- Ramon & Prakash, Business Communication, Oxford.

Reference
- Sydney Greenbaum Oxford English Grammar, Oxford.
- Successful Communications, MalraTreece (Allyn and Bacon)
- Effective Technical Communication, M. Ashraf Rizvi.

Course Name	Course Code	LTP	Credit	Semester
Behavioural Science - II (Problem Solving And Creative Thinking)	**BSS 204**	1:0:0	1	2

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Recognize the relation critical thinking with various mental processes.
CLO 2	Identify hindrance to problem solving processes.
CLO 3	Analyze the steps in problem-solving process.
CLO 4	Create plan of action applying creative thinking.

Course Objective:

To enable the students:

- Understand the process of problem solving and creative thinking.
- Facilitation and enhancement of skills required for decision-making.

Course Contents:

Module I: Thinking as a tool for Problem Solving
What is thinking: The Mind/Brain/Behaviour
Critical Thinking and Learning:
Making Predictions and Reasoning
Memory and Critical Thinking
Emotions and Critical Thinking
Thinking skills

Module II: Hindrances to Problem Solving Process
Perception
Expression
Emotion
Intellect
Work environment

Module III: Problem Solving
Recognizing and Defining a problem
Analyzing the problem (potential causes)
Developing possible alternatives
Evaluating Solutions
Resolution of problem
Implementation
Barriers to problem solving:
Perception
Expression
Emotion
Intellect
Work environment

Module IV: Plan of Action
Construction of POA
Monitoring
Reviewing and analyzing the outcome

Module V: Creative Thinking
Definition and meaning of creativity
The nature of creative thinking

Convergent and Divergent thinking
Idea generation and evaluation (Brain Storming)
Image generation and evaluation
Debating
The six-phase model of Creative Thinking: ICEDIP model

Module VI:End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

Text

- Michael Steven: How to be a better problem solver, Kogan Page, New Delhi, 1999
- Geoff Petty: How to be better at creativity; Kogan Page, New Delhi, 1999
- Richard Y. Chang and P. Keith, Kelly: Wheeler Publishing, New Delhi, 1998.
- Phil Lowe Koge Page: Creativity and Problem Solving, New Delhi, 1996

Reference

- J William Pfeiffer (ed.) Theories and Models in Applied Behavioural Science, Vol 3, Management (1996); Pfeiffer & Company
- Bensley, Alan D.: Critical Thinking in Psychology – A Unified Skills Approach, (1998), Brooks/Cole Publishing Company.

Course Name	Course Code	LTP	Credit	Semester
FRENCH	**FLT 201**	2:0:0	2	2

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone Basic language skills such as reading, writing, speaking, listening & interactive in the language Students will be able to read and interpret small texts .
CLO 2	Students will be able to read and interpret small texts of advance level.
CLO 3	Students will be able to communicate in small sentences in writing, self introduction, family description etc.
CLO 4	Students will be able to communicate in small sentences in oral, self introduction, family description etc

Course Objective:

To enable the students to overcome the fear of speaking a foreign language and take position as a foreigner speaking French.
To make them learn the basic rules of French Grammar.

Course Contents:

Module A: pp.38 – 47: Unité 3 : Objectif 3, 4, 5. 6

Module B: pp. 47 to 75 Unité 4, 5

Contenu lexical: **Unité 3: Organiser son temps**

1. donner/demander des informations sur un emploi du temps, un horaire SNCF – Imaginer un dialogue
2. rédiger un message/ une lettre pour …
   i) prendre un rendez-vous/ accepter et confirmer/ annuler
   ii) inviter/accepter/refuser
3. Faire un programme d'activités
   imaginer une conversation téléphonique/un dialogue
   Propositions- interroger, répondre

Unité 4:Découvrir son environnement

1. situer un lieu
2. s'orienter, s'informer sur un itinéraire.
3. Chercher, décrire un logement
4. connaître les rythmes de la vie

Unité 5 : s'informer

1. demander/donner des informations sur un emploi du temps passé.
2. donner une explication, exprimer le doute ou la certitude.
3. découvrir les relations entre les mots
4. savoir s'informer

Contenu grammatical:

1. Adjectifsdémonstratifs
2. Adjectifs possessifs/exprimer la possession à l'aide de : i. « de » ii. A+nom/pronom disjoint
3. Conjugaison pronominale – négative, interrogative - construction à l'infinitif
4. Impératif/exprimer l'obligation/l'interdiction à l'aide de « il faut…. »/ «il ne faut pas… »
5. passé composé
6. Questions directes/indirectes

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- **le livre à suivre : Campus: Tome 1**

Course Name	Course Code	LTP	Credit	Semester
GERMAN	**FLG 201**	2:0:0	2	2

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone Basic language skills such as reading, writing, speaking, listening & interactive in the language
CLO 2	Students will be able to read and interpret small texts
CLO 3	Students will be able to communicate in small sentences in writing, self introduction, family description etc.
CLO 4	Students will be able to communicate in small sentences in oral, self introduction, family description etc.

Course Objective:

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.
To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany. Introduction to Grammar to consolidate the language base learnt in Semester I

Course Contents:

Module I: Everything about Time and Time periods
Time and times of the day.
Weekdays, months, seasons.
Adverbs of time and time related prepositions

Module II: Irregular verbs
Introduction to irregular verbs like to be, and others, to learn the conjugations of the same, (fahren, essen, lessen, schlafen, sprechen und ähnliche).

Module III: Separable verbs
To comprehend the change in meaning that the verbs undergo when used as such
Treatment of such verbs with separable prefixes

Module IV: Reading and comprehension
Reading and deciphering railway schedules/school time table
Usage of separable verbs in the above context

Module V: Accusative case
Accusative case with the relevant articles
Introduction to 2 different kinds of sentences – Nominative and Accusative

Module VI: Accusative personal pronouns
Nominative and accusative in comparison
Emphasizing on the universal applicability of the pronouns to both persons and objects

Module VII: Accusative prepositions
Accusative propositions with their use
Both theoretical and figurative use

Module VIII: Dialogues
Dialogue reading: 'In the market place'
'At the Hotel'

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

Course Name	Course Code	LTP	Credit	Semester
SPANISH	**FLS 201**	2:0:0	2	2

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of advance level.
CLO 3	Students will be able to communicate with complex sentences
CLO 4	Students will be able to communicate in small sentences in oral, self introduction, family description etc.
CLO 5	To enhance all five skills of the language: Reading, Writing, Listening, Interacting and speaking.

Course Objective:

To enable students acquire more vocabulary, grammar, Verbal Phrases to understand simple texts and start describing any person or object in Simple Present Tense.

Course Contents:

Module I
Revision of earlier modules.

Module II
Some more AR/ER/IR verbs. Introduction to root changing and irregular AR/ER/IR ending verbs

Module III
More verbal phrases (eg, Dios Mio, Que lastima etc), adverbs *(bueno/malo, muy, mucho, bastante, poco).*
Simple texts based on grammar and vocabulary done in earlier modules.

Module IV
Possessive pronouns

Module V
Writing/speaking essays like my friend, my house, my school/institution, myself….descriptions of people, objects etc, computer/internet related vocabulary

Examination Scheme:

Components	**CT1**	**CT2**	**C**	**I**	**V**	**A**
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español, EnDirecto I A
- Español Sin Fronteras

Course Name	Course Code	LTP	Credit	Semester
CHINESE	**FLC 201**	2:0:0	2	2

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone Basic language skills such as reading, writing, speaking, listening & interactive in the language
CLO 2	Students will be able to read and interpret small texts
CLO 3	Students will be able to communicate in small sentences in writing, self introduction, family description etc.
CLO 4	Students will be able to communicate in small sentences in oral, self introduction, family description etc.

Course Objective:

Chinese is a tonal language where each syllable in isolation has its definite tone (flat, falling, rising and rising/falling), and same syllables with different tones mean different things. When you say, "ma" with a third tone, it mean horse and "ma" with the first tone is Mother. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I
Drills
Practice reading aloud
Observe Picture and answer the question.
Tone practice.
Practice using the language both by speaking and by taking notes.
Introduction of basic sentence patterns.
Measure words.
Glad to meet you.

Module II
Where do you live?
Learning different colors.
Tones of "bu"
Buying things and how muchit costs?
Dialogue on change of Money.
More sentence patterns on Days and Weekdays.
How to tell time. Saying the units of time in Chinese. Learning to say useful phrases like – 8:00, 11:25, 10:30 P.M. everyday, afternoon, evening, night, morning 3:58, one hour, to begin, to end ….. etc.
Morning, Afternoon, Evening, Night.

Module III
Use of words of location like-li, wais hang, xia
Furniture – table, chair, bed, bookshelf,.. etc.
Description of room, house or hostel room.. eg what is placed where and how many things are there in it?
Review Lessons – Preview Lessons.
Expression 'yao", "xiang" and "yaoshi" (if).
Days of week, months in a year etc.
I am learning Chinese. Is Chinese difficult?

Module IV
Counting from 1-1000
Use of "chang-chang".
Making an Inquiry – What time is it now? Where is the Post Office?
Days of the week. Months in a year.
Use of Preposition – "zai", "gen".
Use of interrogative pronoun – "duoshao" and "ji".

"Whose"??? Sweater etc is it?
Different Games and going out for exercise in the morning.

Module V
The verb "qu"
- Going to the library issuing a book from the library
- Going to the cinema hall, buying tickets
- Going to the post office, buying stamps
- Going to the market to buy things.. etc
- Going to the buy clothes …. Etc.

Hobby. I also like swimming.
Comprehension and answer questions based on it.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- "Elementary Chinese Reader Part I" Lesson 11-20

ANANDAM

Course Name	Course Code	LTP	Credit	Semester
ANANDAM	AND002	2:0:0	2	2

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Awareness and empathy regarding community issues
CLO 2	Interaction with the community and impact on society
CLO 3	Interaction with mentor and development of Student teacher relationship
CLO 4	Interaction among students, enlarge social network
CLO 5	Cooperative and Communication skills and leadership qualities
CLO 6	Critical thinking, Confidence and Efficiency

Course Objectives:
After the completion of this course, students will be able to:
- apply their knowledge and skills to solve specific community problem
- learn to plan, lead, and organize community events have a sense of belonging to their college campus and community and find something they are interested in doing during their free time
- make new friends, expand social network, and boost social skills and mental health.

- be useful to society as it will protect them against stress, frustration, and depression

Course Contents:

The project report should be guided by the mentor and shall contain:

- **Synopsis**: clearly stating objectives and activities to be undertaken. Problem identifying and problem-solving projects to be taken up.
- Details of the **Mentor and the Participants are to** be given (name of mentor, name of participants, phone number/mobile no, email, and address)
- Location / community where the work was carried out
- Details of Activities performed are to be given with date
- Number of beneficiaries and impact on the society (the object should be to empower the community and make them self-reliant)
- Photographs taken for documentation of work should be submitted
- Media coverage of the projects should be attached if any
- The Group Community Service Project Report will be submitted by the Student group leader under the guidance of the mentor to the Director/HoIs of the Department.
- The Director/HoIs should get the best report (more than one if required) of the Group Community Service Project uploaded on the HTE website and on the University page
- The Director/HoIs will forward the best report of the department to the Nodal Officer of the University.
- University will forward the report to the state level committee.

GUIDELINES FOR GCSP (Group Community Service Project)
ASSIGNMENT OF ANANDAM FOR SOCIAL AWARENESS (for students)

1. Each member of the group shall write one blog about the decided topic of 500 words (minimum) along with any relevant photos/diagrams/statistical data (with reference).
2. The group member shall write his/her name at the end of the blog.
3. The blog shall be posted on Instagram and Facebook (apart from these any other website wherever the group seems necessary).
4. Print out of the blog where date of when the content is posted, number of followers, comments, name of the writer shall be visible will be taken and file will be maintained for the same.
5. In the cover page of the project mention heading **"Group Community Service Project"**, and the filled format of final project report given by Anandam Scheme.
6. For the topic chosen by the group, students are recommended to cover the following points:
    a) Current scenario (Regional, national and international level as applicable)
    b) Future predictions
    c) Duty of the government
    d) Government policies (related to the topic), if any
    e) Duty of public
    f) Conclusion

Evaluation Scheme:

Project Participation: 2 hours X 8 days (per month) X 4 months = 64 hours

- **C grade =32 hrs (Below 20 marks)**
- **B grade >32 hrs to <=44hrs (20-30 marks)**
- **A grade >44 hrs to<=54hrs (30-40 marks)**
- **O grade >54 hrs to<=64hrs (40-50 marks)**

Evaluation Criteria:

Respective Departmental Anandam mentors are requested to evaluate the project (out of 50) as per the following criteria:

1. Position and exceptions, if any, are clearly stated. The organization of the blog is completely and clearly outlined and implemented.
2. The body of the blog is coherently organized, original and the logic is easy to follow. There is no spelling or grammatical errors and terminology is clearly defined. Writing is clear, concise, and persuasive.
3. Conclusion is clearly stated. The underlying logic is explicit.

Course Name	Course Code	LTP	Credit	Semester
ENVIRONMENTAL STUDIES	**EVS 001**	3:1:0	4	2

Course Objective:

The term environment is used to describe, in the aggregate, all the external forces, influences and conditions, which affect the life, nature, behaviour and the growth, development and maturity of living organisms. At present a great number of environment issues, have grown in size and complexity day by day, threatening the survival of mankind on earth. A study of environmental studies is quite essential in all types of environmental sciences, environmental engineering and industrial management. The objective of environmental studies is to enlighten the masses about the importance of the protection and conservation of our environment and control of human activities which has an adverse effect on the environment.

Course Contents:

Module I: The multidisciplinary nature of environmental studies

Definition, scope and importance

Need for public awareness

Module II: Natural Resources

Renewable and non-renewable resources:

Natural resources and associated problems

Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.

Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.

Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.

Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, case studies.

Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

- Role of an individual in conservation of natural resources.
- Equitable use of resources for sustainable lifestyles.

Module III: Ecosystems

Concept of an ecosystem

Structure and function of an ecosystem

Producers, consumers and decomposers

Energy flow in the ecosystem

Ecological succession

Food chains, food webs and ecological pyramids

Introduction, types, characteristic features, structure and function of the following ecosystem:

e. Forest ecosystem
f. Grassland ecosystem
g. Desert ecosystem
h. Aquatic ecosystems (ponds, streams, lakes, rivers, ocean estuaries)

Module IV: Biodiversity and its conservation

Introduction – Definition: genetic, species and ecosystem diversity

Biogeographical classification of India

Value of biodiversity: consumptive use, productive use, social, ethical aesthetic and option values

Biodiversity at global, national and local levels

India as a mega-diversity nation

Hot-spots of biodiversity

Threats to biodiversity: habitat loss, poaching of wildlife, man wildlife conflicts

Endangered and endemic species of India

Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity

Module V: Environmental Pollution

Definition

Causes, effects and control measures of:

h. Air pollution
i. Water pollution
j. Soil pollution
k. Marine pollution
l. Noise pollution
m. Thermal pollution
n. Nuclear pollution

Solid waste management: Causes, effects and control measures of urban and industrial wastes.

Role of an individual in prevention of pollution.

Pollution case studies.

Disaster management: floods, earthquake, cyclone and landslides.

Module VI: Social Issues and the Environment

From unsustainable to sustainable development

Urban problems and related to energy

Water conservation, rain water harvesting, watershed management

Resettlement and rehabilitation of people; its problems and concerns. Case studies.

Environmental ethics: Issues and possible solutions

Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.

Wasteland reclamation

Consumerism and waste products

Environmental Protection Act
Air (Prevention and Control of Pollution) Act
Water (Prevention and control of Pollution) Act
Wildlife Protection Act
Forest Conservation Act
Issues involved in enforcement of environmental legislation
Public awareness

Module VII: Human Population and the Environment
Population growth, variation among nations
Population explosion – Family Welfare Programmes
Environment and human health
Human Rights
Value Education
HIV / AIDS
Women and Child Welfare
Role of Information Technology in Environment and Human Health
Case Studies

Module VIII: Field Work
Visit to a local area to document environmental assets-river / forest/ grassland/ hill/ mountain.
Visit to a local polluted site – Urban / Rural / Industrial / Agricultural
Study of common plants, insects, birds
Study of simple ecosystems-pond, river, hill slopes, etc (Field work equal to 5 lecture hours)

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text

- Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
- BharuchaErach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad 380 013, India
- Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p
- Clark R.S., Marine Pollution, Clanderson Press Oxford (TB)
- Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Publ. House, Mumabai, 1196p
- De A.K., Environmental Chemistry, Wiley Eastern Ltd.
- Down to Earth, Centre for Science and Environment (R)
- Gleick, H.P. 1993. Water in Crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute Oxford Univ. Press. 473p
- Hawkins R.E., Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay (R)
- Heywood, V.H &Waston, R.T. 1995. Global Biodiversity Assessment. Cambridge Univ. Press 1140p.
- Jadhav, H & Bhosale, V.M. 1995. Environmental Protection and Laws. Himalaya Pub. House, Delhi 284 p.
- Mckinney, M.L. & School, R.M. 1996. Environmental Science Systems & Solutions, Web enhanced edition. 639p.

Reference

- Mhaskar A.K., Matter Hazardous, Techno-Science Publication (TB)
- Miller T.G. Jr. Environmental Science, Wadsworth Publishing Co. (TB)
- Odum, E.P. 1971. Fundamentals of Ecology. W.B. Saunders Co. USA, 574p
- Rao M N. & Datta, A.K. 1987. Waste Water treatment. Oxford & IBH Publ. Co. Pvt. Ltd. 345p.
- Sharma B.K., 2001. Environmental Chemistry. Geol Publ. House, Meerut
- Survey of the Environment, The Hindu (M)
- Townsend C., Harper J, and Michael Begon, Essentials of Ecology, Blackwell Science
- Trivedi R.K., Handbook of Environmental Laws, Rules Guidelines, Compliances and Standards, Vol I and II, Enviro Media (R)
- Trivedi R. K. and P.K. Goel, Introduction to air pollution, Techno-Science Publication (TB)
- Wanger K.D., 1998 Environnemental Management. W.B. Saunders Co. Philadelphia, USA 499p

Course Name	Course Code	LTP	Credit	Semester
APPLIED MATHEMATICS – III	**AM 301**	2:1:0	3	3

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Investigate the basic concept about partial differential equations.
CLO 2	Create an interest in finding the solution by Fourier Series and Fourier Transforms.
CLO 3	Apply basic concepts of Laplace Transformation
CLO 4	Develop the physical problems using optimization techniques.

Course Objective:

The knowledge of Mathematics is necessary for a better understanding of almost all the Engineering and Science subjects. Here our intention is to make the students acquainted with the concept of basic topics from Mathematics, which they need to pursue their Engineering degree in different disciplines.

Course Contents:

Module I: Partial Differential Equations

Formation of PDEs, Solutions of a PDE, Equations solvable by direct integration, Linear equations of the first order, Non-linear equations of the first order, Charpit's method, Homogeneous linear equations with constant coefficients, Non homogeneous linear equations.

Module II: Fourier series and Harmonic Analysis

Euler's formulae, Conditions for a Fourier expansion, Functions having points of discontinuity, Change of interval, Odd and even functions – expansions of odd or even periodic functions, Half-range series, Parseval's formula, Complex form of Fourier series, Practical Harmonic analysis.

Module III: Laplace Transformation

Definition, Transforms of elementary functions, Properties of Laplace transforms, Existence conditions, Transforms of derivatives, Transforms of integrals, Evaluation of integrals by Laplace transform, Inverse transforms, Other methods of finding inverse transforms, Convolution theorem, Application to differential equations, Simultaneous linear equations with constant coefficients, Unit step functions, Periodic functions.

Module IV: Linear Programming

Formulation of the problem, Graphical method, Canonical and standard forms of L.P.P. Simplex method, Artificial variable techniques- M-method, Two phase method, Degeneracy, Dual simplex method.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text:

- Higher Engineering Mathematics by H.K. Dass

References:

- Partial Differential Equations by I. N. Snedon
- Laplace Transformation Schaum outline series
- Advance Engineering Mathematics –Kreszig
- Linear Programming – Hadley

ANALOG ELECTRONICS – I

Course Name	Course Code	LTP	Credit	Semester
ANALOG ELECTRONICS – I	BEC 302	2:1:0	3	3

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Understand the current voltage characteristics of semiconductor devices.
CLO 2	Acquire industrial skills of microbial culture, growth, and practices
CLO 3	Design and analyze of electronic circuits.
CLO 4	Evaluate frequency response to understand behaviour of Electronics circuits.
CLO 5	Students will develop some minor projects based on the concepts of Analog Electronics.

Course Objective:

This course builds from basic knowledge of Semiconductor Physics to an understanding of basic devices and their models. This course builds a foundation for courses on VLSI design and analog CMOS IC Design.

Course Contents:

Module I: Semiconductor Diode and Diode Circuits

Drift, Diffusion, Poisson's equation, Solution for E and V and their plots for pn junction, Different types of diodes: Zener, Schottky, LED. Zener as voltage regulator, Diffusion capacitance, Drift capacitance, the load line concept, half wave, full wave rectifiers, clipping and clamping circuits.

Module II: Bipolar Junction Transistor

Bipolar junction transistor: Introduction, Transistor, construction, transistor operations, BJT characteristics, load line, operating point, leakage currents, saturation and cut off mode of operations.
Bias stabilization: Need for stabilization, fixed Bias, emitter bias, self bias, bias stability with respect to variations in $I_{co,}$ V_{BE} &β, Stabilization factors, thermal stability.

Module III: Small signal Analysis of transistor and Multistage Amplifier

Hybrid model for transistors at low frequencies, Analysis of transistor amplifier using h parameters, emitter follower, Miller's theorem, THE CE amplifier with an emitter resistance, Hybrid π model, Hybrid π Conducatnces and Capacitances, CE short circuit current gain, CE short circuit current gain with R_L
Multistage amplifier: Cascading of Amplifiers, Coupling schemes(RC coupling and Transformer coupling)

Module IV: Field Effect Transistors

Field effect transistor (JFET, MOSFET): volt-ampere characteristics, small signal model –common drain, common source, common gate, operating point, MOSFET, enhancement and -depletion mode, Common source amplifier, Source follower

Module V: Feedback Amplifiers

Feedback concept, Classification of Feedback amplifiers, Properties of negative Feedback amplifiers, Impedance considerations in different Configurations, Examples of analysis of feedback Amplifiers.

Module VI: Power amplifiers

Power dissipation in transistors, difference with voltage amplifiers, Amplifier classification (Class A, Class B, Class C, Class AB) class AB push pull amplifier, collector efficiency of each, cross over distortion.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text

- Boylestad: Electronic Devices and Circuits

References

- Robert F. Pierret: Semiconductor Device Fundamentals
- Millman and Halkias: Electronic Devices and circuits

Course Name	Course Code	LTP	Credit	Semester
CIRCUITS & SYSTEMS	**BEC 303**	2:1:0	3	3

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Do the time-domain and S- domain analysis of circuits
CLO 2	Obtain transfer functions of circuits and analysis of stability using poles of the transfer function
CLO 3	Analyze the frequency response of circuits and to obtain the correlation between time domain and frequency domain response specifications
CLO 4	Obtain steady state solutions for nonsinusoidal inputs using fourier series and to analyze the effect of harmonics in circuits
CLO 5	Understand the features of two port networks and to obtain their equivalent circuits

Course Objective:

The course intends to make the students proficient in analyzing circuits. At the completion of the course, the student should be able to construct and interpret block diagrams and signal flow graphs of control systems and to use basic methods of determining their stability.

Course Contents:

Module I: Graph Theory and Network equations

Graph of a network, Trees, Co-trees and loops, Cut set matrix, Tie set matrix, number of possible trees of a graph, duality, Loop Analysis and Node Analysis.

Module II: Analysis of circuits using classical Method

Time and Frequency domain analysis of RL, RC and RLC circuits, Linear constant coefficient differential equation.

Module III: Signals and Laplace Transforms

Unit step signal, Ramp signal, impulse signal, Laplace transformations and its properties, Gate function, Inverse Laplace transformations, Application of Laplace Transforms in circuit analysis.

Module IV: Network Theorems

Reciprocity theorem, Superposition theorem, Thevenin's and Norton's theorems, Millman's theorem, Maximum power transfer theorem, Compensation theorem, Tellegan's theorem.

Module V: Two port Network & Network Functions

Introduction, two port z-, y-, T-, h-parameters, Inter-relations among parameters, Condition for reciprocity and symmetry, Interconnections of two port networks, Driving point and transfer functions, Poles, Zeros and necessary condition for driving point and transfer function,.

Module VI: Network Synthesis

Hurwitz polynomial, Positive real functions, synthesis of LC, RC, RL immittance functions.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text:

- M.E. Valkenburg, "Network analysis", PHI.
- D. R. Choudhary, "Networks and Systems", New Age International.
- K.M. Soni, 2009, "Circuits and Systems", VIII Edition, S.K. Kataria& Sons Delhi.

References:

- Bhise, Chadda, Kulshreshtha, "Engineering network analysis and filter design", Umesh Publication.
- F.F. Kuo, "Network Analysis and Synthesis", Wiley India Pvt. Ltd.

Course Name	Course Code	LTP	Credit	Semester
Electric Machine – I	BEE 304	2:1:0	3	3

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Demonstrate mastery over knowledge in various functional areas of engineering.
CLO 2	Analyze and apply various engineering concepts and theories to facilitate a problem solving approach.
CLO 3	Demonstrate research and technical skills to analyze numerical challenges

Course Objective:

The purpose of this course is to introduce the student to the various types of basic machines used in the industry and its application.

Course Contents:

Module I: D. C. Machines

EMF and Torque equations, Armature windings, Armature Reaction, Demagnetizing and Cross-magnetizing armature MMF, Inter pole and compensating windings, commutation. Characteristics of D.C.generators. D.C. motors and their characteristics

Module II : DC MACHINE STARTERS AND SPEED CONTROL

Starting of D.C.motors. Starter step calculation for a D.C. shunt and series motor. Speed control of D.C. motors. Ward Leonard control. Braking of d.c.motors. Efficiency and testing of d.c. machines, Hopkinson test.

Module III:1- Ø Transformers

Transformer construction and practical considerations. Equivalent circuit, Exact and approximate, per unit values, Phasor diagram, Transformer testing: open circuit test, Short Circuit test, Sumpner's test, Efficiency and voltage regulation, All day efficiency, Auto-transformer.

Module IV:3 – Ø Transformer

Three-phase Bank of Single-phase Transformers, Parallel operations of 1 and 3 phase transformers, 3 to 2 and 6 phase conversion. Load division between transformers in parallel. Three winding transformers, Tertiary winding, Tap Changing, Transformers for special purpose, Welding, Traction, Instruments and pulse Transformers.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text*:*

- Electrical Machines: I. J. Nagrath and D. P. Kothari (Tata McGraw Hill)
- Electrical Machniery: Fitzerald, Kingsley (McGraw Hill)
- Electrical Machnies: P. C. Sen

Course Name	Course Code	LTP	Credit	Semester
JAVA PROGRAMMING	BEC 305	2:1:0	3	3

Course Objective:

The objective is to impart programming skills used in this object oriented language java.
The course explores all the basic concepts of core java programming. The students are expected to learn it enough so that they can develop the web solutions like creating applets etc.

Course Contents:

Module I

Concepts of OOP, Features of Java, How Java is different from C++, Data types, Control Statements, identifiers, arrays, operators. Inheritance: Multilevel hierarchy, method overriding, Abstract classes, Final classes, String Class.

Module II

Defining, Implementing, Applying Packages and Interfaces, Importing Packages. Fundamentals, Types, Uncaught Exceptions, Multiple catch Clauses, Java's Built-in Exception.

Module III

Creating, Implementing and Extending thread, thread priorities, synchronization suspending, resuming and stopping Threads, Constructors, Various Types of String Operations. Exploring Various Basic Packages of Java: Java.lang, Java. util, Java.i.o

Module IV

Event handling Mechanism, Event Model, Event Classes, Sources of Events, Event Listener Interfaces
AWT: Working with Windows, AWT Controls, Layout Managers

Module V

AppletClass, Architecture, Skeleton, Display Methods.
Swings: Japplet, Icons, labels, Text Fields, Buttons, Combo Boxes.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text:

- JAVA The Complete Reference by Patrick Naughton & Herbert Schild, TMH
- Introduction to JAVA Programming a Primar, Balaguruswamy.

References:

- "Introduction to JAVA Programming" Daniel/Young PHI
- Jeff Frentzen and Sobotka, "Java Script", Tata McGraw Hill,1999

ANALOG ELECTRONICS LAB – I

Course Name	Course Code	LTP	Credit	Semester
Analog Electronics Lab – I	BEC 322	0:0:2	1	3

Course Contents:

1. To study and plot the characteristics of a junction diode.
2. To study Zener diode I-V characteristics.
3. To study diode based clipping and clamping circuits.
4. To study half wave, full wave and bridge rectifier with filters.
5. To study the input and output characteristics of a transistor in its various configurations (CE and CB).
6. To study and plot the characteristics of a JFET in its various configurations.
7. To study and plot the characteristics of a MOSFET in its various configurations.
8. To study various types of Bias Stabilization for a transistor.
9. To study the gain and plot the frequency response of a single stage transistor amplifier.
10. To measure gain and plot the frequency response of double stage RC coupled amplifier.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

Course Name	Course Code	LTP	Credit	Semester
CIRCUITS AND SYSTEMS LAB	**BEC 323**	0:0:1	1	3

List of Experiments:

1. To determine the Fourier components of a square wave.
2. To determine the Fourier components of a clipped sine wave.
3. To verify Tellegen's Theorem in a given network.
4. To determine the Y- and Z parameters of a network.
5. To design series-series connections and determine its Z parameters.
6. To design parallel-parallel connections and determine its Y parameters.
7. To design series-parallel connections and determine its h parameters.
8. To design a cascade connection and determine its ABCD (transmission) parameters.
9. To determine the h parameters of a transistor in its various configurations.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

Course Name	Course Code	LTP	Credit	Semester
ELECTRIC MACHINE LAB – I	BEE 324	0:0:1	1	3

List of Experiments:

1. Load test on a single phase transformer.
2. To perform Open circuit and short circuit tests on a single phase transformer and hence find equivalent circuit, voltage regulation and efficiency.
3. To find the efficiency and voltage regulation of single phase transformer under different loading conditions.
4. To perform parallel operation of two single phase transformers.
5. To study the various connections of three phase transformer.
6. To study the constructional details of D.C. machine and to draw sketches of different components.
7. To measure armature and field resistance of D.C. shunt generator and to obtain its open circuit characteristics.
8. To obtain load characteristics of D.C. shunt/series /compound generator.
9. To draw speed-torque characteristics of D.C. shunt/series /compound generator.
10. To study D.C. motor starters.

Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

Course Name	Course Code	LTP	Credit	Semester
JAVA PROGRAMMING LAB	BEC 325	0:0:1	1	3

Course Contents:
Software Required: JDK1.3

Assignments will be provided for the following:

- Java programs using classes & objects and various control constructs such as loops etc, and data structures such as arrays, structures and functions
- Java programs for creating Applets for display of images and texts.
- Programs related to Interfaces & Packages.
- Input/Output and random files programs in Java.
- Java programs using Event driven concept.
- Programs related to network programming.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

Course Name	Course Code	LTP	Credit	Semester
Signals And Systems	BEC 304	2:1:0	3	3

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	To define the energy and power of a signal.
CLO 2	To classify different type of signals.
CLO 3	To define linear and time invariant systems.
CLO 4	To Introduce Fourier series and Fourier transform.

Course Objective:

The objective of the course is to provide knowledge of Signals and Systems to students of ECE. This Course includes good insight of types of signals and types of systems, various operations performed on them through the use of Fourier series, Fourier transform, z transform.

Course Contents:

Module I: Signals and Systems

Def. of signal, def. of system, classification of signal, continuous time and discrete time signals, operations performed on them, even and odd signals, periodic and non periodic signals, deterministic and random signals, energy signals, power signals, step, impulse, ramp functions, classification of systems.

Module II: LTI system

Impulse response, step response, convolution sum, convolution integral, continuous LTI, discrete LTI, properties of LTI system, LTI system described by differential and difference equation, interconnection of system.

Module III: Fourier series

Representation of continuous time periodic signal, properties of continuous time Fourier series, representation of discrete time periodic signals, properties of discrete time Fourier series.

Module IV: Fourier Transform

Continuous time Fourier transform, properties of continuous time Fourier transform, discrete time Fourier transform, properties of discrete time Fourier transform

Module V: Z-Transform

Region of convergence, first order system, second order system, inverse Z transform, analysis of LTI system using Z transform.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

- A.V Oppenheim, A.S Willsky: Signals and Systems
- Haykins: Signals and Systems

Course Name	Course Code	LTP	Credit	Semester
MEASUREMENTS & INSTRUMENTATION	**BEC 307**	2:1:0	3	3

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Know the importance of measurement systems in industries.
CLO 2	Select and calibrate the appropriate sensors, calculate sensibility, errors, and repeatability
CLO 3	Design and use of amplifiers with measurement systems in order to facilitate the reading of output signal Noise filtering to decrease reading errors
CLO 4	Convert analog signal into digital signal in order to be saved into a computer

Course Objective:

This course dealswith the systematic study of the electrical and electronics measurements, their basic features and types. This also describe the basic fundamental for characterizing all possible types of electrical and electronics measurements.

Module I :Basics of Measurement Systems:
General concepts and terminology of measurement systems, Basic characteristics of measuring devices, standards and calibration, Accuracy, Precision, Sensitivity, Resolution, Linearity & Errors in measurement.

Module II :PMMC Instruments:
PMMC meters- construction, torque equation, ammeter shunts, multirange ammeter, voltmeter multiplier, sensitivity, ohmmeters, multimeters; Construction & general equation of moving iron, electrodynamometer, hot wire instruments,

Module III: Measurement of Resistance, Inductance and Capacitance:
D.C. Bridges: Wheatstone's bridge, Sensitivity & Limitations; Carey Foster Bridge; Kelvin double bridge; Megaohm Bridge. A.C. Bridges: Maxwell's inductance Capacitance Bridge; Andersons Bridge; De Sauty's Bridge; Schering Bridge.

Module IV: Component Measuring Instruments:
Q meter, Vector Impedance meter, RF Power & Voltage Measurements, Introduction to shielding & grounding & Noise problem.

Module V: Cathode Ray Oscillioscope:
CRT Construction, Basic CRO circuits, CRO Probes, Basic functioning, Techniques of Measurement of Voltage, Current, Phase Angle and Frequency, , Multibeam, multi trace, storage & sampling Oscilloscopes.

EXAMINATION SCHEME:

Components	**A**	**CT**	**S/V/Q**	**HA**	**EE**
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text &Reference books:

Text:

- A Course In Electrical & Electronic Measurement & Instrumentation, A.K.Sawhney, Dhanpat Rai

Reference

- Introduction To Measurements And Instrumentation, Arun K. Ghosh, PHI
- Electronic Measurements & Instrumentation, Bernard Oliver, John Cage, TMH
- Elements Of Electronic Instrumentation And Measurement, Carr, Pearson
- Electronic Instrumentation, H S Kalsi, TMH

Course Name	Course Code	LTP	Credit	Semester
COMMUNICATION SKILLS – I	**BCS 301**	1:0:0	1	3

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Inculcating creative thinking skills
CLO 2	Construct and showcase their communication skills in a creative manner.
CLO 3	Comprehending and demonstrating ways of self-introduction
CLO 4	Outlining and illustrating presentation Skills

Course Objective:

To form written communication strategies necessary in the workplace

Course Contents:

Module I: Introduction to Writing Skills

Effective Writing Skills
Avoiding Common Errors
Paragraph Writing
Note Taking
Writing Assignments

Module II: Letter Writing

Types
Formats

Module III

Memo
Agenda and Minutes
Notice and Circulars

Module IV: Report Writing

Purpose and Scope of a Report
Fundamental Principles of Report Writing
Project Report Writing
Summer Internship Reports

Examination Scheme:

Components	CT1	CT2	CAF	V	GD	GP	A
Weightage (%)	20	20	25	10	10	10	5

CAF – Communication Assessment File

GD – Group Discussion
GP – Group Presentation

Text & References:

- Business Communication, Raman – Prakash, Oxford
- Creative English for Communication, Krishnaswamy N, Macmillan
- Textbook of Business Communication, Ramaswami S, Macmillan
- Working in English, Jones, Cambridge
- A Writer's Workbook Fourth edition, Smoke, Cambridge
- Effective Writing, Withrow, Cambridge
- Writing Skills, Coe/Rycroft/Ernest, Cambridge
- Welcome , Jones, Cambridge

Course Name	Course Code	LTP	Credit	Semester
BEHAVIOURAL SCIENCE - III (INTERPERSONAL COMMUNICATION)	BSS 304	1:0:0	1	3

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Demonstrate knowledge of strategies for developing a healthy interpersonal communication.
CLO 2	Recognize the importance of transactional analysis, script analysis
CLO 3	Identify the difference between healthy and unhealthy expression of emotions and develop emotional competence necessary for conflict resolution and impression management.
CLO 4	Enhance personal effectiveness and performance through effective interpersonal communication.

Course Objective:

This course provides practical guidance on

- Enhancing personal effectiveness and performance through effective interpersonal communication
- Enhancing their conflict management and negotiation skills

Course Contents:

Module I: Interpersonal Communication: An Introduction

Importance of Interpersonal Communication
Types – Self and Other Oriented
Rapport Building – NLP, Communication Mode
Steps to improve Interpersonal Communication

Module II: Behavioural Communication

Meaning and Nature of behavioiural communication
Persuasion, Influence, Listening and Questioning
Guidelines for developing Human Communication skills
Relevance of Behavioural Communication for personal and professional development

Module III: Interpersonal Styles

Transactional Analysis
Life Position/Script Analysis
Games Analysis
Interactional and Transactional Styles

Module IV: Conflict Management

Meaning and nature of conflicts
Styles and techniques of conflict management
Conflict management and interpersonal communication

Module V: Negotiation Skills

Meaning and Negotiation approaches (Traditional and Contemporary)

Process and strategies of negotiations
Negotiation and interpersonal communication

Module VI:End-of-Semester Appraisal

Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

- Vangelist L. Anita, Mark N. Knapp, Inter Personal Communication and Human Relationships: Third Edition, Allyn and Bacon
- Julia T. Wood. Interpersonal Communication everyday encounter
- Simons, Christine, Naylor, Belinda: Effective Communication for Managers, 1997 1st Edition Cassel
- Goddard, Ken: Informative Writing, 1995 1st Edition, Cassell
- Harvard Business School, Effective Communication: United States of America
- Foster John, Effective Writing Skills: Volume-7, First Edition 2000, Institute of Public Relations (IPR)
- Beebe, Beebe and Redmond; Interpersonal Communication, 1996; Allyn and Bacon Publishers.

Course Name	Course Code	LTP	Credit	Semester
FRENCH – III	FLT 301	2:0:0	2	3

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone Basic language skills such as reading, writing, speaking, listening & interactive in the language
CLO 2	Students will be able to read and interpret small texts .
CLO 3	Students will be able to communicate in small sentences in writing, self introduction, family description etc.
CLO 4	Students will be able to communicate in small sentences in oral, self introduction, family description etc

Course Objective:

To provide the students with the know-how

- To master the current social communication skills in oral and in written.
- To enrich the formulations, the linguistic tools and vary the sentence construction without repetition.

Course Contents:

Module B: pp. 76 – 88 Unité 6

Module C: pp. 89 to103 Unité 7

Contenu lexical: **Unité 6:se faire plaisir**

1. acheter : exprimer ses choix, décrire un objet (forme, dimension, poids et matières) payer
2. parler de la nourriture, deux façons d'exprimer la quantité, commander un repas au restaurant
3. parler des différentes occasions de faire la fête

Unité 7: Cultiverses relations

1. maîtriser les actes de la communication sociale courante (Salutations, présentations, invitations, remerciements)
2. annoncer un événement, exprimer un souhait, remercier, s'excuser par écrit.
3. caractériser une personne (aspect physique et caractère)

Contenu grammatical:

1. accord des adjectifs qualificatifs
2. articles partitifs
3. Négations avec de, ne…rien/personne/plus
4. Questions avec combien, quel…
5. expressions de la quantité
6. ne…plus/toujours - encore
7. pronoms compléments directs et indirects
8. accord du participe passé (auxiliaire « avoir ») avec l'objet direct
9. Impératif avec un pronom complément direct ou indirect
10. construction avec « que » - Je crois que/ Je pense que/ Je sais que

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- **le livre à suivre : Campus: Tome 1**

Course Name	Course Code	LTP	Credit	Semester
GERMAN – III	**FLG 301**	2:0:0	2	3

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone Basic language skills such as reading, writing, speaking, listening & interactive in the language
CLO 2	Students will be able to read and interpret small texts .
CLO 3	Students will be able to communicate in small sentences in writing, self introduction, family description etc.
CLO 4	Students will be able to communicate in small sentences in oral, self introduction, family description etc.

Course Objective:

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.
To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany

Course Contents:

Module I: Modal verbs
Modal verbs with conjugations and usage
Imparting the finer nuances of the language

Module II: Information about Germany (ongoing)
Information about Germany in the form of presentations or "Referat"– neighbors, states and capitals, important cities and towns and characteristic features of the same, and also a few other topics related to Germany.

Module III: Dative case: Dative case, comparison with accusative case
Dative case with the relevant articles
Introduction to 3 different kinds of sentences – nominative, accusative and dative

Module IV: Dative personal pronouns : Nominative, accusative and dative pronouns in comparison

Module V: Dative prepositions : Dative preposition with their usage both theoretical and figurative use

Module VI: Dialogues : In the Restaurant, At the Tourist Information Office,A telephone conversation

Module VII: Directions : Names of the directions Asking and telling the directions with the help of a roadmap

Module VIII: Conjunctions : To assimilate the knowledge of the conjunctions learnt indirectly so far

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch alsFremdsprache 1A, Grundkurs

Course Name	Course Code	LTP	Credit	Semester
SPANISH – III	FLS 301	2:0:0	2	3

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of advance level.
CLO 3	Students will be able to communicate with complex sentences
CLO 4	To be able to write formal and informal, business letters/ E-mails
CLO 5	Translating basic technical texts from Spanish to English
CLO 6	Essay writing on different issues.
CLO 7	Spanish for specific purposes

Course Objective:

To enable students acquire knowledge of the Set/definite expressions (idiomatic expressions) in Spanish language and to handle some Spanish situations with ease.

Course Contents:

Module I

Revision of earlier semester modules
Set expressions (idiomatic expressions) with the verb *Tener*, *Poner, Ir….*
Weather

Module II

Introduction to *Gustar*…and all its forms. Revision of *Gustar* and usage of it

Module III

Translation of Spanish-English; English-Spanish. Practice sentences.
How to ask for directions (using estar)
Introduction to IR + A + INFINITIVE FORM OF A VERB

Module IV

Simple conversation with help of texts and vocabulary
En el restaurante
En el instituto
En el aeropuerto

Module V

Reflexives

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español, EnDirecto I A
- Español Sin Fronteras -Nivel El

Course Name	Course Code	LTP	Credit	Semester
CHINESE – III	FLC 301	2:0:0	2	3

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone Basic language skills such as reading, writing, speaking, listening & interactive in the language
CLO 2	Students will be able to read and interpret small texts .
CLO 3	Students will be able to communicate in small sentences in writing, self introduction, family description etc.

Course Objective:

Foreign words are usually imported by translating the concept into Chinese, the emphasis is on the meaning rather than the sound. But the system runs into a problem because the underlying name of personal name is often obscure so they are almost always transcribed according to their pronciation alone. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I

Drills
Dialogue practice
Observe picture and answer the question.
Introduction of written characters.
Practice reading aloud
Practice using the language both by speaking and by taking notes.
Character writing and stroke order

Module II

Measure words
Position words e.g. inside, outside, middle, in front, behind, top, bottom, side, left, right, straight.
Directional words – beibian, xibian, nanbian, dongbian, zhongjian.
Our school and its different building locations.
What game do you like?
Difference between “hii” and “neng”, “keyi”.

Module III

Changing affirmative sentences to negative ones and vice versa
Human body parts.
Not feeling well words e.g. ; fever, cold, stomach ache, head ache.
Use of the modal particle “le”
Making a telephone call
Use of “jiu” and “cal” (Grammar portion)
Automobiles e.g. Bus, train, boat, car, bike etc.
Traveling, by train, by airplane, by bus, on the bike, by boat.. etc.

Module IV

The ordinal number "di"
"Mei" the demonstrative pronoun e.g. mei tian, meinian etc.
use of to enter to exit
Structural particle "de" (Compliment of degree).
Going to the Park.
Description about class schedule during a week in school.
Grammar use of "li" and "cong".
Comprehension reading followed by questions.

Module V

Persuasion-Please don't smoke.
Please speak slowly
Praise – This pictorial is very beautiful
Opposites e.g. Clean-Dirty, Little-More, Old-New, Young-Old, Easy-Difficult, Boy-Girl, Black-White, Big-Small, Slow-Fast … etc.
Talking about studies and classmates
Use of "it doesn't matter"
Enquiring about a student, description about study method.
Grammar: Negation of a sentence with a verbal predicate.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- "Elementary Chinese Reader Part I, Part-2" Lesson 21-30

Course Title: Anandam

ANANDAM

Course Name	Course Code	LTP	Credit	Semester
ANANDAM	AND003	2:0:0	2	3

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Awareness and empathy regarding community issues
CLO 2	Interaction with the community and impact on society
CLO 3	Interaction with mentor and development of Student teacher relationship
CLO 4	Interaction among students, enlarge social network
CLO 5	Cooperative and Communication skills and leadership qualities
CLO 6	Critical thinking, Confidence and Efficiency

Course Objectives:

After the completion of this course, students will be able to:

- apply their knowledge and skills to solve specific community problem
- learn to plan, lead, and organize community events have a sense of belonging to their college campus and community and find something they are interested in doing during their free time
- make new friends, expand social network, and boost social skills and mental health.
- be useful to society as it will protect them against stress, frustration, and depression

Course Contents:

The project report should be guided by the mentor and shall contain:

- **Synopsis**: clearly stating objectives and activities to be undertaken. Problem identifying and problem-solving projects to be taken up.
- Details of the **Mentor and the Participants are to** be given (name of mentor, name of participants, phone number/mobile no, email, and address)
- Location / community where the work was carried out
- Details of Activities performed are to be given with date
- Number of beneficiaries and impact on the society (the object should be to empower the community and make them self-reliant)
- Photographs taken for documentation of work should be submitted
- Media coverage of the projects should be attached if any
- The Group Community Service Project Report will be submitted by the Student group leader under the guidance of the mentor to the Director/HoIs of the Department.
- The Director/HoIs should get the best report (more than one if required) of the Group Community Service Project uploaded on the HTE website and on the University page
- The Director/HoIs will forward the best report of the department to the Nodal Officer of the University.
- University will forward the report to the state level committee.

GUIDELINES FOR GCSP (Group Community Service Project)
ASSIGNMENT OF ANANDAM FOR SOCIAL AWARENESS (for students)

1. Each member of the group shall write one blog about the decided topic of 500 words (minimum) along with any relevant photos/diagrams/statistical data (with reference).
2. The group member shall write his/her name at the end of the blog.
3. The blog shall be posted on Instagram and Facebook (apart from these any other website wherever the group seems necessary).
4. Print out of the blog where date of when the content is posted, number of followers, comments, name of the writer shall be visible will be taken and file will be maintained for the same.
5. In the cover page of the project mention heading **"Group Community Service Project"**, and the filled format of final project report given by Anandam Scheme.
6. For the topic chosen by the group, students are recommended to cover the following points:
    a) Current scenario (Regional, national and international level as applicable)
    b) Future predictions
    c) Duty of the government
    d) Government policies (related to the topic), if any
    e) Duty of public
    f) Conclusion

Evaluation Scheme:

Project Participation: 2 hours X 8 days (per month) X 4 months = 64 hours

- **C grade =32 hrs (Below 20 marks)**
- **B grade >32 hrs to <=44hrs (20-30 marks)**
- **A grade >44 hrs to<=54hrs (30-40 marks)**
- **O grade >54 hrs to<=64hrs (40-50 marks)**

Evaluation Criteria:

Respective Departmental Anandam mentors are requested to evaluate the project (out of 50) as per the following criteria:

1. Position and exceptions, if any, are clearly stated. The organization of the blog is completely and clearly outlined and implemented.
2. The body of the blog is coherently organized, original and the logic is easy to follow. There is no spelling or grammatical errors and terminology is clearly defined. Writing is clear, concise, and persuasive.
3. Conclusion is clearly stated. The underlying logic is explicit.

Course Name	Course Code	LTP	Credit	Semester
DIGITAL CIRCUITS AND SYSTEMS – I	**BEC 401**	2:1:0	3	4

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Introduction and historical information on Microorganisms and their use in different industries
CLO 2	Acquire industrial skills of microbial culture, growth, and practices

CLO 3	Demonstrate the advanced application of Microbes in emerging industrial sectors

Course Objective:

This course is an introduction to the basic principles of digital electronics. At the conclusion of this course, the student will be able to quantitatively identify the fundamentals of computers, including number systems, logic gates, logic and arithmetic subsystems, and integrated circuits. They will gain the practical skills necessary to work with digital circuits through problem solving and hands on laboratory experience with logic gates, encoders, flip-flops, counters, shift registers, adders, etc. The student will be able to analyze and design simple logic circuits using tools such as Boolean Algebra and Karnaugh Mapping, and will be able to draw logic diagrams.

Course Contents:

Module I: Boolean Functions

Analog & digital signals, AND, OR, NOT, NAND, NOR, XOR & XNOR gates, Boolean algebra, DeMorgan's theorems, Implementation of logical function using only NAND/NOR gates, 1`s complement and 2`s complement, BCD to Gray and Gray to BCD code conversion, Standard representation of logical functions (SOP and POS forms), K-map representation and simplification of logical function up to five variables, don't care conditions, XOR & XNOR simplifications of K-maps, Tabulation method.

Module II: Combinational Circuits

Adders, Subtractors, Implementation of full adder using half adder, full subtractor using half subtractor, Multiplexer, de-multiplexer, decoder & encoder, code converters, 1 & 2 bit comparators, BCD to seven segment decoder/encoder, Implementation of logic functions using multiplexer/de-multiplexer and decoder, Implementation of 16×1 MUX using 4×1 MUX, 4×16 decoder using 3×8 decoder etc., logic implementations using PROM, PLA & PAL.

Module III: Sequential Circuits

Difference between combinational and sequential circuits, Latch, Flip-flops: SR, JK, D & T flip flops – Truth table, Excitation table, Conversion of flip-flops, set up and hold time, race around condition, Master Slave flip flop, Shift registers: SIPO, PISO, PIPO, SIPO, Bi-directional, 4-bit universal shift register; Counters: Asynchronous/ripple & synchronous counters – up/down, Ring counter, sequence detector.

Module IV: Logic families & data converters

Logic families: Special characteristics (Fan out, Power dissipation, propagation delay, noise margin), working of RTL, DTL, TTL, ECL and CMOS families; Data converters: Special characteristics, ADC – successive approximation, linear ramp, dual slope; DAC – Binary Weighted, R-2R ladder type.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

- Moris Mano: Digital Design, Pearson Education.
- R. P. Jain: Digital Electronics, Tata McGraw Hill.
- Thomas L. Floyd: Digital Fundamentals, Pearson Education.
- Malvino and Leech: Digital Principles & Applications, Tata McGraw Hill.

Course Name	Course Code	LTP	Credit	Semester
ANALOG ELECTRONICS – II	BEC 402	2:1:0	3	4

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Familiar with Operational Amplifier in terms of characteristics, operation, applications and limitations.
CLO 2	Know the foundation of advance courses on VLSI design and analog CMOS IC Design
CLO 3	Determine the importance, necessity & use of operational Amplifier in electronic devices.

Course Objective:

The purpose of this course is to introduce the student to the application of semiconductor devices in linear analog circuits. To insure the usefulness of the course material to both computer engineers and electrical engineers, the course stresses circuit designs using the operational amplifier.

Course Contents:

Module I: Building Blocks of Analog ICs

Differential amplifier, Op-amp Model, op-amp DC & AC parameters, virtual ground, Current mirrors, Active loads, Level shifters and output stages.

Module II: Operational amplifiers

Introduction, open loop and closed loop configuration, op-amp parameters (input offset current, output offset current, i/p bias current, CMRR, PSRR, null adjustment range, etc,) Inverting and non-inverting configuration, voltage gain of inverting and non inverting configurations.

Module III: Linear &Non Linear Wave shaping

Adders, Voltage to current, current to voltage Converter, Integrators, Differentiators**,** Voltage follower (voltage buffer), summer, subtractor, Comparators, log/antilog circuits using Op-amps, precision rectifiers

Module IV: Waveform Generations

Damped and undamped oscillations, Barkhausen criterion for sustained oscillation. Tank circuit generator Astable multi Vibrators, OTA-C Oscillators, Crystal oscillator**.** Types of oscillators: LC-Hartley and Colpitts, RC-RC phase shift and Wien bridge oscillator, Basics of tuned Amplifiers, Voltage Controlled Oscillator.

Module V: Active RC Filters & Applications of Linear Circuits

Idealistic & Realistic response of filters (LP, BP, and HP), Butter worth & Chebyshev approximation filter functions, LP,BP,HP and All pass, Notch Filter, Operational transconductance amplifier (OTA)-C filters.

Module VI: Applications of IC Analog Multiplier & Timer

IC phase locked loops, 555 Timer, IC voltage regulators-(fixed, variable) 78xx, 79xx series and adjustable.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

- Richard C. Jaeger: Microelectronic Circuit Design
- Adel S. Sedra and K. C. Smith: Microelectronic Circuits
- Ramakant Gaekwad: Operational Amplifiers
- Rolf Schaumann and Mac E. Van Valkenburg: Design of Analog Filters
- D. Roy Choudhury and Shail B. Jain: Linear Integrated Circuits

Course Name	Course Code	LTP	Credit	Semester
ELECTRIC MACHINES – II	BEE 403	2:1:0	3	4

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Demonstrate mastery over knowledge in various functional areas of engineering.
CLO 2	Analyze and apply various engineering concepts and theories to facilitate a problem solving approach.
CLO 3	Demonstrate research and technical skills to analyze numerical challenges.

Course Objective:

This course deals with the systematic study and application of the AC machines which are widely used in the Industry

Course Contents:

Module I: Poly phase Induction Machines – I

Construction features, production of rotating magnetic field, equivalent circuit, torque and power equations, torque-slip characteristics, no load and blocked rotor tests' efficiency. Induction generator, Starting and speed control, cogging and crawling.

Module II: Single- Phase Induction Motor

Double revolving field theory, equivalent circuit, no load and blocked rotor tests, starting methods, repulsion motor.

A.C. Commutator Motor:E.M.F. induced in commutator windings, single phase a.c. series motor, Universal motor

Module III: Synchronous Machines – I

Constructional features, armature windings, E.M.F. equation, winding coefficients, harmonics in the induced E.M.F., armature reaction, O.C. and S.C. tests, voltage regulation-Synchronous impedance method, MMF Method, Potier's triangle method and parallel operation, operation on infinite bus, cooling.

Module IV: Synchronous Machines - II

Two reaction theory, power expressions for cylindrical and salient pole machines, performance characteristics.

Synchronous Motor : Principle of operation, starting methods, phasor diagram torque-angle characteristics, V-curves hunting and dampling, synchronous condenser, reluctance motor.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text:

- M.G.Say, “Alternating Current machines”, Pitman & Sons.
- P.S. Bimbhra, “Electric Machinery”, Khanna Publishers.

References:

- P.S. Bimbhra, “Generalized Theory of Electrical Machnies”, Khanna Publishers.
- I.J. Nagrath and D.P. Kothari, “Electrical Machnies”, Tata McGraw Hill.
- B.R. Gupta and V. Singhal, ”fundamental of Electrical Machines”, New Age International

Course Name	Course Code	LTP	Credit	Semester
CONTROL SYSTEM	BEE 404	2:1:0	3	4

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Study the control system component behavior by transfer function methods.
CLO 2	Ability to design a suitable compensator Lead, Lag and Lead – lag compensator using frequency domain method or time domain method.
CLO 3	Understand mathematical models of linear discrete-time control systems using transfer functions and state-space models.
	Analyze and determine whether performance of linear discrete-time control systems meet specified design criteria.

Course Objective:

The basic objective of this course is to impart to the students, the basic and core knowledge of Linear control system engineering so that the students are able to analyze the linear control systems with the help of time domain and frequency domain tools.

Course Contents:

Module I: Introduction

History and evolution, definition, configuration of a process and control system, classification, open and closed loop systems, merits and demerits, Elements of closed loop systems, importance of feedback, other methods of classification.

Module II: Modelling of Control Systems

Transfer function, block diagram, signal flow graph, Reduction Technique, Mason's Gain Formula. Mathematical modelling and representation of physical systems (Electrical Mechanical and Thermal), derivation of transfer function for different types of systems, Analogous Systems, gear train.

Module III: Time – Domain Analysis

Time domain performance criteria, transient response and steady state response of first, second & higher order systems, steady state errors and static error constants in unity feedback control systems, error criteria, generalized error constants, Sensitivity, Control actions

Module IV: Frequency Domain Analysis

Frequency Domain Analysis frequency domain specifications, Logarithmic plots (Bode Plots), gain and phase margins, relative stability, Correlation with time domain, Polar plots,

Module V: Stability

Stability Concept, Asymptotic stability and conditional stability, Routh – Hurwitz criterion,

Module VI: Methods of Analysis

Bode Plots: Drawing and analyzing, gain and phase margin, stability

Nyquist Criteria: Mapping of contours in s-plane, Nyquist criteria, plots, stability
Root Locus plots: Introduction, concept, procedure and stability.

Module VII: Compensation

Compensation Techniques:Concept of compensation, Lag, Lead and Lag-Lead networks, design of closed loop systems using compensation techniques. P, PI, PID controllers.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text:

- R C Dorf,“ Modern Control Systems”, Pearson Education
- J. Nagrath& M. Gopal, 2000, “Control System Engineering”, New Age International.
- Norman S Nise, “Control system Engineering”, Wiley publishers

References:

- M. K. Ogata, 2002, “Modern Control Engineering, PHI.
- B. C. Kuo, 2001, “Automatic Control system, Prentice Hall of India.

Course Name	Course Code	LTP	Credit	Semester
POWER PLANT ENGINEERING	BEE 405	2:1:0	3	4

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Describe and analyse different types of sources and mathematical expressions related to thermodynamics and various terms and factors involved with power plant operation.
CLO 2	Analyse the working and layout of steam power plants and the different systems comprising the plant and discuss about its economic and safety impacts
CLO 3	Combine concepts of previously learnt courses to define the working principle of diesel power plant, its layout, safety principles and compare it with plants of other types.
CLO 4	Describe the working principle and basic components of the nuclear power plant and the economic and safety principles involved with it.
CLO 5	Discuss the working principle and basic components of the hydroelectric plants and the economic principles and safety precautions involved with it
CLO 6	Discuss and analyse the mathematical and working principles of different electrical equipment's involved in the generation of power

Course Objective:

The objective of the course is to provide a brief knowledge of power plant economics, types of Energy sources and study pf power plants.

Course Contents:

Module I: Introduction

Energy sources, their availability electrical energy demand and growth in India; general state of the energy system; global Energy scenario.

Module II: Power Plant Economics

Types of load; chronological load curves; load duration curve; mass curve; max. Demand; demand factor; load factor; capacity factor; utilization factor; diversity factors; base load and peak load power plants; Capital cost of plants; annual fixed and operating costs of plants; generation cost and depreciation; effect of load factor on unit energy cost; role of load diversity in power system economics; off peak energy utilization; energy cost reduction.

Module III: Tariffs

Objectives of tariffs; general tariff form; flat demand rate; straight meter rate; block meter rate; two part tariffs; power factor dependant tariffs; three parts tariffs; spot (time differentiated) pricing.

Module IV: Conventional Energy Sources

Selection of site; capacity calculations; detailed description and use of different parts; schematic diagram and working of thermal, hydro electric, nuclear power, diesel power and gas turbine power plant.

Module V: non-conventional Energy Sources

Study of wind, solar, tidal, geo-thermal bio-gas sources of energy, fuel cell, magneto hydro dynamic generation system; power crisis; future energy demand; role of private sector in energy management.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text:

- Pratab. H. "Art and Science of Utilization of Electrical Energy": Dhanpat Rai& Sons, 2001
- Wadhwa C.L. "Generation, Distribution and Utilization of Electrical Power"; Khanna Publications,2005
- Gupta.J. B. "A Course of Electric Power", S. K. Kataria& Sons, 2009

References:

- Uppal .S. L. "Electrical Power", Khanna Publisher, 2005
- Dover. A. T. "Electric Traction" , Sir Isaac Pitman & Sons Ltd. 1965
- Taylor Open Shaw "Utilization of Electrical Energy", ELBS, 1995

DIGITAL CIRCUITS AND SYSTEMS LAB - I

Course Name	Course Code	LTP	Credit	Semester
DIGITAL CIRCUITS AND SYSTEMS LAB - I	BEE 421	0:0:1	1	4

List of Experiments:

1. To study the op amp as an inverting ,non inverting amplifier, adder, subtract or, integrator and differentiator
2. To design a ramp and a square wave generator.
3. To study the IC-555 timer as stable and bistable multivibrator
4. To design low pass, high pass and band pass filters using op- amp. and plot their frequency response
5. To design various LC & RC oscillators.
6. To design and study class a power amplifier and class B push pull amplifier.
7. To verify the truth tables of NOT, OR, AND, NOR, NAND, XOR, XNOR gates.
8. To obtain half adder, full adder using gates and verify their truth tables.
9. To obtain half subtractor, full subtractor using gates and verify their truth tables.

10. To verify the truth tables of RS, D, JK and T flip- flops.
11. To implement and verify 3-bit bi-directional shift register.
12. To design and study asynchronous/ripple counter.
13. To design and study synchronous counter.
14. To design and study a sequence detector

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

ANALOG ELECTRONICS – II LAB

Course Name	Course Code	LTP	Credit	Semester
ANALOG ELECTRONICS – II LAB	BEC 422	1:0:0	1	4

List of Experiments:

1. To studies the various kinds of Printed Circuit Board (PCBs).
2. To study the artwork & drafting for designing of PCB.
3. To study the unregulated power supply & design of adequate circuit diagram.
4. To study the process of manufacturing of PCB.
5. To study the manufacturing & testing of step down transformer of 9V/1A
6. To study soldering of components.
7. To study the regulated power supply & design of adequate circuit diagram

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

Course Name	Course Code	LTP	Credit	Semester
ELECTRICAL MACHINE – II LAB	BEE 423	0:0:1	1	4

List of Experiments:

1. To Perform load-test on 3 ph. Induction motor & to plot torque V/S speed characteristics.
2. To Perform no-load & blocked –rotor tests on 3 ph. Induction motor to obtain equivalent ckt. Parameters & to draw circle diagram.
3. To study the speed control of 3 ph. Induction motor by Kramer's Concept.
4. To study the speed control of 3 ph. Induction motor by cascading of two induction motors, i.e. by feeding the slip power of one motor into the other motor.
5. To study star- delta starters physically and
   (a) to draw electrical connection diagram
   (b) to start the 3 ph. Induction motor using it.
   (c) To reverse the direction of 3 ph. I.M.
6. To start a 3 phase slip –ring induction motor by inserting different levels of resistance in the rotor ckt. And to plot torque –speed characteristics.
7. To perform no-load & blocked –rotor test on 1 ph. Induction motor & to determine the parameters of equivalent ckt. Drawn on the basis of double revolving field theory.
8. To Perform load –test on 1 ph. Induction motor & plot torque –speed characteristics.
9. To Perform no load & short ckt. Test on 3- phase alternator and draw open ckt. And
10. Short ckt. Characteristics.
11. To find voltage regulation of an alternator by zero power factor (z.p.f.) method.
12. To study effect of variation of field current upon the stator current and power factor
13. With synchronous motor running at no load and draw V & inverted V curves of motor.
14. To measure negative sequence & zero sequence reactance of Syn. Machines.

Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

CONTROL SYSTEM LAB

Course Name	Course Code	LTP	Credit	Semester
CONTROL SYSTEM LAB	BEE 424	0:0:1	1	4

Course Contents:

1. Study and draw
   a) Step response of open Loop system (linear 1st order, 2nd order
   b) Step response of closed loop systems (1st order)
2. Study and draw temperature control system the open loop response and closed loop response with different values of gains
3. Study of operations and characteristics of a stepper motor
4. To Study a D.C. motor speed control system.
5. Performance evaluation and design of PID controller.
6. Study of microprocessor control of a simulated linear system.
7. To design a suitable cascade compensator for the given system and verify the resulting improvement.
8. Note: three experiments in MATLAB have to be performed in the slot of MATLAB.
   Using MATLAB, obtain the unit-step response and unit impulse response of the following system:

$$\frac{C(s)}{R(s)} = \frac{16}{s^2 + 1.6s + 16}$$

9. For a 2nd order transfer function using MATLAB
   a) Bode Plot
   b) Root locus plot
   c) Nyquist plot.

Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

Course Name	Course Code	LTP	Credit	Semester
ELECTROMAGNETIC FIELD THEORY	BEC406	2:1:0	3	4

Course Objective:

This course provides a general introduction to the important physical concepts and mathematical methods used in treating all types of wave phenomena, but stresses electromagnetic signal propagation and issues of central importance in electrical engineering. As a core course in the Electrical Computer and Systems Engineering option of the Engineering Sciences concentration, it provides essential background and basic preparation for more advanced work in device physics, microwave and ultra-fast circuitry, antenna design, optics, optical communication and optoelectronics.

Course Contents:

Module I:

Mathematical Basics and Electrostatics
Coordinate Systems: Spherical and Cylindrical coordinates, Dirac delta function, Coulomb's law, Gauss's law, Poisson's Equation, Laplace's Equation, Electrostatic Boundary conditions, Work and Energy in Electrostatics, Conductors, Surface charge and force on conductors

Module II:

Magneto statics and Magnetic Fields in matter
Magnetic induction and Faraday's law, Magnetic Flux density, Magnetic Field Intensity, Biot Savart Law, steady currents, Ampere's law, Magneto static Boundary conditions, magnetic field inside matter, magnetic susceptibility and permeability, ferromagnetism, energy stored in a Magnetic field, Magnetic Vector Potential

Module III:

Electrodynamics
Faraday's laws, Maxwell's equations, Maxwell's modification of Ampere's law, continuity equation and Poynting theorem.

Module IV:

Electrodynamic Waves
Wave propagation in unbounded media, Boundary conditions, reflection and transmission, polarization, E.M. waves in vacuum, E. M. waves in matter: reflection and transmission of plane waves.

Module V:

Introduction to Transmission Lines
Transmission Line, Line Parameters, Characteristic Impedance, Image Impedance, HVDC and HVAC Common faults in transmission lines. Skin Effect, Ferranti Effect and Corona.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

- Griffiths: Introduction to Electrodynamics
- Fawwaz T. Ulaby:Fundamentals of Applied Electromagnetics
- Hayt, William H., Buck, John A. Hayt, William H., Buck, John A., Engineering Electromagnetics

COMMUNICATION SKILLS – II

Course Name	Course Code	LTP	Credit	Semester
Introduction to Industrial Microbiology	MMC 101	4:0:0	4	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Identify steps to professional communication
CLO 2	Identify the key components of meeting, agendas and meeting minutes
CLO 3	Understand the key skills and behaviors required to facilitate a group discussion/presentation
CLO 4	Polish current affairs & rapport building

Course Objective:

To teach the participants strategies for improving academic reading and writing.
Emphasis is placed on increasing fluency, deepening vocabulary, and refining academic language proficiency.

Course Contents:

Module I: Social Communication Skills

Small Talk
Conversational English
Appropriateness
Building rapport

Module II: Context Based Speaking

In general situations
In specific professional situations
Discussion and associated vocabulary
Simulations/Role Play

Module III: Professional Skills

Presentations
Negotiations
Meetings
Telephony Skills

Examination Scheme:

Components	CT1	CT2	CAF	V	GD	GP	A
Weightage (%)	20	20	25	10	10	10	5

CAF – Communication Assessment File

GD – Group Discussion
GP – Group Presentation

Text & References:

- Essential Telephoning in English, Garside/Garside, Cambridge
- Working in English, Jones, Cambridge
- Business Communication, Raman – Prakash, Oxford
- Speaking Personally, Porter-Ladousse, Cambridge
- Speaking Effectively, Jermy Comfort, et.al, Cambridge
- Business Communication, Raman – Prakash, Oxford

Course Name	Course Code	LTP	Credit	Semester
BEHAVIOURAL SCIENCE - IV (RELATIONSHIP MANAGEMENT)	**BSS 404**	1:0:0	1	4

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Identify the basis of interpersonal relationship.
CLO 2	Describe the importance of interpersonal relationship and bridging individual differences
CLO 3	Recognize the development and strategies for effective interpersonal relationship.

Course Objective:

To understand the basis of interpersonal relationship
To understand various communication style
To learn the strategies for effective interpersonal relationship

Course Contents:

Module I: Understanding Relationships

Importance of relationships
Role and relationships
Maintaining healthy relationships

Module II: Bridging Individual Differences

Understanding individual differences
Bridging differences in Interpersonal Relationship – TA
Communication Styles

Module III: Interpersonal Relationship Development

Importance of Interpersonal Relationships
Interpersonal Relationships Skills
Types of Interpersonal Relationships

Module IV: Theories of Interpersonal Relationships

Theories: Social Exchange, Uncertainty Reduction Theory
Factors Affecting Interpersonal Relationships
Improving Interpersonal Relationships

Module V: Impression Management

Meaning & Components of Impression Management
Impression Management Techniques (Influencing Skills)
Impression Management Training-Self help and Formal approaches

Module VI: End-of-Semester Appraisal

Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

- Vangelist L. Anita, Mark N. Knapp, Inter Personal Communication and Human Relationships: Third Edition, Allyn and Bacon
- Julia T. Wood. Interpersonal Communication everyday encounter
- Simons, Christine, Naylor, Belinda: Effective Communication for Managers, 1997 1st Edition Cassell
- Goddard, Ken: Informative Writing, 1995 1st Edition, Cassell
- Harvard Business School, Effective Communication: United States of America
- Foster John, Effective Writing Skills: Volume-7, First Edition 2000, Institute of Public Relations (IPR)
- Beebe, Beebe and Redmond; Interpersonal Communication, 1996; Allyn and Bacon Publishers.

Course Name	Course Code	LTP	Credit	Semester
FRENCH – IV	**FLT 401**	2:0:0	2	4

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone intermediate language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of intermediate level.
CLO 3	Students will be able to communicate in small sentences in Simple Future and Past tenses .
CLO 4	Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.

Course Objective:

To enable students:

- To develop strategies of comprehension of texts of different origin
- To present facts, projects, plans with precision

Course Contents:

Module C: pp. 104 – 139: Unités 8, 9

Contenu lexical:Unité 8: Découvrir le passé

1. parler du passé, des habitudes et des changements.
2. parler de la famille, raconter une suite d'événements/préciser leur date et leur durée.
3. connaîtrequelques moments de l'histoire

Unité 9: Entreprendre

1. faire un projet de la réalisation: (exprimer un besoin, préciser les étapes d'une réalisation)
2. parlerd'uneentreprise
3. parler du futur

Contenu grammatical:

1. Imparfait
2. Pronom « en »
3. Futur
4. Discoursrapporté au présent
5. Passé récent
6. Présentprogressif

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- **le livre à suivre : Campus: Tome 1**

Course Name	Course Code	LTP	Credit	Semester
GERMAN – IV	**FLG 401**	2:0:0	2	4

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone intermediate language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of intermediate level.
CLO 3	Students will be able to communicate in small sentences in Simple Future and Past tenseS.
CLO 4	Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.

Course Objective:

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.
To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany.Introduction to Advanced Grammar Language and Professional Jargon

Course Contents:

Module I: Present perfect tense

Present perfect tense, usage and applicability
Usage of this tense to indicate near past
Universal applicability of this tense in German

Module II: Letter writing

To acquaint the students with the form of writing informal letters.

Module III: Interchanging prepositions

Usage of prepositions with both accusative and dative cases
Usage of verbs fixed with prepositions
Emphasizing on the action and position factor

Module IV: Past tense

Introduction to simple past tense
Learning the verb forms in past tense
Making a list of all verbs in the past tense and the participle forms

Module V: Reading a Fairy Tale

Comprehension and narration
- Rotkäppchen
- Froschprinzessin
- Die Fremdsprache

Module VI: Genitive case

Genitive case – Explain the concept of possession in genitive

Mentioning the structure of weak nouns

Module VII: Genitive prepositions

Discuss the genitive propositions and their usage: (während, wegen, statt, trotz)

Module VIII: Picture Description

Firstly recognize the persons or things in the picture and identify the situation depicted in the picture;
Secondly answer questions of general meaning in context to the picture and also talk about the personal experiences which come to your mind upon seeing the picture.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2

Course Name	Course Code	LTP	Credit	Semester
SPANISH – IV	**FLS 401**	2:0:0	2	4

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone intermediate language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of intermediate level.
CLO 3	Students will be able to communicate in small sentences in Simple Future and Past tenses .
CLO 4	Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.

Course Objective:

To enable students acquire working knowledge of the language; to give them vocabulary, grammar, voice modulations/intonations to handle everyday Spanish situations with ease.

Course Contents:

Module I
Revision of earlier semester modules
Introduction to Present Continuous Tense (Gerunds)

Module II
Translation with Present Continuous Tense
Introduction to Gustar, Parecer, Apetecer, doler

Module III
Imperatives (positive and negative commands of regular verbs)

Module IV
Commercial/business vocabulary

Module V
Simple conversation with help of texts and vocabulary
En la recepciondelhotel
En el restaurante
En la agencia de viajes
En la tienda/supermercado

Examination Scheme:

Components	**CT1**	**CT2**	**C**	**I**	**V**	**A**
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español Sin Fronteras (Nivel – Elemental)

Course Name	Course Code	LTP	Credit	Semester
CHINESE – IV	**FLC 401**	2:0:0	2	4

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone intermediate language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of intermediate level.
CLO 3	Students will be able to communicate in small sentences in Simple Future and Past tenses .
CLO 4	Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.

Course Objective:

How many characters are there? The early Qing dynasty dictionary included nearly 50,000 characters the vast majority of which were rare accumulated characters over the centuries. An educate person in China can probably recognize around 6000 characters. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I
Dialogue Practice
Observe picture and answer the question
Pronunciation and intonation
Character writing and stroke order.
Electronic items

Module II
Traveling – The Scenery is very beautiful
Weather and climate
Grammar question with – "bushi …. Ma?"
The construction "yao … le" (Used to indicate that an action is going to take place)
Time words "yiqian", "yiwai" (Before and after).
The adverb "geng".

Module III

Going to a friend house for a visit meeting his family and talking about their customs.
Fallen sick and going to the Doctor, the doctor examines, takes temperature and writes prescription.
Aspect particle "guo" shows that an action has happened some time in the past.
Progressive aspect of an actin "zhengzai" Also the use if "zhe" with it.
To welcome someone and to see off someone …. I cant go the airport to see you off… etc.

Module IV
Shipment. Is this the place to checking luggage?
Basic dialogue on – Where do u work?
Basic dialogue on – This is my address
Basic dialogue on – I understand Chinese

Basic dialogue on – What job do u do?
Basic dialogue on – What time is it now?

Module V
Basic dialogue on – What day (date) is it today?
Basic dialogue on – What is the weather like here.
Basic dialogue on – Do u like Chinese food?
Basic dialogue on – I am planning to go to China.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

"Elementary Chinese Reader, Part-2" Lesson 31-38

Course Name	Course Code	LTP	Credit	Semester
ANANDAM	AND003	2:0:0	2	3

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Awareness and empathy regarding community issues
CLO 2	Interaction with the community and impact on society
CLO 3	Interaction with mentor and development of Student teacher relationship
CLO 4	Interaction among students, enlarge social network
CLO 5	Cooperative and Communication skills and leadership qualities
CLO 6	Critical thinking, Confidence and Efficiency

Course Objectives:

After the completion of this course, students will be able to:

- apply their knowledge and skills to solve specific community problem
- learn to plan, lead, and organize community events have a sense of belonging to their college campus and community and find something they are interested in doing during their free time
- make new friends, expand social network, and boost social skills and mental health.
- be useful to society as it will protect them against stress, frustration, and depression

Course Contents:

The project report should be guided by the mentor and shall contain:

- **Synopsis**: clearly stating objectives and activities to be undertaken. Problem identifying and problem-solving projects to be taken up.
- Details of the **Mentor and the Participants are to** be given (name of mentor, name of participants, phone number/mobile no, email, and address)
- Location / community where the work was carried out
- Details of Activities performed are to be given with date
- Number of beneficiaries and impact on the society (the object should be to empower the community and make them self-reliant)
- Photographs taken for documentation of work should be submitted
- Media coverage of the projects should be attached if any
- The Group Community Service Project Report will be submitted by the Student group leader under the guidance of the mentor to the Director/HoIs of the Department.
- The Director/HoIs should get the best report (more than one if required) of the Group Community Service Project uploaded on the HTE website and on the University page
- The Director/HoIs will forward the best report of the department to the Nodal Officer of the University.
- University will forward the report to the state level committee.

GUIDELINES FOR GCSP (Group Community Service Project)
ASSIGNMENT OF ANANDAM FOR SOCIAL AWARENESS (for students)

1. Each member of the group shall write one blog about the decided topic of 500 words (minimum) along with any relevant photos/diagrams/statistical data (with reference).
2. The group member shall write his/her name at the end of the blog.

3. The blog shall be posted on Instagram and Facebook (apart from these any other website wherever the group seems necessary).
4. Print out of the blog where date of when the content is posted, number of followers, comments, name of the writer shall be visible will be taken and file will be maintained for the same.
5. In the cover page of the project mention heading **"Group Community Service Project"**, and the filled format of final project report given by Anandam Scheme.
6. For the topic chosen by the group, students are recommended to cover the following points:
    a) Current scenario (Regional, national and international level as applicable)
    b) Future predictions
    c) Duty of the government
    d) Government policies (related to the topic), if any
    e) Duty of public
    f) Conclusion

Evaluation Scheme:

Project Participation: 2 hours X 8 days (per month) X 4 months = 64 hours

- **C grade =32 hrs (Below 20 marks)**
- **B grade >32 hrs to <=44hrs (20-30 marks)**
- **A grade >44 hrs to<=54hrs (30-40 marks)**
- **O grade >54 hrs to<=64hrs (40-50 marks)**

Evaluation Criteria:

Respective Departmental Anandam mentors are requested to evaluate the project (out of 50) as per the following criteria:

1. Position and exceptions, if any, are clearly stated. The organization of the blog is completely and clearly outlined and implemented.
2. The body of the blog is coherently organized, original and the logic is easy to follow. There is no spelling or grammatical errors and terminology is clearly defined. Writing is clear, concise, and persuasive.
3. Conclusion is clearly stated. The underlying logic is explicit.

Course Name	Course Code	LTP	Credit	Semester
MICROPROCESSOR AND MICROCONTROLLER SYSTEMS	**BEC 501**	2:1:0	3	5

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	They can Gain a detailed understanding of any system for a specific application.
CLO 2	Student are able to design a any hardware based on application.
CLO 3	To familiarize the Architecture of 8085 and 8086microprocessor.
CLO 4	To classify the types and characteristics of buses in microprocessor.
CLO 5	To analyze the features, addressing mode and programming of Intel 8085 and 8086 microprocessor.

Course Objective:

This course deals with the systematic study of the Architecture and programming issues of 8085-microprocessor family. The aim of this course is to give the students basic knowledge of the above microprocessor needed to develop the systems using it.

Course Contents:

Module I: Introduction to Microcomputer Systems

Introduction to Microprocessors and microcomputers, Study of 8 bit Microprocessor, 8085 pin configuration, Internal Architecture and operations,interrupts, Stacks and subroutines, various data transfer schemes.

Module II: ALP and timing diagrams

Introduction to 8085 instruction set, advance 8085 programming, Addressing modes, Counters and time Delays, Instruction cycle, machine cycle, T-states, timing diagram for 8085 instruction.

Module III: Memory System Design & I/O Interfacing

Memory interfacing with 8085. Interfacing with input/output devices (memory mapped, peripheral I/O), Cache memory system. Study of following peripheral devices 8255, 8253, 8257, 8259, 8251.

Module IV: 8051 Microcontroller and Real time Control

THE 8051 MICROCONTROLLER: Introduction, The 8051 microcontroller hardware, I/O pins, Ports, External memory, Counters and Timers, Serial data,
8051 ASSEMBLY LANGUAGE PROGRAMMING: Addressing modes, External data moves, Stack,Push and Pop opcodes, Logical operations, Byte level and bit level logical operations. Arithmetic operations, Jump and call instructions, Interrupts & returns.

Module V: System Design

Interrupts, Multiple sources of interrupts, Non maskable sources of interrupts, Interrupt structure in 8051,Timers,Free running counter & Real Time control .Serial I/O interface, Parallel I/O ports interface, Digital and Analog interfacing methods, LED array, keyboard, Printer, Flash memory interfacing.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

- Ramesh. S. Gaonkar, "Microprocessor architecture Programming and Application with 8085" Penram International Publishing, 4th Edition
- B.Ram, "Fundamentals of microprocessors and microcomputer" Dhanpat Rai, 5th Edition.] Douglas V Hall.
- M. Rafiquzzaman, "Microprocessor Theory and Application" PHI – 10th Indian Reprint.
- Naresh Grover, "Microprocessor comprehensive studies Architecture, Programming and Interfacing" Dhanpat Rai, 2003.
- Gosh," 0000 to 8085" PHI.

Course Name	Course Code	LTP	Credit	Semester
DIGITAL CIRCUITS AND SYSTEMS – II	**BEC 502**	2:1:0	3	5

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Identify and explain fundamental concepts of advance digital logic design including combinational and sequential circuits.
CLO 2	Analyse the digital circuit and can describe that circuit by using hardware description language
CLO 3	Analyse small-scale combinational and sequential digital circuits and can implement on FPGA after writing the VHDL code of particular circuit
CLO 4	Implement finite state machine in VHDL language and other arithmetic operation can be done on FPGA using XILINX tool.

Course Objective:

This course builds on the course Digital Circuits and Systems - Hardware development language VHDL is introduced; the usage of the same to implement the systems is dealt in detail.

Course Contents:

Module I:

Design of Sequential circuits

SR, JK, T and D flip flops and their timing diagrams, characteristic table, characteristic equation and excitation tables. Design of Finite State Machines: Mealy and Moore type using next state tables, state diagrams, state minimization, state encoding: minimum bit change and hot one encodings. Comparative cost and delays of

different implementations and their optimization and timing diagrams, Asynchronous and synchronous sequential circuits
Data paths, FSMs with datapaths, ASM charts, synthesis from ASM charts

Module II:

Basics of VHDL
Writing Entities for Digital circuits like decoders, registers etc, Scalar Data types and Operations: Object types: constants, variables, signal and files. Data Types: scalar, integer, floating, physical, enumeration, type declarations, subtypes, expressions and operators for various types.
Sequential statements: If, case, Null, Loop, Exit, Next statements, while loops, For loops, Assertion and report statements
Composite Arrays: arrays, Array aggregates, unconstrained array types, strings, Bit vectors, Standard Logic Arrays, array operations and records

Module III:

VHDL Programming
Behavioural Modeling: process statements, variable and signal assignments, inertial and transport delay models, signal drivers, multiple and postponed processes
Dataflow Modeling: Concurrent signal assignment, multiple drivers, block statement
Structural Modeling: component declaration, component instantiation, resolving signal values, and configuration: basic configuration, configuration for structural modeling, mapping library entities.
Generics, generic (AND, NAND, OR, NOR, XOR and XNOR) gates, functions and subprograms, packages and libraries

Module IV:

Synthesis: mapping statements to gates
Writing a test bench, converting real and integers to time, dumping and reading from text file
Vhdlmodeling of basic gates, half and full adder AOI, IOA, OAI, multiplexes, decoders (dataflow, behavioural and structural modeling), three state driver, parity checker, D, T, JK and SR flip flops, flip flops with preset and clear, modeling for multiplexer, priority encoder, ALU etc, modeling regular structures, delays, conditional operations, synchronous logic, state machine modeling, Moore and Mealy machines, generic priority encoder, clock divider, shift registers, pulse counter etc

Module V:

Overview of the following
PLD devices, PROM, PAL, EPLD, GAL, FPGA, FLGA, DRAM etc and their applications, FPGA programming, Design exercises ASIC design using CAD tools

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	5	5	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
A: Attendance

Text & References:

- Daniel Gajski: Principles of Digital Design
- Bhasker: A VHDL Primer 3/e
- Pedroni: Circuit Design with VHDL
- Perry: VHDL: Programming by examples K. Skahill, VHDL for programmable Logic

Course Name	Course Code	LTP	Credit	Semester
MODERN AND DIGITAL CONTROL ENGINEERING	**BEE 503**	2:1:0	3	5

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Study the control system component behavior by transfer function methods.

CLO 2	Ability to design a suitable compensator Lead, Lag and Lead – lag compensator using frequency domain method or time domain method.
CLO 3	Understand mathematical models of linear discrete-time control systems using transfer functions and state-space models.
CLO 4	Analyze and determine whether performance of linear discrete-time control systems meet specified design criteria
CLO 5	Ability to design a suitable PID Controller to improve the performance the controlled systems PID controllers

Course Objective:

The basic objective of the course is to impart knowledge to the students on modern control theory and design of control systems.

Course Contents:

Module I:

Control System Components
Basic components, amplifiers, plants, transducers, error detectors, servo systems and regulator, DC and AC position and speed control systems.

Design of Feedback control systems
Introduction, cascade compensation networks, phase lag and lead design using Bode and Root locus plots

Module II:

Modern theory
Introduction- State variables, state differential equations(homogeneous and non-homogeneous), Solution, state transition matrix- properties and computation, Laplace solution of state equations, transfer function matrix, representation of state equations in term of state transition matrix, characteristic equation

Modeling- state variable modeling, state model signal flow graph, state models-physical, phase, Jordan, similarity transformation, other useful transformation- controllability and observability canonical, diagonal canonical, Jordan canonicalDecomposition- direct, cascade, parallel. Controllability and observability – introduction, definition, tests, theorems, rank of a matrix, output controllability, duality theorem, pole- zero cancellation
Design-state feedback, relationship with closed-loop transfer function, pole placement and assignment, design of controller by transformation, Observer design, Ackerman's formula

Module III:

Discrete time signals and systems
Introduction, SDC systems, sampling and data reconstruction.

Transform analysis of discrete systems: Introduction, linear difference equations, the pulse T.F. and pulse response, Z-transform equivalence of Zdomain to S-domain, stability analysis.

Module IV:

Design of digital controls
Introduction, design of a positional Servomechanism, digital PID controller, multivariable controllers.

Module V:

State space models of discrete time systems: Introduction, discrete time state equation and solution, design examples, concepts of controllability and observability Liapunov stability analysis.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text:

- R C Dorf,“ Modern Control Systems”, Pearson Education
- J. Nagrath& M. Gopal, 2000, “Control System Engineering”, New Age International.
- Norman S Nise, “Control system Engineering”, Wiley publishers

References:

- M, K. Ogata, 2002, “Modern Control Engineering, PHI.
- B. C. Kuo, 2001, “Automatic Control system, Prentice Hall of India

Course Name	Course Code	LTP	Credit	Semester
WEB DEVELOPMENT	**BCS 510**	2:0:0	2	5

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Structure and implement HTML/CSS.
CLO 2	Apply intermediate and advanced web development practices.
CLO 3	Implement basic JavaScript.
CLO 4	Create visualizations in accordance with UI/UX theories.
CLO 5	Develop a fully functioning website and deploy on a web server.
CLO 6	Find and use code packages based on their documentation to produce working results in a project

Course Objective:

To design web base and context aware systems to acquire, organize process, share and use the knowledge of web sites**.** The field of web site is multidisciplinary as web sites are amazingly complex systems**.** The major objective of this course is to provide a sound foundation to the students on the concepts, percepts and practices in a field that is of immense concern to the industry and business**.**

Course Contents:

Module I: Overview of Internet

Introduction to Internet and WWW, Concept of Networking and Layers of OSI Model, Internet protocols like TCP/IP, http, telnet and ftp, URL, email, domain name, Web Browsers.

Module II: Principles of Web Design

Key issues to be considered in web site design. Structure of a Web Page: Introduction to HTML, Elements of HTML syntax, Head and Body sections, Building HTML documents, Inserting text, images, hyperlinks, Backgrounds and Color Control, HTML Editors & Tools: Use of different HTML editors and tools like Netscape Communicator and Microsoft Front Page etc

Module III: HTML Tags

Use of Different HTML tags in web pages. Table Handling: Table layout & presentation, constructing tables in a web page, developing a web page in a table. Ordered and unordered lists. Frames: Developing Web pages using frames. Advantages and disadvantages of frames. Creating forms, Role of Databases in web applications. Use of at least one graphical and animation tools like Adobe Fireworks, Abode Photoshop, Gif Animator, Gimp etc.

Module IV: Cascading style-sheet (CSS) in HTML

Introduction to Cascading Style Sheets (CSS), Types of Style Sheets (Inline, Internal and External), CSS for Website Layout and Print Layout.

Types of various CSS Selectors, CSS properties: Type Properties, Background Properties, Block Properties, Box Model Properties, List Properties, Border Properties, Positioning Propeties.

Module V: Introduction to Java Script

Role of java script in a web page, Script writing basics, Adding interactivity to a web page, creating dynamic web pages,

Similarities to java, embedding JavaScript code, embedding java applets in a web page**,** Form validation using java script

Projects:

Creating a discussion form, creating an online store, creating a job site**.**

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE

Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance.

Text & References:

Text:

- Ramesh Bangia, "Web Technology", Firewall media
- C. Xavier, "World Wide Web Design with HTML", Tata McGraw Hill.
- Unleashed ASP, Techmedia

References:

- Rick Dranell, "HTML4 unleashed", Techmedia Publication.
- Shelly Powers, "Dynamic Web Publishing Unleashed", Techmedia.
- Don Gosselin, "JavaScript", Vikas Publication
- Mark Swank & Drew Kittel, "World Wide Web Database", Sams net.

Course Name	Course Code	LTP	Credit	Semester
MICROPROCESSOR AND MICRO CONTROLLER SYSTEMS LAB	**BEE 521**	0:0:1	1	5

List of Experiments:

1. To load the numbers 49H and 53H in the memory location 9510 and 9511 respectively and add the contents of memory location 9601.
2. To write assembly language programming for 8 bit addition/subtraction with and without carry/borrow
3. To write assembly language programming for 8 bit multiplication and division.
4. To write assembly language programming for sorting an array of numbers in ascending and descending order.
5. To study and program the programmable peripheral interface (8255) board and programmable interval timer (8253) board.
6. To study and program the programmable DMA controller (8257) board and the programmable. Interrupt controller (8259) board.
7. To study 8086 microprocessor kit.
8. To write a program to move a block of data of 10 numbers from location starting from 2050H to Location starting from 2070H.
9. WAP to solve the equation (AX) + 7(BX) + 9 (DX) → SI.
10. To write a subroutine in 8086 assembly language that can be called by a main program in a different code segment. The subroutine call will multiply a signed 16 bit number with an 8 bit number. Store the result in two consecutive memory word and stop. Assume SI and DI point to 8 bit & 16 bit data respectively.
11. To write instructions to check the various flags in the flag register of 8086.
12. To write a program based on arithmetic instructions.
13. To write a program for addition of two 16 - bit numbers. If the result is more than 32
14. Bits then store the result in memory or else out it at peripheral device.
15. To write a program for 8086 involving logical & machine control instructions.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

Course Name	Course Code	LTP	Credit	Semester
DIGITAL CIRCUITS AND SYSTEMS – II LAB	**BEC 522**	0:0:1	1	5

List of Experiments

To implement VHDL code for

1. 2, 3, 4 inputs AND, OR, XOR and XNOR gates and testing their simulation with signals.
2. Half adder, full adder and full subtractor. Also trying out other simple combinatorial circuits like AOI, IOA, OAI.
3. D and T, flip-flops.
4. JK and SR flip-flops.
5. 2 to 4 and 3 to 8 decoders.
6. 2 to 1, 4 to 1 and 8 to 1 multiplexers.
7. 2 to 1, 4 to 2 and 8 to 3 priority encoders.
8. 8 bit tri state drivers.
9 9 input parity checker.
10 1 bit, 4 bit 8 bit comparators.
11 Adding and subtracting 8 bit integers of various types.
12. Clock divider
13. Shift register
14. Pulse counters.
15. VHDL Design examples of Moore machine, Mealy machine, generic gate inputs and delays.
16. VHDL code examples of structural modeling showing binding.

Experiments based Field Programmable Gate Array (FPGA) Programming

17. Implementation of all the above VHDL experiments using FPGA.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

Course Name	Course Code	LTP	Credit	Semester
MATLAB THEORY AND PRACTICES	**BEE 528**	0:0:1	1	5

Course Objective:
To impart the knowledge on MATLAB software widely used for analysis in Control Systems.

Course Contents:

Module I

Introduction, MATLAB environment- Command, History, Directory, launch pad, Workspace, Array editor and Figure windows

Module II

MATLAB features, variables, keywords, output formats, Help provisions, m-files.

Module III

Input of vectors and matrices, matrix functions, eigen values and eigen vectors, Transfer function and polynomial commands, symbolic math commands and toolbox features

Module IV

MATLAB LTI viewer and Simulink LTI viewer, SISO design tool

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

- Chapman- "MATLAB programming for Engineers", Thomson Learning
- Hanselman and Littlefield- "Mastering MATLAB", Prentice Hall

Course Name	Course Code	LTP	Credit	Semester
WEB WEVELOPMENT LAB	**BCS 530**	0:0:1	1	5

Software Required: Java

List of Assignment:

1. Design a HTML page using all the basic tags.
2. Design a page containing your educational qualification in a table.
3. Design a page containing an ordered list/unordered list.
4. Design a HTML page for your resume.
5. Design a form in HTML to enter different attribute of student information.
6. Design a home page for ASE using Frame.
7. Design another page and connect these to the home page.
8. Write a function in Javascript for input validation.
9. Write a function in Javascript to calculate monthly installation of the loan.
10. Write an input form and save its data in a database using ASP.
11. Display the data stored in database in tabular form on the page.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

Course Name	Course Code	LTP	Credit	Semester
PRACTICAL TRAINING(EVALUTION)	**BEE 560**	0:0:6	6	5

Methodology:

Practical training is based on the theoretical subjects studied by students. It can be arranged within the college or in any related industrial unit. The students are to learn various industrial, technical and administrative processes followed in the industry. In case of on-campus training the students will be given specific task of fabrication/assembly/testing/analysis. On completion of the practical training the students are to present a report covering various aspects learnt by them and give a presentation on same.

Examination Scheme:

Feedback from industry/work place	20
Training Report	40
Viva	15
Presentation	25
Total	**100**

Course Name	Course Code	LTP	Credit	Semester
COMPUTER SYSTEM ARCHITECTURE	BEE 505	2:1:0	3	5

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Investigate the Operate logical components and relate them with the various components of computer.
CLO 2	Create the general organization of the central processing unit.
CLO 3	Apply various computer memories and system communication mechanisms.
CLO 4	. Develop various parallel processing architectures.

Course Objective:

This course deals with computer architecture as well as computer organization and design. Computer architecture is concerned with the structure and behaviour of the various functional modules of the computer and how they interact to provide the processing needs of the user. Computer organization is concerned with the way the hardware components are connected together to form a computer system. Computer design is concerned with the development of the hardware for the computer taking into consideration a given set of specifications.

Course Contents:

Module I:

Register Transfer Language
Register Transfer, Bus and Memory Transfers, Arithmetic Micro-operations, Logic Micro-operations, Shift Micro-operations, Arithmetic Logic shift Unit.

Module II:

Basic Computer Organizations and Design
Instruction Codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory-Reference Instructions, Input-Output and Interrupt, Design of Accumulator Logic. Hardwired and Microprogrammed control: Control Memory, Address Sequencing, Design of Control Unit

Module III:

Central Processing Unit
Introduction, General Register Organization, Stack Organization, Instruction representation, Instruction Formats, Instruction type, Addressing Modes, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer RISC and CISC
Computer Arithmetic: Introduction, Multiplication Algorithms, Division Algorithms, Floating-Point Arithmetic Operations

Module IV:

Memory and Intrasystem Communication and Input output organization Memory: Memory types and organization Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory, Memory Management Hardware

Intrasystem communication and I/O: Peripheral Devices, Input-Output
Controller and I/O driver, IDE for hard disk, I/O port and Bus concept, Bus cycle, Synchronous and asynchronous transfer, Interrupt handling in PC, Parallel Port, RS – 232 interface, Serial port in PC, Serial I/O interface, Universal serial bus IEEE 1394, Bus Arbitration Techniques, Uni-bus and multi-bus architectures EISA Bus, VESA Bus.

Module V:

Pipelining, Vector Processing and Multiprocessors
Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processors.

Multiprocessors: Characteristics of Multiprocessors, Interconnection Structures, Interprocessor Arbitration, Interprocessor Communication and Synchronization, Advanced computer architecture, Pentium and Pentinum – Pro, Power PC Architecture

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text:

- Morris Mano, Computer System Architecture, 3rd Edition – 1999, Prentice-Hall of India Private Limited.
- Harry & Jordan, Computer Systems Design & Architecture, Edition 2000, Addison Wesley, Delhi.

References:

- WIliam Stallings, Computer Organization and Architecture, 4th Edition-2000, Prentice-Hall of India Private Limited.
- Kai Hwang-McGraw-Hill, Advanced Computer Architecture.
- Kai Hwang & Faye a Briggs, McGrew Hill, inc., Computer Architecture & Parallel Processing.
- John D. Carpinelli, Computer system Organization & Architecture, Edition 2001, Addison Wesley, Delhi
- John P Hayes, McGraw-Hill Inc, Computer Architecture and Organization.
- M. Morris Mano and Charles, Logic and Computer Design Fundamentals, 2nd Edition Updated, Pearson Education, ASIA.
- Hamacher, "Computer Organization," McGraw hill.
- Tennenbaum," Structured Computer Organization," PHI
- B. Ram, "Computer Fundamentals architecture and organization," New age international Gear C. w., "Computer Organization and Programming, McGraw hill

Course Name	Course Code	LTP	Credit	Semester
PROCESS CONTROL ENGINEERING	**BEE 507**	2:1:0	3	5

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Understand the process control and dynamics
CLO 2	Analyze the different types of control techniques
CLO 3	Verify the process calculation, static and dynamics based and instrumentation based techniques
CLO 4	Apply the P, PI and PID system to real life.

Course Objective:

The basic objective of this course is to provide the students the core knowledge of control systems, when applied to specific process control. The idea is provide knowledge about feedback control systems, its design and computer process interface.

Course Contents:

Module I:

Basic Considerations
Introduction to process control system, control loop study- realization with load-changes at arbitrary points in the loop, offset and its analysis, modelling consideration for control purposes, degree of freedom and process controllers, formulating the scope at modelling for process control. Computer simulation and linearization of non linear system transfer function and input output models, Dynamic behaviour of firstorder lag system, process with variable time constant and gain. Dynamic behaviour of second order and higher order system-multicaplacity process, real time process, inverse response process, Introduction to
Feedback control and effects P, I & D controllers.

Module II:

Designing feed back controller
Outline of the design problems, Selection of type of feedback controller. Time-Integral performanceCriterion, Process Reaction Curve and frequency response characteristic, Ziegler-Nichol Rule, effect of dead
time, dead time compensator and inverse response compensator.

Module III:

Control Systems with Multiple Loops
Cascade, spilt-range feed forward, ratio inferential and adaptive control.

Module IV:

Interaction & De-Coupling of Control Loop

Interaction of control loops, relative gain array and selection of the loops, Design of non-interacting control loop.

Module V:

Computer Process Interface for Data Acquisition & Control
Introduction to digital computer control of processes. Design of control system for complete plant.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

mination Scheme:

Text & References:

***Text*:**

- Chemical process Control – George Stephanopoulos. Pub. PHI

***References*:**

- Digital Computer Process Control-C.L. Smith Pub: Intext Educational Publisher
- Process Control-F.G. Shinskey, Pub. Mc-Graw Hill
- Advanced Process Control-W.H. Ray, Pub. McGraw Hill
- Process system and analysis and control-D.R. Coushanour, TMH
- Process Instrument & Control handbook-D.M. Considins, Pub: McGraw Hill

Course Name	Course Code	LTP	Credit	Semester
COMMUNICATION SKILLS – III	**BCS 501**	1:0:0	1	5

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Create right selection of words and ideas while also choosing the appropriate channelof formalcommunication.
CLO 2	Demonstrate the ability to analyse a problem and devise a solution in a group.
CLO 3	Demonstrate proficiency in the use of written communication.
CLO 4	Recognize the mannerisms and methodology of Interview and GD to become more expressive in their body language and verbal performance.

Course Objective:

To equip the participant with linguistic skills required in the field of science and technology while guiding them to excel in their academic field.

Course Contents:

Module I

Reading Comprehension
Summarising
Paraphrasing

Module II

Essay Writing
Dialogue Report

Module III

Writing Emails
Brochure
Leaflets

Module IV

Introduction to Phonetics
Vowels
Consonants
Accent and Rhythm
Accent Neutralization
Spoken English and Listening Practice

Examination Scheme:

Components	CT1	CT2	CAF	V	GD	GP	A
Weightage (%)	20	20	25	10	10	10	5

CAF – Communication Assessment File

GD – Group Discussion
GP – Group Presentation

Text & References:

- Effective English for Engineering Students, B Cauveri, Macmillan India
- Creative English for Communication, Krishnaswamy N, Macmillan
- A Textbook of English Phonetics, Balasubramanian T, Macmillan

Course Name	Course Code	LTP	Credit	Semester
BEHAVIOURAL SCIENCE - V (GROUP DYNAMICS AND TEAM BUILDING)	**BSS 504**	1:0:0	1	5

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Recognize their personality and individual differences and identify its importance of diversity at workplace and ways to enhance it.
CLO 2	Recognize effective socialization strategies and importance of patriotism and taking accountability of integrity.
CLO 3	Recognize different types of human rights and its importance.
CLO 4	Identify Indian values taught by different religions.
CLO 5	Identify long term goals and recognize their talent, strengths and styles to achieve them

Course Objective:

To inculcate in the students an elementary level of understanding of group/team functions
To develop team spirit and to know the importance of working in teams

Course Contents:

Module I:

Group formation
Definition and Characteristics
Importance of groups
Classification of groups
Stages of group formation
Benefits of group formation

Module II:

Group Functions
External Conditions affecting group functioning: Authority, Structure, Org. Resources, Organizational policies etc.
Internal conditions affecting group functioning: Roles, Norms, Conformity, Status, Cohesiveness, Size, Inter group conflict.
Group Cohesiveness and Group Conflict
Adjustment in Groups

Module III:

Teams
Meaning and nature of teams
External and internal factors effecting team
Building Effective Teams
Consensus Building
Collaboration

Module IV:

Leadership
Meaning, Nature and Functions
Self leadership
Leadership styles in organization
Leadership in Teams

Module V:

Power to empower: Individual and Teams
Meaning and Nature
Types of power
Relevance in organization and Society

Module VI:

End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Organizational Behaviour, Davis, K.
- Hoover, Judhith D. Effective Small Group and Team Communication, 2002,Harcourt College Publishers
- Dick, Mc Cann&Margerison, Charles: Team Management, 1992 Edition, viva books
- Bates, A. P. and Julian, J.: Sociology - Understanding Social Behaviour
- Dressers, David and Cans, Donald: The Study of Human Interaction
- Lapiere, Richard. T – Social Change
- Lindzey, G. and Borgatta, E: Sociometric Measurement in the Handbook of Social Psychology, Addison – Welsley, US.
- Rose, G.: Oxford Textbook of Public Health, Vol.4, 1985.
- LaFasto and Larson: When Teams Work Best, 2001, Response Books (Sage), New Delhi
- J William Pfeiffer (ed.) Theories and Models in Applied Behavioural Science, Vol 2, Group (1996); Pfeiffer & Company
- Smither Robert D.; The Psychology of Work and Human Performance, 1994, Harper Collins College Publishers

Course Name	Course Code	LTP	Credit	Semester
FRENCH - V	FLT 501	2:0:0	2	5

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone intermediate language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of intermediate level.
CLO 3	Students will be able to communicate in small sentences in Simple Future and Past tenses .
CLO 4	Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.

Course Objective:

To furnish some basic knowledge of French culture and civilization for understanding an authentic document and information relating to political and administrative life

Course Contents:

Module D: pp. 131 – 156 Unités 10, 11

Contenu lexical: Unité 10: Prendre des décisions

1. Faire des comparaisons
2. décrire un lieu, le temps, les gens, l'ambiance
3. rédiger une carte postale

Unité 11: faire face aux problèmes

1. Exposer un problème.
2. parler de la santé, de la maladie
3. interdire/demander/donner uneautorisation
4. connaître la vie politique française

Contenu grammatical:

1. comparatif - comparer des qualités/ quantités/actions
2. supposition : Si + présent, futur
3. adverbe - caractériserune action
4. pronom "Y"

Examination Scheme:

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- **le livre à suivre : Campus: Tome 1**

Course Name	Course Code	LTP	Credit	Semester
GERMAN - V	**FLG 501**	2:0:0	2	5

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone intermediate language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of intermediate level.
CLO 3	Students will be able to communicate in small sentences in Simple Future and Past tenses .
CLO 4	Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.

Course Objective:

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.
To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany
Introduction to Advanced Grammar and Business Language and Professional Jargon

Course Contents:

Module I:

Genitive case
Genitive case – Explain the concept of possession in genitive
Mentioning the structure of weak nouns

Module II:

Genitive prepositions
Discuss the genitive propositions and their usage: (während, wegen, statt, trotz)

Module III:

Reflexive verbs
Verbs with accusative case
Verbs with dative case
Difference in usage in the two cases

Module IV:

Verbs with fixed prepositions
Verbs with accusative case
Verbs with dative case
Difference in the usage of the two cases

Module V:

Texts
A poem ‘Maxi’
A text Rocko

Module VI:

Picture Description
Firstly recognize the persons or things in the picture and identify the situation depicted in the picture;
Secondly answer questions of general meaning in context to the picture and also talk about the personal experiences which come to your mind upon seeing the picture.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

Course Name	Course Code	LTP	Credit	Semester
SPANISH - V	FLS 501	2:0:0	2	5

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone intermediate language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of intermediate level.
CLO 3	Students will be able to communicate in small sentences in Simple Future and Past tenses .
CLO 4	Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.

Course Objective:
To enable students acquire working knowledge of the language; to give them vocabulary, grammar, voice modulations/intonations to handle everyday Spanish situations with ease.

Course Contents:

Module I

Revision of earlier semester modules

Module II

Future Tense

Module III

Presentations in English on
Spanish speaking countries'
Culture
Sports
Food
People
Politics
Society
Geography

Module IV

Situations:
En el hospital
En la comisaria
En la estacion de autobus/tren
Enel banco/cambio

Module V

General revision of Spanish language learnt so far.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español Sin Fronteras, Greenfield

Course Name	Course Code	LTP	Credit	Semester
CHINESE – V	FLC 501	2:0:0	2	5

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone intermediate language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of intermediate level.
CLO 3	Students will be able to communicate in small sentences in Simple Future and Past tenses .
CLO 4	Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.

Course Objective:

What English words come from Chinese? Some of the more common English words with Chinese roots areginseng, silk, dim sum, fengshui, typhoon, yin and yang, T'al chi, kung-fu. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I

Drills
Dialogue practice
Observe picture and answer the question.
Pronunciation and intonation.
Character writing and stroke order

Module II

Intonation
Chinese foods and tastes – tofu, chowmian, noodle, Beijing duck, rice, sweet, sour….etc. Learning to say phrases like – Chinese food, Western food, delicious, hot and spicy, sour, salty, tasteless, tender, nutritious, god for health, fish, shrimps, vegetables, cholesterol is not high, pizza, milk, vitamins, to be able to cook, to be used to, cook well, once a week, once a month, once a year, twice a week……
Repetition of the grammar and verbs taught in the previous module and making dialogues usingit.
Compliment of degree "de".

Module III

Grammar the complex sentence "suiran … danshi…."
Comparison – It is colder today than it was yesterday…..etc.
The Expression "chule….yiwai". (Besides)
Names of different animals.
Talking about Great Wall of China
Short stories

Module IV

Use of "huozhe" and "haishi"
Is he/she married?
Going for a film with a friend.
Having a meal at the restaurant and ordering a meal.

Module V

Shopping – Talking abut a thing you have bought, how much money you spent on it? How many kinds were there? What did you think of others?
Talking about a day in your life using compliment of degree "de". When you get up? When do you go for class? Do you sleep early or late? How is Chinese? Do you enjoy your life in the hostel?
Making up a dialogue by asking question on the year, month, day and the days of the week and answer them.

Examination Scheme:

Components	**CT1**	**CT2**	**C**	**I**	**V**	**A**
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- "ElementaryChinese Reader " Part-II Lesson 39-46

Course Title: Anandam

ANANDAM

Course Name	Course Code	LTP	Credit	Semester
ANANDAM	AND005	2:0:0	2	5

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Awareness and empathy regarding community issues
CLO 2	Interaction with the community and impact on society
CLO 3	Interaction with mentor and development of Student teacher relationship
CLO 4	Interaction among students, enlarge social network
CLO 5	Cooperative and Communication skills and leadership qualities
CLO 6	Critical thinking, Confidence and Efficiency

Course Objectives:

After the completion of this course, students will be able to:

- apply their knowledge and skills to solve specific community problem
- learn to plan, lead, and organize community events have a sense of belonging to their college campus and community and find something they are interested in doing during their free time

- make new friends, expand social network, and boost social skills and mental health.
- be useful to society as it will protect them against stress, frustration, and depression

Course Contents:

The project report should be guided by the mentor and shall contain:

- **Synopsis**: clearly stating objectives and activities to be undertaken. Problem identifying and problem-solving projects to be taken up.
- Details of the **Mentor and the Participants are to** be given (name of mentor, name of participants, phone number/mobile no, email, and address)
- Location / community where the work was carried out
- Details of Activities performed are to be given with date
- Number of beneficiaries and impact on the society (the object should be to empower the community and make them self-reliant)
- Photographs taken for documentation of work should be submitted
- Media coverage of the projects should be attached if any
- The Group Community Service Project Report will be submitted by the Student group leader under the guidance of the mentor to the Director/HoIs of the Department.
- The Director/HoIs should get the best report (more than one if required) of the Group Community Service Project uploaded on the HTE website and on the University page
- The Director/HoIs will forward the best report of the department to the Nodal Officer of the University.
- University will forward the report to the state level committee.

GUIDELINES FOR GCSP (Group Community Service Project)
ASSIGNMENT OF ANANDAM FOR SOCIAL AWARENESS (for students)

1. Each member of the group shall write one blog about the decided topic of 500 words (minimum) along with any relevant photos/diagrams/statistical data (with reference).
2. The group member shall write his/her name at the end of the blog.
3. The blog shall be posted on Instagram and Facebook (apart from these any other website wherever the group seems necessary).
4. Print out of the blog where date of when the content is posted, number of followers, comments, name of the writer shall be visible will be taken and file will be maintained for the same.
5. In the cover page of the project mention heading **"Group Community Service Project"**, and the filled format of final project report given by Anandam Scheme.
6. For the topic chosen by the group, students are recommended to cover the following points:
    a) Current scenario (Regional, national and international level as applicable)
    b) Future predictions
    c) Duty of the government
    d) Government policies (related to the topic), if any
    e) Duty of public
    f) Conclusion

Evaluation Scheme:

Project Participation: 2 hours X 8 days (per month) X 4 months = 64 hours

- **C grade =32 hrs (Below 20 marks)**
- **B grade >32 hrs to <=44hrs (20-30 marks)**
- **A grade >44 hrs to<=54hrs (30-40 marks)**
- **O grade >54 hrs to<=64hrs (40-50 marks)**

Evaluation Criteria:

Respective Departmental Anandam mentors are requested to evaluate the project (out of 50) as per the following criteria:

1. Position and exceptions, if any, are clearly stated. The organization of the blog is completely and clearly outlined and implemented.
2. The body of the blog is coherently organized, original and the logic is easy to follow. There is no spelling or grammatical errors and terminology is clearly defined. Writing is clear, concise, and persuasive.
3. Conclusion is clearly stated. The underlying logic is explicit.

Course Name	Course Code	LTP	Credit	Semester
POWER ELECTRONICS	BEE 601	2:1:0	3	6

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Accurately analyse and select the power semiconductor switching devices for a given power converter.
CLO 2	Understand the constructional details and principle of operation of triggering devices to control the power devices.
CLO 3	Design an appropriate triggering and protection scheme for power semiconductor devices.
CLO 4	Understand the working of various types of converters, choppers and inverter circuits.

Course Objective:

The course aims to introduce them to the theory of operation, analytical and circuit models and basic design concepts of Electric Power components and systems.

Course Contents:

Module I:

Characteristics of semiconductor power devices
Diode, Thyristor, Triac, GTO, MOSFET, IGBT

Module II:

Triggering Devices
Unijunction Transistor, Characteristics and applications of UJT, Programmable Unijunction Transistor, DIAC, Silicon Controlled Switch, Silicon Unilateral Switch, silicon Silicon bilateral Switch, Shockley diode.

Module III:

Thyristor Firing Circuits, Turn on systems
Two transistor model of Thyristor, Method of Triggering a thyristor, Thyristor Types, Requirement for triggering circuits, Thyristor Firing Circuits, Fullwave control of Ac with one thryristor, Light activated SCrs (LASCR), Control Circuit, dv/dt and di/dt protection of Thyristor, Pulse Transformer triggering, Firing SCR by UJT, TRIAC firing circuit, Phase control of SCR by pedestal and Ramp.

Module IV:

Controlled Rectifiers
Types of Converters, effect of inductive load, Commutating diode or free wheeling diode, controlled rectifiers, Bi phase half wave, single phase full wave phase controlled converter using bridge principle, Issues of line current harmonics, Power factor, Distortion factor of ac to dc converters.

Module V:

Inverters
Types of Inverters, Bridge Inverters, Voltage Source Inverters, Sinusoidal Pulse Width Modulation Inverters, Current source Inverters.

Module VI:

AC Voltage Controllers
Types of AC voltage Controllers, AC Phase Voltage controllers, single Phase Voltage Controller with RL load

Module VII:

DC to DC Converters
DC choppers, Chopper classification, two quadrant chopper, Four quadrant chopper.

Module VIII:

Industrial Applications
One shot Thyristor trigger Circuit, over voltage protection, simple battery charger, battery charging regulator, AC static switches, DC static switch.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text:

- J. Michael: Power Electronics: Principles and Applications
- M. H. Rashid: Power Electronics circuits

References:

- H. C. Rai, "Power Electronics Devices, Circuits, Systems and Application", Galgotia, 3rd Ed.
- P. S. Bimbhara, "Electrical Machinery, Theory Performance and Applications" Khanna Publications, 7th Ed

Course Name	Course Code	LTP	Credit	Semester
POWER SYSTEM ANALYSIS	**BEE 602**	2:1:0	3	6

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Ability to determine the solution for economic dispatch and unit commitment problems of a power system
CLO 2	Understand the concept of stability, able to identify and calculate the steady state stability limits of power system network using various methods.
CLO 3	Able to identify the transient stability limits of power system network and apply various methods to enhance stability limits.
CLO 4	Able to formulate and analyse the load flow problems for existing power network.
CLO 5	Apply and analyse the load flow solutions for existing and new modified power system networks.
CLO 6	Able to identify, formulate, and solve the power system engineering problems

Course Objective :

To provide the knowledge of power system analysis . To blend the students with admittance modelling and impedance modelling and also with the symmetrical components essentials for the power system designing and analysis .

Course Contents :

Module I:

Percent and per unit quantities. Single line diagram for a balanced 3-phase system **Admittance Model:** Branch and node admittances Equivalent admittance network
and calculation of Y bus. Modification of an existing Y bus.

Impendence Model: Bus admittance and impedance matrices. Thevenin's theorem and Z bus. Direct determination of Z bus. Modification of an existing bus.

Module II:

Symmetrical fault Analysis: Transient on a Transmission line, short circuit of a
synchronous machine on no load, short circuit of a loaded synchronous machine. Equivalent circuits of synchronous machine under sub transient, transient and steady state conditions. Selection of circuit breakers,

Algorithm for short circuit studies. Analysis of three-phase faults.

Module III:

Symmetrical Components: Fortes cue's theorem, symmetrical component transformation. Phase shift in star-delta transformers. Sequence Impedances of transmission lines, Synchronous Machine and Transformers, zero sequence network of transformers and transmission lines. Construction of sequence networks of power system.

Module IV:

Fault Analysis: Analysis of single line to ground faults using symmetrical components, connection of sequence networks under the fault condition. Unsymmetrical Fault Analysis: (i) Analysis of line-to-line and double line to ground faults using symmetrical components, connection of sequence networks under fault conditions. (ii) Analysis of unsymmetrical shunt faults using bus impedance matrix method.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text Books

- J. J. Grainger, William, D. Stevenson Jr.: Power System Analysis, MGH. 2003
- T. K. Nagsarkar& M. S. Sukhija: Power System Analysis, Oxford University Press. 2007

Reference Books

- J. D. Glover, M. S. Sharma & T. J. Overbye: Power System Analysis and Design,

Course Name	Course Code	LTP	Credit	Semester
TRANSMISSION AND DISTRIBUTION SYSTEM	**BEE603**	2:1:0	3	6

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	To Conceptualize Students the Basics of existing power Transmission & Distribution System networks in Utilities in Public and Private sectors along with their Rating methods. Future integrated approach of Reduction of line losses and reduction of Transformer Failures projects will be understood
CLO 2	To apply the systematic approach to the policies and other DPR related methodologies for arranging funds from government schemes will be learned by the students.
CLO 3	To analyze delays caused in the progress of implementing of projects for improvements will be learned and their remedial measures will be understood by the student
CLO 4	To integrate All regulatory matters/Acts/policies/guidelines/rules will be understood by the students in details particularly Electricity Act 2003 and its Amendments..
CLO 5	To apply Transmission and Distribution Sub Station upgradation/ modernization work in practical by the students and time over runs/cost over runs with quality standards will be learned

Course Objective:

The basic objective of this course is to provide the students the core knowledge of electric power transmission and distribution.

Course Contents:

Module I:

Supply systems: Basic network of power system. Transmission and distribution voltage, effect of system voltage on size of conductor and losses. Comparison of DC 2- wire, DC 3-wire, 1-phase AC and 3-phase AC (3-wire and 4-wire) systems.
Distribution Systems: Primary and secondary distribution systems, feeder, distributor and service mains. Radial and ring- main distribution systems. Kelvin's law for conductor size.

Module II:

Mechanical Features of Overhead Lines: Conductor material and types of conductor. Conductor arrangements and spacing.
Calculation of sag and tension, supports at different levels, effect of wind and ice loading, stringing chart and sag template. Conductor vibrations and vibration dampers.

Module III:

Parameters of Transmission Lines: Resistance inductance and capacitance of overheadlines, effect of earth, line transposition. Geometric mean radius and distance.
Inductance and capacitance of line with symmetrical and unsymmetrical spacing Inductance and capacitance of double circuit lines. Skin and proximity effects. Equivalent circuits and performance of short and medium transmission lines.

Module IV:

Generalized ABCD Line Constants: equivalent circuit and performance of long transmission line. Ferranti effect. Interference with communication circuits. Power flow through a transmission line.
Corona: Electric stress between parallel conductors. Disruptive critical voltage and visual critical voltage, Factors affecting corona. Corona power loss. Effects of corona.

Module V:

Insulators: Pin, shackle, suspension, post and strain insulators. Voltage distribution across an insulator string, grading and methods of improving string efficiency.
Underground Cables: Conductor, insulator, sheathing and armoring materials. Types of cables. Insulator resistance and capacitance calculation. Electrostatic stresses and reduction of maximum stresses. Causes of breakdown. Thermal rating of cable. Introduction to oil filled and gas filled cables.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

- Electric Power System: By – C.L. Wadhwa
- Electric Power System: By - Asfaq Husain
- Elements of Power System Analysis: By – William D. Stevenson
- Power System Analysis & Design: By – B.R. Gupta
- HVDC Transmission: By K.R. Padiyar
- Electric power by Soni, Gupta and Bhatnagar

Course Name	Course Code	LTP	Credit	Semester
UTILIZATION OF ELECTRIC POWER	BEE 604	2:1:0	3	6

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Recognize different methods of electric heating and welding, design of heating elements for resistance furnaces and analyze the performance of arc furnaces
CLO 2	Explain different types of chemical processes and design electrical circuits for refrigeration and air conditioning applications
CLO 3	Define basic terms used in illumination engineering, explain different sources of light and design simple indoor illumination schemes
CLO 4	Distinguish between different types of traction systems and explain track electrification supply system constituents and equipment used in traction substation
CLO 5	Analyze different types of speed time curves and define important terms used in traction mechanics like average speed, schedule speed, tractive effort, specific energy consumption and coefficient of adhesion
CLO 6	Explain characteristics of traction motors, control of traction motors, electrical braking and railway signalling

Course Objective:

This course intends to impart knowledge on the practical and practice aspects of electrical engineering

Course Contents:

Module I: Illumination

Basic laws of illumination; light sources and their characteristics; sources of light; design of lighting schemes; incandescent lamp; sodium lamp; mercury lamp and fluorescent lamp; comparison of various lamps.

Module II: Heating and Welding

Electrical heating-advantages, methods and application, resistance over general construction, design of heating elements, efficiency and losses control. Induction heating: core type furnaces, core less furnaces and high frequency eddy current heating, dielectric heating: principle and special applications, arc furnaces: direct arc furnaces, Indirect arc furnaces, electrodes, power supply and control. Different methods of electrical welding and electrical equipment for them. Arc furnaces transformer and welding transformers.

Module III: Traction

Advantages and disadvantages, system of electric traction, diesel electric locomotives. Mechanics of train movement: simplified speed time curves, average and schedule speed, tractive effort, specific energy consumption, factors affecting specific energy consumption.

Module IV: Traction Motors

DC motors, single phase and three phase motors, starting and control of traction motors, braking of traction motors. Modern 25 KV a.c. single phase traction systems: advantages, equipment and layout of 25 KV, single phase power frequency A.C. traction.

Module V: Electric Drives

Individual and collective drives- electrical braking, plugging, rheostatic and regenerative braking load equalization use of fly wheel criteria for selection of motors for various
industrial drives.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

- Pratab. H. "Art and Science of Utilization of Electrical Energy": Dhanpat Rai & Sons, 2001
- Wadhwa C.L. "Generation, Distribution and Utilization of Electrical Power"; Khanna Publications,2005
- Gupta.J. B. "A Course of Electric Power", S. K. Kataria& Sons, 2009
- Uppal .S. L. "Electrical Power", Khanna Publisher, 2005
- Dover. A. T. "Electric Traction" , Sir Isaac Pitman & Sons Ltd. 1965

Course Name	Course Code	LTP	Credit	Semester
PROGRAMMING WITH PYTHON	**BCS 610**	2:0:0	2	6

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	To acquire programming skills in core Python
CLO 2	To acquire Object Oriented Skills in Python
CLO 3	To develop the skill of designing Graphical user Interfaces in Python
CLO 4	To develop the ability to write database applications in Python

Course Objective:

Objective: Python is next generation multi-purpose programming language that allows different users to create applications of various domains. Students will be able to learn primary fundamentals of python programming and potential of python is to achieve modern computing requirements

Course Outcomes: After completion of this course, student will be able to

- To learn basics of Python.

- To develop console application in python.
- To develop database application in python.
- To develop basic machine learning application.

Pre-requisite of course: Object oriented concepts, Programming fundamentals

Course Contents:

Module I: Basic of Python Programming

The concept of data types; variables, assignments; immutable variables; numerical types; arithmetic operators and expressions; comments in the program; understanding error messages.

Module II: Conditioning and looping in python

Conditions, Boolean logic, logical operators; ranges; Control statements: if-else, loops (for, while); lambda function in python.

Module III: String, List, Tuple, Set, Dictionary data structure

String manipulations: subscript operator, indexing, slicing a string; strings and number system: converting strings to numbers and vice versa. Lists, tuples, and dictionaries; basic list operators, replacing, inserting, removing an element; searching and sorting lists; dictionary literals, adding and removing keys, accessing and replacing values, traversing dictionaries.

Module IV: Function

Design with functions: hiding redundancy, complexity; arguments and return values; formal vs actual arguments, named arguments. Program structure and design. Recursive functions.

Module V: Basic Python Libraries

Pandas: creation of dataframe, Manipulation of dataframe, generation of series, iloc and loc function etc. NumPy: creation of arrays (1-D, 2-D and n-D array), random matrix, one's matrix, zero's matrix and all other operation over arrays, matplotlib: plotting of line graph, pi chart and box plot etc.

Projects:
Creating a discussion form, creating an online store, creating a job site**.**

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text:

- Ramesh Bangia, "Web Technology", Firewall media
- C. Xavier, "World Wide Web Design with HTML", Tata McGraw Hill.
- Unleashed ASP, Techmedia

References:

- Rick Dranell, "HTML4 unleashed", Techmedia Publication.
- Shelly Powers, "Dynamic Web Publishing Unleashed", Techmedia.
- Don Gosselin, "JavaScript", Vikas Publication
- Mark Swank & Drew Kittel, "World Wide Web Database", Sams net.

Course Name	Course Code	LTP	Credit	Semester
POWER ELECTRONICS LAB	**BEE 621**	0:0:1	1	6

Course Objective:

The course aims to introduce them to the theory of operation, analytical and circuit models and basic design concepts of Electric Power components and systems.

Course Contents:

1. Study of VI Characteristics of SCR at different gate currents.
2. Study of VI characteristics of DIAC.
3. Static characteristics of IGBT and MOSFET
4. RC and UJT triggering of SCR.
5. Different types of commutation..
6. Single phase half and full controlled wave converter.
7. Step up and step down choppers.
8. a. Single phase series inverter.

   b. Single phase parallel inverter.
9. Speed control of universal motor.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

Reference/Suggested Books

1. O. P. Arora: Power Electronics Laboratory-Experiments and Organization, Narosa Pub.
2. P. B. Zbar: Industrial Electronics- A Text-Lab Manual, MGH.

.

Course Name	Course Code	LTP	Credit	Semester
POWER SYSTEM LAB	**BEE 622**	0:0:1	1	6

List of Experiments:

1. To study the performance of a transmission line. Also compute its ABCD parameters.
2. Study of Characteristics of over current and earth fault protection.
3. To study the operating characteristics of fuse. (HRC or open type)
4. To find the earth resistance using three spikes
5. To study over current static relay.
6. To study the different types of faults on transmission line demonstration panel/model.
7. To study the radial feeder performance when
   (a) Fed at one end.
   (b) Fed at both ends
8. To study the performance of under voltage and over voltage relay.
9. To study the characteristics of bimetal mini circuit breakers.
10. To study the characteristics of Distance Relay.
11. To find the breakdown strength of transformer oil.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

Course Name	Course Code	LTP	Credit	Semester
PROGRAMMING WITH PYTHON LAB	**BCS 630**	0:0:1	1	6

Software Required: Java

List of Assignment:

1. Write a program to demonstrate basic data type in python.
2. Write a program to compute distance between two points taking input from the user.
3. Write a program add.py that takes 2 numbers as command line arguments and prints its sum.
4. Write a Program for checking whether the given number is an even number or not. Using a for loop, write a program that prints out the decimal equivalents of1/2, 1/3, 1/4, . . . , 1/10.
5. Write a Program to demonstrate list and tuple in python.
6. Write a program using for loop that loops over a sequence.
7. Write a program using a while loop that asks the user for a number, and print countdown from that number to zero
8. WAP to find the sum of the even-valued terms.
9. Write a program to count the numbers of characters in the string and store them in a dictionary data structure.
10. Write a program to use split and join methods in the string and trace a birthday of a person with a dictionary data structure.
11. Write a program to print each line of a file in reverse order.
12. Write a program to compute the number of characters, words and lines in a file.
13. Write a function nearly equal to test whether two strings are nearly equal. Two strings a and b are nearly equal when a can be generated by a single mutation.
14. Write function to compute gcd, lcm of two numbers. Each function shouldn’texceed one line

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

Course Name	Course Code	LTP	Credit	Semester
DATA STRUCTURES AND IT	**BEC 606**	2:1:0	3	6

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Understanding of fundamental Data Structures including linked-lists, trees, binary search trees, AVL trees, stacks, queues, priority queues, and hash-tables and skiplists.
CLO 2	Understanding of fundamental abstract data types which can include: Maps, Sets and Vectors.
CLO 3	Ability to program data structures and use them in implementations of abstract data types.
CLO 4	Ability to devise novel solutions to small scale programming challenges involving data structures and and recursion.
CLO 5	Understanding of basic algorithmic complexity.

Course Objective:

Data structure deals with organizing large amount of data in order to reduce space complexity and time requirement. This course gives knowledge of algorithms, different types of data structures and the estimation space and time complexity.

Course Contents:

Module I: Introduction to Data structures

Data structures: Definition, Types. Algorithm design, Complexity, Time-Space Trade offs. Use of pointers in data structures.Array Definition and Analysis, Representation of Linear Arrays in Memory, Traversing of Linear Arrays, Insertion And Deletion, Single Dimensional Arrays, Two Dimensional Arrays, Multidimensional Arrays, Function Associated with Arrays, Character String in C, Character String Operations, Arrays as parameters, Implementing One Dimensional Array, Sparse matrix.

Module II: Introduction to Stacks and queue

Stack: Definition, Array representation of stacks, Operations Associated with Stacks- Push & Pop, Polish expressions, Conversion of infix to postfix, infix to prefix (and vice versa),Application of stacks recursion, polish expression and their compilation, conversion of infix expression to prefix and postfix expression, Tower of Hanoi problem.

Queue: Definition, Representation of Queues, Operations of queues- QInsert, QDelete, Priority Queues, Circular Queue, Deque.

Module III: Dynamic Data Structure

Linked list: Introduction to Singly linked lists: Representation of linked lists in memory, Traversing, Searching, Insertion into, Deletion from linked list, doubly linked list, circular linked list, generalized list. Applications of Linked List-Polynomial representation using linked list and basic operation. Stack and queue implementation using linked list.

Module IV: Trees and Graphs

Trees: Basic Terminology, Binary Trees and their representation, expression evaluation, Complete Binary trees, extended binary trees, Traversing binary trees, Searching, Insertion and Deletion in binary search trees, General trees, AVL trees, Threaded trees, B trees.

Graphs: Terminology and Representations, Graphs & Multigraphs, Directed Graphs, Sequential representation of graphs, Adjacency matrices, Transversal Connected Component and Spanning trees.

Module V: Sorting and Searching and file structures

Sorting: Insertion Sort, Bubble sort, Selection sort, Quick sort, two-way Merge sort, Heap sort, Partition exchange sort, Shell sort, Sorting on different keys, External sorting.

Searching: Linear search, Binary search

File structures: Physical storage media, File Organization, Linked organization of file, Inverted file, Organization records into blocks, Sequential blocks, Hash function, Indexing & Hashing, Multilevel indexing, Tree Index, Random file, Primary Indices, Secondary Indices, B tree index files.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text:

- Horowitz and Sahani, "Fundamentals of Data structures", Galgotia publications
- Tannenbaum, "Data Structures", PHI
- R.L. Kruse, B.P. Leary, C.L. Tondo, "Data structure and program design in C" PHI
- "Data structures and algorithms" – Schaum Series.
- File Structures An object-Oriented Approach with C++ by Michael J. Folk, Bill Zoellick, BregRiccardi, Published by Addison Wesley (1st ISE Reprint,1999).

References:

- J. P. Tremblay and P. G. Sorenson, Introduction to Data Structures with Applications, McGraw – Hill Computer Science Series, Mc-Graw – Hill New York, 1984
- Algorithms by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Published by Prentice-Hall India (1999).
- Data Structures Using C and C++ second edition by YeddidyahLangsam, Moshe J.Augenstein, Aaron M. Tenen Baum, Published by Prentice-Hall India
- Data Structures and Algorithm analysis in C++ by Mark Allen Weiss, Published by Addison Wesley (3rd Indian Reprint 2000).
- "Data Structures" – R. S. Salaria

Course Name	Course Code	LTP	Credit	Semester
SWITCHED MODE POWER SUPPLIES	**BEE 606**	2:1:0	3	6

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Investigate the various types of SMPS and the common requirements for their designs
CLO 2	Create awareness of all existing types of SMPS related AC power line surge protection.
CLO 3	Apply theoretical knowledge for practical domains such as Electro Magnetic Interference [EMI] and Radio Frequency Interference [RFI].
CLO 4	Develop various kinds of fuse selection for SMPS

Course Objective:

To understand the ability to utilize or specify a modern power processing system more effectively, the user should be familiar with the advantages and limitations of the many techniques available. With this information, the system engineer can specify the power supply requirements so that the most cost-effective and reliable system may be designed to meet these needs. Very often a small change in specification or rearrangement of the power distribution system will allow the power supply designer to produce a much more reliable and cost-effective solution to the user's needs. Hence, to produce the most reliable and cost-effective design, the development of the specification should be an interactive exercise between the power supply designer and the user.

Course Contents:

Module I: Common Requirements: An overview

Introduction, input transient voltage protection, Electromagnetic capability, Start-up methods, soft start, start-up overvoltage prevention, output overvoltage protection, output under voltage protection, output current limiting.

Module II: AC Power line surge protection

Introduction, location categories, likely rate of surge occurrences, surge voltage waveforms, transient suppression devices. Transient protection diodes. Gas filters surge arresters. Line filters Transient suppression combinations, a case study.

Module III: EMI in SMPS

EMI/RFI propagation Modes, Power line filters, Line impedance stabilization networks, line filter design.

Module IV: Fuse Selection

Fuse parameters, types of fuse, selection of fuses, SCR crowbar fuses, Transformer Input Fuses.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance.

Text & References:

Text:

- Higher Engineering Mathematics by H.K. Dass

References:

- Partial Differential Equations by I. N. Snedon
- Laplace Transformation Schaum outline series
- Advance Engineering Mathematics - Kreszig

Linear Programming – Hadley

Course Name	Course Code	LTP	Credit	Semester
COMMUNICATION SKILLS - IV	**BCS 601**	0:0:1	1	6

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Demonstrate professional attitude needed for interview preparedness, power dressing, and respectful self orientation.
CLO 2	Showcase their leadership skills with effective team work.
CLO 3	Outline the basic etiquettes in expressing their personality individually and in group.

Course Objective:
To enhance the skills needed to work in an English-speaking global business environment.

Course Contents:

Module I: Business/Technical Language Development

Advanced Grammar: Syntax, Tenses, Voices
Advanced Vocabulary skills: Jargons, Terminology, Colloquialism
Individualised pronunciation practice

Module II: Social Communication

Building relationships through Communication
Communication, Culture and Context
Entertainment and Communication
Informal business/ Technical Communication

Module III: Business Communication

Reading Business/ Technical press
Listening to Business/ Technical reports (TV, radio)
Researching for Business /Technology

Module IV: Presentations

Planning and getting started
Design and layoutof presentation
Information Packaging
Making the Presentation

Examination Scheme:

Components	**A**	**CT**	**S/V/Q**	**HA**	**EE**
Weightage (%)	5	15	5	5	70

CAF – Communication Assessment File
GD – Group Discussion
GP – Group Presentation

Text & References:

- Business Vocabulary in Use: Advanced Mascull, Cambridge
- Business Communication, Raman – Prakash, Oxford
- Business Communications, Rodgers, Cambridge
- Working in English, Jones, Cambridge
- New International Business English, Jones/Alexander, Cambridge

Course Name	Course Code	LTP	Credit	Semester
BEHAVIOURAL SCIENCE - VI (STRESS AND COPING STRATEGIES)	**BSS 604**	0:0:1	1	6

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Identify stress and that an individual come across.
CLO 2	Recognize the causes of stress in their lives.
CLO 3	Analyze symptoms and how they are affecting lives.
CLO 4	Create ways to effectively cope with it.

Course Objective:
To develop an understanding the concept of stress its causes, symptoms and consequences.
To develop an understanding the consequences of the stress on one's wellness, health, and work performance.

Course Contents:

Module I: Stress

Meaning & Nature
Characteristics
Types of stress

Module II: Stages and Models of Stress

Stages of stress
The physiology of stress
Stimulus-oriented approach.
Response-oriented approach.
The transactional and interact ional model.
Pressure – environment fit model of stress.

Module III: Causes and symptoms of stress

Personal
Organizational
Environmental

Module IV: Consequences of stress

Effect of stress on performance
Individual and Organizational consequences with special focus on health

Module V: Strategies for stress management
Importance of stress management
Healthy and Unhealthy strategies
Peer group and social support
Happiness and well-being

Module VI: End-of-Semester Appraisal

Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

- Blonna, Richard; Coping with Stress in a Changing World: Second edition
- Pestonjee, D.M, Pareek, Udai, Agarwal Rita; Studies in Stress And its Management
- Pestonjee, D.M.; Stress and Coping: The Indian Experience
- Clegg, Brian; Instant Stress Management – Bring calm to your life now

Course Name	Course Code	LTP	Credit	Semester
FRENCH – VI	**FLT 601**	2:0:0	2	6

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone intermediate language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of intermediate level.
CLO 3	Students will be able to communicate in small sentences in Simple Future and Past tenses
CLO 4	Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.

Course Objective:

To strengthen the language of the students both in oral and written so that they can:

i) express their sentiments, emotions and opinions, reacting to information, situations;

ii) narrate incidents, events ;

iii) perform certain simple communicative tasks.

Course Contents:

Module D: pp. 157 – 168 – Unité 12

Unité 12: s'évader

1. présenter, caractériser, définir
2. parler de livres, de lectures
3. préparer et organiser un voyage
4. exprimer des sentiments et des opinions
5. téléphoner
6. faire uneréservation

Contenu grammatical:

1. proposition relative avec pronom relatif "qui", "que", "où" - pour caractériser
2. faire + verbe

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

Text & References:

- le livre à suivre : Campus: Tome 1

Course Name	Course Code	LTP	Credit	Semester
GERMAN – VI	**FLG 601**	2:0:0	2	6

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone intermediate language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of intermediate level.
CLO 3	Students will be able to communicate in small sentences in Simple Future and Past tenses .
CLO 4	Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.

Course Objective:

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.
To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany
Introduction to Advanced Grammar and Business Language and Professional Jargon

Course Contents:

Module I: Adjective endings

Adjective endings in all the four cases discussed so far
Definite and indefinite articles
Cases without article

Module II: Comparative adverbs

Comparative adverbs as and like

Module III: Compound words

To learn the structure of compound words and the correct article which they take
Exploring the possibility of compound words in German

Module IV: Infinitive sentence

Special usage of 'to' sentences called zu+ infinitive sentences

Module V: Texts

A Dialogue: 'Ein schwieriger Gast'
A text: 'Abgeschlossene Vergangenheit'

Module VI: Comprehension texts

Reading and comprehending various texts to consolidate the usage of the constructions learnt so far in this semester.

Module VII: Picture Description

Firstly recognize the persons or things in the picture and identify the situation depicted in the picture;
Secondly answer questions of general meaning in context to the picture and also talk about the personal experiences which come to your mind upon seeing the picture.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

Course Name	Course Code	LTP	Credit	Semester
SPANISH – VI	FLS 601	0:0:0	2	6

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone intermediate language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of intermediate level.
CLO 3	Students will be able to communicate in small sentences in Simple Future and Past tenses .
CLO 4	Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.

Course Objective:

To enable students acquire working knowledge of the language; to give them vocabulary, grammar, voice modulations/intonations to handle everyday Spanish situations in Present as well as in Present Perfect Tense with ease.

Course Contents:

Module I

Revision of the earlier modules

Module II

Present Perfect Tense

Module III

Commands of irregular verbs

Module IV

Expressions with **Tener que** and **Hay que**

Module V

En la embajada
Emergency situations like fire, illness, accident, theft

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español, EnDirecto I A
- Español Sin Fronteras

Course Name	Course Code	LTP	Credit	Semester
CHINESE – VI	**FLC 601**	2:0:0	2	6

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone intermediate language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of intermediate level.
CLO 3	Students will be able to communicate in small sentences in Simple Future and Past tenses .
CLO 4	Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.

Course Objective:

Chinese emperor Qin Shi Huang – Ti who built the great wall of China also built a network of 270 palaces, linked by tunnels, and was so afraid of assassination that he slept in a different palace each night. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I

Drills
Dialogue practice
Observe picture and answer the question.
Pronunciation and intonation.
Character writing and stroke order.

Module II

Going out to see a science exhibition
Going to the theatre.
Train or Plane is behind schedule.
Indian Economy-Chinese Economy
Talking about different Seasons of the Year and Weather conditions. Learning to say phrases like-spring, summer, fall, winter, fairly hot, very cold, very humid, very stuffy, neither hot nor cold, most comfortable, pleasant …. etc.

Module III

Temperature – how to say – What is the temperature in May here?

- How is the weather in summer in your area?
- Around 30 degrees
- Heating, air-conditioning
- Is winter is Shanghai very cold?

Talking about birthdays and where you were born?
The verb "shuo" (speak) saying useful phrases like speak very well, do not speak very well, if speak slowly then understand if speak fast then don't understand, difficult to speak, difficult to write, speak too fast, speak too slow, listen and can understand, listen and cannot understand … etc.
Tell the following in Chinese – My name is …. I was born in … (year). My birthday is …… Today is … (date

and day of the week). I go to work (school) everyday. I usually leave home at . (O'clock). In the evening, I usually ……. (do what)? At week end, I ……. On Sundays I usually …… It is today….. It will soon be my younger sisters birthday. She was born in ….. (year). She lives in ……. (where). She is working (or studying)…… where… She lives in …….. (where.)

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Elementary Chinese Reader Part-2, 3; Lesson 47-54

Course Name	Course Code	LTP	Credit	Semester
ANANDAM	AND006	2:0:0	2	6

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Awareness and empathy regarding community issues
CLO 2	Interaction with the community and impact on society
CLO 3	Interaction with mentor and development of Student teacher relationship
CLO 4	Interaction among students, enlarge social network
CLO 5	Cooperative and Communication skills and leadership qualities
CLO 6	Critical thinking, Confidence and Efficiency

Course Objectives:

After the completion of this course, students will be able to:

- apply their knowledge and skills to solve specific community problem
- learn to plan, lead, and organize community events have a sense of belonging to their college campus and community and find something they are interested in doing during their free time
- make new friends, expand social network, and boost social skills and mental health.
- be useful to society as it will protect them against stress, frustration, and depression

Course Contents:

The project report should be guided by the mentor and shall contain:

- **Synopsis**: clearly stating objectives and activities to be undertaken. Problem identifying and problem-solving projects to be taken up.
- Details of the **Mentor and the Participants are to** be given (name of mentor, name of participants, phone number/mobile no, email, and address)
- Location / community where the work was carried out
- Details of Activities performed are to be given with date
- Number of beneficiaries and impact on the society (the object should be to empower the community and make them self-reliant)
- Photographs taken for documentation of work should be submitted
- Media coverage of the projects should be attached if any
- The Group Community Service Project Report will be submitted by the Student group leader under the guidance of the mentor to the Director/HoIs of the Department.
- The Director/HoIs should get the best report (more than one if required) of the Group Community Service Project uploaded on the HTE website and on the University page
- The Director/HoIs will forward the best report of the department to the Nodal Officer of the University.
- University will forward the report to the state level committee.

GUIDELINES FOR GCSP (Group Community Service Project)
ASSIGNMENT OF ANANDAM FOR SOCIAL AWARENESS (for students)

1. Each member of the group shall write one blog about the decided topic of 500 words (minimum) along with any relevant photos/diagrams/statistical data (with reference).
2. The group member shall write his/her name at the end of the blog.
3. The blog shall be posted on Instagram and Facebook (apart from these any other website wherever the group seems necessary).
4. Print out of the blog where date of when the content is posted, number of followers, comments, name of the writer shall be visible will be taken and file will be maintained for the same.
5. In the cover page of the project mention heading **"Group Community Service Project"**, and the filled format of final project report given by Anandam Scheme.
6. For the topic chosen by the group, students are recommended to cover the following points:
    a) Current scenario (Regional, national and international level as applicable)
    b) Future predictions
    c) Duty of the government
    d) Government policies (related to the topic), if any
    e) Duty of public
    f) Conclusion

Evaluation Scheme:

Project Participation: 2 hours X 8 days (per month) X 4 months = 64 hours

- **C grade =32 hrs (Below 20 marks)**
- **B grade >32 hrs to <=44hrs (20-30 marks)**
- **A grade >44 hrs to<=54hrs (30-40 marks)**
- **O grade >54 hrs to<=64hrs (40-50 marks)**

Evaluation Criteria:

Respective Departmental Anandam mentors are requested to evaluate the project (out of 50) as per the following criteria:

1. Position and exceptions, if any, are clearly stated. The organization of the blog is completely and clearly outlined and implemented.
2. The body of the blog is coherently organized, original and the logic is easy to follow. There is no spelling or grammatical errors and terminology is clearly defined. Writing is clear, concise, and persuasive.
3. Conclusion is clearly stated. The underlying logic is explicit.

Course Name	Course Code	LTP	Credit	Semester
POWER SYSTEM ENGINEERING	**BEE 701**	2:1:0	3	7

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Ability to determine the solution for economic dispatch and unit commitment problems of a power system.
CLO 2	Understand the concept of stability, able to identify and calculate the steady state stability limits of power system network using various methods.
CLO 3	Able to identify the transient stability limits of power system network and apply various methods to enhance stability limits
CLO 4	Able to formulate and analyse the load flow problems for existing power network.
CLO 5	Apply and analyse the load flow solutions for existing and new modified power system networks.
CLO 6	Able to identify, formulate, and solve the power system engineering problems.

Course Objective :

To blend the knowledge of Power system stability for power system operations and control. Also, to provide knowledge of Economics of power system and load flow analysis.

Course Content:

Module I: Economic Operation of Power Systems:

Introduction, system constraints, optimal operation of power systems. Input output, heat rate and incremental rate curves of thermal generating units.Economic distribution of load between generating units within a plant. Economic distribution of load between power stations, transmission loss equation. Introduction to unit commitment and dynamic programming

Module II: Power System Stability-I:

Power angle equations and power angle curves under
steady state and transient conditions. Rotor dynamics and swing equation (solution of swing equation not included). Synchronizing power coefficient. Introduction to steady state and dynamic stabilities, steady state stability limit.

Module III: Power System Stability-II:

Introduction to transient stability. Equal area criterion and its application to transient stability studies under basic disturbances. Critical clearing angle and critical clearing time. Factors affecting stability and methods to improve stability.

Module IV:Load Flow Analysis:

Load flow problem, development of load flow equations, bus classification Gauss Seidel, Newton Raphosn, decoupled and fast decoupled methods for load flow analysis. Comparison of load flow methods.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Elementary Chinese Reader Part-2, 3; Lesson 47-54

HIGH VOLTAGE ENGINEERING

Course Name	Course Code	LTP	Credit	Semester
High voltage engineering	**BEE 702**	2:1I:0	3	7

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Understand the current voltage characteristics of various types of materials.
CLO 2	To learn the basic concepts of high voltage applications and the apparatus used for this purpose.
CLO 3	To make the students aware about how to implement several high voltage generation methods and to take care of high voltage operations.
CLO 4	This course is to explain highlights and key concepts of each high voltage testing method.

Course Objective:

This subject deals with the detailed analysis of Breakdown occur in gaseous, liquids and solid dielectrics. Information about generation and measurement of High voltage and current. In additionthe High voltage testing methods are also discussed.

Course Contents:

Module I: Introduction to High Voltage Technology and Applications

Electric Field Stresses, Gas / Vaccum as Insulator, Liquid Dielectrics, Solids and Composites, Estimation and Control of Electric Stress, Numerical methods for electric field computation, Surge voltages, their distribution and control, Applications of insulating materials in transformers, rotating machines, circuit breakers, cable power Capacitors andbushings.

Module II: Break Down in Gaseous and Liquid Dielectrics

Gases as insulating media, collision process, Ionization process, Townsend's criteria of breakdown in gases, Paschen's law. Liquid as Insulator, pure and commercial liquids, breakdown in pure and commercial liquids.

Module III: Break Down in Solid Dielectrics

Intrinsic breakdown, electromechanical breakdown, thermal breakdown, breakdown of solid dielectrics in practice, Breakdown in composite dielectrics, solid dielectrics used in practice.

Module IV: Generation of High Voltages and Currents

Generation of High Direct Current Voltages, Generation of High alternating voltages, Generation of Impulse Voltages, Generation of Impulse currents, Tripping and control of impulse generators.

Module V: Measurement of High Voltages and Currents

Measurement of High Direct Current voltages, Measurement of High Voltages alternating and impulse,

Measurement of High Currents-direct, alternating and Impulse, Oscilloscope for impulse voltage and current measurements.

Module VI: Over Voltage Phenomenon and Insulation Co-Ordination

Natural causes for over voltages – Lightning phenomenon, Overvoltage due to switching surges, system faults and other abnormal conditions, Principles of Insulation Coordination on High voltage and Extra High Voltage power systems.

Module VII: Non-Distructive Testing Of Material and Electrical Apparatus

Measurement of D.C Resistivity, Measurement of Dielectric Constant and loss factor, Partial discharge measurements.

Module VIII: High Voltage Testing Of Electrical Apparatus

Testing of Insulators and bushings, Testing of Isolators and circuit breakers, testing of cables, Testing of Transformers, Testing of Surge Arresters, Radio Interference measurements.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text&References:

Text:

- High Voltage Engineering by M.S.Naidu and V. Kamaraju – TMH Publications, 3rd Edition
- High Voltage Engineering: Fundamentals by E.Kuffel, W.S.Zaengl, J.Kuffel by Elsevier, 2nd Edition.

References:

- High Voltage Engineering by C.L.Wadhwa, New Age Internationals (P) Limited, 1997.

High Voltage Insulation Engineering by Ravindra Arora, Wolfgang Mosch, New Age International (P)

Course Name	Course Code	LTP	Credit	Semester
Power system protection	**BEE 703**	2:1:0	3	7

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Develop a practical approach for analysis and design of neutral earthing for electrical power equipment.
CLO 2	Able to describe the operating principles of various relays and their construction for fault protection of an electrical supply network.
CLO 3	Understand the constructional details, principle of operation and application of static relays for electrical supply network.
CLO 4	Design, analyse and evaluate the relaying scheme for power equipment protection such as generator, transformer and induction motor.
CLO 5	Able to identify, formulate, and solve the power system fault and protection problem by selecting relay for a particular application.

Course Objective:

The basic objective of the course is to impart knowledge to the students on power system protection

Course Contents:

Module I: Neutral Earthing

Introduction, Terms and definition, Disadvantages of ungrounded Systems, Advantages of neutral grounding, Types of grounding, Ungrounded system, Connection of arc suppression coil, Neutral point earthing of transformer LV circuits, Neutral grounding practice, Earthing transformer, Station earthing system, Resonant grounding - Methods of neutral grounding.

Module II: Protective Relaying

Introduction, Importance, Protective zones, primary and backup protection, desirable quantities of protective relaying, Some terms in protective relaying, Basic operation of relay, Classification of relays, Buchholz's relay, Induction relays, Directional relays, Distance relays- impedance relay, admittance relay, classification of distance relays and distance protection, Differential relays

Module III: Static Relays

Introduction, Static relay techniques using semi conductors,: Phase and amplitude comparators, Duality between phase and amplitude comparators, general equation for comparators, Basic elements of a static relay, over-current relays, differential protection, static distance protection

Module IV: Apparatus Protection

Alternator protection- types of faults, Stator protection, differential protection, rotor protection, over load protection, loss of excitation protection, un balanced loading protection, prime mover protection, over speed protection, over voltage protection, Transformer protection-, nature, faults in auxiliary equipment, winding faults, over load and external short circuits, differential protection of transformers, over current and earth fault protection, tank leakage

protection, restricted earth fault protection, gas relays, transformer feeder protection, Induction Motor Protection: Abnormal operating conditions, Contactors and circuit breakers for motors, Under voltage protection, phase and Earth fault protection, Overload protection, Unbalanced voltage protection, Single phasing preventer, Phase reversal protection.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

- Electric Power System: By – C.L.Wadhwa
- Electric Power System: By - Asfaq Husain
- Elements of Power System Analysis: By – William D.Stevenson
- Power System Analysis & Design: By – B.R.Gupta
- HVDC Transmission: By K.R. Padiyar

Course Name	Course Code	LTP	Credit	Semester
SUBSTATION ENGINEERING	**BEE704**	2:1:0	3	7

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	
CLO 2	
CLO 3	

Course Objective:

The purpose of this course is to provide a thorough introduction to Substation engineering with an in depth study of various components that make a complete Substation.

Course Contents:

Module I

IntroductionFunctions of a substation, Classification, Layout, Design and Construction of Bus Bar and earth wire in substation.
Jumpering of conducters, Factors affecting layout of substation, Testing of substation. Reactive power management, Fundamentals of earthing

Module II

Load Management,Causes and effect of low power factor; advantages of power factor improvement; PF improvement using shunt capacitors and synchronous condensers; calculation of most economic pf when (a) kw

demand is constant (b) KVA demand is constant. importance of capacitor banks,

Module III

Computer applications, SCADA subsystem, Data acquisition and data processing, supervisory control , voltage control and voltage stability, Protection using circuit breakers, fuse and protection against overvoltage. Bus bar protection.

Module IV

Technical standards for construction of sub stations, Substation automation system. Gas insulated substations,.

Module V

Air and water pollution by thermal power plants and its control; acid rains; thermal pollution by thermal and nuclear power plants; radio-active pollution of environment by nuclear power plants; noise pollution and noise control; methods suggested to reduce the pollution. pollution flashover mechanism in insulators, basics of current transformers and voltage transformers. Economic operation of power system.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

- Substation Engineering by Er. R.S. Dahiya (KATSON BOOKS)
- EHV AC and DC by S.Rao

Course Name	Course Code	LTP	Credit	Semester
ADVANCED PROGRAMMING WITH PYTHON	BCS 710	0:0:2	2	7

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	To acquire Object Oriented Skills in Python
CLO 2	To develop the skill of designing Graphical user Interfaces in Python
CLO 3	To develop the ability to write database applications in Python

Course Objective:
The course should enable the students:

- Describe the semantics of Python programming language and illustrate the process of structuring the data using lists, dictionaries, tuples, strings and sets.
- Illustrate the Object-oriented Programming concepts in Python.
- Demonstrate the basic database design for storing data as part of a multi-step data gathering, analysis, and processing.
- Familiarize the basics of machine learning using an approachable, and also understand the advantage of using Python libraries for implementing Machine Learning models Course Outcomes: After completion of this course, student will be able to:

Course Outcomes:

- Interpret the basic principles of Python programming language.
- Articulate the Object-Oriented Programming concepts such as encapsulation, inheritance and polymorphism as used in Python.
- Identify the commonly used operations involving file systems and regular expressions.
- Implement Machine Learning algorithms.

Course Contents:

Module-I:

Introduction to Python, use IDLE to develop programs, Basic coding skills, working with data types and variables, working with numeric data, working with string data, Python functions, Boolean expressions, selection structure, iteration structure, working with lists, work with a list of lists, work with tuples, work with dates and times, get started with dictionaries

Learning Outcome:

At the end of this Unit the student will be able to

- Solve, test and debug basic problems using python script.
- Manipulate python programs by using the python data structures like lists, dictionaries, tuples, strings and sets.

Module -II

Classes in Python: OOPS Concepts,Classes and objects ,Classes in Python, Constructors, Datahiding, Creating Classes, Instance Methods, Special Methods, Class Variables, Inheritance, Polymorphism, Type Identification, Custom Exception Classes, Iterators, generators and decorators.

Learning Outcome:At the end of this Unit the student will be able to

- Design object-oriented programs with Python classes.
- Usage of inheritance and polymorphism for reusability.

Module -III

I/O and Error Handling In Python :Introduction, Data Streams, Creating Your Own Data Streams, Access Modes, Writing Data to a File, Reading Data From a File, Additional File Methods, Handling IO Exceptions, Errors, Run Time Errors, The Exception Model, Exception Hierarchy, Handling Multiple Exceptions, Working with Directories.

Learning Outcome: At the end of this Unit the student will be able to

- Identify the commonly used operation involved in files for I/O processing.
- Familiarize the handling of I/O Exception sand usage of Directories.

Module -IV

Implement Machine Learning algorthims:Usage of Numpy for numerical Data,Usage of Pandas for Data Analysis, Matplotlib for Python plotting, Seaborn for Statically plots, interactive Dynamic visualizations, SciKit for Machine learning.

Learning Outcome: At the end of this Unit the student will be able to
Understand the advantage of using Python libraries for implementing Machine Learning models.

Projects:
Creating a discussion form, creating an online store, creating a job site.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

1. Michael Urban and Joel Murach, Python Programming, Shroff/Murach, 2016.
2. Haltermanpython.
3. Mark Lutz, Programming Python, O`Reilly, 4th Edition, 2010ONLINE

RESOURCES:
https://www.w3schools.com/python.
https://docs.python.org/3/tutorial/index.html.
https://www.python-course.eu/advanced_topics.ph

Course Name	Course Code	LTP	Credit	Semester

POWER SYSTEM ENGINEERING LAB	**BEE 721**	0:0:1	1	7

Course Objective:

The aim of this course is to make the students learn about the theory and engineering behind load flow and digital techniques in short circuit studies.

Course Contents:

1. Simulate swing equation in simulink (matlab)
2. Economic load dispatch in power system
3. Formation of bus impedance & admittance matrix
4. Simulate simple circuits using circuit breaker.
5. (a) modeling of synchronous machine with pss (b) simulation of synchronous machine With facts device.
6. (a) modeling of synchronous machine with facts device (b) simulation of synchronous Machine with facts devices.
7. Facts controller designs with fact devices for smib system.

Examination Scheme:

IA				**EE**	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

Course Name	Course Code	LTP	Credit	Semester
Electrical Simulation Lab	BEE 725	0:0:1	1	7

Course Objective: The course is aimed:

1. To understand basic block sets of different simulation platform used in electrical /electronic circuit design.
2. To understand use and coding in different software tools used in electrical/ electronic circuit design

Course Contents:

1 Analysis of Electrical Networks

2 Network Theorems (Thévenin and Norton Theorem)

3 Solution of Network Problems (Solution of Linear Differential Equations)

4 Characteristics of Different types of Diode

5 Diode Circuits and Rectifiers

6 SCR based Circuits

7 Simulation of Battery Charge

8 Simulation of DC-AC Inverters

9 AC Voltage Controllers

10 Neuro / Fuzzy applications and simulation

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

Course Name	Course Code	LTP	Credit	Semester
ADVANCED PROGRAMMING WITH PYTHON LAB	**BCS730**	0:0:1	1	7

List of Assignment:

- Practice Assignment based on string data, Python functions, and Boolean expressions.
- Practical based on iteration, working with lists, tuples and dictionaries.
- Practical based on class, objects, constructor, method in side class.
- Practical questions based on Inheritance, Polymorphism, Type Identification, Custom Exception Classes.
- Handling Errors using Python.
- Practical Assignment based on Usage of Numpy for numerical Data,
- Practical Assignment based on Usage of Usage of Pandas for Data Analysis.
- Practical Assignment based on Usage of Matplotlib for Python plotting.
- Practical Assignment based on Usage of Seaborn for Statically plots.
- Practical Assignment based on Usage of Interactive Dynamic visualizations.
- Practical Assignment based on Usage of SciKit for Machine learning.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

Course Name	Course Code	LTP	Credit	Semester
INDUSTRIAL TRAINING (Evaluation)	**BEE 750**	0:0:3	3	7

Methodology:

Practical training is based on the theoretical subjects studied by students. It can be arranged within the college or in any related industrial unit. The students are to learn various industrial, technical and administrative processes followed in the industry. In case of on-campus training the students will be given specific task of fabrication/assembly/testing/analysis. On completion of the practical training the students are to present a report covering various aspects learnt by them and give a presentation on same.

Examination Scheme:

Feedback from industry/work place	20
Training Report	40
Viva	15
Presentation	25
Total	**100**

Course Name	Course Code	LTP	Credit	Semester
SEMINAR	**BEE 760**	0:0:3	3	7

Methodology:

The objectives of the course 'seminar' are:

- To provide students with a comprehensive experience for applying the knowledge gained so far by studying various courses.
- To develop an inquiring aptitude and build confidence among students by working on solutions of small industrial problems.
- To give students an opportunity to do something creative and to assimilate real life work situation in institution.
- To adapt students for latest developments and to handle independently new situations.
- To develop good expressions power and presentation abilities in students.
- The focus of the 'seminar' is on preparing a working system or some design or understanding of a complex system using system analysis tools and submit it the same in the form of a write-up i.e. detail seminar report.
- The student should select some real-life problems for their seminar and maintain proper documentation of different stages of seminar such as need analysis, market analysis, concept evaluation, requirement specification, objectives, work plan, analysis, design, implementation and test plan.
- Each student is required to prepare a seminar report and present the same with a demonstration of the working system (if any).
- The faculty and student should work according to following schedule: i) Each student undertakes substantial and individual project/Topic in an approved area of the subject and supervised by a member of staff. ii) The student must submit outline and action plan for the project execution (time schedule) and the same be approved by the concerned faculty. iii) At all the steps of the seminar, students must submit a written report of the same.

Examination Scheme:

Feedback from industry/workplace	20
Training Report	40
Viva	15
Presentation	25
Total	**100**

Course Name	Course Code	LTP	Credit	Semester
COMMUNICATION SKILLS – V	**BCS 701**	0:0:1	1	7

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Investigate their personal strengths and insights to be revealed in a Formal Setup of Communication.
CLO 2	Create right selection of words and ideas while choosing the appropriate channel of formal communication
CLO 3	Apply acquired knowledge with the appropriate selection of channel of formal communication.
CLO 4	Develop and empower self with the ease of using appropriate medium of communication.

Course Objective:
To facilitate the learner with Academic Language Proficiency and make them effective users of functional language to excel in their profession.

Course Contents:

Module I

Introduction to Public Speaking
Business Conversation
Effective Public Speaking
Art of Persuasion

Module II: Speaking for Employment

Types of Interview
Styles of Interview
Facing Interviews-Fundamentals and Practice Session
Conducting Interviews- Fundamentals and Practice Session
Question Answer on Various Dimensions

Module III

Resume Writing
Covering Letters
Interview Follow Up Letters

Module IV: Basic Telephony Skills

Guidelines for Making a Call
Guidelines for Answering a Call

Module V: Work Place Speaking

Negotiations
Participation in Meetings
Keynote Speeches

Examination Scheme:

Components	CT1	CT2	CAF	V	GD	GP	A
Weightage (%)	20	20	25	10	10	10	5

CAF – Communication Assessment File
GD – Group Discussion
GP – Group Presentation

Text & References:

- Jermy Comfort, Speaking Effectively, et.al, Cambridge
- Krishnaswamy, N, Creative English for Communication, Macmillan
- Raman Prakash, Business Communication, Oxford.

Course Name	Course Code	LTP	Credit	Semester
BEHAVIOURAL SCIENCE - VII (INDIVIDUAL, SOCIETY AND NATION)	**BSS 704**	0:0:1	1	7

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Recognize their personality and individual differences and identify its importance of diversity at workplace and ways to enhance it.
CLO 2	Recognize effective socialization strategies and importance of patriotism and taking accountability of integrity.
CLO 3	Recognize different types of human rights and its importance.
CLO 4	Identify Indian values taught by different religions.
CLO 5	Identify long term goals and recognize their talent, strengths and styles to achieve them

Course Objective:

This course aims at enabling students towards:
Understand the importance of individual differences
Better understanding of self in relation to society and nation
Facilitation for a meaningful existence and adjustment in society
Inculcating patriotism and national pride

Course Contents:

Module I: Individual differences& Personality

Personality: Definition& Relevance
Importance of nature & nurture in Personality Development
Importance and Recognition of Individual differences in Personality
Accepting and Managing Individual differences (adjustment mechanisms)
Intuition, Judgment, Perception & Sensation (MBTI)
BIG5 Factors

Module II: Managing Diversity

Defining Diversity
Affirmation Action and Managing Diversity
Increasing Diversity in Work Force
Barriers and Challenges in Managing Diversity

Module III: Socialization

Nature of Socialization
Social Interaction
Interaction of Socialization Process

Contributions to Society and Nation

Module IV: Patriotism and National Pride

Sense of pride and patriotism
Importance of discipline and hard work
Integrity and accountability

Module V: Human Rights, Values and Ethics

Meaning and Importance of human rights
Human rights awareness
Values and Ethics- Learning based on project work on Scriptures like- Ramayana, Mahabharata, Gita etc.

Module VI: End-of-Semester Appraisal

Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

- Davis, K. Organizational Behaviour,
- Bates, A. P. and Julian, J.: Sociology - Understanding Social Behaviour
- Dressler, David and Cans, Donald: The Study of Human Interaction
- Lapiere, Richard. T – Social Change

Course Name	Course Code	LTP	Credit	Semester
FRENCH - VII	**FLT 701**	2:0:0	2	7

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of advance level.
CLO 3	Students will be able to communicate with complex sentences.

Course Objective:

Revise the portion covered in the first volume, give proper orientation in communication and culture.

Course Contents:

Module A: Unités 1 – 3: pp. 06 - 46

Contenu lexical: Unité 1: Rédiger et présenter son curriculum vitae
Exprimer une opinion
Caractériser, mettre en valeur
Parler des rencontres, des lieux, des gens

Unité 2: Imaginer - Faire des projets
Proposer - conseiller
Parler des qualités et des défauts
Faire une demande écrite
Raconter une anecdote
Améliorer son image

Unité 3: Exprimer la volonté et l'obligation
Formuler des souhaits
Exprimer un manque/un besoin
Parler de l'environnement, des animaux, des catastrophes naturelles

Contenu grammatical:

1. Le passé : passé composé/imparfait
2. Pronoms compléments directs/indirects, y/en (idées/choses)
3. Propositons relatives introduites par qui, que, où
4. Comparatif et superlatif
5. Le conditionnelprésent
6. Situer dans le temps
7. Féminin des adjectifs
8. La prise de paroles : expressions
9. Le subjonctif : volonté, obligation

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- **le livre à suivre : Campus: Tome 2**

Course Name	Course Code	LTP	Credit	Semester
GERMAN – VII	**FLG 701**	2:0:0	2	7

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of advance level.
CLO 3	Students will be able to communicate with complex sentences.

Course Objective:

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.

To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany

Introduction to Advanced Grammar and Business Language and Professional Jargon

Course Contents:

Module I: Dass- Sätze

Explain the use of the conjunction "-that", where verb comes at the end of the sentence

Module II: IndirekteFragesätze

To explain the usage of the "Question Pronoun" as the Relative Pronoun in a Relative Sentence, where again the verb falls in the last place in that sentence.

Module III: Wenn- Sätze

Equivalent to the conditional "If-" sentence in English. Explain that the verb comes at the end of the sentence.

Module IV: Weil- Sätze

Explain the use of the conjunction "because-" and also tell that the verb falls in the last place in the sentence.

Module V: Comprehension texts

Reading and comprehending various texts to consolidate the usage of the constructions learnt so far in this semester.

Module VI: Picture Description

Firstly recognize the persons or things in the picture and identify the situation depicted in the picture;
Secondly answer questions of general meaning in context to the picture and also talk about the personal experiences which come to your mind upon seeing the picture.

Examination Scheme:

Components	CT1	CT2	C	I	V	A

Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant - 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

Course Name	Course Code	LTP	Credit	Semester
SPANISH – VII	**FLS 701**	2:0:0	2	7

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of advance level.
CLO 3	Students will be able to communicate with complex sentences
CLO 4	To be able to give order, command and make request. Formal and Informa
CLO 5	Use of imperative in different types of situation: In a bar/ Classroom/ Market etc
CLO 6	To express prohibitions and permissions
CLO 7	To be able to talk about actions in past indefinite tense
CLO 8	To be able to talk about past events – What did you do yesterday? Etc

Course Objective:
To enable students acquire working knowledge of the language; to give them vocabulary, grammar, expressions used on telephonic conversation and other situations to handle everyday Spanish situations with ease.

Course Contents:

Module I

Revision of earlier semester modules

Module II

Zodiac signs. More adjectives…to describe situations, state of minds, surroundings, people and places.

Module III

Various expressions used on telephonic conversation (formal and informal)

Module IV

Being able to read newspaper headlines and extracts (Material to be provided by teacher)

Module V

Negative commands (AR ending verbs)

Module VI

Revision of earlier sessions and introduction to negative ER ending commands, introduction to negative IR ending

verbs

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español En Directo I A, 1B
- Español Sin Fronteras
- Material provided by the teacher from various sources

Course Name	Course Code	LTP	Credit	Semester
CHINESE – VII	FLC 701	2:0:0	2	7

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of advance level.
CLO 3	Students will be able to communicate with complex sentences.

Course Objective:

The story of Cinderella first appears in a Chinese book written between 850 and 860 A.D. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I

Drills
Dialogue practice
Observe picture and answer the question.
About china part –I Lesson 1, 2.

Module II

Pronunciation and intonation
Character Writing and stroke order.

Module III

Ask someone what he/she usually does on weekends?
Visiting people, Party, Meeting, After work….etc.

Module IV

Conversation practice
Translation from English to Chinese and vise-versa.
Short fables.

Module V

A brief summary of grammar.
The optative verb “yuanyi”.

The pronoun “ziji”.

Examination Scheme:

Components	**CT1**	**CT2**	**C**	**I**	**V**	**A**
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- “Kan tushuohua” Part-I Lesson 1-7

Course Name	Course Code	LTP	Credit	Semester
ANANDAM	AND007	2:0:0	2	7

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Awareness and empathy regarding community issues
CLO 2	Interaction with the community and impact on society
CLO 3	Interaction with mentor and development of Student teacher relationship
CLO 4	Interaction among students, enlarge social network
CLO 5	Cooperative and Communication skills and leadership qualities
CLO 6	Critical thinking, Confidence and Efficiency

Type: Compulsory

Course Learning Outcomes:

The student should develop:

- Awareness and empathy regarding community issues
- Interaction with the community and impact on society
- Interaction with mentor and development of Student teacher relationship
- Interaction among students, enlarge social network
- Cooperative and Communication skills and leadership qualities
- Critical thinking, Confidence and Efficiency

Course Objectives:

After the completion of this course, students will be able to:

- apply their knowledge and skills to solve specific community problem
- learn to plan, lead, and organize community events have a sense of belonging to their college campus and community and find something they are interested in doing during their free time
- make new friends, expand social network, and boost social skills and mental health.
- be useful to society as it will protect them against stress, frustration, and depression

Course Contents:

The project report should be guided by the mentor and shall contain:

- **Synopsis**: clearly stating objectives and activities to be undertaken. Problem identifying and problem-solving projects to be taken up.
- Details of the **Mentor and the Participants are to** be given (name of mentor, name of participants, phone number/mobile no, email, and address)
- Location / community where the work was carried out
- Details of Activities performed are to be given with date

- Number of beneficiaries and impact on the society (the object should be to empower the community and make them self-reliant)
- Photographs taken for documentation of work should be submitted
- Media coverage of the projects should be attached if any
- The Group Community Service Project Report will be submitted by the Student group leader under the guidance of the mentor to the Director/HoIs of the Department.
- The Director/HoIs should get the best report (more than one if required) of the Group Community Service Project uploaded on the HTE website and on the University page
- The Director/HoIs will forward the best report of the department to the Nodal Officer of the University.
- University will forward the report to the state level committee.

GUIDELINES FOR GCSP (Group Community Service Project)
ASSIGNMENT OF ANANDAM FOR SOCIAL AWARENESS (for students)

1. Each member of the group shall write one blog about the decided topic of 500 words (minimum) along with any relevant photos/diagrams/statistical data (with reference).
2. The group member shall write his/her name at the end of the blog.
3. The blog shall be posted on Instagram and Facebook (apart from these any other website wherever the group seems necessary).
4. Print out of the blog where date of when the content is posted, number of followers, comments, name of the writer shall be visible will be taken and file will be maintained for the same.
5. In the cover page of the project mention heading **"Group Community Service Project"**, and the filled format of final project report given by Anandam Scheme.
6. For the topic chosen by the group, students are recommended to cover the following points:
    a) Current scenario (Regional, national and international level as applicable)
    b) Future predictions
    c) Duty of the government
    d) Government policies (related to the topic), if any
    e) Duty of public
    f) Conclusion

Evaluation Scheme:

Project Participation: 2 hours X 8 days (per month) X 4 months = 64 hours

- **C grade =32 hrs (Below 20 marks)**
- **B grade >32 hrs to <=44hrs (20-30 marks)**
- **A grade >44 hrs to<=54hrs (30-40 marks)**
- **O grade >54 hrs to<=64hrs (40-50 marks)**

Evaluation Criteria:

Respective Departmental Anandam mentors are requested to evaluate the project (out of 50) as per the following criteria:

1. Position and exceptions, if any, are clearly stated. The organization of the blog is completely and clearly outlined and implemented.

2. The body of the blog is coherently organized, original and the logic is easy to follow. There is no spelling or grammatical errors and terminology is clearly defined. Writing is clear, concise, and persuasive.
3. Conclusion is clearly stated. The underlying logic is explicit.

Course Name	Course Code	LTP	Credit	Semester
ELECTRICAL DRIVE AND CONTROL	**BEE 801**	2:1:0	3	8

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	
CLO 2	
CLO 3	

Course Objective :

The course is aiming to give a thorough understanding of converter topologies and control principles used in modern electrical motor drives**.**

Course Contents:

Module I: Dynamics of Electric Drives:

Fundamental torque equations, speed-torque conventions and multi-quadrant operation, Nature and classification of load torques, steadystate stability, load equalization, close loop configurations of drives.

Module II: DC Drives:

Speed torque curves, torque and power limitation in armature voltage and field control, Starting, Braking: Regenerative Braking, dynamic braking and plugging. Speed Control-Controlled Rectifier fed DC drives, Chopper Controlled DC drives.

Module III: Induction Motor Drives :

Starting, Braking- Regenerative braking, plugging and dynamic braking.

Speed Control: Stator voltage control, variable frequency control from voltage source, Voltage Source Inverter (VSI) Control. Cycloconverter Control, Static rotor resistance control, Slip Power Recovery- Stator Scherbius drive, Static Kramer drive.

Module IV:Synchronous Motor Drive:

Control of Synchronous Motor-Separately Controlled and VSI fed Self-Controlled Synchronous Motor Drives.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text Books

- G. K. Dubey: Fundamentals of Electrical Drives, Narosa Publishing House, New Delhi. 2002
- B. K. Bose: Power Electronics and Motor Drives, Elsevier. 2010

Reference Books

- V. Subrahmanyam: Electric Drives- Concepts and Applications, MGH. 2011
- Theodore Wildi: Electrical Machines, Drives and Power Systems, Pearson 2007
- S. K. Pillai: A First Course on Electrical Drives, Wiley Eastern limited, India. 1989

Course Name	Course Code	LTP	Credit	Semester
FLEXIBLE AC TRANSMISSION SYSTEMS	**BEE 802**	2:1:0	3	8

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Develop a practical approach for analysis of basics of power transmission networks and demand of flexible controlling of AC transmission system.
CLO 2	Able to apply the understanding towards analysis of uncompensated lines of an electrical supply network.
CLO 3	Capable of analysis of need of reactive power compensation, methods employed for it and placement of these devices in the transmission lines.
CLO 4	To acquire the knowledge about the concepts of applications of static synchronous compensators & unified power flow controllers along with their locations in the transmission system.
CLO 5	Able to identify, formulate, and solve the problems related to controlling of power systems equipments.

Course Objective:

The course gives an opportunity to attendees to understand more fully the technicalities of steady state, dynamic and transient stability and to be fully aware of the types and functionality of equipment available today in the FACTS artillery.

Course Contents:

Module 1 : Introduction

Basics of Power Transmission networks, control of power flow in AC Transmission line, Flexible AC transmission system controllers Application of FACTS controllers in distribution systems.

Module 2: AC Transmission line and Reactive Power compensation

Analysis of Uncompensated AC line, Passive Reactive Power Compensations, Compensation by a Series Capacitor Connected at the Mid- point of the Line, Shunt Compensation Connected at
the Midpoint of the Line, Comparison between Series and Shunt Capacitor and SSSC.

Module 3: Static Var Compensator

Static Var Compensator, Analysis of SVC, Configuration of SVC, SVC Controller, Harmonics and Filtering, Applications of SVC**.**

Module 4: Static Synchronous Compensator (STATCOM)

Introduction**,** Principle of Operation of STATCOM, Simplified Analysis of a Three Phase Six Pulse STATCOM, Analysis of a Six Pulse VSC Using Switching Functions, Harmonic Transfer and Resonance in VSC, Applications of STATCOM, Compensation by STATCOM.

Module 5: Unified Power Flow Controller and other Multi-Converter Devices

Introduction, Operation of a UPFC, Control of UPFC, Protection of UPFC, Interline Power Flow Controller, Convertible Static Compensator, SSR Characteristics of UPFC, Applications of UPFC.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

- K. R. Padiyar: Flexible AC Transmission Systems, 2009

Course Name	Course Code	LTP	Credit	Semester
MAJOR PROJECT	**BEE 860**	12:0:0	12	8

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Introduction and historical information on Microorganisms and their use in different industries
CLO 2	Acquire industrial skills of microbial culture, growth, and practices
CLO 3	Demonstrate the advanced application of Microbes in emerging industrial sectors

Methodology

Topics of project are to be based on the latest trends, verifying engineering concepts /principals and should involve elementary research work. The projects may involve design, fabrications, testing, computer modelling, and analysis of any engineering problem. On completion of the practical training the students are to present a report covering various aspects learnt by them and give a presentation on same.

Examination Scheme:

Literature study/ Fabrication/ Experimentation	40
Written Report	20
Viva	15
Presentation	25
Total	**100**

Course Name	Course Code	LTP	Credit	Semester
OPTIMIZATION TECHNIQUES AND ALGORITHMS	**BEE 803**	2:1:0	3	8

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	
CLO 2	
CLO 3	

Course Objective:

To impart the knowledge of optimization techniques used in the industries and research projects for product development and applications.

Course Contents:

Module I: **Introduction**

Engineering application of Optimization, Formulation of designproblems as mathematical programming problems, classification of optimization problems.

Module II : optimization techniques

Classical optimization, multivariable with no constraints,unconstrained minimization techniques,Penalty function techniques, Lagrange multipliers and feasibility techniques.

ModuleIII: Linear Programming

Graphical method, Simplex method, Duality in linearprogramming (LP), Sensitivity analysis, Applications in civil engineering.

ModuleIV: Non Linear Programming Techniques/Method

Unconstrained optimization,one dimensional minimization, golden section, elimination, quadratic and cubic, Fibonacci, interpolationDirect search, Descent, Constrained optimization, Direct and indirect, Optimization with calculus, Khun-Tucker conditions.

Module V:**Constrained Optimization Techniques**

Direct, complex, cutting plane, exterior Penalty function methods for structural engineering problems.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text Books

- Rao S. S.: Engineering Optimization- Theory and Practice, New Age International. 2009

- Hadley. G.: Linear programming, Narosa Publishing House, New Delhi. 2003

Reference Books

- Deb. K.: Optimization for Engineering Design_ Algorithms and Examples, PHI. 2012

- Bhavikatti S. S.: Structural Optimization Using Sequential Linear Programming, Vikas Publishing House, New Delhi. 2003

- Spunt: Optimum Structural Design, Prentice Hall. 1971

Course Name	Course Code	LTP	Credit	Semester
SMART GRID TECHNOLOGY	BEE 804	2:1:0	3	8

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Understand the concept of smart grid, their comparison over conventional grid & international policies
CLO 2	Assess the role of automation in Transmission/Distribution substations.
CLO 3	Understand operation and importance of High-Efficiency Distribution Transformers, Phase Shifting Transformers and Plug in Hybrid Electric Vehicles (PHEV).

Course Objective:

The course discusses the international and national development towards the futures renewable electric energy system, and the concept known as Smart Grid. The starting point is the understanding of how design, operation and control of power systems traditionally have been considered. Integration of distributed and intermittent renewable energy requires a new paradigm, and the course gives a basis to understand and contribute to this development. Power systems, power electronics and renewable energy merge, for example in micro grids. A major part of the course concerns electric energy production with photovoltaic (solar) cells. The solar resource and photovoltaic materials and their electrical characteristics are discussed, followed by the treatment of photovoltaic systems, including economic considerations and energy storage. Also other renewable resources are mentioned. In addition, the course discusses the interaction between the power grid and flexible resources, and smart meters.

Course Contents:

Module I: Introduction to Smart Grid:

Evolution of Electric Grid, Concept, Definitions and Need for Smart Grid, Smart grid drivers, functions, opportunities, challenges and Benefits Difference between conventional & Smart Grid, Concept of Resilient &Self-Healing Grid, Present development & International policies in Smart Grid, Diverse perspectives from experts and global Smart Grid initiatives.

Module II: Smart Grid Technologies:

Technology Drivers, Smart energy resources, Smart substations, Substation Automation, Feeder Automation ,Transmission systems: EMS, FACTS and HVDC, Wide area monitoring,

Protection and Control, Distribution Systems: DMS, Volt/Var control, Fault Detection, Isolation and service restoration, Outage management, High-Efficiency Distribution Transformers, Phase Shifting Transformers, Plug in Hybrid Electric Vehicles (PHEV).

Module III: Smart Meters and Advanced Metering Infrastructure:

Introduction to Smart Meters, Advanced Metering infrastructure (AMI) drivers and benefits, AMIprotocols, standards and initiatives, AMI needs in the smart grid, Phasor Measurement, Unit (PMU), Intelligent\ Electronic Devices (IED) & their application for monitoring & protection.

Module IV: Power Quality Management in Smart Grid:

Power Quality & EMC in Smart Grid, Power Quality issues of Grid connected Renewable Energy Sources, Power Quality Conditioners for Smart Grid, Web based Power Quality monitoring, Power Quality Audit.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text and References:

Text:

- Vehbi C. Güngör, Dilan Sahin, Taskin Kocak, Salih Ergüt, ConcettinaBuccella,CarloCecati, and Gerhard P. Hancke: Smart Grid Technologies-CommunicationTechnologies and Standards IEEE Transactions on Industrial Informatics, Vol. 7, No.4, November 2011.

- Xi Fang, SatyajayantMisra, Guoliang Xue, and Dejun Yang: Smart Grid – The Newand Improved Power Grid- A Survey, IEEE Transaction on Smart Grids, 2011

Reference:

- Stuart Borlase: Smart Grid-Infrastructure, Technology and Solutions, CRC Press 2012

ANANDAM

Course Name	Course Code	LTP	Credit	Semester
ANANDAM	AND008	2:0:0	2	8

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Awareness and empathy regarding community issues
CLO 2	Interaction with the community and impact on society
CLO 3	Interaction with mentor and development of Student teacher relationship
CLO 4	Interaction among students, enlarge social network
CLO 5	Cooperative and Communication skills and leadership qualities
CLO 6	Critical thinking, Confidence and Efficiency

B. Course Objectives:

After the completion of this course, students will be able to:

- apply their knowledge and skills to solve specific community problem
- learn to plan, lead, and organize community events have a sense of belonging to their college campus and community and find something they are interested in doing during their free time
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- be useful to society as it will protect them against stress, frustration, and depression

Course Contents:

The project report should be guided by the mentor and shall contain:

- **Synopsis**: clearly stating objectives and activities to be undertaken. Problem identifying and problem-solving projects to be taken up.
- Details of the **Mentor and the Participants are to** be given (name of mentor, name of participants, phone number/mobile no, email, and address)
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- Number of beneficiaries and impact on the society (the object should be to empower the community and make them self-reliant)
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- The Group Community Service Project Report will be submitted by the Student group leader under the guidance of the mentor to the Director/HoIs of the Department.
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- University will forward the report to the state level committee.

GUIDELINES FOR GCSP (Group Community Service Project) ASSIGNMENT OF ANANDAM FOR SOCIAL AWARENESS (for students)

1. Each member of the group shall write one blog about the decided topic of 500 words (minimum) along with any relevant photos/diagrams/statistical data (with reference).
2. The group member shall write his/her name at the end of the blog.
3. The blog shall be posted on Instagram and Facebook (apart from these any other website wherever the group seems necessary).
4. Print out of the blog where date of when the content is posted, number of followers, comments, name of the writer shall be visible will be taken and file will be maintained for the same.
5. In the cover page of the project mention heading **"Group Community Service Project"**, and the filled format of final project report given by Anandam Scheme.
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    a) Current scenario (Regional, national and international level as applicable)
    b) Future predictions
    c) Duty of the government
    d) Government policies (related to the topic), if any
    e) Duty of public
    f) Conclusion

Evaluation Scheme:

Project Participation: 2 hours X 8 days (per month) X 4 months = 64 hours

- **C grade =32 hrs (Below 20 marks)**
- **B grade >32 hrs to <=44hrs (20-30 marks)**
- **A grade >44 hrs to<=54hrs (30-40 marks)**
- **O grade >54 hrs to<=64hrs (40-50 marks)**

Evaluation Criteria:

Respective Departmental Anandam mentors are requested to evaluate the project (out of 50) as per the following criteria:

1. Position and exceptions, if any, are clearly stated. The organization of the blog is completely and clearly outlined and implemented.
2. The body of the blog is coherently organized, original and the logic is easy to follow. There is no spelling or grammatical errors and terminology is clearly defined. Writing is clear, concise, and persuasive.
3. Conclusion is clearly stated. The underlying logic is explicit.

AMITY UNIVERSITY
RAJASTHAN

AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY (ASET)

Bachelor of Technology

(Data Science & Engineering)

Programme Code: BDS

Duration – 4 Years Full Time

(Programme Structure)

Choice Based Credit System (CBCS)

AMITY UNIVERSITY
RAJASTHAN

Program Learning Outcomes – PLO

1. Students will be able to demonstrate role of Computer Science in the following core knowledge areas
   - Algorithms, Data Structures and Databases
   - Programming Languages and Compilers
   - Software Engineering and Development
   - Computer Hardware and Architecture
   - Data Communication and Computer Networks
2. Students will be able to analyze role of computer science and information technology, with mainstay in mathematics, basic sciences and engineering fundamentals.
3. Students will apply problem solving strategies to a range of modern computing paradigms related to computer programming, data intensive technologies, distributed and cloud computing, computational techniques.
4. Students will gain experiential learning on developing techno-commercially feasible and socially acceptable computing solutions to real world engineering problems thorough internship and projects, in industry.
5. Students will recognize the role of technological advances impacting society and the social, legal, ethical, cultural and communicative implications of computer technology and their usage.

Evaluation Scheme: [50 +50]

Credits Summary

Semester	Core Courses (CC)	Domain Electives (DE)	Value Added Courses(VA)	Non-Teaching Credit Courses (NTCC)	Open Electives(OE)	Anandam	Total
1	22	-	04	-	-	02	28
2	24	-	04	01	03	02	34
3	18	04	04	-	03	02	31
4	14	04	04	-	03	02	27
5	12	04	04	05	03	02	30
6	14	04	04	-	03	02	27
7	07	04	04	04	03	02	24
8	11	-	-	15	-	-	26
Total	122	20	28	25	18	14	227

Total Credit=122+20+28+25+18+14=227

CC= Core Course, DE=Domain Elective, OE= Open Elective, VA=Value Added Course, NTCC=Non-Teaching Credit Courses

AMITY UNIVERSITY
RAJASTHAN

AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY (ASET)

Program Name: B.Tech.(DSE)

FIRST SEMESTER

Code	Course	Category	L	T	P/FW	Credit Units
Core Courses						
AM101	Applied Mathematics – I	CC	3	1	-	4
AP 102	Applied Physics - I – Fields & Waves	CC	2	1	-	3
BME 103	Engineering Mechanics	CC	2	1	-	3
BDS 104	Introduction to Computers & Programming in C/C++	CC	2	1	-	3
BEE 105	Basic Electrical Engineering	CC	2	1	-	3
BME 106	Engineering Graphics	CC	1	-	-	1
Practical Courses						
AP 122	Applied Physics - I lab	CC	-	-	2	1
BME 123	Engineering Mechanics Lab	CC	-	-	2	1
BDS 124	Programming in C Lab	CC	-	-	2	1
BEE 125	Basic Electrical Engineering Lab	CC	-	-	2	1
BME 126	Engineering Graphics Lab	CC	-	-	2	1
Value Added Courses						
BCS 101	English	VA	1	-	-	1
BSS 104	Behavioral Science-I(Understanding Self for Effectiveness)	VA	1	-	-	1
FLT 101 FLG 101 FLS 101 FLC 101	Foreign Language – I French German Spanish Chinese	VA	2	-	-	2
Non-Teaching Credit Course (NTCC)						
AND001	Anandam-I	NTCC	-	-	-	2
Total						**28**

AMITY UNIVERSITY
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AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY (ASET)

Program Name: B.Tech.(DSE)

SECOND SEMESTER

Code	Course	Category	L	T	P/FW	Credit Units
Core Courses						
AM 201	Applied Mathematics – II	CC	3	1	-	4
AP 202	Applied Physics - II – Modern Physics	CC	2	1	-	3
AC 203	Applied Chemistry	CC	2	1	-	3
BDS 204	Programming in Python Language	CC	2	1	-	3
BME 205	Elements of Mechanical Engineering	CC	2	1	-	3
BCS 206	Domain Workshop/Seminar	NTCC	-	-	-	1
EVS 001	Environmental Studies	CC	4	-	-	4
Practical Courses						
AP 222	Applied Physics – II Lab	CC	-	-	2	1
AC 223	Applied Chemistry Lab	CC	-	-	2	1
BDS 224	Python Programming Laboratory	CC	-	-	2	1
BME 225	Elements of Mechanical Engineering Lab	CC	-	-	2	1
Open Elective						
	OPEN ELECTIVE- 1	**OE**	**3**	**-**	**-**	**3**
Value Added Courses						
BCS 201	English	VA	1	-	-	1
BSS 204	Behavioural Science – II (Problem solving and Creative Thinking)	VA	1	-	-	1
FLT 201 FLG 201 FLS 201 FLC 201	Foreign Language – II French German Spanish Chinese	VA	2	-	-	2
Non-Teaching Credit Course (NTCC)						
AND002	Anandam-II	NTCC	-	-	-	2

Total					**34**

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RAJASTHAN

Program Name: B.Tech.(DSE)

THIRD SEMESTER

Code	Course	Category	L	T	P/FW	Credit Units
Core Courses						
AM 301	Statistics	CC	2	1	-	3
BDS 302	Data Structures and Algorithms	CC	2	1	-	3
BDS 303	Fundamentals of Operating Systems	CC	2	1	-	3
BDS 304	Database Management and SQL	CC	2	1	-	3
BDS 307	Introduction to Artificial Intelligence	CC	2	1	-	3
Practical Courses						
BDS 322	Data structures and Algorithms Lab	CC	-	-	2	1
BDS 323	Operating Systems with Unix lab	CC	-	-	2	1
BDS 324	Database Management Systems lab	CC	-	-	2	1
Domain Elective-I : Choose any ONE from the following courses along with corresponding labs						
BDS 305	Digital Electronics	DE	2	1	-	3
BDS 306	Website Design	DE				
BDS 325	Digital Electronics lab	DE	-	-	2	1
BDS 326	Website Design Lab	DE				
Open Elective Course						
	OPEN ELECTIVE- 2	**OE**	**3**	**-**	**-**	**3**
Value Added Courses						
BCS 301	Communication Skills – I	VA	1	-	-	1
BSS 304	Behavioral Science – III (Interpersonal Communication)	VA	1	-	-	1
FLT 301 FLG 301 FLS 301 FLC 301	Foreign Language – III French German Spanish Chinese	VA	2	-	-	2
Non-Teaching Credit Course (NTCC)						

AND003	Anandam-III	NTCC	-	-	-	2
Total						**31**

AMITY UNIVERSITY
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AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY (ASET)

Program Name: B.Tech.(DSE)

FOURTH SEMESTER

Code	Course	Category	L	T	P/FW	Credit Units
Core Courses						
BDS 402	Probability and Random Variables	CC	3		-	3
BDS 403	Networking Methodologies	CC	2	1	-	3
BDS 404	Design and Analysis of Algorithms	CC	2	1	-	3
BDS 405	Knowledge Engineering	CC	2	1	-	3
Practical Courses						
BDS 424	Design and Analysis of Algorithms Lab	CC	-	-	2	1
BDS 425	Data Communication & Computer Networks Lab	CC	-	-	2	1
Domain Elective-II : Choose any one from the following courses						
BDS 406	Data warehousing and data mining	DE	2	1	-	3
BDS 407	Computer System Architecture and Organization	DE	4	-	-	4
BDS 426	Data mining Tools Lab	DE	-	-	2	1
Open Elective Courses						
	OPEN ELECTIVE- 3	**OE**	**3**	**-**	**-**	**3**
Value Added Courses						
BCS 401	Communication Skills – II	VA	1	-	-	1
BSS 404	Behavioural Science – IV (Relationship Management)	VA	1	-	-	1
FLT 401 FLG 401 FLS 401 FLC 401	Foreign Language – IV French German Spanish Chinese	VA	2	-	-	2
Non-Teaching Credit Course (NTCC)						
AND004	Anandam-IV	NTCC	-	-	-	2
Total						**27**

PRACTICAL TRAINING – I: 6 – 8 WEEKS

AMITY UNIVERSITY
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AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY (ASET)

Program Name: B.Tech.(DSE)

FIFTH SEMESTER

Code	Course	Category	L	T	P/FW	Credit Units
Core Courses						
BDS 502	Foundation of data science	CC	2	1	-	3
BDS 503	Artificial Neural Networks	CC	2	1	-	3
BDS 504	Data Visualization	CC	3	-	-	3
BDS 550	Internship - I (Evaluation)	NTCC	-	-	-	5
Practical Courses						
BDS 522	Artificial Neural NetworksLab	CC	-	1	1	1
BDS 523	Machine Learning Laboratory	CC	-	-	2	1
BDS 524	Data Visualization Laboratory	CC	-	-	2	1
Domain Elective-III : Choose any ONE from the following courses along with their corresponding labs						
BDS 505	Pattern Recognition	DE	2	1	-	3
BDS 506	Advance Networking	DE	2	1	-	3
BDS 525	Pattern Recognition in Python Programming Lab	DE	-	-	2	1
BDS 526	Advance Networking Lab	DE	-	-	2	1
Open Elective Courses						
	OPEN ELECTIVE- 4	OE	3	-	-	3
Value Added Courses						
BCS 501	Communication Skills – III	VA	1	-	-	1
BSS 504	Behavioural Science –V (Group Dynamics and Team Building)	VA	1	-	-	1
FLT 501 FLG 501	Foreign Language – V French German	VA	2	-	-	2

FLS 501 FLC 501	Spanish Chinese					
Non-Teaching Credit Course (NTCC)						
AND005	Anandam-V	NTCC	-	-	-	2
Total						**30**

AMITY UNIVERSITY
RAJASTHAN

AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY (ASET)

Program Name: B.Tech.(DSE)

SIXTH SEMESTER

Code	Course	Category	L	T	P/FW	Credit Units
Core Courses						
BDS 602	Statistical Methods for Data Engineering	CC	3	-	-	3
BDS 603	Data Analytics and Exploratory Data Analysis	CC	2	1	-	3
BDS 604	Fundamental concepts of IoT	CC	2	1	-	3
BDS 605	Intelligent Information Retrieval	CC	2	1	-	3
Practical Courses						
BDS 622	Data Analytics Laboratory	CC	-	-	2	1
BDS 624	Advanced SAS Programming Lab	CC	-	-	2	1
Domain Elective-IV : Choose any ONE from the following courses along with their corresponding labs						
BDS 606	Natural Language Processing	DE	2	1	-	3
BDS 607	Data Security	DE	2	1	-	3
BDS 608	Cloud Computing	DE	2	1	-	3
BDS 626	Natural Language ProcessingLab	DE	-	-	2	1
BDS 627	Data SecurityLab	DE				
BDS 628	Cloud Computing Lab	DE	-	-	2	1
Open Elective Course						
	OPEN ELECTIVE- 5	OE	3	-	-	3
Value Added Courses						
BCS 601	Communication Skills – IV	VA	1	-	-	1
BSS 604	Behavioral Science – VI (Stress and Coping Strategies)	VA	1	-	-	1
FLT 601 FLG 601 FLS 601 FLC 601	Foreign Language – VI French German Spanish Chinese	VA	2	-	-	2

Non-Teaching Credit Course (NTCC)						
AND006	Anandam-VI	NTCC	-	-	-	2
Total						**27**

PRACTICAL TRAINING – II: 6 – 8 WEEKS

AMITY UNIVERSITY
RAJASTHAN

AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY (ASET)

Program Name: B.Tech.(DSE)

SEVENTH SEMESTER

Code	Course	Category	L	T	P/FW	Credit Units
Core Courses						
BDS 702	Software Process and project	CC	2	1	-	3
BDS 703	Predictive Analytics	CC	3	-	-	3
BDS 750	Internship – II(Evaluation)	NTCC	-	-	-	4
Practical Courses						
BDS 722	Model Deployment Laboratory	CC	-	-	2	1
Domain Elective-V : Choose any ONE from the following courses along with their corresponding labs						
BDS 704	IoT Architecture and Protocol	DE	2	1	-	3
BDS 705	Statistics for Business Analytics	DE	2	1	-	3
BDS 706	Block Chain	DE	3	1	-	4
BDS 707	Deep Learning Algorithm and Architectures	DE	2	1	-	3
BDS 724	IoT Architecture and ProtocolLab	DE	-	-	2	1
BDS 725	Block Chain Lab	DE	-	-	2	1
BDS 727	Deep Learning Algorithm and ArchitecturesLab	DE	-	-	2	1
Open Elective Course						
	OPEN ELECTIVE- 6	OE	3	-	-	3
Value Added Courses						
BCS 701	Communication Skills – V	VA	1	-	-	1
BSS 704	Behavioural Science – VII (Individual, Society and Nation)	VA	1	-	-	1
FLT 701 FLG 701 FLS 701 FLC 701	Foreign Language – VII French German Spanish Chinese	VA	2	-	-	2
Non-Teaching Credit Course (NTCC)						
AND007	Anandam-VII	NTCC	-	-	-	2
Total						**24**

AMITY UNIVERSITY
RAJASTHAN

AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY (ASET)

Program Name: B.Tech.(DSE)

EIGHTh SEMESTER

SEMESTER VIII

Code	Course	Category	L	T	P/FW	Credit Units
Core Courses						
BDS 801	Secure Cloud Computing	CC	2	1	-	3
BDS 802	Applied Machine Learning	CC	2	1	-	3
BDS 803	Digital Image Processing	CC	2	1	-	3
BDS 860	Project	NTCC	-	-	-	15
Practical Courses						
BDS 821	Soft Computing in MATLAB Lab	CC	-	-	2	1
BDS 823	Digital Image Processing Lab	CC	-	-	2	1
Total						**26**

Note:-

CC - Core Course,
VA - Value Added Course,
OE - Open Elective,
DE - Domain Elective,
FW - Field Work

APPLIED MATHEMATICS - I

Course Code:AM 101 **CreditUnits: 04**

Course Objective:

The knowledge of Mathematics is necessary for a better understanding of almost all the Engineering and Science subjects. Here our intention is to make the students acquainted with the concept of basic topics from Mathematics, which they need to pursue their Engineering degree in different disciplines.

Course Contents:

Module I: Differential Calculus

Successive differentiation, Leibnitz's theorem (without proof), Mean value theorem, Taylor's theorem (proof), Remainder terms, Asymptote & Curvature, Partial derivatives, Chain rule, Differentiation of Implicit functions, Exact differentials, Tangents and Normals, Maxima, Approximations, Differentiation under integral sign, Jacobians and transformations of coordinates.

Module II: Integral Calculus

Fundamental theorems, Reduction formulae, Properties of definite integrals, Applications to length, area, volume, surface of revolution, improper integrals, Multiple Integrals-Double integrals, Applications to areas, volumes.

Module III: Ordinary Differential Equations

Formation of ODEs, Definition of order, degree & solutions, ODE of first order: Method of separation of variables, homogeneous and non homogeneous equations, Exactness & integrating factors, Linear equations & Bernoulli equations, General linear ODE of n^{th} order, Solution of homogeneous equations, Operator method, Method of undetermined coefficients, Solution of simple simultaneous ODE.

Module IV: Vector Calculus

Scalar and Vector Field, Derivative of a Vector, Gradient, Directional Derivative, Divergence and Curl and their Physical Significance, Arc Length, Tangent, Directional Derivative, Evaluation of Line Integral, Green's Theorem in Plane (without proof), Representation of Surfaces, Tangent Plane and Surface Normal, Surface Integral, Stoke's Theorem (without proof), Gauss Divergence Theorem (without proof).

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- Differential Calculus by Shanti Narain
- Integral Calculus by Shanti Narain

References:

- Differential Equation by A.R. Forsyth
- Higher Engineering Mathematics by H.K. Dass

APPLIED PHYSICS - I - FIELDS AND WAVES

Course Code: AP 102 **CreditUnits: 03**

Course Objective:

Aim of this course is to introduce the students to fundamentals of graduate level physics, which form the basis of all applied science and engineering

Course Contents:

Module I: Oscillations & Waves

Oscillations: Introduction to S.H.M. Damped Oscillations: Differential Equation and its solution, logarithmic decrement, Quality Factor, Different conditions of damping of harmonic oscillations. Forced oscillations: Amplitude and Frequency Response, Resonance, Sharpness of Resonance

Plane Progressive Waves: Differential Equation and Solution, Superposition of Progressive Waves stationary waves.

Ultrasonics: Generation and application of ultrasonicwaves.

Module II: Wave Nature of Light

Interference: Coherent Sources, Conditions of interference, Interference due to division of wavefront, Fresnels biprism Interference due to division of amplitude, Newton's rings, Interference due to thin films, .

Diffraction: Fresnel and Fraunhofer diffraction, Fraunhofer diffraction at a single slit, double slit, N Slits, Transmission grating, Rayleigh criterion and Resolving power of grating.

Polarization: Birefringence, Nicol prism, Production and analysis of plane, circularly and elliptically polarized light, Half and quarter wave plates, Optical rotation, Polarimeter.

Module III: Electromagnetics

Scalar and vector fields, gradient of a scalar field, physical significance of gradient, equipotential surface. Line, surface and volume integrals, Divergence and curl of vector field and mathematical analysis physical significance, Electric flux, Gauss' law, Proof and Applications, Gauss divergence and Stokes theorems.

Differential form of Gauss' Law, Amperes' Law, Displacement current, Faradays Law, Maxwell equations in free space & isotropic media (Integral form & differential form), EM wave propagation in free space, Poynting vector.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

- Waves & oscillation, A. P. French
- Physics of waves, W. C. Elmore & M. A. Heald
- Introduction to Electrodynamics, D. J. Griffith
- Electrodynamics, Gupta, Kumar & Singh
- Optics, A. K. Ghatak
- Engineering Physics, Satya Prakash

ENGINEERING MECHANICS

Course Code: BME 103 **CreditUnits: 03**

Course Objective:

Objective of this course is to provide fundamental knowledge of force system and its effect on the behaviour of the bodies that may be in dynamic or in static state. It includes the equilibrium of different structures like beams, frames, truss etc and the force transfer mechanism in the different components of a body under given loading condition.

Course Contents:

Module I: Force system & Structure
Free body diagram, Equilibrium equations and applications. Plane truss, perfect and imperfect truss, assumption in the truss analysis, analysis of perfect plane trusses by the method of joints, method of section.

Module II:Friction
Static and Kinetic friction, laws of dry friction, co-efficient of friction, angle of friction, angle of repose, cone of friction, friction lock, efficiency of screw jack, transmission of power through belt

Module III: Distributed Force
Determination of center of gravity, center of mass and centroid by direct integration and by the method of composite bodies, mass moment of inertia and area moment of inertia by direct integration and composite bodies method, radius of gyration, parallel axis theorem, Pappus theorems and its application, polar moment of inertia.

Module IV: Work -Energy
Work energy equation, conservation of energy, Virtual work, impulse, momentum conservation, impact of bodies, co-efficient of restitution, loss of energy during impact, D'alembert principle

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

- S.S. Bhavikatti, Engineering Mechanics, New Age International Ltd
- Timoshenko, Engineering Mechanics, McGraw Hill
- R. S. Khurmi, Engineering Mechanics, S. Chand Publication
- H. Shames & G. K. M. Rao, Engineering Mechanics, Pearson Education, 2006

INTRODUCTION TO COMPUTERS AND PROGRAMMING IN C

Course Code: BDS 104 CreditUnits: 03

Course Objective:

The objective of this course module is to acquaint the students with the basics of computers system, its components, data representation inside computer and to get them familiar with various important features of procedure-oriented programming language i.e., C.The objective of this module is also to introduce object-oriented programming. To explore and implement the various features of OOP such as inheritance, polymorphism, Exceptional handling using programming language C++. After completing this course student can easily identify the basic difference between the programming approaches like procedural and object oriented.

Course Contents:

Module I: Programming in C
History of C, Introduction of C, Basic structure of C program, Concept of variables, constants and data types in C, Operators and expressions: Introduction, arithmetic, relational, Logical, Assignment, Increment and decrement operator, Conditional, bitwise operators, Expressions, Operator precedence and associativity. Managing Input and output Operation, formatting I/O.

C Statements, conditional executing using if, else, nesting of if, switch and break Concepts of loops, example of loops in C using for, while and do-while, continue and break. Storage types (automatic, register etc.), predefined processor, Command Line Argument.

Module II: Arrays and Functions and Advanced features in C
One dimensional arrays and example of iterative programs using arrays, 2-D arrays Use in matrix computations. Concept of Sub-programming, functions Example of user defined functions. Function prototype, Return values and their types, calling function, function argument, function with variable number of argument, recursion.

Pointers, relationship between arrays and pointers Argument passing using pointers, Array of pointers. Passing arrays as arguments.Strings and C string library.
Structure and Union. Defining C structures, Giving values to members, Array of structure, Nested structure, passing strings as arguments and File Handling.

Module III: Introduction to C++ and Classes and Objects
Review of C, Difference between C and C++, Procedure Oriented and Object Oriented Approach. Basic Concepts: Objects, classes, Principals like Abstraction, Encapsulation, Inheritance and Polymorphism. Dynamic Binding, Message Passing. Characteristics of Object-Oriented Languages. Introduction to Object-Oriented Modeling techniques (Object, Functional and Dynamic Modeling).

Abstract data types, Object & classes, attributes, methods, C++ class declaration, Local Class and Global Class, State identity and behaviour of an object, Local Object and Global Object, Scope resolution operator, Friend Functions, Inline functions, Constructors and destructors, instantiation of objects, Types of Constructors, Static Class Data, Array of Objects, Constant member functions and Objects, Memory management Operators.

Module IV: Inheritance and Polymorphism
Inheritance, Types of Inheritance, access modes – public, private & protected, Abstract Classes, Ambiguity resolution using scope resolution operator and Virtual base class, Aggregation, composition vs classification hiérarchies, Overriding inheritance methods, Constructors in derived classes, Nesting of Classes.

Polymorphism, Type of Polymorphism – Compile time and runtime, Function Overloading, Operator Overloading (Unary and Binary) Polymorphism by parameter, Pointer to objects, this pointer, Virtual Functions, pure virtual functions.

Module V: Strings, Files and Exception Handling
Manipulating strings, Streams and files handling, formatted and Unformatted Input output. Exception handling, Generic Programming – function template, class Template Standard Template Library: Standard Template

Library, Overview of Standard Template Library, Containers, Algorithms, Iterators, Other STL Elements, The Container Classes, General Theory of Operation, Vectors.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- "ANSI C" by E Balagurusamy
- Yashwant Kanetkar, "Let us C", BPB Publications, 2nd Edition, 2001.
- Herbert Schildt, "C: The complete reference", Osbourne Mcgraw Hill, 4th Edition, 2002.
- V. Raja Raman, "Computer Programming in C", Prentice Hall of India, 1995.
- A.R. Venugopal, Rajkumar, T. Ravishanker"Mastering C++", TMH, 1997
- R. Lafore, "Object Oriented Programming using C++", BPB Publications, 2004.
- "Object Oriented Programming with C++" By E. Balagurusamy.
- Schildt Herbert, "C++: The Complete Reference", Wiley DreamTech, 2005.

***References*:**

- **Kernighan & Ritchie, "C Programming Language", The (Ansi C Version), PHI, 2nd Edition.**
- **J. B Dixit, "Fundamentals of Computers and Programming in 'C'.**
- P.K. Sinha and Priti Sinha, "Computer Fundamentals", BPB publication.
- Parasons, "Object Oriented Programming with C++", BPB Publication, 1999.
- Steven C. Lawlor, "The Art of Programming Computer Science with C++", Vikas Publication, 2002.
- Yashwant Kanethkar, "Object Oriented Programming using C++", BPB, 2004

BASIC ELECTRICAL ENGINEERING

Course Code: BEE 105 **Credit Units: 03**

Course Objective:

The objective of the course is to provide a brief knowledge of Electrical Engineering to students of all disciplines. This Course includes some theorems related to electrical, some law's related to flow of current, voltages, basic knowledge of Transformer, basic knowledge of electromagnetism, basic knowledge of electrical network.

Course Contents:

Module I: Basic Electrical Quantities
Basic Electrical definitions-Energy, Power, Charge, Current, Voltage, Electric Field Strength, Magnetic Flux Density, etc., Resistance, Inductance and Capacitance. Ideal Source, Independent Source and Controlled Source

Module II: Network Analysis Techniques & Theorems
Circuit Principles: Ohm's Law, Kirchoff's Current Law, Kirchoff's Voltage Law Network Reduction: Star–Delta Transformation, Source Transformation, Nodal Analysis, Loop analysis. Superposition theorem, Thevenin's Theorem, Norton's theorem and Reciprocity theorem.

Module III: Alternating Current Circuits
Peak, Average and RMS values for alternating currents, Power calculation:
reactive power, active power, Complex power, power factor, impedance, reactance, conductance, susceptance Resonance: series Resonance, parallel resonance, basic definition of Q factor & Band-width.

Module IV: Transformers
Basic Transformer Operation principle, Construction, Voltage relations, current relations, Linear circuit models, open circuit test, short circuit test, Transformer Efficiency.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

- R.J. Smith, R.C. Dorf: Circuits, devices and Systems
- B.L. Thareja: Electrical Technology: Part -1 & 2
- V. Deltoro: Electrical Engineering fundamentals
- Schaum's Series: Electrical Circuits

APPLIED PHYSICS - I LAB

Course Code: AP 122 **Credit Units: 01**

List of Experiments:

1. To determine the wavelength of sodium light by Newton's rings method.
2. To determine the dispersive power of the material of prism with the help of a spectrometer.
3. To determine the specific rotation of sugar by Bi-quartz or Laurent half shade polarimeter.
4. To determine the speed of ultrasonic waves in liquid by diffraction method.
5. To determine the width of a narrow slit using diffraction phenomena.
6. To determine the temperature coefficient of platinum wire, using a platinum resistance thermometer and a Callender&Griffth's bridge.
7. To determine the value of specific charge (ratio of e/m) of an electron by Thomson method.
8. To determine the internal resistance of Leclanche cell with the help of Potentiometer.
9. To determine the resistance per unit length of a Carey Foster's bridge wire and also to find out the specific resistance of a given wire.
10. To plot graph showing the variation of magnetic field with distance along the aixs of a circular coil carrying current, and hence estimate the radius of the coil.
11. To determine the value of acceleration due to gravity ('g') in the laboratory using bar pendulum.
12. To determine the moment of inertia of a flywheel about its own axis of rotation.
13. To determine the density of material of the given wire with the help of sonometer.

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

ENGINEERING MECHANICS LAB

Course Code: BME 123 **CreditUnits: 01**

Engineering Mechanics:

1. To verify the law of Force Polygon
2. To verify the law of Moments using Parallel Force apparatus. (Simply supported type)
3. To determine the co-efficient of friction between wood and various surface (like
4. Leather, Wood, Aluminum) on an inclined plane.
5. To find the forces in the members of Jib Crane.
6. To determine the mechanical advantage, Velocity ratio and efficiency of a screw jack.
7. To determine the mechanical advantage, Velocity ratio and Mechanical efficiency of the
8. Wheel and Axle
9. To determine the MA, VR, η of Worm Wheel (2-start)
10. Verification of force transmitted by members of given truss.
11. To verify the law of moments using Bell crank lever
12. To find CG and moment of Inertia of an irregular body using Computation method

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

PROGRAMMING IN C LAB

Course Code: **BDS 124** **CreditUnits: 01**

Software Required: Turbo C

Course Contents:

- C program involving problems like finding the nth value of cosine series, Fibonacci series. Etc.
- C programs including user defined function calls
- C programs involving pointers, and solving various problems with the help of those.
- File handling

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

Basic Electrical Engineering Lab

Course Code: BEE 125 **CreditUnits: 01**

List of Experiments:

1. To verify KVL & KCL in the given network.
2. To verify Superposition Theorem.
3. To verify Maximum Power Transfer Theorem.
4. To verify Reciprocity Theorem.
5. To determine and verify RTh, VTh, RN, IN in a given network.
6. To perform open circuit & short circuit test on a single-phase transformer.
7. To study transient response of a given RLC Circuit.
8. To perform regulation, ratio & polarity test on a single-phase transformer.
9. To measure power & power factor in a three phase circuit by two wattmeter method.
10. To measure power & power factor in a three phase load using three ammeter & three voltmeter method.

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

ENGINEERING GRAPHICS LAB

Course Code: BME 125 **CreditUnits: 01**

Course Objective:

This course will provide students concepts on the drawings of different curves like straight line, parabola, ellipse etc. After completion of this course, students will be able to draw different figures manually and will be capable of using various instruments involved in drawings.

Course Contents:

Module I: General
Importance, Significance and scope of engineering drawing, Lettering, Dimensioning, Scales, Sense of proportioning, Different types of projections, Orthographic Projection, B.I.S. Specifications.

Module II: Projections of Point and Lines
Introduction of planes of projection, Reference and auxiliary planes, projections of points and Lines in different quadrants, traces, inclinations, and true lengths of the lines, projections on Auxiliary planes, shortest distance, intersecting and non-intersecting lines.

Module III: Planes other than the Reference Planes
Introduction of other planes (perpendicular and oblique), their traces, inclinations etc., Projections of points and lines lying in the planes, conversion of oblique plane into auxiliary Plane and solution of related problems.

Module IV: Projections of Plane Figures
Different cases of plane figures (of different shapes) making different angles with one or both reference planes and lines lying in the plane figures making different given angles (with one of both reference planes). Obtaining true shape of the plane figure by projection.

Module V: Projection of Solids
Simple cases when solid is placed in different positions, Axis faces and lines lying in the faces of the solid making given angles.

Module VI:Development of Surface
Development of simple objects with and without sectioning. Isometric Projection

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

Text & References:

- M.B. Shah & B.C. Rana, Engineering Drawing, Pearson Education, 2007
- PS Gill, Engineering Drawing, Kataria Publication
- ND Bhatt, Engineering Drawing, Charotar publications
- N Sidheshwar, Engineering Drawing, Tata McGraw Hill
- CL Tanta, Mechanical Drawing, “Dhanpat Rai”

ENGLISH

Course Code: BCS 101 **CreditUnits: 01**

Course Objective:

The course is intended to give a foundation of English Language. The literary texts are indented to help students to inculcate creative & aesthetic sensitivity and critical faculty through comprehension, appreciation and analysis of the prescribed literary texts. It will also help them to respond form different perspectives.

Course Contents:

Module I: Vocabulary
Use of Dictionary
Use of Words: Diminutives, Homonyms & Homophones

Module II: Essentials of Grammar - I
Articles
Parts of Speech
Tenses

Module III: Essentials of Grammar - II
Sentence Structure, Subject -Verb agreement
Punctuation
Module IV: Communication
The process and importance, Principles & benefits of Effective Communication
Module V: Spoken English Communication
Speech Drills, Pronunciation and accent, Stress and Intonation

Module VI: Communication Skills-I
Developing listening skills, Developing speaking skills
Module VII: Communication Skills-II
Developing Reading Skills
Developing writing Skills

Module VIII: Written English communication
Progression of Thought/ideas, Structure of Paragraph, Structure of Essays

Module IX: Short Stories
Of Studies, by Francis Bacon
Dream Children, by Charles Lamb
The Necklace, by Guy de Maupassant
A Shadow, by R.K.Narayan
Glory at Twilight, Bhabani Bhattacharya

Module X: Poems

All the Worlds a Stage	Shakespeare
To Autumn	Keats
O! Captain, My Captain.	Walt Whitman
Where the Mind is Without Fear	Rabindranath Tagore
Psalm of Life	H.W. Longfellow

Examination Scheme:

Components	A	CT	HA	EE
Weightage (%)	05	15	10	70

Text & References:

- Madhulika Jha, Echoes, Orient Long Man
- Ramon & Prakash, Business Communication, Oxford.
- Sydney Greenbaum Oxford English Grammar, Oxford.
- Successful Communications, MalraTreece (Allyn and Bacon)
- Effective Technical Communication, M. Ashraf Rizvi.

*** 30 hrsProgramme to be continued for Full year**

BEHAVIOURAL SCIENCE - I
(UNDERSTANDING SELF FOR EFFECTIVENESS)

Course Code: BSS 104 **CreditUnits: 01**

Course Objective:

This course aims at imparting:
Understanding self & process of self exploration
Learning strategies for development of a healthy self esteem
Importance of attitudes and its effective on personality
Building Emotional Competence

Course Contents:

Module I: Self: Core Competency
Understanding of Self
Components of Self – Self identity
Self concept
Self confidence
Self image

Module II: Techniques of Self Awareness
Exploration through Johari Window
Mapping the key characteristics of self
Framing a charter for self
Stages – self awareness, self acceptance and self realization

Module III: Self Esteem & Effectiveness
Meaning and Importance
Components of self esteem
High and low self esteem
Measuring your self esteem

Module IV: Building Positive Attitude
Meaning and nature of attitude
Components and Types of attitude
Importance and relevance of attitude

Module V: Building Emotional Competence
Emotional Intelligence – Meaning, components, Importance and Relevance
Positive and Negative emotions
Healthy and Unhealthy expression of emotions

Module VI:End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

- Organizational Behaviour, Davis, K.
- Hoover, Judhith D. Effective Small Group and Team Communication, 2002,Harcourt College Publishers
- Dick, Mc Cann&Margerison, Charles: Team Management, 1992 Edition, viva books
- Bates, A. P. and Julian, J.: Sociology - Understanding Social Behaviour
- Dressler, David and Cans, Donald: The Study of Human Interaction
- Lapiere, Richard. T – Social Change
- Lindzey, G. and Borgatta, E: Sociometric Measurement in the Handbook of Social Psychology, Addison – Welsley, US.
- Rose, G.: Oxford Textbook of Public Health, Vol.4, 1985.
- LaFasto and Larson: When Teams Work Best, 2001, Response Books (Sage), New Delhi
- J William Pfeiffer (ed.) Theories and Models in Applied Behavioural Science, Vol 2, Group (1996); Pfeiffer & Company
- Smither Robert D.; The Psychology of Work and Human Performance, 1994, Harper Collins College Publishers

FRENCH - I

Course Code: FLT 101 **CreditUnits: 02**

Course Objective:

To familiarize the students with the French language

- with the phonetic system
- with the syntax
- with the manners
- with the cultural aspects

Course Contents:

Module A: pp. 01 to 37: Unités 1, 2, Unité 3 Object if 1, 2
Only grammar of Unité 3: object if 3, 4 and 5

Contenu lexical :Unité 1 : Découvrir la langue française : (oral et écrit)

1. se présenter, présenter quelqu'un, faire la connaissance des autres, formules de politesse, rencontres
2. dire/interroger si on comprend
3. Nommer les choses

Unité 2: Faire connaissance

1. donner/demander des informations sur une personne, premiers contacts, exprimer ses goûts et ses préférences
2. Parler de soi: parler du travail, de ses activités, de son pays, de sa ville.

Unité 3:Organiser son temps

1. dire la date et l'heure

Contenu grammatical :

1. organisation générale de la grammaire
2. article indéfini, défini, contracté
3. nom, adjectif, masculin, féminin, singulier et pluriel
4. négation avec « de », "moi aussi", "moi non plus"
5. interrogation : Inversion, est-ce que, qui, que, quoi, qu'est-ce que, où, quand, comment, quel(s), quelle(s)

Interro-négatif : réponses : oui, si, non

6. pronom tonique/disjoint- pour insister après une préposition
7. futurproche

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- le livre à suivre: Campus: Tome 1

GERMAN - I

Course Code: FLG 101 **CreditUnits: 02**

Course Objective:

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.
To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany

Course Contents:

Module I: Introduction
Selfintroduction: heissen, kommen, wohnwn, lernen, arbeiten, trinken, etc.
All personal pronouns in relation to the verbs taught so far.
Greetings: Guten Morgen!, Guten Tag!, Guten Abend!, Gute Nacht!, Danke sehr!, Danke!, Vielen Dank!, (es tut mir Leid!),
Hallo, wie geht's?: Danke gut!, sehr gut!, prima!, ausgezeichnet!,
Es geht!, nicht so gut!, so la la!, miserabel!

Module II: Interviewspiel
To assimilate the vocabulary learnt so far and to apply the words and phrases in short dialogues in an interview – game for self introduction.

Module III: Phonetics
Sound system of the language with special stress on Dipthongs

Module IV: Countries, nationalities and their languages
To make the students acquainted with the most widely used country names, their nationalitie and the language spoken in that country.

Module V: Articles
The definite and indefinite articles in masculine, feminine and neuter gender. All Vegetables, Fruits, Animals, Furniture, Eatables, modes of Transport

Module VI: Professions
To acquaint the students with professions in both the genders with the help of the verb "sein".

Module VII: Pronouns
Simple possessive pronouns, the use of my, your, etc.
The family members, family Tree with the help of the verb "to have"

Module VIII: Colours
All the color and color related vocabulary – colored, colorful, colorless, pale, light, dark, etc.

Module IX: Numbers and calculations – verb "kosten"
The counting, plural structures and simple calculation like addition, subtraction, multiplication and division to test the knowledge of numbers.
"Wie vielkostet das?"

Module X: Revision list of Question pronouns
W – Questions like who, what, where, when, which, how, how many, how much, etc.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, TangramAktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

SPANISH – I

Course Code: FLS 101 **CreditUnits: 02**

Course Objective:

To enable students acquire the relevance of the Spanish language in today's global context, how to greet each other. How to present / introduce each other using basic verbs and vocabulary

Course Contents:

Module I

A brief history of Spain, Latin America, the language, the culture…and the relevance of Spanish language in today's global context.
Introduction to alphabets

Module II

Introduction to '*Saludos*' (How to greet each other. How to present / introduce each other).
Goodbyes (despedidas)
The verb *llamarse*and practice of it.

Module III

Concept of Gender and Number
Months of the years, days of the week, seasons. Introduction to numbers 1-100, Colors, Revision of numbers and introduction to ordinal numbers.

Module IV

Introduction to *SER* and *ESTAR* (both of which mean To Be).Revision of '*Saludos*' and '*Llamarse*'. Some adjectives, nationalities, professions, physical/geographical location, the fact that spanish adjectives have to agree with gender and number of their nouns. Exercises highlighting usage of *Ser* and *Estar*.

Module V

Time, demonstrativepronoun (Este/esta, Aquel/aquellaetc)

Module VI

Introduction to some key AR /ER/IR ending regular verbs.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español, EnDirecto I A
- Español Sin Fronteras

CHINESE – I

Course Code: FLC 101 **Credit Units: 02**

Course Objective:

There are many dialects spoken in China, but the language which will help you through wherever you go is Mandarin, or Putonghua, as it is called in Chinese. The most widely spoken forms of Chinese are Mandarin, Cantonese, Gan, Hakka, Min, Wu and Xiang. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I
Show pictures, dialogue and retell.
Getting to know each other.
Practicing chart with Initials and Finals. (CHART – The Chinese Phonetic Alphabet Called "Hanyu Pinyin" in Mandarin Chinese.)
Practicing of Tones as it is a tonal language.
Changes in 3rd tone and Neutral Tone.

Module II
Greetings
Let me Introduce
The modal particle "ne".
Use of Please 'qing" – sit, have tea …….. etc.
A brief self introduction – Ni hao ma? Zaijian!
Use of "bu" negative.

Module III
Attributives showing possession
How is your Health? Thank you
Where are you from?
A few Professions like – Engineer, Businessman, Doctor, Teacher, Worker.
Are you busy with your work?
May I know your name?

Module IV
Use of "How many" – People in your family?
Use of "zhe" and "na".
Use of interrogative particle "shenme", "shui", "ma" and "nar".
How to make interrogative sentences ending with "ma".
Structural particle "de".
Use of "Nin" when and where to use and with whom. Use of guixing.
Use of verb "zuo" and how to make sentences with it.

Module V
Family structure and Relations.
Use of "you" – "mei you".
Measure words
Days and Weekdays.
Numbers.
Maps, different languages and Countries.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

"Elementary Chinese Reader Part I" Lesson 1-10

APPLIED MATHEMATICS - II

Course Code: AM 201 **Credit Units: 04**

Course Objective:

The knowledge of Mathematics is necessary for a better understanding of almost all the Engineering and Science subjects. Here our intention is to make the students acquainted with the concept of basic topics from Mathematics, which they need to pursue their Engineering degree in different disciplines.

Course Contents:

Module I: Linear Algebra

Hermitian and Skew Hermitian Matrix, Unitary Matrix, Orthogonal Matrix, Elementary Row Transformation, Reduction of a Matrix to Row Echelon Form, Rank of a Matrix, Consistency of Linear Simultaneous Equations, Gauss Elimination Method, Gauss-Jordan Method, Eigen Values and Eigen Vectors of a Matrix, Caley-Hamilton Theorem, Diagonalization of a Matrix, Vector Space, Linear Independence and Dependence of Vectors, Linear Transformations.

Module II: Infinite Series

Definition of Sequence, Bounded Sequence, Limit of a Sequence, Series, Finite and Infinite Series, Convergence and Divergence of Infinite series, Cauchy's Principle of Convergence, Positive Term Infinite Series, Comparison test, D'Alembert's Ratio test. Raabe's Test, Cauchy's nth root Test. Logarithmic Test, Alternating Series, Leibnitz's Test, Absolute and conditioinal convergence, Uniform Convergence, Power Series and its Interval of Convergence.

Module III: Complex Analysis

De Moivre's Theorem and Roots of Complex Numbers, Logarithmic Functions, Circular, Hyperbolic Functions and their Inverses.

Functions of a Complex Variables, Limits, Continuity and Derivatives, Analytic Function, Cauchy-Riemann Equations (without proof), Harmonic Function, Harmonic Conjugates, Conformal Mapping, Bilinear Transformations, Complex Line Integral, Cauchy Integral Theorem, Cauchy Integral Formula, Derivative of Analytic Function, Power Series, Taylor Series, Laurent Series, Zeroes and Singularities, Residues, Residue Theorem, Evaluation of Real Integrals of the Form and $\int_{-\infty}^{\infty} \frac{f(x)}{F(x)} dx$.

Module IV: Statistics and Probability

Moments, Skewness, Kurtosis, Random Variables and Probability Distribution, Mean and Variance of a Probability Distribution, Binomial Distribution, Poisson Distribution and Normal Distribution.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

- Engineering Mathematics by Erwin Kreyszig.
- Engineering Mathematics by R.K. Jain and S.R.K. Iyengar.
- Higher Engineering Mathematics by H.K. Dass.
- Engineering Mathematics by B.S. Grewal.
- Differential Calculus by Shanti Narain.
- Integral Calculus by Shanti Narain.
- Linear Algebra- Schaum Outline Series.

APPLIED PHYSICS - II - MODERN PHYSICS

Course Code: AP 202 **CreditUnits: 03**

Course Objective:

Aim of this course is to introduce the students to fundamentals of graduate level physics which form the basis of all applied science and engineering

Course Contents:

Module I: Special Theory of Relativity

Michelson-Morley experiment, Importance of negative result, Inertial & non-inertial frames of reference, Einstein's postulates of Special theory of Relativity, Space-time coordinate system, Relativistic Space Time transformation (Lorentz transformation equation), Transformation of velocity, Addition of velocities, Length contraction and Time dilation, Mass-energy equivalence (Einstein's energy mass relation) & Derivation of Variation of mass with velocity,

Module II: Wave Mechanics

Wave particle duality, De-Broglie matter waves, phase and group velocity, Heisenberg uncertainty principle, wave function and its physical interpretation, Operators, expectation values. Time dependent & time independent Schrödinger wave equation for free & bound states, square well potential (rigid wall), Step potential.

Module III: Atomic Physics

Vector atom model, LS and j-j coupling, Zeceman effect (normal & anomalous), Paschen-Bach effect, X-ray spectra and energy level diagram, Moseleys Law, Lasers – Einstein coefficients, conditions for light amplification, population inversion, optical pumping, three level and four level lasers, He-Ne and Ruby laser, Properties and applications of lasers.

Module IV: Solid State Physics

Sommerfield's free electron theory of metals, Fermi energy, Introduction to periodic potential &Kronig-Penny model (Qualitative) Band Theory of Solids, Semi-conductors: Intrinsics and Extrinsic Semiconductors, photoconductivity and photovotaics, Basic aspects of Superconductivity, Meissner effect.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

- Concept of Modern Physics, A. Beiser
- Applied Physics II, Agarawal& Goel
- Solid State Physics, S. O. Pallai
- Physics of Atom, Wehr& Richards

APPLIED CHEMISTRY

Course Code: AC 203 **Credit Units: 03**

Course Objective:

Four basic sciences, Physics, Chemistry, Mathematics and Biology are the building blocks in engineering and technology. Chemistry is essential to develop analytical capabilities of students, so that they can characterize, transform and use materials in engineering and apply knowledge in their field. All engineering fields have unique bonds with chemistry whether it is Aerospace, Mechanical, Environmental and other fields the makeup of substances is always a key factor, which must be known. For electronics and computer science engineering, apart from the material, computer modeling and simulation knowledge can be inherited from the molecule designing. The upcoming field of technology like Nanotechnology and Biotechnology depends fully on the knowledge of basic chemistry. With this versatile need in view, course has been designed in such a way so that the student should get an overview of the whole subject.

Course Contents:

Module I: Water Technology
Introduction and specifications of water,
Hardness and its determination (EDTA method only),
Alkalinity,
Boiler feed water, boiler problems – scale, sludge, priming &foaming: causes & prevention, Boiler problems – caustic embrittlement & corrosion: causes & prevention,
Carbonate & phosphate conditioning, colloidal conditioning &calgon treatment
Water softening processes: Lime – soda process, Ion exchange method,
Water for domestic use.

Module II: Fuels
Classification, calorific value of fuel, (gross and net),
Determination of calorific value of fuels, bomb calorimeter,
Solid fuels - Proximate and ultimate analysis,
Octane & Cetane No. and its significance.
Numericals on combustion

Module III: Instrumental Methods of analysis
Introduction; Principles of spectroscopy; Laws of absorbance
IR:Principle, Instrumentation, Application
UV:Principle, Instrumentation, Application
NMR: Principle, Instrumentation, Application

Module III: Lubricants
Introduction; Mechanism of Lubrication;
Types of Lubricants; Chemical structure related to Lubrication;
Properties of lubricants; Viscosity and Viscosity Index; Iodine Value; Aniline Point; Emulsion number; Flash Point; Fire Point; Drop Point; Cloud Point; Pour Point.
Selection of Lubricants.

Module VI: Corrosion
Introduction, Mechanism of dry and wet corrosion,
Types of corrosion-Galvanic, Concentration cell, soil, pitting, intergranular, waterline. Passivity.
Factors influencing corrosion.
Corrosion control.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

Text:

- Engineering Chemistry- Jain and Jain
- Engineering Chemistry- Sunita Rattan
- Engineering Chemistry-Shashi Chawla

References:

- Engineering Chemistry –Dara and Dara
- Spectroscopy- Y.R Sharma
- Corrosion Engineering – Fontenna and Greene

ENVIRONMENTAL STUDIES

Course Code: EVS 001 **Credit Units: 04**

Course Objective:

The term environment is used to describe, in the aggregate, all the external forces, influences and conditions, which affect the life, nature, behaviour and the growth, development and maturity of living organisms. At present a great number of environment issues, have grown in size and complexity day by day, threatening the survival of mankind on earth. A study of environmental studies is quite essential in all types of environmental sciences, environmental engineering and industrial management. The objective of environmental studies is to enlighten the masses about the importance of the protection and conservation of our environment and control of human activities which has an adverse effect on the environment.

Course Contents:

Module I: The multidisciplinary nature of environmental studies
Definition, scope and importance
Need for public awareness

Module II: Natural Resources
Renewable and non-renewable resources:
Natural resources and associated problems
Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.
Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, case studies.
Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

- Role of an individual in conservation of natural resources.
- Equitable use of resources for sustainable lifestyles.

Module III: Ecosystems
Concept of an ecosystem
Structure and function of an ecosystem
Producers, consumers and decomposers
Energy flow in the ecosystem
Ecological succession
Food chains, food webs and ecological pyramids
Introduction, types, characteristic features, structure and function of the following ecosystem:

a. Forest ecosystem
b. Grassland ecosystem
c. Desert ecosystem
d. Aquatic ecosystems (ponds, streams, lakes, rivers, ocean estuaries)

Module IV: Biodiversity and its conservation
Introduction – Definition: genetic, species and ecosystem diversity
Biogeographical classification of India
Value of biodiversity: consumptive use, productive use, social, ethical aesthetic and option values
Biodiversity at global, national and local levels
India as a mega-diversity nation
Hot-spots of biodiversity
Threats to biodiversity: habitat loss, poaching of wildlife, man wildlife conflicts
Endangered and endemic species of India
Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity

Module V: Environmental Pollution
Definition
Causes, effects and control measures of:

a. Air pollution

b. Water pollution
c. Soil pollution
d. Marine pollution
e. Noise pollution
f. Thermal pollution
g. Nuclear pollution

Solid waste management: Causes, effects and control measures of urban and industrial wastes.
Role of an individual in prevention of pollution.
Pollution case studies.
Disaster management: floods, earthquake, cyclone and landslides.

Module VI: Social Issues and the Environment
From unsustainable to sustainable development
Urban problems and related to energy
Water conservation, rain water harvesting, watershed management
Resettlement and rehabilitation of people; its problems and concerns. Case studies.
Environmental ethics: Issues and possible solutions
Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.
Wasteland reclamation
Consumerism and waste products
Environmental Protection Act
Air (Prevention and Control of Pollution) Act
Water (Prevention and control of Pollution) Act
Wildlife Protection Act
Forest Conservation Act
Issues involved in enforcement of environmental legislation
Public awareness

Module VII: Human Population and the Environment
Population growth, variation among nations
Population explosion – Family Welfare Programmes
Environment and human health
Human Rights
Value Education
HIV / AIDS
Women and Child Welfare
Role of Information Technology in Environment and Human Health
Case Studies

Module VIII: Field Work
Visit to a local area to document environmental assets-river / forest/ grassland/ hill/ mountain.
Visit to a local polluted site – Urban / Rural / Industrial / Agricultural
Study of common plants, insects, birds
Study of simple ecosystems-pond, river, hill slopes, etc (Field work equal to 5 lecture hours)

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text &References:

- Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
- BharuchaErach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad 380 013, India, Email:mapin@icenet.net (R)
- Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p
- Clark R.S., Marine Pollution, Clanderson Press Oxford (TB)
- Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Publ. House, Mumabai, 1196p
- De A.K., Environmental Chemistry, Wiley Eastern Ltd.
- Down to Earth, Centre for Science and Environment (R)
- Gleick, H.P. 1993. Water in Crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute Oxford Univ. Press. 473p
- Hawkins R.E., Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay (R)

- Heywood, V.H &Waston, R.T. 1995. Global Biodiversity Assessment. Cambridge Univ. Press 1140p.
- Jadhav, H & Bhosale, V.M. 1995. Environmental Protection and Laws. Himalaya Pub. House, Delhi 284 p.
- Mckinney, M.L. & School, R.M. 1996. Environmental Science Systems & Solutions, Web enhanced edition. 639p.
- Mhaskar A.K., Matter Hazardous, Techno-Science Publication (TB)
- Miller T.G. Jr. Environmental Science, Wadsworth Publishing Co. (TB)
- Odum, E.P. 1971. Fundamentals of Ecology. W.B. Saunders Co. USA, 574p
- Rao M N. &Datta, A.K. 1987. Waste Water treatment. Oxford & IBH Publ. Co. Pvt. Ltd. 345p.
- Sharma B.K., 2001. Environmental Chemistry. Geol Publ. House, Meerut
- Survey of the Environment, The Hindu (M)
- Townsend C., Harper J, and Michael Begon, Essentials of Ecology, Blackwell Science
- Trivedi R.K., Handbook of Environmental Laws, Rules Guidelines, Compliances and Standards, Vol I and II, Enviro Media (R)
- Trivedi R. K. and P.K. Goel, Introduction to air pollution, Techno-Science Publication (TB)
- Wanger K.D., 1998 Environnemental Management. W.B. Saunders Co. Philadelphia, USA 499p

ELEMENTS OF MECHANICAL ENGINEERING

Course Code: BME 205 **Credit Units: 03**

Course Objective:

The objective of this course is to impart the basic knowledge of thermodynamics, stress- strain, materials & their properties and various manufacturing processes to the students of all engineering discipline.

Course Contents:

Module I:Fundamental Concepts
Definition of thermodynamics, system, surrounding and universe, phase, concept of continuum, macroscopic & microscopic point of view, Thermodynamic equilibrium, property, state, path, process, cyclic process, Zeroth, first and second law of thermodynamics, Carnot Cycle, Introduction to I.C. Engines-two & four stoke S.I. and C.I. engines. Otto cycle. Diesel cycle.

Module II: Stress And Strain Analysis
Simple stress and strain: introduction, normal shear, and stresses-strain diagrams for ductile and brittle materials. Elastic constants, one-dimensional loadings of members of varying cross-section, Strain Energy, Properties of material-strength, elasticity, stiffness, malleability, ductility, brittleness, hardness and plasticity etc; Concept of stress and strain stress strain diagram, tensile test, impact test and hardness test.

Module III:Casting& Forging
Introduction of casting, pattern, mould making procedures, sand mould casting, casting defects, allowances of pattern. Forging-introduction, upsetting & drawing out, drop forging, press forging & m/c forging

Module IV: Welding& Sheet metal working:
Introduction of welding processes, classification, gas welding, arc welding, resistance welding. Introduction to sheet metal shop, Shearing, trimming, blanking, piercing, shaving, notching, stretch forming, nibbling coining, embossing and drawing.

Examination Scheme:

Components	CA	A	CT	EE
Weightage (%)	30	5	15	50

CT: Class Test, HA: Home Assignment, CA: Continuous Assessment, EE: End Semester Examination; A Attendance

Text & References:

- Engineering thermodynamics, by P.K. Nag, Tata McGraw Hill.
- Thermal Engineering, by D.S. Kumar. S.K. Kataria and Sons.
- Thermal Engineering by PL Ballaney; Khanna Publishers, Delhi.
- Engineering Thermodynamics: Work and Heat Transfer, by Rogers and Mayhew, ELBS Publications
- Heine, R.W. C.R. Loper and P.C. Rosenthal, Principles of metal casting McGraw Hill
- Welding Technology by R.S. Parmar, Khanna Publishers.
- Thermodynamics and Heat Engines Volume-I, by R. Yadav: Central Publications.
- Ganesan, V. *Internal Combustion Engine*, Tata McGraw-Hill.

APPLIED PHYSICS – II LAB

Course Code: **AP 222** **Credit Units: 01**

List of Experiments:

1. To determine the wavelength of sodium light by Newton's rings method.
2. To determine the dispersive power of the material of prism with the help of a spectrometer.
3. To determine the specific rotation of sugar by Bi-quartz or Laurent half shade polarimeter.
4. To determine the speed of ultrasonic waves in liquid by diffraction method.
5. To determine the width of a narrow slit using diffraction phenomena.
6. To determine the temperature coefficient of platinum wire, using a platinum resistance thermometer and a Callender&Griffth's bridge.
7. To determine the value of specific charge (ratio of e/m) of an electron by Thomson method.
8. To determine the internal resistance of Leclanche cell with the help of Potentiometer.
9. To determine the resistance per unit length of a Carey Foster's bridge wire and also to find out the specific resistance of a given wire.
10. To plot graph showing the variation of magnetic field with distance along the aixs of a circular coil carrying current, and hence estimate the radius of the coil.
11. To determine the value of acceleration due to gravity ('g') in the laboratory using bar pendulum.
12. To determine the moment of inertia of a flywheel about its own axis of rotation.
13. To determine the density of material of the given wire with the help of sonometer.

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

APPLIED CHEMISTRY LAB

Course Code: AC 223 **Credit Units: 01**

Course Contents:

List of Experiments:

(Any 10 Experiments)

1. To determine the ion exchange capacity of a given cation exchanger.

2. To determine the temporary, permanent and total hardness of a sample of water by complexometric titration method.

3. To determine the type and extent of alkalinity of given water sample.

4. To determine the number of water molecules of crystallization in Mohr's salt (ferrous ammonium sulphate) provided standard potassium dichromate solution (0.1N) using diphenylamine as internal indicator.

5. To determine the ferrous content in the supplied sample of iron ore by titrimetric analysis against standard $K_2Cr_2O_7$ solution using potassium ferricyanide $[K_3Fe(CN)_6]$ as external indicator.

6. (a) To determine the surface tension of a given liquid by drop number method.
(b) To determine the composition of a liquid mixture A and B (acetic acid and water) by surface tension method.

7. To prepare and describe a titration curve for phosphoric acid – sodium hydroxide titration using pH-meter.

8. (a) To find the cell constant of conductivity cell.
(b) Determine the strength of hydrochloric acid solution by titrating it against standard sodium hydroxide solution conductometrically
9. Determination of Dissolved oxygen in the given water sample.

10 To determine the total residual chlorine in water.

11 Determination of amount of oxalic acid and H_2SO_4 in 1 L of solution using N/10 NaOH and N/10 $KMnO_4$ solution.

12 Determination of viscosity of given oil by means of Redwood viscometer I.

13 To determine flash point and fire point of an oil by Pensky Martin's Apparatus

14 To determine the Iodine value of the oil.

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

ELEMENTS OF MECHANICAL ENGINEERING - LAB (EEM)

Course Code: BME 225 **CreditUnits: 01**

Course Contents:

1. Welding

   (a) Arc Welding
   - Butt Joint
   - Lap Joint
   - T Joint

   (b) Gas Welding
   - Butt Joint
   - Lap Joint
   - Brazing of Broken pieces

2. Foundry
   - Sand mould casting by single piece pattern& Split pattern bracket with cores

3. Sheet Metal
   - Dust Bin
   - Mug
   - Funnel
   - Cylindrical Mug with handle-Rectangular

4. Fitting Shop
   - Male – Female Joint
   - Rectangular piece Filing the job

Examination Scheme:

IA				EE		
A	**Practical (Mid-Term)**	**PR**	**V**	**LR**	**PR (End Term)**	**V**
5	20	10	15	10	25	15

Note: IA –InternalAssessment, EE- ExternalExam, PR- Performance, LR – Lab Record, V – Viva.

ENGLISH

Course Code: BCS 201 **Credit Units: 01**

Course Objective:

The course is intended to give a foundation of English Language. The literary texts are indented to help students to inculcate creative & aesthetic sensitivity and critical faculty through comprehension, appreciation and analysis of the prescribed literary texts. It will also help them to respond form different perspectives.

Course Contents:

Module I: Vocabulary

Use of Dictionary
Use of Words: Diminutives, Homonyms & Homophones

Module II: Essentials of Grammar - I
Articles
Parts of Speech
Tenses

Module III: Essentials of Grammar - II
Sentence Structure
Subject -Verb agreement
Punctuation

Module IV: Communication
The process and importance
Principles & benefits of Effective Communication

Module V: Spoken English Communication
Speech Drills
Pronunciation and accent
Stress and Intonation

Module VI: Communication Skills-I
Developing listening skills
Developing speaking skills

Module VII: Communication Skills-II
Developing Reading Skills
Developing writing Skills

Module VIII: Written English communication
Progression of Thought/ideas
Structure of Paragraph
Structure of Essays

Module IX: Short Stories
Of Studies, by Francis Bacon
Dream Children, by Charles Lamb
The Necklace, by Guy de Maupassant
A Shadow, by R.K.Narayan
Glory at Twilight, Bhabani Bhattacharya

Module X: Poems

All the Worlds a Stage	Shakespeare
To Autumn	Keats
O! Captain, My Captain.	Walt Whitman
Where the Mind is Without Fear	Rabindranath Tagore
Psalm of Life	H.W. Longfellow

Examination Scheme:

Components	A	CT	HA	EE
Weightage (%)	05	15	10	70

Text & References:

- Madhulika Jha, Echoes, Orient Long Man

- Ramon & Prakash, Business Communication, Oxford.
- Sydney Greenbaum Oxford English Grammar, Oxford.
- Successful Communications, MalraTreece (Allyn and Bacon)
- Effective Technical Communication, M. Ashraf Rizvi.

BEHAVIOURAL SCIENCE - II
(PROBLEM SOLVING AND CREATIVE THINKING)

Course Code: BSS 204 **CreditUnits: 01**

Course Objective:

To enable the students:
Understand the process of problem solving and creative thinking.
Facilitation and enhancement of skills required for decision-making.

Course Contents:

Module I: Thinking as a tool for Problem Solving
What is thinking: The Mind/Brain/Behaviour
Critical Thinking and Learning:
Making Predictions and Reasoning
Memory and Critical Thinking
Emotions and Critical Thinking
Thinking skills

Module II: Hindrances to Problem Solving Process
Perception, Expression, Emotion, Intellect, Work environment

Module III: Problem Solving
Recognizing and Defining a problem, Analyzing the problem (potential causes), Developing possible alternatives, Evaluating Solutions, Resolution of problem, Implementation,
Barriers to problem solving:
Perception,
Expression
Emotion
Intellect
Work environment

Module IV: Plan of Action
Construction of POA, Monitoring, Reviewing and analyzing the outcome

Module V: Creative Thinking
Definition and meaning of creativity, The nature of creative thinking, Convergent and Divergent thinking, Idea generation and evaluation (Brain Storming), Image generation and evaluation, Debating, The six-phase model of Creative Thinking: ICEDIP model

Module VI:End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

- Michael Steven: How to be a better problem solver, Kogan Page, New Delhi, 1999
- Geoff Petty: How to be better at creativity; Kogan Page, New Delhi, 1999
- Richard Y. Chang and P. Keith, Kelly: Wheeler Publishing, New Delhi, 1998.
- Phil Lowe Koge Page: Creativity and Problem Solving, New Delhi, 1996
- J William Pfeiffer (ed.) Theories and Models in Applied Behavioural Science, Vol 3, Management (1996); Pfeiffer & Company

- Bensley, Alan D.: Critical Thinking in Psychology – A Unified Skills Approach, (1998), Brooks/Cole Publishing Company.

FRENCH - II

Course Code: FLT 201 Credit Units: 02

Course Objective:

To enable the students to overcome the fear of speaking a foreign language and take position as a foreigner speaking French.

To make them learn the basic rules of French Grammar.

Course Contents:

Module A : pp.38 – 47 : Unité 3: Objectif 3, 4, 5, 6

Module B: pp. 47 to 75 Unité 4, 5

Contenu lexical: **Unité 3 : Organiser son temps**

1. donner/demander des informations sur un emploi du temps, un horaire SNCF – Imaginer un dialogue
2. rédiger un message/ une lettre pour …
   i) prendre un rendez-vous/ accepter et confirmer/ annuler
   ii) inviter/accepter/refuser
3. Faire un programmed'activités
   imaginer une conversation téléphonique/un dialogue
   Propositions- interroger, répondre

Unité 4:**Découvrir son environnement**

1. situerun lieu
2. s'orienter, s'informer sur un itinéraire.
3. Chercher, décrire un logement
4. connaître les rythmes de la vie

Unité 5: s'informer

1. demander/donner des informations sur un emploi du temps passé.
2. donner une explication, exprimer le doute ou la certitude.
3. découvrir les relations entre les mots
4. savoir s'informer

Contenu grammatical:

1. Adjectifsdémonstratifs
2. Adjectifs possessifs/exprimer la possession à l'aide de :
   i. « de » ii. A+nom/pronom disjoint
3. Conjugaison pronominale – négative, interrogative - construction à l'infinitif
4. Impératif/exprimer l'obligation/l'interdiction à l'aide de « il faut…. »/ «il ne faut pas… »
5. passé composé
6. Questions directes/indirectes

ExaminationScheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- **le livre à suivre: Campus: Tome 1**

GERMAN – II

Course Code: FLG 201 **Credit Units: 02**

Course Objective:

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.
To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany
Introduction to Grammar to consolidate the language base learnt in Semester I

Course Contents:

Module I: Everything about Time and Time periods
Time and times of the day.
Weekdays, months, seasons.
Adverbs of time and time related prepositions

Module II: Irregular verbs
Introduction to irregular verbs like to be, and others, to learn the conjugations of the same, (fahren, essen, lessen, schlafen, sprechen und ähnliche).

Module III: Separable verbs
To comprehend the change in meaning that the verbs undergo when used as such
Treatment of such verbs with separable prefixes

Module IV: Reading and comprehension
Reading and deciphering railway schedules/school time table
Usage of separable verbs in the above context

Module V: Accusative case
Accusative case with the relevant articles
Introduction to 2 different kinds of sentences – Nominative and Accusative

Module VI: Accusative personal pronouns
Nominative and accusative in comparison
Emphasizing on the universal applicability of the pronouns to both persons and objects

Module VII: Accusative prepositions
Accusative propositions with their use
Both theoretical and figurative use

Module VIII: Dialogues
Dialogue reading: 'In the market place'
'At the Hotel'

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, TangramAktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

SPANISH – II

Course Code: FLS 201 **Credit Units: 02**

Course Objective:

To enable students acquire more vocabulary, grammar, Verbal Phrases to understand simple texts and start describing any person or object in Simple Present Tense.

Course Contents:

Module I
Revision of earlier modules.

Module II
Some more AR/ER/IR verbs. Introduction to root changing and irregular AR/ER/IR ending verbs

Module III
More verbal phrases (eg, Dios Mio, Que lastima etc), adverbs*(bueno/malo, muy, mucho, bastante, poco).*
Simple texts based on grammar and vocabulary done in earlier modules.

Module IV
Possessive pronouns

Module V
Writing/speaking essays like my friend, my house, my school/institution, myself….descriptions of people, objects etc, computer/internet related vocabulary

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español, EnDirecto I A
- Español Sin Fronteras

CHINESE – II

Course Code: FLC 201 **Credit Units: 02**

Course Objective:

Chinese is a tonal language where each syllable in isolation has its definite tone (flat, falling, rising and rising/falling), and same syllables with different tones mean different things. When you say, "ma" with a third tone, it mean horse and "ma" with the first tone is Mother. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I

Drills

Practice reading aloud, Observe Picture and answer the question., Tone practice., Practice using the language, both by speaking and by taking notes.

Introduction of basic sentence patterns.Measure words., Glad to meet you.

Module II

Where do you live?

Learning different colors.Tones of "bu", Buying things and how muchit costs?

Dialogue on change of Money.

More sentence patterns on Days and Weekdays.

How to tell time. Saying the units of time in Chinese. Learning to say useful phrases like – 8:00, 11:25, 10:30 P.M. everyday, afternoon, evening, night, morning 3:58, one hour, to begin, to end ….. etc.

Morning, Afternoon, Evening, Night.

Module III

Use of words of location like-li, wais hang, xia

Furniture – table, chair, bed, bookshelf,.. etc.

Description of room, house or hostel room..eg what is placed where and how many things are there in it?

Review Lessons – Preview Lessons.

Expression 'yao", "xiang" and "yaoshi" (if).

Days of week, months in a year etc.

I am learning Chinese. Is Chinese difficult?

Module IV

Counting from 1-1000, Use of "chang-chang", Making an Inquiry – What time is it now? Where is the Post Office?,Days of the week. Months in a year, Use of Preposition – "zai", "gen", Use of interrogative pronoun – "duoshao" and "ji", "Whose"??? Sweater etc is it?

Different Games and going out for exercise in the morning.

Module V

The verb "qu"

- Going to the library issuing a book from the library
- Going to the cinema hall, buying tickets
- Going to the post office, buying stamps
- Going to the market to buy things..etc
- Going to the buy clothes …. Etc.

Hobby. I also like swimming.

Comprehension and answer questions based on it.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

Text & References:

- "Elementary Chinese Reader Part I" Lesson 11-20

AMITY UNIVERSITY
RAJASTHAN

AMITY SCHOOL OF ENGINEERING & TECHNOLOGY (ASET)

PROGRAM STRUCTURE & SYLLABUS

B. Tech. (Robotics & IoT)

Program Code: BRI

Duration – 4 Years Full Time

Program Outcomes (POs)

B.Tech. (Robotics & IoT)

PLO.1-An ability to apply and understand the knowledge of mathematics, science, and engineering.

PL0.2-Knowledge and understanding of mathematics through differential and integral calculus, and basic sciences and engineering topics (including computing science) necessary to analyze and design complex electrical and electronic devices, software, and systems containing embedded hardware and software components and their design.

PLO.3-Develop and deploy engineering/technological solutions using latest techniques & tools/Keil, Proteus, MPLAB, LabVIEW, MATLAB, Tensor flow imbibing concern for eco-system, and an attitude to serve society & humanity at large.

PLO.4-Graduates will successfully engage themselves in practice of multidisciplinary engineering or relevant fields; They will pursue wide-spectrum careers appropriately as technologists, innovators, consultants, managers & entrepreneurs and will advance in their profession.

PLO.5-An ability to design and conduct experiments as well as to analyze and interpret data.

PLO.6-An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, health and safety.

PLO7-An ability to identify, formulate, and solve engineering problems.

PLO8-Knowledge of probability and statistics, including applications appropriate to the electrical engineering (Electronics, Communication, Processing and Embedded technology)

Credit Summary

Semester	Core course (CC)	Domain Electives (DE)	Values Added Course (VAC)	Open Electives	NTCC	Total
I	24	-	4	-	2	30
II	23	-	4	3	2	32
III	20	3	4	3	---	30
IV	16	3	4	3	---	26
V	12	3	4	3	6	28
VI	16	3	4	3	--	26
VII	12	-	4	3	-	19
VIII	24	_	--	--		24
Total	**147**	**12**	**28**	**18**	**10**	**215**

Semester I						
Code	**Course**	**Categor**	**L**	**T**	**P**	**Credit**

		y				s
Core Courses						
AM 101	Applied Mathematics – I	CC	3	1	-	4
AP 102	Applied Physics - I – Fields & Waves	CC	2	1		3
AC 103	Applied Chemistry	CC	2	1		3
BME 104	Element of Mechanical Engineering	CC	2	1		3
BCS 105	Introduction to Computers & Programming in C	CC	2	1		3
BEE 106	Basic Electrical Engineering	CC	2	1		3
Practical Courses						
AP 122	Applied Physics lab	CC	-	-	2	1
AC 123	Applied Chemistry lab	CC	-	-	2	1
BME 124	Element of Mechanical Engineering lab	CC	-	-	2	1
BCS 125	Programming in C lab	CC	-	-	2	1
BEE 126	Basic Electrical Engineering Lab	CC	-	-	2	1
Value Added Courses						
BCS 101	English	VA	1	-	-	1
BSS 104	Behavioral Science-I Understanding Self For Effectiveness- I		1	-	-	1
FLT 101 FLG 101 FLS 101 FLC 101	Foreign Language – I French German Spanish Chinese		2	-	-	2
Non-Teaching Credit Course (NTCC)						
AND001	Anandam-I	NTCC	-	-	-	2
Total						**30**

Semester II						
Code	**Course**	**Category**	**L**	**T**	**P**	**Credits**
Core Courses						
AM 201	Applied Mathematics – II	CC	3	1	-	4

AP 202	Applied Physics - II – Modern Physics	CC	2	1		3
BCS 203	Object Oriented Programming using C++	CC	2	1		3
BME 204	Engineering Mechanics	CC	2	1		3
BME 205	Engineering Graphics	CC	1			1
BME 206	Domain Workshop	CC	1	-	-	1
Practical Courses						
AP 222	Applied Physics - II – Modern Physics lab	CC	-	-	2	1
BCS 223	Object Oriented Programming using C++ lab	CC	-	-	2	1
BME 224	Engineering Mechanics lab	CC	-	-	2	1
BME 225	Engineering Graphics lab	CC	-	-	2	1
Open Elective						
	OPEN ELECTIVE – I	OE	3	-	-	3
Value Added Courses						
BCS 201	English	VA	1	-	-	1
BSS 204	Behavioral Science-II (Problem Solving & Creation thinking)	VA	1	-	-	1
FLF 201 FLG 201 FLS 201 FLC 201	Foreign Language – II French German Spanish Chinese	VA	2	-	-	2
EVS 001	Environmental Studies	VC	4	-	-	4
Non-Teaching Credit Course (NTCC)						
AND002	Anandan-II	NTCC	-	-	2	2
Total						**32**

	Semester III					
Code	**Course**	**Category**	**L**	**T**	**P**	**Credits**
Core Courses						

AM 301	Discrete Mathematics	CC	3	-	-	3
BRI 301	Electronics Device and circuit	CC	3	1	-	4
BEC 303	Circuits & Systems	CC	3	1	-	4
BRI 302	Theory of automation and computation	CC	2	1	-	3
BEC 305	Digital circuit system-I	CC	3	-	-	3
Practical Courses						
BEC 321	Electronics Device and circuit Lab	CC	-	-	2	1
BEC 323	Circuits & Systems Lab	CC	-	-	2	1
BEC 325	Digital circuit system I LAB	CC	-	-	2	1
Domain Elective-I: Student must select one course from the following courses						
BRI 303	Electrical and Electronic materials	DE	2	1		3
BRI 304	Electronic measurement	DE	2	1		3
Open Elective						
	OPEN ELECTIVE – II	OE	3		-	3
Value Added Courses						
BCS 301	Communication Skills – I	VA	1	-	-	1
BSS 304	Behavioral Science-III (Interpersonal Communication)	VA	1	-	-	1
FLT 301 FLG 301 FLS 301 FLC 301	Foreign Language – III French German Spanish Chinese	VA	2	-	-	2
Non-Teaching Credit Course (NTCC						
AND002	Anandan-II	NTCC	-	-	2	2
Total						**30**

Semester IV						
Code	**Course**	**Category**	**L**	**T**	**P**	**Credits**
Core Courses						
BRI 401	Computer aided design and Analysis	CC	3	-		3
BRI 402	Microprocessor and microcontroller system	CC	3	-		3
BRI 403	Sensor and Transducer	CC	3	-	-	3
BRI 404	Linear Integrated circuit	CC	3	-		3
Practical Courses						
BRI 421	Computer aided design and Analysis lab	CC			2	1
BRI 422	Microprocessor and microcontroller system lab	CC			2	1
BRI 423	Sensor and Transducer lab	CC			2	1
BRI 424	Linear Integrated circuit	CC			2	1
Domain Elective-II: Student has to select one course from the following courses						
BRI 405	Signal and System	DE	2	1		3
BRI 406	Virtual instruments	DE	2	1		3
Open Elective						
	OPEN ELECTIVE – III	OE	3			3
Value Added Courses						
BCS 401	Communication Skills – II	VA	1	-	-	1
BSS 404	Behavioral Science-IV (Relationship Management)	VA	1	-	-	1
 FLT 401 FLG 401 FLS 401 FLC 401	Foreign Language – IV French German Spanish Chinese	VA	2	-	-	2
Non-Teaching Credit Course (NTCC						
AND003	Anandan-IIi	NTCC	-	-	2	2
Total						**26**

Semester V						
Code	**Course**	**Category**	**L**	**T**	**P**	**Credits**
Core Courses						
BRI 501	Arduino and Its Interfacing	CC	3	-		3
BRI 502	Robotics & Automation	CC	3	-	-	3
BRI 503	Control System/DSP	CC	3	-		3
BEC 550	Industrial Training (Evaluation)	CC	-	-	-	6
Practical Courses						
BRI 521	Arduino and Its Interfacing Lab	CC			2	1
BRI 522	Robotics & Automation lab	CC	-	-	2	1
BRI 523	Control System lab/DSP	CC			2	1
Domain Elective-III: Student has to select one course from the following courses						
BRI 504	Python for data science	DE	3			3
BRI 505	R for data science	DE	3			3
BRI 506	Industrial Automation	DE	3			3
Open Elective						
	OPEN ELECTIVE – IV	OE	3			3
Value Added Courses						
BCS 501	Communication Skills – III	VA	1	-	-	1
BSS 504	Behavioral Science-V (Understanding self for effectiveness	VA	1	-	-	1
FLT 501 FLG 501 FLS 501 FLC 501	Foreign Language – V French German Spanish Chinese	VA	2	-	-	2
Non-Teaching Credit Course (NTCC						
AND005	Anandan-V	NTCC	-	-	2	2
Total						**28**

Semester VI						
Code	**Course**	**Category**	**L**	**T**	**P**	**Credits**
Core Courses						
BRI 601	Robotics motor and drives	CC	3	-		3
BRI 602	Mechatronics and robotics application	CC	3	-		3
BRI 603	IoT and cloud computing	CC	3	-		3
BRI 604	Digital Communications	CC	3	-	-	3
Practical Courses						
BRI 621	Robotics motor and drives lab	CC			2	1
BRI 622	Mechatronics and robotics application lab	CC			2	1
BRI 623	IoT and cloud computing lab	CC			2	1
BRI 624	Digital Communications lab	CC		-	2	1
Domain Elective-IV: Student has to select one course from the following courses						
BRI 605	Tools and technique for data science	DE	3			3
BRI 606	Deep Learning	DE	3			3
BRI 607	Industrial IoT 4.0	DE	3			3
Open Elective						
	OPEN ELECTIVE – V	OE	3			3
Value Added Courses						
BCS 601	Communication Skills – IV	VA	1	-	-	1
BSS 604	Understanding self for Effectiveness – VI	VA	1	-	-	1
FLT 601 FLG 601 FLS 601 FLC 601	Foreign Language – VI French German Spanish Chinese	VA	2	-	-	2
Non-Teaching Credit Course (NTCC						
AND006	Anandan-IV	NTCC	-	-	2	2
Total						**26**

Semester VII						
Code	**Course**	**Category**	**L**	**T**	**P**	**Credits**
Core Courses						
BRI 701	Raspberry Pi and Its interfacing	CC	3	-		3
BRI 702	Cloud development IoT applications	CC	3	-		3
BRI 703	Advanced Robotics	CC	3	-		3
Practical Courses						
BRI 721	Raspberry Pi and Its interfacing lab	CC			2	1
BRI 722	Cloud development IoT applications lab	CC			2	1
BRI 723	Advanced Robotics lab	CC			2	1
Open Elective						
	OPEN ELECTIVE – VI	OE	3			3
Value Added Courses						
BCS 701	Communication Skills – V	VA	1	-	-	1
BSS 704	Understanding self for effectiveness – VII	VA	1	-	-	1
FLT 701 FLG 701 FLS 701 FLC 701	Foreign Language – VII French German Spanish Chinese	VA	2	-	-	2
Non-Teaching Credit Course (NTCC						
AND007	AnandanVII	NTCC	-	-	2	2
TOTAL						**19**

Semester VIII						
Code	**Course**	**Category**	**L**	**T**	**P**	**Credits**
Core Courses						
BRI 801	Project design based upon patent and copyright	CC	6	-	-	24
Total						**24**
Note: CC - Core Course, VA - Value Added Course, OE - Open Elective, DE - Domain Elective, FW - Field Work						
Total Credits						**226**

Course Code: **Credit Units: 04**

Course Name	Course Code	LTP	Credit	Semester
APPLIED MATHEMATICS – I	**AM 101**	4	4	1

COURSE LEARNING OUTCOMES (CLO)

CLO 1	Solve system of linear equations; be familiar with the definition and properties of matrix; find the eigenvalues and eigenvectors of a square matrix.
CLO 2	Investigate the convergence of infinite series using different tests.
CLO 3	Calculate the measure of central tendency, moments, skewness and kurtosis.
CLO 4	Develop knowledge of basic discrete and continuous distributions (Binomial, Poisson, Normal) and how to work with them.
CLO 5	Apply the method to use complex variable and complex valued

Course Objective:

The knowledge of Mathematics is necessary for a better understanding of almost all the Engineering and Science subjects. Here our intention is to make the students acquainted with the concept of basic topics from Mathematics, which they need to pursue their Engineering degree in different disciplines.

Course Contents:

Module I: Differential Calculus

Successive differentiation, Leibnitz's theorem (without proof), Mean value theorem, Taylor's theorem (proof), Remainder terms, Asymptote & Curvature, Partial derivatives, Chain rule, Differentiation of Implicit functions, Exact differentials, Tangents and Normals, Maxima, Approximations, Differentiation under integral sign, Jacobians and transformations of coordinates.

Module II: Integral Calculus

Fundamental theorems, Reduction formulae, Properties of definite integrals, Applications to length, area, volume, surface of revolution, improper integrals, Multiple Integrals-Double integrals, Applications to areas, volumes.

Module III: Ordinary Differential Equations

Formation of ODEs, Definition of order, degree & solutions, ODE of first order : Method of separation of variables, homogeneous and non homogeneous equations, Exactness & integrating factors, Linear equations & Bernoulli equations, General linear ODE of n^{th} order, Solution of homogeneous equations, Operator method, Method of undetermined coefficients, Solution of simple simultaneous ODE.

Module IV: Vector Calculus

Scalar and Vector Field, Derivative of a Vector, Gradient, Directional Derivative, Divergence and Curl and their Physical Significance, Arc Length, Tangent, Directional Derivative, Evaluation of Line Integral, Green's Theorem in Plane (without proof), Representation of Surfaces, Tangent Plane and Surface Normal, Surface Integral, Stoke's Theorem (without proof), Gauss Divergence Theorem (without proof).

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text:

- Differential Calculus by Shanti Narain
- Integral Calculus by Shanti Narain

References:

- Differential Equation by A.R. Forsyth
- Higher Engineering Mathematics by H.K. Dass

Course Name	Course Code	LTP	Credit	Semester
APPLIED PHYSICS - I - FIELDS AND WAVES	**AM 102**	3	3	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	develop an understanding of the various concepts of simple harmonic motion for with and without damping.
CLO 2	solve simple problems on simple harmonic motion and related topics
CLO 3	explain and interpret the wave nature of light.
CLO 4	solve simple problems on the applications of wave nature of light
CLO 5	define and understand vector calculus and electromagnetics
CLO 6	solve numerical problems on vector calculus and electromagnetics

Course Objective:

Aim of this course is to introduce the students to fundamentals of graduate level physics, which form the basis of all applied science and engineering

Course Contents:

Module I: Oscillations & Waves Oscillations

Introduction to S.H.M. Damped Oscillations: Differential Equation and its solution, logarithmic decrement, Quality Factor, Different conditions of damping of harmonic oscillations. Forced oscillations: Amplitude and

Frequency Response, Resonance, Sharpness of Resonance
Plane. Progressive Waves: Differential Equation and Solution, Superposition of Progressive Waves stationary waves. Ultrasonics: Generation and application of ultrasonicwaves.

Module II: Wave Nature of Light Interference:
Coherent Sources, Conditions of interference, Interference due to division of wavefront, Fresnels biprism Interference due to division of amplitude, Newton's rings, Interference due to thin films .Diffraction: Fresnel and Fraunhofer diffraction, Fraunhofer diffraction at a single slit, double slit, N Slits, Transmission grating, Rayleigh criterion and Resolving power of grating. Polarization: Birefringence, Nicol prism, Production and analysis of plane, circularly and elliptically polarized light, Half and quarter wave plates, Optical rotation, Polarimeter.

Module III: Electromagnetics
Scalar and vector fields, gradient of a scalar field, physical significance of gradient, equipotential surface. Line, surface and volume integrals, Divergence and curl of vector field and mathematical analysis physical significance, Electric flux, Gauss' law, Proof and Applications, Gauss divergence and Stokes theorems.
Differential form of Gauss' Law, Amperes' Law, Displacement current, Faradays Law, Maxwell equations in free space & isotropic media (Integral form & differential form), EM wave propagation in free space, Poynting vector.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text
- Waves & oscillation, A. P. French
- Physics of waves, W. C. Elmore & M. A. Heald
- Introduction to Electrodynamics, D. J. Griffith

Reference
- Electrodynamics, Gupta, Kumar & Singh
- Optics, A. K. Ghatak
- Engineering Physics, Satya Prakash

Course Name	Course Code	LTP	Credit	Semester
APPLIED CHEMISTRY	**AM 103**	3	3	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Describe the concept of physical and analytical chemistry for engineering applications Cognitive
CLO 2	Explain water treatment methods, extraction of metals and its purification and different concepts of

	physical chemistry Coginitive
CLO 3	Solve the problems of thermochemistry, electrochemistry, gases, liquids and fuels

Course Objective:

Four basic sciences, Physics, Chemistry, Mathematics and Biology are the building blocks in engineering and technology. Chemistry is essential to develop analytical capabilities of students, so that they can characterize, transform and use materials in engineering and apply knowledge in their field. All engineering fields have unique bonds with chemistry whether it is Aerospace, Mechanical, Environmental and other fields the makeup of substances is always a key factor, which must be known. For electronics and computer science engineering, apart from the material, computer modeling and simulation knowledge can be inherited from the molecule designing. The upcoming field of technology like Nanotechnology and Biotechnology depends fully on the knowledge of basic chemistry. With this versatile need in view, course has been designed in such a way so that the student should get an overview of the whole subject.

Course Contents:

Module I: Water Technology

Introduction and specifications of water, Hardness and its determination (EDTA method only), Alkalinity, Boiler feed water, boiler problems – scale, sludge, priming & foaming: causes & prevention, Boiler problems – caustic embitterment & corrosion: causes & prevention, Carbonate & phosphate conditioning, colloidal conditioning & calgon treatment Water softening processes: Lime – soda process, Ion exchange method, Water for domestic use.

Module II: Fuels

Classification, calorific value of fuel, (gross and net), Determination of calorific value of fuels, bomb calorimeter, Solid fuels - Proximate and ultimate analysis, Octane & Cetane No. and its significance. Numericals on combustion.

Module III: Instrumental Methods of analysis

Introduction; Principles of spectroscopy; Laws of absorbance IR : Principle, Instrumentation, Application UV : Principle, Instrumentation, Application NMR : Principle, Instrumentation, Application

Module III: Lubricants

Introduction; Mechanism of Lubrication; Types of Lubricants; Chemical structure related to Lubrication; Properties of lubricants; Viscosity and Viscosity Index; Iodine Value; Aniline Point; Emulsion number; Flash Point; Fire Point; Drop Point; Cloud Point; Pour Point. Selection of Lubricants.

Module VI: Corrosion

Introduction, Mechanism of dry and wet corrosion, Types of corrosion-Galvanic, Concentration cell, soil, pitting, intergranular, waterline. Passivity. Factors influencing corrosion. Corrosion control.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text:

- Engineering Chemistry- Jain and Jain
- Engineering Chemistry - Sunita Rattan
- Engineering Chemistry - Shashi Chawla

References:

- Engineering Chemistry – Dara and Dara
- Spectroscopy- Y.R Sharma
- Corrosion Engineering – Fontenna and Greene

Course Name	Course Code	LTP	Credit	Semester
ELEMENT OF MECHANICAL ENGINEERING	**BME 104**	3	3	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Investigate – Basic machines used in the field of mechanical engineering.
CLO 2	Create – Mathematical models of fundamental physical phenomenon and apply them to predict the behaviour of engineering systems
CLO 3	Apply – this knowledge to analyse the working of IC Engines, Steam Turbines, Lathe machines etc.
CLO 4	Develop – Ability to perform and conduct basic experiments and evaluate the results of the same.
CLO 5	Investigate – Basic machines used in the field of mechanical engineering.

Course Contents:

Module I: Fundamental Concepts
Definition of thermodynamics, system, surrounding and universe, phase, concept of continuum, macroscopic & microscopic point of view, Thermodynamic equilibrium, property, state, path, process, cyclic process, Zeroth, first and second law of thermodynamics, Carnot Cycle, Introduction to I.C. Engines-two &four stoke S.I. and C.I. engines. Otto cycle. Diesel cycle.

Module II: Stress And Strain Analysis
Simple stress and strain: introduction, normal shear, and stresses-strain diagrams for ductile and brittle materials. Elastic constants, one-dimensional loadings of members of varying cross-section, Strain Energy, Properties of material-strength, elasticity, stiffness, malleability, ductility, brittleness, hardness and plasticity etc; Concept of stress and strain stress strain diagram, tensile test, impact test and hardness test.

Module III: Casting & Forging
Introduction of casting, pattern, mould making procedures, sand mould casting, casting defects, allowances of pattern. Forging-introduction, upsetting & drawing out, drop forging, press forging & m/c forging

Module IV: Welding & Sheet metal working
Introduction of welding processes, classification, gas welding, arc welding, resistance welding. Introduction to sheet metal shop, Shearing, trimming, blanking, piercing, shaving, notching, stretch forming, nibbling coining, embossing and drawing.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text

- Engineering thermodynamics, by P.K. Nag, Tata McGraw Hill.
- Thermal Engineering, by D.S. Kumar. S.K. Kataria and Sons.
- Thermal Engineering by PL Ballaney; Khanna Publishers, Delhi.
- Engineering Thermodynamics: Work and Heat Transfer, by Rogers and Mayhew, ELBS Publications

Reference

- Heine, R.W. C.R. Loper and P.C. Rosenthal, Principles of metal casting McGraw Hill
- Welding Technology by R.S. Parmar, Khanna Publishers.
- Thermodynamics and Heat Engines Volume-I, by R. Yadav: Central Publications.
- Ganesan, V. Internal Combustion Engine, Tata McGraw-Hill.
- Mathur, M.L. and Sharma, R.P. Internal Combustion Engine. Dhanpat Rai Publication

Course Name	Course Code	LTP	Credit	Semester
INTRODUCTION TO COMPUTERS AND PROGRAMMING IN C	**BCS 105**	3	3	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Able to figure out the basic architecture and components of computers
CLO 2	Will be able to understand the syntax of programs in C language
CLO 3	Build C language programs and projects

Course Objective:

The objective of this course module is to acquaint the students with the basics of computers system, its components, data representation inside computer and to get them familiar with various important features of procedure oriented programming language i.e. C.

Course Contents:

Module I: Introduction

Introduction to computer, history, von-Neumann architecture, memory system (hierarchy, characteristics and types), H/W concepts (I/O Devices), S/W concepts (System S/W & Application S/W, utilities). Data Representation: Number systems, character representation codes, Binary, octal, hexadecimal and their interconversions. Binary arithmetic, floating point arithmetic, signed and unsigned numbers, Memory storage unit.

Module II: Programming in C

History of C, Introduction of C, Basic structure of C program, Concept of variables, constants and data types in C, Operators and expressions: Introduction, arithmetic, relational, Logical, Assignment, Increment and decrement operator, Conditional, bitwise operators, Expressions, Operator precedence and associativity. Managing Input and output Operation, formatting I/O.

Module III: Fundamental Features in C

C Statements, conditional executing using if, else, nesting of if, switch and break Concepts of loops, example of loops in C using for, while and do-while, continue and break. Storage types (automatic, register etc.), predefined processor, Command Line Argument.

Module IV: Arrays and Functions

One dimensional arrays and example of iterative programs using arrays, 2-D arrays Use in matrix computations. Concept of Sub-programming, functions Example of user defined functions. Function prototype, Return values and their types, calling function, function argument, function with variable number of argument, recursion.

Module V: Advanced features in C

Pointers, relationship between arrays and pointers Argument passing using pointers, Array of pointers. Passing arrays as arguments. Strings and C string library. Structure and Union. Defining C structures, Giving values to members, Array of structure, Nested structure, passing strings as arguments. File Handling.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text:

- "ANSI C" by E Balagurusamy
- Yashwant Kanetkar, "Let us C", BPB Publications, 2nd Edition, 2001.
- Herbert Schildt, "C:The complete reference", Osbourne Mcgraw Hill, 4th Edition, 2002.
- V. Raja Raman, "Computer Programming in C", Prentice Hall of India, 1995.

References:
- Kernighan & Ritchie, "C Programming Language", The (Ansi C Version), PHI, 2nd Edition.
- J. B Dixit, "Fundamentals of Computers and Programming in 'C'.
- P.K. Sinha and Priti Sinha, "Computer Fundamentals", BPB publication.

Course Name	Course Code	LTP	Credit	Semester
BASIC ELECTRICAL ENGINEERING	**BEE 106**	3	3	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Develop a practical approach for analysis of resistive circuits and solution of resistive circuits with independent sources.
CLO 2	Able to apply two terminal element relationships for inductors and capacitors in an electrical network.
CLO 3	Capable of analysis of single phase AC circuits, the representation of alternating quantities and determining the power in these circuits.
CLO 4	To acquire the knowledge about the constructional concepts & working principles for the applications of DC machines, AC machines & measuring instruments.
CLO 5	Able to identify, formulate, and solve the electrical engineering problems.

Course Objective:

The objective of the course is to provide a brief knowledge of Electrical Engineering to students of all disciplines. This Course includes some theorems related to electrical, some law's related to flow of current, voltages, basic knowledge of Transformer, basic knowledge of electromagnetism, basic knowledge of electrical network.

Course Contents:

Module I: Basic Electrical Quantities
Basic Electrical definitions-Energy, Power, Charge, Current, Voltage, Electric Field Strength, Magnetic Flux Density, etc., Resistance, Inductance and Capacitance. Ideal Source, Independent Source and Controlled Source

Module II: Network Analysis Techniques & Theorems
Circuit Principles: Ohm's Law, Kirchoff's Current Law, Kirchoff's Voltage Law Network Reduction: Star–Delta Transformation, Source Transformation, Nodal Analysis, Loop analysis. Superposition theorem Thevenin's Theorem, Norton's theorem and Reciprocity theorem.

Module III: Alternating Current Circuits
Peak, Average and RMS values for alternating currents, Power calculation: reactive power, active power, Complex power, power factor, impedance, reactance, conductance, susceptance Resonance: series Resonance, parallel resonance, basic definition of Q factor & Band-width.

Module IV: Transformers
Basic Transformer Operation principle, Construction, Voltage relations, Current relations, Linear circuit models, Open circuit test, Short circuit test, Transformer Efficiency.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text

- R.J. Smith, R.C. Dorf: Circuits, devices and Systems
- B.L. Thareja: Electrical Technology : Part -1 & 2

Reference

- V. Deltoro: Electrical Engineering fundamentals
- Schaum's Series: Electrical Circuits

APPLIED PHYSICS LAB - I

Course Code: AP 122 **Credit Units: 01**

List of Experiments:

1. To determine the wavelength of sodium light by Newton's rings method.
2. To determine the dispersive power of the material of prism with the help of a spectrometer.
3. To determine the specific rotation of sugar by Bi-quartz or Laurent half shade polarimeter.
4. To determine the speed of ultrasonic waves in liquid by diffraction method.
5. To determine the width of a narrow slit using diffraction phenomena.
6. To determine the temperature coefficient of platinum wire, using a platinum resistance thermometer and a Callender & Griffth's bridge.
7. To determine the value of specific charge (ratio of e/m) of an electron by Thomson method.
8. To determine the internal resistance of Leclanche cell with the help of Potentiometer.
9. To determine the resistance per unit length of a Carey Foster's bridge wire and also to find out the specific resistance of a given wire.
10. To plot graph showing the variation of magnetic field with distance along the aixs of a circular coil carrying current, and hence estimate the radius of the coil.
11. To determine the value of acceleration due to gravity ('g') in the laboratory using bar pendulum.
12. To determine the moment of inertia of a flywheel about its own axis of rotation.
13. To determine the density of material of the given wire with the help of sonometer.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

APPLIED CHEMISTRY LAB

Course Code: AC 123 Credit Units: 01

List of Experiments:

1. To determine the ion exchange capacity of a given cation exchanger.
2. To determine the temporary, permanent and total hardness of a sample of water by complexometric titration method.
3. To determine the type and extent of alkalinity of given water sample.
4. To determine the number of water molecules of crystallization in Mohr's salt (ferrous ammonium sulphate) provided standard potassium dichromate solution (0.1N) using diphenylamine as internal indicator.
5. To determine the ferrous content in the supplied sample of iron ore by titrimetric analysis against standard $K_2Cr_2O_7$ solution using potassium ferricyanide $[K_3Fe(CN)_6]$ as external indicator.
6. (a) To determine the surface tension of a given liquid by drop number method.
   (b) To determine the composition of a liquid mixture A and B (acetic acid and water) by surface tension method.
7. To prepare and describe a titration curve for phosphoric acid – sodium hydroxide titration using pH-meter.
8. (a) To find the cell constant of conductivity cell.
   (b) Determine the strength of hydrochloric acid solution by titrating it against standard sodium hydroxide solution conductometrically
9. Determination of Dissolved oxygen in the given water sample.
10. To determine the total residual chlorine in water.
11. Determination of amount of oxalic acid and H_2SO_4 in 1 L of solution using N/10 NaOH and N/10 $KMnO_4$ solution.
12. Determination of viscosity of given oil by means of Redwood viscometer I.
13. To determine flash point and fire point of an oil by Pensky Martin's Apparatus
14. To determine the Iodine value of the oil.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

ELEMENT OF MECHANICAL ENGINEERING LAB

Course Code: BME 124 **Credit Units: 01**

List of Experiments:

1. Welding

   (a) Arc Welding
   - Butt Joint
   - Lap Joint
   - T Joint

   (b) Gas Welding
   - Butt Joint
   - Lap Joint
   - Brazing of Broken pieces

2. Foundry
   - Sand mould casting by single piece pattern& Split pattern bracket with cores

3. Sheet Metal
   - Dust Bin
   - Mug
   - Funnel
   - Cylindrical Mug with handle-Rectangular

4. Fitting Shop
   - Male – Female Joint
   - Rectangular piece
   - Filing the job

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

PROGRAMMING IN C LAB

Course Code: **BCS 125** **Credit Units: 01**

Software Required: Turbo C

Course Contents:

1. C program involving problems like finding the nth value of cosine series, Fibonacci series. Etc.
2. C programs including user defined function calls
3. C programs involving pointers, & solving various problems with the help of those.
4. File handling

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

INTRODUCTION TO COMPUTERS & PROGRAMMING IN C LAB

Course Code: **BCS 124** **Credit Units: 01**

Software Required: Turbo C

List of Experiments:

5. C program involving problems like finding the nth value of cosine series, Fibonacci series. Etc.
6. C programs including user defined function calls
7. C programs involving pointers and solving various problems with the help of those.
8. File handling

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

BASIC ELECTRICAL ENGINEERING LAB

Course Code: BEE 126 **Credit Units: 01**

List of Experiments:

1. To verify KVL & KCL in the given network.
2. To verify Superposition Theorem.
3. To verify Maximum Power Transfer Theorem.
4. To verify Reciprocity Theorem.
5. To determine and verify R_{Th}, V_{Th}, R_N, I_N in a given network.
6. To perform open circuit & short circuit test on a single-phase transformer.
7. To study transient response of a given RLC Circuit.
8. To perform regulation, ratio & polarity test on a single-phase transformer.
9. To measure power & power factor in a three phase circuit by two wattmeter method.
10. To measure power & power factor in a three phase load using three ammeter & three voltmeter method.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

Course Name	Course Code	LTP	Credit	Semester
ENGLISH	**BCS 101**	1	1	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Identify the basic elements of grammar required for good and effective communication.
CLO 2	Interpret and discuss key ideas of grammar, diction and communication.
CLO 3	Develop Creative & Literary Sensitivity in all communication.
CLO 4	Design and create texts for a variety of purposes and audiences, evaluating and assessing the effectiveness of grammatical aspects.

Course Objective:

The course is intended to give a foundation of English Language. The literary texts are indented to help students to inculcate creative & aesthetic sensitivity and critical faculty through comprehension, appreciation and analysis of the prescribed literary texts. It will also help them to respond form different perspectives.

Course Contents:

Module I: Vocabulary
Use of Dictionary
Use of Words: Diminutives, Homonyms & Homophones

Module II: Essentials of Grammar - I
Articles
Parts of Speech
Tenses

Module III: Essentials of Grammar - II
Sentence Structure
Subject -Verb agreement
Punctuation

Module IV: Communication
The process and importance
Principles & benefits of Effective Communication

Module V: Spoken English Communication
Speech Drills
Pronunciation and accent
Stress and Intonation

Module VI: Communication Skills - I
Developing listening skills
Developing speaking skills

Module VII: Communication Skills - II
Developing Reading Skills
Developing writing Skills

Module VIII: Written English communication
Progression of Thought/ideas
Structure of Paragraph
Structure of Essays

Module IX: Short Stories
Of Studies, by Francis Bacon
Dream Children, by Charles Lamb
The Necklace, by Guy de Maupassant
A Shadow, by R.K.Narayan
Glory at Twilight, Bhabani Bhattacharya

Module X: Poems

All the Worlds a Stage	Shakespeare
To Autumn	Keats
O! Captain, My Captain.	Walt Whitman
Where the Mind is Without Fear	Rabindranath Tagore
Psalm of Life	H.W. Longfellow

Examination Scheme:

Components	A	CT	HA	EE
Weightage (%)	05	15	10	70

Text & References:

Text

- Madhulika Jha, Echoes, Orient Long Man
- Ramon & Prakash, Business Communication, Oxford.

Reference

Sydney Greenbaum Oxford English Grammar, Oxford.

- Successful Communications, Malra Treece (Allyn and Bacon)
- Effective Technical Communication, M. Ashraf Rizvi.

Course Name	Course Code	LTP	Credit	Semester
BEHAVIOURAL SCIENCE - I (UNDERSTANDING SELF FOR EFFECTIVENESS)	**BSS 104**	1	1	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Demonstrate awareness of self and the process of self-exploration.
CLO 2	Demonstrate knowledge of strategies for developing a healthy self-esteem.
CLO 3	Recognize the importance of attitudes and its effect on personality.
CLO 4	Identify the difference between healthy and unhealthy expression of emotions and develop emotional competence necessary for personal and professional life.
CLO 5	Demonstrate awareness of self and the process of self-exploration.

Course Objective:

This course aims at imparting:

- Understanding self & process of self exploration
- Learning strategies for development of a healthy self esteem
- Importance of attitudes and its effective on personality
- Building Emotional Competence

Course Contents:

Module I: Self: Core Competency
Understanding of Self
Components of Self – Self identity
Self concept
Self confidence
Self image

Module II: Techniques of Self Awareness
Exploration through Johari Window
Mapping the key characteristics of self
Framing a charter for self
Stages – self awareness, self acceptance and self realization

Module III: Self Esteem & Effectiveness
Meaning and Importance
Components of self esteem
High and low self esteem
Measuring your self esteem

Module IV: Building Positive Attitude
Meaning and nature of attitude
Components and Types of attitude
Importance and relevance of attitude

Module V: Building Emotional Competence
Emotional Intelligence – Meaning, components, Importance and Relevance
Positive and Negative emotions
Healthy and Unhealthy expression of emotions

Module VI: End-of-Semester Appraisal
Viva based on personal journal

Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

Text

- Organizational Behaviour, Davis, K.
- Hoover, Judhith D. Effective Small Group and Team Communication, 2002,Harcourt College Publishers
- Dick, Mc Cann & Margerison, Charles: Team Management, 1992 Edition, viva books
- Bates, A. P. and Julian, J.: Sociology - Understanding Social Behaviour
- Dressler, David and Cans, Donald: The Study of Human Interaction
- Lapiere, Richard. T – Social Change

Reference

- Lindzey, G. and Borgatta, E: Sociometric Measurement in the Handbook of Social Psychology, Addison – Welsley, US.
- Rose, G.: Oxford Textbook of Public Health, Vol.4, 1985.
- LaFasto and Larson: When Teams Work Best, 2001, Response Books (Sage), New Delhi
- J William Pfeiffer (ed.) Theories and Models in Applied Behavioural Science, Vol 2, Group (1996); Pfeiffer & Company
- Smither Robert D.; The Psychology of Work and Human Performance, 1994, Harper Collins College Publishers

Course Code: **Credit Units: 02**

Course Name	Course Code	LTP	Credit	Semester
FRENCH	**FLT 101**	2	2	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of advance level.
CLO 3	Students will be able to communicate with complex sentences.

Course Objective:

To familiarize the students with the French language

- with the phonetic system
- with the syntax
- with the manners
- with the cultural aspects

Course Contents:

Module A: pp. 01 to 37: Unités 1, 2, Unité 3 Objectif 1, 2
Only grammar of Unité 3: objectif 3, 4 and 5

Contenu lexical: Unité 1 : Découvrir la langue française : (oral et écrit)

1. se présenter, présenter quelqu'un, faire la connaissance des autres, formules de politesse, rencontres
2. dire/interroger si on comprend
3. Nommer les choses

Unité 2: Faire connaissance

1. donner/demander des informations sur une personne, premiers contacts, exprimer ses goûts et ses préférences
2. Parler de soi: parler du travail, de ses activités, de son pays, de sa ville.

Unité 3: Organiser son temps

1. dire la date et l'heure

Contenu grammatical:

1. organisation générale de la grammaire
2. article indéfini, défini, contracté
3. nom, adjectif, masculin, féminin, singulier et pluriel
4. négation avec « de », "moi aussi", "moi non plus"
5. interrogation : Inversion, est-ce que, qui, que, quoi, qu'est-ce que, où, quand, comment, quel(s), quelle(s)
   Interro-négatif : réponses : oui, si, non
6. pronom tonique/disjoint- pour insister après une préposition
7. futur proche

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- le livre à suivre : Campus: Tome 1

Course Name	Course Code	LTP	Credit	Semester
GERMAN	**FLG 101**	2	2	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of advance level.
CLO 3	Students will be able to communicate with complex sentences.

Course Objective:

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.
To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany

Course Contents:

Module I: Introduction
Self introduction: heissen, kommen, wohnwn, lernen, arbeiten, trinken, etc.
All personal pronouns in relation to the verbs taught so far.
Greetings: Guten Morgen!, Guten Tag!, Guten Abend!, Gute Nacht!, Danke sehr!, Danke!, Vielen Dank!, (es tut mir Leid!),
Hallo, wie geht's?: Danke gut!, sehr gut!, prima!, ausgezeichnet!,
Es geht!, nicht so gut!, so la la!, miserabel!

Module II: Interviewspiel
To assimilate the vocabulary learnt so far and to apply the words and phrases in short dialogues in an interview – game for self introduction.

Module III: Phonetics
Sound system of the language with special stress on Dipthongs

Module IV: Countries, nationalities and their languages
To make the students acquainted with the most widely used country names, their nationalitie and the language spoken in that country.

Module V: Articles
The definite and indefinite articles in masculine, feminine and neuter gender. All Vegetables, Fruits, Animals, Furniture, Eatables, modes of Transport

Module VI: Professions
To acquaint the students with professions in both the genders with the help of the verb "sein".

Module VII: Pronouns
Simple possessive pronouns, the use of my, your, etc.
The family members, family Tree with the help of the verb "to have"

Module VIII: Colours
All the color and color related vocabulary – colored, colorful, colorless, pale, light, dark, etc.

Module IX: Numbers and calculations – verb "kosten"
The counting, plural structures and simple calculation like addition, subtraction, multiplication and division to test the knowledge of numbers.
"Wie viel kostet das?"

Module X: Revision list of Question pronouns

W – Questions like who, what, where, when, which, how, how many, how much, etc.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

Text

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer

Reference

- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

Course Name	Course Code	LTP	Credit	Semester
SPANISH	**FLS 101**	2	2	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of advance level.
CLO 3	Students will be able to communicate with complex sentences.

Course Objective:

To enable students acquire the relevance of the Spanish language in today's global context, how to greet each other. How to present / introduce each other using basic verbs and vocabulary

Course Contents:

Module I
A brief history of Spain, Latin America, the language, the culture…and the relevance of Spanish language in today's global context.
Introduction to alphabets

Module II
Introduction to '*Saludos*' (How to greet each other. How to present / introduce each other).
Goodbyes (despedidas)
The verb *llamarse* and practice of it.

Module III
Concept of Gender and Number
Months of the years, days of the week, seasons. Introduction to numbers 1-100, Colors, Revision of numbers and introduction to ordinal numbers.

Module IV
Introduction to *SER* and *ESTAR* (both of which mean To Be).Revision of '*Saludos*' and '*Llamarse*'. Some adjectives, nationalities, professions, physical/geographical location, the fact that spanish adjectives have to agree with gender and number of their nouns. Exercises highlighting usage of *Ser* and *Estar*.

Module V
Time, demonstrative pronoun (Este/esta, Aquel/aquella etc)

Module VI
Introduction to some key AR /ER/IR ending regular verbs.

Examination Scheme:

Components	**CT1**	**CT2**	**C**	**I**	**V**	**A**
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

Text

- Español, En Directo I A

Reference

- Español Sin Fronteras

Course Name	Course Code	LTP	Credit	Semester
CHINESE	**FLC 101**	2	2	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of advance level.
CLO 3	Students will be able to communicate with complex sentences.

Course Objective:

There are many dialects spoken in China, but the language which will help you through wherever you go is Mandarin, or Putonghua, as it is called in Chinese. The most widely spoken forms of Chinese are Mandarin, Cantonese, Gan, Hakka, Min, Wu and Xiang. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I
Show pictures, dialogue and retell.
Getting to know each other.
Practicing chart with Initials and Finals. (CHART – The Chinese Phonetic Alphabet Called "Hanyu Pinyin" in Mandarin Chinese.)
Practicing of Tones as it is a tonal language.
Changes in 3rd tone and Neutral Tone.

Module II
Greetings
Let me Introduce
The modal particle "ne".
Use of Please 'qing" – sit, have tea …….. etc.
A brief self introduction – Ni hao ma? Zaijian!
Use of "bu" negative.

Module III
Attributives showing possession
How is your Health? Thank you
Where are you from?
A few Professions like – Engineer, Businessman, Doctor, Teacher, Worker.
Are you busy with your work?
May I know your name?

Module IV
Use of "How many" – People in your family?
Use of "zhe" and "na".
Use of interrogative particle "shenme", "shui", "ma" and "nar".
How to make interrogative sentences ending with "ma".
Structural particle "de".
Use of "Nin" when and where to use and with whom. Use of guixing.
Use of verb "zuo" and how to make sentences with it.

Module V
Family structure and Relations.
Use of "you" – "mei you".
Measure words
Days and Weekdays.

Numbers.
Maps, different languages and Countries.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- "Elementary Chinese Reader Part I" Lesson 1-10

Course Name	Course Code	LTP	Credit	Semester
Anandam	**AND001**	**2**	2	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Awareness and empathy regarding community issues
CLO 2	Interaction with the community and impact on society
CLO 3	Interaction with mentor and development of Student teacher relationship
CLO 4	Interaction among students, enlarge social network
CLO 5	Cooperative and Communication skills and leadership qualities
CLO 6	Critical thinking, Confidence and Efficiency

Course Objectives:

After the completion of this course, students will be able to:

- apply their knowledge and skills to solve specific community problem
- learn to plan, lead, and organize community events have a sense of belonging to their college campus and community and find something they are interested in doing during their free time
- make new friends, expand social network, and boost social skills and mental health.
- be useful to society as it will protect them against stress, frustration, and depression

Course Contents:

The project report should be guided by the mentor and shall contain:

- **Synopsis**: clearly stating objectives and activities to be undertaken. Problem identifying and problem-solving projects to be taken up.
- Details of the **Mentor and the Participants are to** be given (name of mentor, name of participants, phone number/mobile no, email, and address)
- Location / community where the work was carried out
- Details of Activities performed are to be given with date
- Number of beneficiaries and impact on the society (the object should be to empower the community and make them self-reliant)
- Photographs taken for documentation of work should be submitted
- Media coverage of the projects should be attached if any
- The Group Community Service Project Report will be submitted by the Student group leader under the guidance of the mentor to the Director/HoIs of the Department.
- The Director/HoIs should get the best report (more than one if required) of the Group Community Service Project uploaded on the HTE website and on the University page
- The Director/HoIs will forward the best report of the department to the Nodal Officer of the University.
- University will forward the report to the state level committee.

1. Each member of the group shall write one blog about the decided topic of 500 words (minimum) along with any relevant photos/diagrams/statistical data (with reference).
2. The group member shall write his/her name at the end of the blog.
3. The blog shall be posted on Instagram and Facebook (apart from these any other website wherever the group seems necessary).
4. Print out of the blog where date of when the content is posted, number of followers, comments, name of the writer shall be visible will be taken and file will be maintained for the same.
5. In the cover page of the project mention heading **"Group Community Service Project"**, and the filled format of final project report given by Anandam Scheme.
6. For the topic chosen by the group, students are recommended to cover the following points:
    a) Current scenario (Regional, national and international level as applicable)
    b) Future predictions
    c) Duty of the government
    d) Government policies (related to the topic), if any
    e) Duty of public
    f) Conclusion

Evaluation Scheme:

Project Participation: 2 hours X 8 days (per month) X 4 months = 64 hours

- C grade =32 hrs (Below 20 marks)
- B grade >32 hrs to <=44hrs (20-30 marks)
- A grade >44 hrs to<=54hrs (30-40 marks)
- O grade >54 hrs to<=64hrs (40-50 marks)

Evaluation Criteria:

Respective Departmental Anandam mentors are requested to evaluate the project (out of 50) as per the following criteria:

1. Position and exceptions, if any, are clearly stated. The organization of the blog is completely and clearly outlined and implemented.
2. The body of the blog is coherently organized, original and the logic is easy to follow. There is no spelling or grammatical errors and terminology is clearly defined. Writing is clear, concise, and persuasive.
3. Conclusion is clearly stated. The underlying logic is explicit.

Course Name	Course Code	LTP	Credit	Semester
APPLIED MATHEMATICS – II	**AM 201**	4	4	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Solve system of linear equations; be familiar with the definition and properties of matrix; find the eigenvalues and eigenvectors of a square matrix.
CLO 2	Investigate the convergence of infinite series using different tests.
CLO 3	Calculate the measure of central tendency, moments, skewness and kurtosis.
CLO 4	Develop knowledge of basic discrete and continuous distributions (Binomial, Poisson, Normal) and how to work with them.
CLO 5	Apply the method to use complex variable and complex valued functions and able to perform their differentiation and integration

Course Objective:

The knowledge of Mathematics is necessary for a better understanding of almost all the Engineering and Science subjects. Here our intention is to make the students acquainted with the concept of basic topics from Mathematics, which they need to pursue their Engineering degree in different disciplines.

Course Contents:

Module I: Linear Algebra

Hermitian and Skew Hermitian Matrix, Unitary Matrix, Orthogonal Matrix, Elementary Row Transformation, Reduction of a Matrix to Row Echelon Form, Rank of a Matrix, Consistency of Linear Simultaneous Equations, Gauss Elimination Method, Gauss-Jordan Method, Eigen Values and Eigen Vectors of a Matrix, Caley-Hamilton Theorem, Diagonalization of a Matrix, Vector Space, Linear Independence and Dependence of Vectors, Linear Transformations.

Module II: Infinite Series

Definition of Sequence, Bounded Sequence, Limit of a Sequence, Series, Finite and Infinite Series, Convergence and Divergence of Infinite series, Cauchy's Principle of Convergence, Positive Term Infinite Series, Comparison test, D'Alembert's Ratio test. Raabe's Test, Cauchy's nth root Test. Logarithmic Test, Alternating Series, Leibnitz's Test, Absolute and conditioinal convergence, Uniform Convergence, Power Series and its Interval of Convergence.

Module III: Complex Analysis

De Moivre's Theorem and Roots of Complex Numbers, Logarithmic Functions, Circular, Hyperbolic Functions and their Inverses.

Functions of a Complex Variables, Limits, Continuity and Derivatives, Analytic Function, Cauchy-Riemann Equations (without proof), Harmonic Function, Harmonic Conjugates, Conformal Mapping, Bilinear Transformations, Complex Line Integral, Cauchy Integral Theorem, Cauchy Integral Formula, Derivative of Analytic Function, Power Series, Taylor Series, Laurent Series, Zeroes and Singularities, Residues, Residue Theorem, Evaluation of Real Integrals of the Form $\int_0^{2\pi} F(\cos\theta, \sin\theta)\, d\theta$ and $\int_{-\infty}^{\infty} \frac{f(x)}{F(x)}\, dx$.

Module IV: Statistics and Probability

Moments, Skewness, Kurtosis, Random Variables and Probability Distribution, Mean and Variance of a Probability Distribution, Binomial Distribution, Poisson Distribution and Normal Distribution.

Examination Scheme:

IA	EE

A	PR	LR	V	PR	V
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

Text & References:

Text

- Engineering Mathematics by Erwin Kreyszig.
- Engineering Mathematics by R.K. Jain and S.R.K. Iyengar.
- Higher Engineering Mathematics by H.K. Dass.

Reference

- Engineering Mathematics by B.S. Grewal.
- Differential Calculus by Shanti Narain.
- Integral Calculus by Shanti Narain.
- Linear Algebra- Schaum Outline Series.

Course Name	Course Code	LTP	Credit	Semester
APPLIED PHYSICS - II - MODERN PHYSICS	**AP 202**	3	3	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Define and understand space and time and the variations in other related fundamental quantities such as mass, velocity and force
CLO 2	Solve simple problems relating to the above concepts.
CLO 3	Explain by extending the understanding as laid down in Quantum theory to other phenomenon as observed in sub-atomic Physics and also to solve simple problems in Quantum Theory .
CLO 4	Appreciate and understand the various spectra as observed during electronic transitions and Understand the way nature has endowed properties to materials

Course Objective:

Aim of this course is to introduce the students to fundamentals of graduate level physics which form the basis of all applied science and engineering

Course Contents:

Module I: Special Theory of Relativity

Michelson-Morley experiment, Importance of negative result, Inertial & non-inertial frames of reference, Einstein's postulates of Special theory of Relativity, Space-time coordinate system, Relativistic Space Time transformation (Lorentz transformation equation), Transformation of velocity, Addition of velocities, Length contraction and Time dilation, Mass-energy equivalence (Einstein's energy mass relation) & Derivation of Variation of mass with velocity,

Module II: Wave Mechanics

Wave particle duality, De-Broglie matter waves, phase and group velocity, Heisenberg uncertainty principle, wave function and its physical interpretation, Operators, expectation values. Time dependent & time independent Schrödinger wave equation for free & bound states, square well potential (rigid wall), Step potential.

Module III: Atomic Physics

Vector atom model, LS and j-j coupling, Zeceman effect (normal & anomalous), Paschen-Bach effect, X-ray spectra and energy level diagram, Moseleys Law, Lasers – Einstein coefficients, conditions for light amplification, population inversion, optical pumping, three level and four level lasers, He-Ne and Ruby laser, Properties and applications of lasers.

Module IV: Solid State Physics

Sommerfield's free electron theory of metals, Fermi energy, Introduction to periodic potential & Kronig-Penny model (Qualitative) Band Theory of Solids, Semi-conductors: Intrinsics and Extrinsic Semiconductors, photoconductivity and photovotaics, Basic aspects of Superconductivity, Meissner effect.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance.

Text & References:

Text
- Concept of Modern Physics, A. Beiser
- Applied Physics II, Agarawal & Goel

Reference
- Solid State Physics, S. O. Pallai
- Physics of Atom, Wehr & Richards

Course Name	Course Code	LTP	Credit	Semester
OBJECT ORIENTED PROGRAMMING USING C++	**BCS 203**	3	3	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Interpret the characteristics of an object-oriented programming language in a program and advanced features of the C++ programming language as a continuation of the previous course.
CLO 2	Define classes and objects using C++ language to solve real world problems
CLO 3	Apply inheritance and polymorphism through programming
CLO 4	Conclude methods of handling files and strings using C++ and apply exception handling in real world applications.
CLO 5	
CLO 6	

Course Objective:

The objective of this module is to introduce object oriented programming. To explore and implement the various features of OOP such as inheritance, polymorphism, Exceptional handling using programming language C++. After completing this course student can easily identify the basic difference between the programming approaches like procedural and object oriented.

Course Contents:

Module I: Introduction

Review of C, Difference between C and C++, Procedure Oriented and Object Oriented Approach. Basic Concepts:

Objects, classes, Principals like Abstraction, Encapsulation, Inheritance and Polymorphism. Dynamic Binding, Message Passing. Characteristics of Object-Oriented Languages. Introduction to Object-Oriented Modeling techniques (Object, Functional and Dynamic Modeling).

Module II: Classes and Objects
Abstract data types, Object & classes, attributes, methods, C++ class declaration, Local Class and Global Class, State identity and behaviour of an object, Local Object and Global Object, Scope resolution operator, Friend Functions, Inline functions, Constructors and destructors, instantiation of objects, Types of Constructors, Static Class Data, Array of Objects, Constant member functions and Objects, Memory management Operators.

Module III: Inheritance
Inheritance, Types of Inheritance, access modes – public, private & protected, Abstract Classes, Ambiguity resolution using scope resolution operator and Virtual base class, Aggregation, composition vs classification hiérarchies, Overriding inheritance methods, Constructors in derived classes, Nesting of Classes.

Module IV: Polymorphism
Polymorphism, Type of Polymorphism – Compile time and runtime, Function Overloading, Operator Overloading (Unary and Binary) Polymorphism by parameter, Pointer to objects, this pointer, Virtual Functions, pure virtual functions.

Module V: Strings, Files and Exception Handling
Manipulating strings, Streams and files handling, formatted and Unformatted Input output. Exception handling, Generic Programming – function template, class Template Standard Template Library: Standard Template Library, Overview of Standard Template Library, Containers, Algorithms, Iterators, Other STL Elements, The Container Classes, General Theory of Operation, Vectors.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text:
- A.R. Venugopal, Rajkumar, T. Ravishanker "Mastering C++", TMH, 1997
- R. Lafore, "Object Oriented Programming using C++", BPB Publications, 2004.
- "Object Oriented Programming with C++" By E. Balagurusamy.
- Schildt Herbert, "C++: The Complete Reference", Wiley DreamTech, 2005.

References:
- Parasons, "Object Oriented Programming with C++", BPB Publication, 1999.
- Steven C. Lawlor, "The Art of Programming Computer Science with C++", Vikas Publication, 2002.
- Yashwant Kanethkar, "Object Oriented Programming using C++", BPB, 2004

Course Name	Course Code	LTP	Credit	Semester
ENGINEERING MECHANICS	**BME 204**	3	3	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Able to analyse the force system and its effects.

CLO 2	Explain the nature of forces acting upon a system.
CLO 3	Evaluate the static and dynamic system's problem

Course Objective:

Objective of this course is to provide fundamental knowledge of force system and its effect on the behaviour of the bodies that may be in dynamic or in static state. It includes the equilibrium of different structures like beams, frames, truss etc and the force transfer mechanism in the different components of a body under given loading condition.

Course Contents:

Module I: Force system & Structure
Free body diagram, Equilibrium equations and applications. Plane truss, perfect and imperfect truss, assumption in the truss analysis, analysis of perfect plane trusses by the method of joints, method of section.

Module II: Friction
Static and Kinetic friction, laws of dry friction, co-efficient of friction, angle of friction, angle of repose, cone of friction, friction lock, efficiency of screw jack, transmission of power through belt

Module III: Distributed Force
Determination of center of gravity, center of mass and centroid by direct integration and by the method of composite bodies, mass moment of inertia and area moment of inertia by direct integration and composite bodies method, radius of gyration, parallel axis theorem, Pappus theorems and its application, polar moment of inertia.

Module IV: Work -Energy
Work energy equation, conservation of energy, Virtual work, impulse, momentum conservation, impact of bodies, co-efficient of restitution, loss of energy during impact, D'alembert principle

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text

- S.S. Bhavikatti, Engineering Mechanics, New Age International Ltd
- Timoshenko, Engineering Mechanics, McGraw Hill

Reference

- R. S. Khurmi, Engineering Mechanics, S. Chand Publication
- I. H. Shames & G. K. M. Rao, Engineering Mechanics, Pearson Education, 2006

Course Name	Course Code	LTP	Credit	Semester
ENGINEERING GRAPHICS	**BME 205**	1	1	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Describe the theory of scales, engineering curves, different Projection used in engineering drawing.
CLO 2	Draw the different engineering curves, maps and projection of planes and solid accurately.
CLO 3	Identify different geometrical shape and their application used in engineering application.
CLO 4	Describe the theory of scales, engineering curves, different Projection used in engineering drawing.

Course Contents:

Module 1:
Scales & Curves:Representative factor, Plain Scales, Diagonal Scales, Comperative Scales and Scale of chords. Construction of ellipse, Parabola, Hyperbola, Cycloid, Epicycloid, Hypocycloid, Involutes and Spirals by various methods.

Module 2:
Projection of Points & Straight lines:Projection of points, Projection of straight lines. True inclinations and true length of straight lines.

Module 3:
Projection of planes and solids:Projection of circle, triangle, polygons, polyhedrons, pyramids, cylinders and cones in different positions.

Module 1:
Section of solids and Isometric projections:Section of right solids by normal and inclined planes, Orthographic projection, first angle & third angle projection. Isometric scale, Isometric axes, Isometric projection from orthographic drawing.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text

- Engineering Graphics – Basant Agrawal and Dr. C. M. Agrawal, Tata McGraw-Hill Publishing Company Ltd.
- Engineering Drawing – by N. D. Bhatt

Reference

- Engineering Drawing and Graphics – by Veenugopal
- Engineering Drawing – by T. Jeyopoovan

Course Name	Course Code	LTP	Credit	Semester
DOMAIN WORKSHOP	BME 206	1	1	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	To imparting knowledge and skill components in the field of basic workshop technology.
CLO 2	Student able to deals with different hand and machine tools required for manufacturing simple metal components and articles.

Course Contents:

Module 1: Layout of workshop

Workshop layout, Importance of various sections/shops of workshop, Types of jobs done in each shop, General safety rules and work procedure in workshop.

Module 2: Fitting Shop

Demonstration of various fitting operations such as chipping, filing, scraping, grinding, sawing, marking, drilling, tapping. Preparation of simple and male- female joints.

Module 3: Welding Shop

Shielded metal arc welding, Metal Arc welding, tungsten inert arc welding , gas welding.

Module 4: Moulding Shop

Types of moulds, Step involved in making a mould, Moulding boxes, hand tools used for mould making, Moluding processes: Bench moulding, floor moulding, pit moulding and machine moulding, Moulding machines squeeze machine, jolt squeeze machine and sand slinger.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

1. Workshop Technology by BS Raghuvanshi : Dhanpat Rai and Sons Delhi

2. Elements of Workshop Technology by SK Choudhry and Hajra : Asia Publishing House
3. Welding Engineering by RL Aggarwal and T Manghnani; Khanna Publishers, Delhi
4. A Text Book of Production Engineering by PC Sharma; S Chand and Company Ltd. Delhi
5. Foundry Technology by KP Sinha and DB Goel; Roorkee Publishng House, Roorkee.
6. A Text Book of Manufacturing Science and Technology by A Manna, Prentice Hall of India, Delhi.

APPLIED PHYSICS LAB – II- MODERN PHYSICS LAB

Course Code: AP 222 **Credit Units: 01**

List of Experiments:

1. To determine the wavelength of prominent lines of mercury spectrum using plane transmission grating.
2. To determine the thickness of a given wire by Wedge method.
3. To determine the wavelength of He-Ne laser light using single slit.
4. To determine the frequency of an electrically maintained tunning fork by Melde's method.
5. To study the variation of magnetic field along the axis of Helmholtz coil and to find out reduction factor.
6. To draw the V – I characteristics of a forward and reverse bias PN junction diode.
7. To determine the frequency of AC mains using sonometer.
8. To determine the energy band-gap of Germanium crystal using four probes method.
9. To draw V – I characteristics of a photocell and to verify the inverse square law of radiation.
10. To determine the acceleration due to gravity ('g') using Keter's reversible pendulum.
11. To study the characteristics of photo voltaic cell (solar cell).

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

OBJECT ORIENTED PROGRAMMING USING C++ LAB

Course Code: **BCS 223** **Credit Units: 01**

Software Required: Turbo C++

List of Experiments:

- Creation of objects in programs and solving problems through them.
- Different use of private, public member variables and functions and friend functions.
- Use of constructors and destructors.
- Operator overloading
- Use of inheritance in and accessing objects of different derived classes.
- Polymorphism and virtual functions (using pointers).
- File handling.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

ENGINEERING MECHANICS LAB

Course Code: BME 224 Credit Units: 01

List of Experiments:

- To verify the law of Force Polygon
- To verify the law of Moments using Parallel Force apparatus. (Simply supported type)
- To determine the co-efficient of friction between wood and various surface (like
- Leather, Wood, Aluminum) on an inclined plane.
- To find the forces in the members of Jib Crane.
- To determine the mechanical advantage, Velocity ratio and efficiency of a screw jack.
- To determine the mechanical advantage, Velocity ratio and Mechanical efficiency of the Wheel and Axle
- To determine the MA, VR, η of Worm Wheel (2-start)
- Verification of force transmitted by members of given truss.
- To verify the law of moments using Bell crank lever
- To find CG and moment of Inertia of an irregular body using Computation method

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

ENGINEERING GRAPHICS LAB

Course Code: BME 225 **Credit Units: 01**

List of Experiments:

- Sketching and drawing of scale & Curve.
- Sketching and drawing of Cycloidal Curve.
- Sketching and drawing of Involute & Spirals.
- Sketching and drawing of points & line.
- Sketching and drawing of projection of planes.
- Sketching and drawing of projection of solids.
- Sketching and drawing of intersection of surfaces.
- Sketching and drawing of development of surfaces.
- Sketching and drawing of orthographic and isometric projection.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

Course Name	Course Code	LTP	Credit	Semester
ENGLISH	**BCS 201**	1	2	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Participate in conversation and in small- and whole-group discussion
CLO 2	Explore and use English as medium of communication in real life situation
CLO 3	Discuss topics and themes of a reading, using the vocabulary and grammar of the lesson
CLO 4	Identify features of a reading textbook and utilize them as needed
CLO 5	Prepare and deliver organized presentations in small groups and to whole class
CLO 6	

Course Objective:

The course is intended to give a foundation of English Language. The literary texts are indented to help students to inculcate creative & aesthetic sensitivity and critical faculty through comprehension, appreciation and analysis of the prescribed literary texts. It will also help them to respond form different perspectives.

Course Contents:

Module I: Vocabulary
Use of Dictionary
Use of Words: Diminutives, Homonyms & Homophones

Module II: Essentials of Grammar - I
Articles
Parts of Speech
Tenses

Module III: Essentials of Grammar - II
Sentence Structure
Subject -Verb agreement
Punctuation

Module IV: Communication
The process and importance
Principles & benefits of Effective Communication

Module V: Spoken English Communication
Speech Drills
Pronunciation and accent
Stress and Intonation

Module VI: Communication Skills - I
Developing listening skills
Developing speaking skills

Module VII: Communication Skills - II
Developing Reading Skills
Developing writing Skills

Module VIII: Written English communication
Progression of Thought/ideas
Structure of Paragraph
Structure of Essays

Module IX: Short Stories
Of Studies, by Francis Bacon
Dream Children, by Charles Lamb
The Necklace, by Guy de Maupassant
A Shadow, by R.K.Narayan
Glory at Twilight, Bhabani Bhattacharya

Module X: Poems

All the Worlds a Stage	Shakespeare
To Autumn	Keats
O! Captain, My Captain.	Walt Whitman
Where the Mind is Without Fear	Rabindranath Tagore
Psalm of Life	H.W. Longfellow

Examination Scheme:

Components	A	CT	HA	EE
Weightage (%)	05	15	10	70

Text & References:

Text
- Madhulika Jha, Echoes, Orient Long Man
- Ramon & Prakash, Business Communication, Oxford.

Reference
- Sydney Greenbaum Oxford English Grammar, Oxford.
- Successful Communications, Malra Treece (Allyn and Bacon)
- Effective Technical Communication, M. Ashraf Rizvi.

Course Name	Course Code	LTP	Credit	Semester
BEHAVIOURAL SCIENCE - II (PROBLEM SOLVING AND CREATIVE THINKING)	**BSS 204**	1	1	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Recognize the relation critical thinking with various mental processes.
CLO 2	Identify hindrance to problem solving processes
CLO 3	Analyze the steps in problem-solving process.
CLO 4	Create plan of action applying creative thinkings

Course Objective:

To enable the students:

- Understand the process of problem solving and creative thinking.
- Facilitation and enhancement of skills required for decision-making.

Course Contents:

Module I: Thinking as a tool for Problem Solving
What is thinking: The Mind/Brain/Behaviour
Critical Thinking and Learning:
Making Predictions and Reasoning
Memory and Critical Thinking
Emotions and Critical Thinking
Thinking skills

Module II: Hindrances to Problem Solving Process
Perception
Expression
Emotion
Intellect
Work environment

Module III: Problem Solving
Recognizing and Defining a problem
Analyzing the problem (potential causes)
Developing possible alternatives
Evaluating Solutions
Resolution of problem
Implementation
Barriers to problem solving:
Perception
Expression
Emotion
Intellect
Work environment

Module IV: Plan of Action
Construction of POA
Monitoring
Reviewing and analyzing the outcome

Module V: Creative Thinking
Definition and meaning of creativity
The nature of creative thinking
Convergent and Divergent thinking
Idea generation and evaluation (Brain Storming)
Image generation and evaluation
Debating
The six-phase model of Creative Thinking: ICEDIP model

Module VI: End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

Text

- Michael Steven: How to be a better problem solver, Kogan Page, New Delhi, 1999
- Geoff Petty: How to be better at creativity; Kogan Page, New Delhi, 1999
- Richard Y. Chang and P. Keith, Kelly: Wheeler Publishing, New Delhi, 1998.
- Phil Lowe Koge Page: Creativity and Problem Solving, New Delhi, 1996

Reference

- J William Pfeiffer (ed.) Theories and Models in Applied Behavioural Science, Vol 3, Management (1996); Pfeiffer & Company
- Bensley, Alan D.: Critical Thinking in Psychology – A Unified Skills Approach, (1998), Brooks/Cole Publishing Company.

Course Name	Course Code	LTP	Credit	Semester
FRENCH	**FLF 201**	2	2	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of advance level.
CLO 3	Students will be able to communicate with complex sentences.

Course Objective:

To enable the students to overcome the fear of speaking a foreign language and take position as a foreigner speaking French.
To make them learn the basic rules of French Grammar.

Course Contents:

Module A: pp.38 – 47: Unité 3 : Objectif 3, 4, 5. 6

Module B: pp. 47 to 75 Unité 4, 5

Contenu lexical:

Unité 3: Organiser son temps

1. donner/demander des informations sur un emploi du temps, un horaire SNCF – Imaginer un dialogue
2. rédiger un message/ une lettre pour …
   i) prendre un rendez-vous/ accepter et confirmer/ annuler
   ii) inviter/accepter/refuser
3. Faire un programme d'activités
   imaginer une conversation téléphonique/un dialogue
   Propositions- interroger, répondre

Unité 4: Découvrir son environnement

1. situer un lieu
2. s'orienter, s'informer sur un itinéraire.
3. Chercher, décrire un logement
4. connaître les rythmes de la vie

Unité 5 : s'informer

1. demander/donner des informations sur un emploi du temps passé.
2. donner une explication, exprimer le doute ou la certitude.
3. découvrir les relations entre les mots
4. savoir s'informer

Contenu grammatical:

1. Adjectifs démonstratifs
2. Adjectifs possessifs/exprimer la possession à l'aide de :
   i. « de » ii. A+nom/pronom disjoint
3. Conjugaison pronominale – négative, interrogative - construction à l'infinitif
4. Impératif/exprimer l'obligation/l'interdiction à l'aide de « il faut…. »/ «il ne faut pas… »
5. passé composé
6. Questions directes/indirectes

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- le livre à suivre : Campus: Tome 1

Course Name	Course Code	LTP	Credit	Semester
GERMAN	**FLG 201**	2	2	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of advance level.
CLO 3	Students will be able to communicate with complex sentences.

Course Objective:

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.
To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany. Introduction to Grammar to consolidate the language base learnt in Semester I

Course Contents:

Module I: Everything about Time and Time periods
Time and times of the day.
Weekdays, months, seasons.
Adverbs of time and time related prepositions

Module II: Irregular verbs
Introduction to irregular verbs like to be, and others, to learn the conjugations of the same, (fahren, essen, lessen, schlafen, sprechen und ähnliche).

Module III: Separable verbs
To comprehend the change in meaning that the verbs undergo when used as such
Treatment of such verbs with separable prefixes

Module IV: Reading and comprehension
Reading and deciphering railway schedules/school time table
Usage of separable verbs in the above context

Module V: Accusative case
Accusative case with the relevant articles
Introduction to 2 different kinds of sentences – Nominative and Accusative

Module VI: Accusative personal pronouns
Nominative and accusative in comparison
Emphasizing on the universal applicability of the pronouns to both persons and objects

Module VII: Accusative prepositions
Accusative propositions with their use
Both theoretical and figurative use

Module VIII: Dialogues
Dialogue reading: 'In the market place'
'At the Hotel'

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

Course Name	Course Code	LTP	Credit	Semester
SPANISH	**FLS 201**	2	2	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of advance level.
CLO 3	Students will be able to communicate with complex sentences.

Course Objective:

To enable students acquire more vocabulary, grammar, Verbal Phrases to understand simple texts and start describing any person or object in Simple Present Tense.

Course Contents:

Module I
Revision of earlier modules.

Module II
Some more AR/ER/IR verbs. Introduction to root changing and irregular AR/ER/IR ending verbs

Module III
More verbal phrases (eg, Dios Mio, Que lastima etc), adverbs *(bueno/malo, muy, mucho, bastante, poco).*
Simple texts based on grammar and vocabulary done in earlier modules.

Module IV
Possessive pronouns

Module V
Writing/speaking essays like my friend, my house, my school/institution, myself….descriptions of people, objects etc, computer/internet related vocabulary

Examination Scheme:

Components	**CT1**	**CT2**	**C**	**I**	**V**	**A**
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español, En Directo I A
- Español Sin Fronteras

Course Name	Course Code	LTP	Credit	Semester
CHINESE	**FLC 201**	2	2	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of advance level.
CLO 3	Students will be able to communicate with complex sentences.

Course Objective:

Chinese is a tonal language where each syllable in isolation has its definite tone (flat, falling, rising and rising/falling), and same syllables with different tones mean different things. When you say, "ma" with a third tone, it mean horse and "ma" with the first tone is Mother. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I
Drills
Practice reading aloud
Observe Picture and answer the question.
Tone practice.
Practice using the language both by speaking and by taking notes.
Introduction of basic sentence patterns.
Measure words.
Glad to meet you.

Module II
Where do you live?
Learning different colors.
Tones of "bu"
Buying things and how muchit costs?
Dialogue on change of Money.
More sentence patterns on Days and Weekdays.
How to tell time. Saying the units of time in Chinese. Learning to say useful phrases like – 8:00, 11:25, 10:30 P.M. everyday, afternoon, evening, night, morning 3:58, one hour, to begin, to end ….. etc.
Morning, Afternoon, Evening, Night.

Module III
Use of words of location like-li, wais hang, xia
Furniture – table, chair, bed, bookshelf,.. etc.
Description of room, house or hostel room.. eg what is placed where and how many things are there in it?
Review Lessons – Preview Lessons.
Expression 'yao", "xiang" and "yaoshi" (if).
Days of week, months in a year etc.
I am learning Chinese. Is Chinese difficult?

Module IV
Counting from 1-1000
Use of "chang-chang".
Making an Inquiry – What time is it now? Where is the Post Office?
Days of the week. Months in a year.
Use of Preposition – "zai", "gen".
Use of interrogative pronoun – "duoshao" and "ji".
"Whose"??? Sweater etc is it?
Different Games and going out for exercise in the morning.

Module V

The verb “qu”
– Going to the library issuing a book from the library
– Going to the cinema hall, buying tickets
– Going to the post office, buying stamps
– Going to the market to buy things.. etc
– Going to the buy clothes …. Etc.
Hobby. I also like swimming.
Comprehension and answer questions based on it.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- “Elementary Chinese Reader Part I” Lesson 11-20

Course Name	Course Code	LTP	Credit	Semester
Anandam	**AND002**	**2**	2	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Awareness and empathy regarding community issues
CLO 2	Interaction with the community and impact on society
CLO 3	Interaction with mentor and development of Student teacher relationship
CLO 4	Interaction among students, enlarge social network
CLO 5	Cooperative and Communication skills and leadership qualities
CLO 6	Critical thinking, Confidence and Efficiency

Course Objectives:

After the completion of this course, students will be able to:

- apply their knowledge and skills to solve specific community problem
- learn to plan, lead, and organize community events have a sense of belonging to their college campus and community and find something they are interested in doing during their free time
- make new friends, expand social network, and boost social skills and mental health.
- be useful to society as it will protect them against stress, frustration, and depression

Course Contents:

The project report should be guided by the mentor and shall contain:

- **Synopsis**: clearly stating objectives and activities to be undertaken. Problem identifying and problem-solving projects to be taken up.
- Details of the **Mentor and the Participants are to** be given (name of mentor, name of participants, phone number/mobile no, email, and address)
- Location / community where the work was carried out
- Details of Activities performed are to be given with date
- Number of beneficiaries and impact on the society (the object should be to empower the community and make them self-reliant)
- Photographs taken for documentation of work should be submitted
- Media coverage of the projects should be attached if any
- The Group Community Service Project Report will be submitted by the Student group leader under the guidance of the mentor to the Director/HoIs of the Department.
- The Director/HoIs should get the best report (more than one if required) of the Group Community Service Project uploaded on the HTE website and on the University page
- The Director/HoIs will forward the best report of the department to the Nodal Officer of the University.
- University will forward the report to the state level committee.

7. Each member of the group shall write one blog about the decided topic of 500 words (minimum) along with any relevant photos/diagrams/statistical data (with reference).
8. The group member shall write his/her name at the end of the blog.
9. The blog shall be posted on Instagram and Facebook (apart from these any other website wherever the group seems necessary).
10. Print out of the blog where date of when the content is posted, number of followers, comments, name of the writer shall be visible will be taken and file will be maintained for the same.
11. In the cover page of the project mention heading **"Group Community Service Project"**, and the filled format of final project report given by Anandam Scheme.
12. For the topic chosen by the group, students are recommended to cover the following points:
    g) Current scenario (Regional, national and international level as applicable)
    h) Future predictions
    i) Duty of the government
    j) Government policies (related to the topic), if any
    k) Duty of public
    l) Conclusion

Evaluation Scheme:

Project Participation: 2 hours X 8 days (per month) X 4 months = 64 hours

- C grade =32 hrs (Below 20 marks)
- B grade >32 hrs to <=44hrs (20-30 marks)
- A grade >44 hrs to<=54hrs (30-40 marks)
- O grade >54 hrs to<=64hrs (40-50 marks)

Evaluation Criteria:

Respective Departmental Anandam mentors are requested to evaluate the project (out of 50) as per the following criteria:

4. Position and exceptions, if any, are clearly stated. The organization of the blog is completely and clearly outlined and implemented.
5. The body of the blog is coherently organized, original and the logic is easy to follow. There is no spelling or grammatical errors and terminology is clearly defined. Writing is clear, concise, and persuasive.
6. Conclusion is clearly stated. The underlying logic is explicit.

Course Name	Course Code	LTP	Credit	Semester
ENVIRONMENTAL STUDIES	**EVS 001**	4	4	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students able to understand the term environment is used to describe, in the aggregate, all the external forces, influences and conditions, which affect the life, nature, behaviour and the growth, development and maturity of living organisms. At present a great number of environment issues, have grown in size and complexity day by day, threatening the survival of mankind on earth.
CLO 2	Students able to understand environmental studies is to enlighten the masses about the importance of the protection and conservation of our environment and control of human activities which has an adverse effect on the environment.
CLO 3	Students able to study of environmental studies is quite essential in all types of environmental sciences, environmental engineering and industrial management.

Course Objective:

The term environment is used to describe, in the aggregate, all the external forces, influences and conditions, which affect the life, nature, behaviour and the growth, development and maturity of living organisms. At present a great number of environment issues, have grown in size and complexity day by day, threatening the survival of mankind on earth. A study of environmental studies is quite essential in all types of environmental sciences, environmental engineering and industrial management. The objective of environmental studies is to enlighten the masses about the importance of the protection and conservation of our environment and control of human activities which has an adverse effect on the environment.

Course Contents:

Module I: The multidisciplinary nature of environmental studies
Definition, scope and importance
Need for public awareness

Module II: Natural Resources
Renewable and non-renewable resources:
Natural resources and associated problems
Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.
Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern

agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, case studies.
Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

- Role of an individual in conservation of natural resources.
- Equitable use of resources for sustainable lifestyles.

Module III: Ecosystems
Concept of an ecosystem
Structure and function of an ecosystem
Producers, consumers and decomposers
Energy flow in the ecosystem
Ecological succession
Food chains, food webs and ecological pyramids
Introduction, types, characteristic features, structure and function of the following ecosystem:

a. Forest ecosystem
b. Grassland ecosystem
c. Desert ecosystem
d. Aquatic ecosystems (ponds, streams, lakes, rivers, ocean estuaries)

Module IV: Biodiversity and its conservation
Introduction – Definition: genetic, species and ecosystem diversity
Biogeographical classification of India
Value of biodiversity: consumptive use, productive use, social, ethical aesthetic and option values
Biodiversity at global, national and local levels
India as a mega-diversity nation
Hot-spots of biodiversity
Threats to biodiversity: habitat loss, poaching of wildlife, man wildlife conflicts
Endangered and endemic species of India
Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity

Module V: Environmental Pollution
Definition
Causes, effects and control measures of:

a. Air pollution
b. Water pollution
c. Soil pollution
d. Marine pollution
e. Noise pollution
f. Thermal pollution
g. Nuclear pollution

Solid waste management: Causes, effects and control measures of urban and industrial wastes.
Role of an individual in prevention of pollution.
Pollution case studies.
Disaster management: floods, earthquake, cyclone and landslides.

Module VI: Social Issues and the Environment
From unsustainable to sustainable development
Urban problems and related to energy
Water conservation, rain water harvesting, watershed management
Resettlement and rehabilitation of people; its problems and concerns. Case studies.
Environmental ethics: Issues and possible solutions
Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.
Wasteland reclamation
Consumerism and waste products
Environmental Protection Act
Air (Prevention and Control of Pollution) Act
Water (Prevention and control of Pollution) Act
Wildlife Protection Act
Forest Conservation Act
Issues involved in enforcement of environmental legislation
Public awareness

Module VII: Human Population and the Environment
Population growth, variation among nations
Population explosion – Family Welfare Programmes

Environment and human health
Human Rights
Value Education
HIV / AIDS
Women and Child Welfare
Role of Information Technology in Environment and Human Health
Case Studies

Module VIII: Field Work
Visit to a local area to document environmental assets-river / forest/ grassland/ hill/ mountain.
Visit to a local polluted site – Urban / Rural / Industrial / Agricultural
Study of common plants, insects, birds
Study of simple ecosystems-pond, river, hill slopes, etc (Field work equal to 5 lecture hours)

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text

- Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
- Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad 380 013, India
- Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p
- Clark R.S., Marine Pollution, Clanderson Press Oxford (TB)
- Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Publ. House, Mumabai, 1196p
- De A.K., Environmental Chemistry, Wiley Eastern Ltd.
- Down to Earth, Centre for Science and Environment (R)
- Gleick, H.P. 1993. Water in Crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute Oxford Univ. Press. 473p
- Hawkins R.E., Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay (R)
- Heywood, V.H & Waston, R.T. 1995. Global Biodiversity Assessment. Cambridge Univ. Press 1140p.
- Jadhav, H & Bhosale, V.M. 1995. Environmental Protection and Laws. Himalaya Pub. House, Delhi 284 p.
- Mckinney, M.L. & School, R.M. 1996. Environmental Science Systems & Solutions, Web enhanced edition. 639p.

Reference

- Mhaskar A.K., Matter Hazardous, Techno-Science Publication (TB)
- Miller T.G. Jr. Environmental Science, Wadsworth Publishing Co. (TB)
- Odum, E.P. 1971. Fundamentals of Ecology. W.B. Saunders Co. USA, 574p
- Rao M N. & Datta, A.K. 1987. Waste Water treatment. Oxford & IBH Publ. Co. Pvt. Ltd. 345p.
- Sharma B.K., 2001. Environmental Chemistry. Geol Publ. House, Meerut
- Survey of the Environment, The Hindu (M)
- Townsend C., Harper J, and Michael Begon, Essentials of Ecology, Blackwell Science
- Trivedi R.K., Handbook of Environmental Laws, Rules Guidelines, Compliances and Standards, Vol I and II, Enviro Media (R)
- Trivedi R. K. and P.K. Goel, Introduction to air pollution, Techno-Science Publication (TB)
- Wanger K.D., 1998 Environnemental Management. W.B. Saunders Co. Philadelphia, USA 499p

Course Name	Course Code	LTP	Credit	Semester
DISCRETE MATHEMATICS	**AM 301**	3	3	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Proof and logic
CLO 2	Set, relations.
CLO 3	Formulate Lattices as partially ordered sets, their properties
CLO 4	Join and meet irreducible elements of a lattice and introduction to Boolean algebra.
CLO 5	Understand some basic properties of Boolean algebra to solve problem by different method and definition of graphs.

Course Objective:
The knowledge of Discrete Mathematics is necessary for a better understanding of almost all the Engineering and Science subjects. Here our intention is to make the students acquainted with the concept of basic topics from Mathematics, which they need to pursue their Engineering degree in different disciplines.

Course Contents:

Module I: **Set Theory**
Introduction, Combination of sets, Multisets, Ordered pairs. Proofs of some general identities on sets. Relations: Definition, Operations on relations, Properties of relations, Composite Relations, Equality of relations, Recursive definition of relation, Order of relations. Functions: Definition, Classification of functions, Operations on functions, Recursively defined functions, Growth of Functions, Natural Numbers: Introduction, Mathematical Induction, Variants of Induction, Induction with Nonzero Base cases. Proof Methods, Proof by counter – example, Proof by contradiction..

Module II: **Algebraic Structures**
Definition, Groups, Subgroups and order, Cyclic Groups, Cosets, Lagrange's theorem, Normal Subgroups, Permutation and Symmetric groups, Group Homomorphisms, Definition and elementary properties of Rings and Fields, Integers Modulo n.

Module III: **Algebraic Structures**
Definition, Partial order sets, Combination of partial order sets, Hasse diagram. Lattices: Definition, Properties of lattices – Bounded, Complemented, Modular and Complete lattice. Boolean Algebra: Introduction, Axioms and Theorems of Boolean algebra, Algebraic manipulation of Boolean expressions. Simplification of Boolean Functions, Karnaugh maps, Logic gates, Digital circuits and Boolean algebra.
Module IV: **Partial order sets**
Proposition, well-formed formula, Truth tables, Tautology, Satisfiability, Contradiction, Algebra of proposition, Theory of Inference Predicate Logic: First order predicate, well-formed formula of predicate, quantifiers, Inference theory of predicate logic.
. Module IV: **Propositional Logic**
Definition, Binary tree, Binary tree traversal, Binary search tree. Graphs: Definition and terminology, Representation of graphs, Multigraphs, Bipartite graphs, Planar graphs, Isomorphism and Homeomorphism of graphs, Euler and Hamiltonian paths, Graph coloring Recurrence Relation & Generating function: Recursive definition of functions, Recursive algorithms, Method of solving recurrences. Combinatory, Introduction, Counting Techniques, Pigeonhole Principle

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination.
Att: Attendance.

Text & References:

TEXT BOOKS
Elements of Distcrete Mathematics – Liu and Mohapatra, McGraw Hill Publications
Discrete Mathematical Structures – B. Kolman, R.C. Busby, and S.C. Ross, PHI Publications

REFERENCE BOOKS
Discrete Mathematical Structures with Application to Computer Science – Jean Paul Trembley and R Manohar, McGraw-Hill Publications
Discrete and Combinatorial Mathematics – R.P. Grimaldi, Addison Wesley
Discrete Mathematics and Its Applications – Kenneth H. Rosen, McGraw-Hill

Course Name	Course Code	LTP	Credit	Semester
Electronics Device and circuit	**BRI 301**	4	4	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Explain basic Physics of semiconductor material and structure and operation of the pn junction.
CLO 2	Explain I-V characteristics,Modeling, Device operation andapplication of diodes.
CLO 3	Analyze diode circuits. Cognitive
CLO 4	ExplainI-V characteristics, Modeling, Device operation and application of BJT and MOSFET. Cognitive,
CLO 5	Explain basic Physics of semiconductor material and structure and operation of the pn junction.

Course Objective:
This course builds from basic knowledge of Semiconductor Physics to an understanding of basic devices and their models. This course builds a foundation for courses on VLSI design and IC fabrication.

Course Contents:

Module I: Semiconductors
Bonding forces in solids, Energy bands, Metals, Semiconductors and Insulators, Direct and Indirect semiconductors, Electrons and Holes, Intrinsic and Extrinsic materials, Conductivity and Mobility, Drift and Resistance, Effects of temperature and doping on mobility, Hall Effect
Module II: P- N Junction

Forward and Reverse biased junctions- Qualitative description of Current flow at a junction, reverse bias, Reverse bias breakdown- Zener breakdown, avalanche breakdown, Rectifiers Optoelectronic Devices Photodiodes: Current and Voltage in an Illuminated Junction, Solar Cells, Photodetectors. Light Emitting Diode: Light Emitting materials
Module III: Bipolar Junction Transistor

Fundamentals of BJT operation, Amplification with BJTS, BJT Fabrication, The coupled Diode model (Ebers-Moll Model), Switching operation of a transistor, Cutoff, saturation, switching cycle, specifications, Drift in the base region, Base narrowing, Avalanche breakdown

Module IV: Field Effect Transistors

Basic pn JFET Operation, Equivalent Circuit and Frequency Limitations, MOSFETTwo terminal MOS structure- Energy band diagram, Ideal Capacitance – Voltage Characteristics and Frequency Effects, Basic MOSFET Operation- MOSFET structure, Current-Voltage Characteristics
Module V: Fabrication of p-n junctions

Thermal Oxidation, Diffusion, Rapid Thermal Processing, Ion implantation, chemical vapour deposition, photolithography, Etching, metallization.

Module VI: Integrated Circuits

Background, Evolution of ICs, CMOS Process Integration, Integration of Other Circuit Elements.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text Books:

1. Ben. G. Streetman, Sanjay Kumar Banergee, "Solid State Electronic Devices", 7thEdition, Pearson Education, 2016, ISBN 978-93-325-5508-2.
2. Donald A Neamen, Dhrubes Biswas, "Semiconductor Physics and Devices", 4th Edition, MCGraw Hill Education, 2012, ISBN 978-0-07-107010-2.

Reference Book:

1. S. M. Sze, Kwok K. Ng, "Physics of Semiconductor Devices", 3rd Edition, Wiley, 2018.
2. A. Bar-Lev, "Semiconductor and Electronic Devices", 3rd Edition, PHI, 1993.

Course Code: **Credit Units: 04**

Course Name	Course Code	LTP	Credit	Semester
CIRCUITS AND SYSTEMS	**BEC 303**	4	4	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Do the time-domain and S- domain analysis of circuits
CLO 2	2. Obtain transfer functions of circuits and analysis of stability using poles of the transfer function
CLO 3	3. Analyze the frequency response of circuits and to obtain the correlation between time domain and frequency domain response specifications
CLO 4	4. Obtain steady state solutions for nonsinusoidal inputs using fourier series and to analyze the effect of harmonics in circuits
CLO 5	5. Understand the features of two port networks and to obtain their equivalent circuits

Course Objective:

The course intends to make the students proficient in analyzing circuits. At the completion of the course, the student should be able to construct and interpret block diagrams and signal flow graphs of control systems and to use basic methods of determining their stability.

Course Contents:

Module I: Graph Theory and Network equations

Graph of a network, Trees, Co-trees and loops, Cut set matrix, Tie set matrix, number of possible trees of a graph, duality, Loop Analysis and Node Analysis.

Module II: Analysis of circuits using classical Method

Time and Frequency domain analysis of RL, RC and RLC circuits, Linear constant coefficient differential equation.

Module III: Signals and Laplace Transforms

Unit step signal, Ramp signal, impulse signal, Laplace transformations and its properties, Gate function, Inverse Laplace transformations, Application of Laplace Transforms in circuit analysis.

Module IV: Network Theorems

Reciprocity theorem, Superposition theorem, Thevenin's and Norton's theorems, Millman's theorem, Maximum power transfer theorem, Compensation theorem, Tellegan's theorem.

Module V: Two port Network & Network Functions

Introduction, two port z-, y-, T-, h-parameters, Inter-relations among parameters, Condition for reciprocity and symmetry, Interconnections of two port networks, Driving point and transfer functions, Poles, Zeros and necessary condition for driving point and transfer function,.

Module VI: Network Synthesis
Hurwitz polynomial, Positive real functions, synthesis of LC, RC, RL immittance functions.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text:

- M.E. Valkenburg, "Network analysis", PHI.
- D. R. Choudhary, "Networks and Systems", New Age International.
- K.M. Soni, 2009, "Circuits and Systems", VIII Edition, S.K. Kataria & Sons Delhi.

References:

- Bhise, Chadda, Kulshreshtha, "Engineering network analysis and filter design", Umesh Publication.
- F.F. Kuo, "Network Analysis and Synthesis", Wiley India Pvt. Ltd.

Course Name	Course Code	LTP	Credit	Semester
Theory of automation and computation	**BRI 302**	3	3	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	
CLO 2	

CLO 3	
CLO 4	
CLO 5	
CLO 6	

Course Objective:
Formal languages and automata theory deals with the concepts of automata, formal languages, grammar, computability and decidability. The reasons to study Formal Languages and Automata Theory are Automata Theory provides a simple, elegant view of the complex machine that we call a computer. Automata Theory possesses a high degree of permanence and stability, in contrast with the ever-changing paradigms of the technology, development, and management of computer systems. Further, parts of the Automata theory have direct bearing on practice, such as Automata on circuit design, compiler design, and search algorithms; Formal Languages and Grammars on compiler design; and Complexity on cryptography and optimization problems in manufacturing,business, and management. Last, but not least, research oriented students will make good use of theAutomata theory studied in this course**.**

Module I: FINITE AUTOMATA (FA
Introduction, Deterministic Finite Automata (DFA) -Formal definition, simpler notations (state transition diagram, transition table), language of a DFA. Nondeterministic Finite Automata (NFA)- Definition of NFA, language of an NFA, Equivalence of Deterministic and Nondeterministic Finite Automata, Applications of Finite Automata, Finite Automata with Epsilon Transitions, Eliminating Epsilon transitions, Minimization of Deterministic Finite Automata, Finite automata with output (Moore and Mealy machines) and Inter conversion

Module II: REGULAR EXPRESSIONS (RE) And REGULAR GRAMMARS
REGULAR EXPRESSIONS (RE): Introduction, Identities of Regular Expressions, Finite Automata and Regular Expressions- Converting from DFA's to Regular Expressions, Converting Regular Expressions to Automata, applications of Regular Expressions.
REGULAR GRAMMARS**:** Definition, regular grammars and FA, FA for regular grammar, Regular grammar for FA. Proving languages to be non-regular -Pumping lemma, applications, Closure properties of regular languages

Module III: CONTEXT FREE GRAMMER (CFG)
Derivation Trees, Sentential Forms, Rightmost and Leftmost derivations of Strings. Ambiguity in CFG's, Minimization of CFG's, CNF, GNF, Pumping Lemma for CFL's, Enumeration of Properties of CFL (Proof's omitted).

Module IV: PUSHDOWN AUTOMATA:
Definition, Model, Acceptance of CFL, Acceptance by Final State andAcceptance by Empty stack and its Equivalence, Equivalence of CFG and PDA.
TURING MACHINES (TM): Formal definition and behaviour, Languages of a TM, TM as accepters**,** TM as a computer of integer functions, Types of TMs

Module V: RECURSIVE AND RECURSIVELY ENUMERABLE LANGUAGES (REL)
Properties of recursiveand recursively enumerable languages, Universal Turing machine, The Halting problem, Undecidableproblems about TMs. Context sensitive language and linear bounded automata (LBA), Chomsky hierarchy, Decidability, Post's correspondence problem (PCP), undecidability of PCP.

Examination Scheme:

Components	**A**	**CT**	**S/V/Q**	**HA**	**EE**
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References

Text:
John E. Hopcroft, Rajeev Motwani, Jeffrey D. Ullman (2007), Introduction to Automata TheoryLanguages andComputation, 3rdedition, Pearson Education, India.
References:
K. L. P Mishra, N. Chandrashekaran (2003), Theory of Computer Science-AutomataLanguages and Computation, 2nd edition, Prentice Hall of India, India.

Course Code: **Credit Units: 03**

Course Name	Course Code	LTP	Credit	Semester
DIGITAL CIRCUITS AND SYSTEMS – I	**BEC 305**	3	3	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	
CLO 2	
CLO 3	
CLO 4	
CLO 5	
CLO 6	

Course Objective:

This course is an introduction to the basic principles of digital electronics. At the conclusion of this course, the student will be able to quantitatively identify the fundamentals of computers, including number systems, logic gates, logic and arithmetic subsystems, and integrated circuits. They will gain the practical skills necessary to work with digital circuits through problem solving and hands on laboratory experience with logic gates, encoders, flip-flops, counters, shift registers, adders, etc. The student will be able to analyze and design simple logic circuits using tools such as Boolean Algebra and Karnaugh Mapping, and will be able to draw logic diagrams.

Course Contents:

Module I: Boolean Functions:
Analog & digital signals, AND, OR, NOT, NAND, NOR, XOR & XNOR gates, Boolean algebra, DeMorgan's theorems, Implementation of logical function using only NAND/NOR gates, 1`s complement and 2`s complement, BCD to Gray and Gray to BCD code conversion, Standard representation of logical functions (SOP and POS forms), K-map representation and simplification of logical function up to five variables, don't care conditions, XOR & XNOR simplifications of K-maps, Tabulation method.

Module II: Combinational Circuits:
Adders, Subtractors, Implementation of full adder using half adder, full subtractor using half subtractor, Multiplexer, de-multiplexer, decoder & encoder, code converters, 1 & 2 bit comparators, BCD to seven segment decoder/encoder, Implementation of logic functions using multiplexer/de-multiplexer and decoder, Implementation of 16×1 MUX using 4×1 MUX, 4×16 decoder using 3×8 decoder etc., logic implementations using PROM, PLA & PAL.

Module III: Sequential Circuits:
Difference between combinational and sequential circuits, Latch, Flip-flops: SR, JK, D & T flip flops – Truth table, Excitation table, Conversion of flip-flops, set up and hold time, race around condition, Master Slave flip flop, Shift registers: SIPO, PISO, PIPO, SIPO, Bi-directional, 4-bit universal shift register; Counters: Asynchronous/ripple & synchronous counters – up/down, Ring counter, sequence detector.

Module IV: Logic families & data converters:
Logic families: Special characteristics (Fan out, Power dissipation, propagation delay, noise margin), working of RTL, DTL, TTL, ECL and CMOS families; Data converters: Special characteristics, ADC – successive approximation, linear ramp, dual slope; DAC – Binary Weighted, R-2R ladder type.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text

- Moris Mano : Digital Design, Pearson Education.
- R. P. Jain: Digital Electronics, Tata McGraw Hill.

Reference

- Thomas L. Floyd: Digital Fundamentals, Pearson Education.
- Malvino and Leech: Digital Principles & Applications, Tata McGraw Hill.

Course Name	Course Code	LTP	Credit	Semester
ELECTRICAL & ELECRONIC MATERIALS	**BRI 303**	3	3	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	**Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.
CLO 2	**Problem Analysis:** Identity, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics,natural sciences, and engineering sciences.
CLO 3	**Design / development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

Course Objectives: The course aims at to introduce the behaviour of materials in external electric and magnetic field to the students.

Module I: Introduction:
Interaction of free electrons with lattice, Brillouin zones, Nearly free electron model, Tight binding and other electronic structure models.

Module II:Conducting Materials:
Electrical resistivity of metals and alloys, Mattheissen rule, Nordheims Rule, Kondo effect, Ionic and superionic conductors, Properties and their applications.

Module III:Dielectric and Insulating Materials:
Polarization, ClausiusMosotti equation, Dielectric permittivity and loss, Dielectric break down in materials, High

K dielectric materials, Non-linear dielectrics, Ferroelectricity, Piezoelectricity, Pyroelectricity, Actuators and Smart materials.

Module IV : **Magnetic Materials:**
Classification, Ferromagnetism and Exchange interactions, Ferromagnetic domains, Magnetic anisotropy, Magnetic behaviour of polycrystalline materials, Hard and soft magnetic metallic and Intermetallic materials and their characteristics, Their properties and applications, Magnetism and superconductivity, Magnetostriction.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References

Text:

1. Kittel, C, Introduction to Solid State Physics, John Wiley & Sons, Inc., (1996).
2. Ashcroft, N.W., and Mermin, N.D., Solid State Physics, Thomson, (2007).

References:

1. L. Solymar and Walsh, Lectures on Electrical Properties of Materials, Oxford University Press, (2004)
2. Hummel, R.E., Electronic Properties of Materials, Springer Verlag, (2004).

Course Name	Course Code	LTP	Credit	Semester
ELECTRONIC MEASUREMENTS	**BRI 304**	3	3	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	To introduce students to monitor, analyze and control any physical system.
CLO 2	To understand students how different types of meters work and their construction.

CLO 3	To provide a student a knowledge to design and create novel products and solutions for real life problems.

Course Objective:

This course deals with the systematic study of the electrical and electronics measurements, their basic features and types. This also describe the basic fundamental for characterizing all possible types of electrical and electronics measurements.

Module I : Basics of Measurement Systems:
General concepts and terminology of measurement systems, Basic characteristics of measuring devices, standards and calibration, Accuracy, Precision, Sensitivity, Resolution, Linearity & Errors in measurement.

Module II : PMMC Instruments:
PMMC meters- construction, torque equation, ammeter shunts, multirange ammeter, voltmeter multiplier, sensitivity, ohmmeters, multimeters; Construction & general equation of moving iron, electrodynamometer, hot wire instruments,

Module III: Measurement of Resistance, Inductance and Capacitance:
D.C. Bridges: Wheatstone's bridge, Sensitivity & Limitations; Carey Foster Bridge; Kelvin double bridge; Megaohm Bridge. A.C. Bridges: Maxwell's inductance Capacitance Bridge; Andersons Bridge; De Sauty's Bridge; Schering Bridge.

Module IV: Component Measuring Instruments:
Q meter, Vector Impedance meter, RF Power & Voltage Measurements, Introduction to shielding & grounding & Noise problem.

Module V: Cathode Ray Oscillioscope:
CRT Construction, Basic CRO circuits, CRO Probes, Basic functioning, Techniques of Measurement of Voltage, Current, Phase Angle and Frequency, , Multibeam, multi trace, storage & sampling Oscilloscopes.

EXAMINATION SCHEME:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & Reference books:

Text:

- A Course In Electrical & Electronic Measurement & Instrumentation, A.K.Sawhney, Dhanpat Rai

Reference

- Introduction To Measurements And Instrumentation, Arun K. Ghosh, PHI
- Electronic Measurements & Instrumentation, Bernard Oliver, John Cage, TMH
- Elements Of Electronic Instrumentation And Measurement, Carr, Pearson
- Electronic Instrumentation, H S Kalsi, TMH

Electronic DEVICE AND CIRCUIR LAB

Course Code: BEC 321 Credit Units: 01

List of Experiments:

1. To study and plot the characteristics of a junction diode.
2. To study Zener diode I-V characteristics.
3. To study diode based clipping and clamping circuits.
4. To study half wave, full wave and bridge rectifier with filters.
5. To study the input and output characteristics of a transistor in its various configurations (CE and CB).
6. To study and plot the characteristics of a JFET in its various configurations.
7. To study and plot the characteristics of a MOSFET in its various configurations.
8. To study various types of Bias Stabilization for a transistor.
9. To study the gain and plot the frequency response of a single stage transistor amplifier.
10. To measure gain and plot the frequency response of double stage CE coupled amplifier.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

CIRCUITS AND SYSTEMS LAB

Course Code: BEC 323 **Credit Units: 01**

List of Experiments:

1. To verify Thevenin's theorem in a given network.
2. To verify reciprocity theorem in a given network.
3. To verify maximum power transfer theorem in a given network.
4. To verify Tellegen's theorem in a given network.
5. To determine the Z- and Y- parameters of a resistive two-port network.
6. To determine the T- (ABCD) parameters of a resistive two-port network.
7. To determine the h- parameters of a resistive two-port network.
8. To design series-series connection of 2 two-port networks and determine its Z- parameters.
9. To design parallel-parallel connection of 2 two-port networks and determine its Y- parameters.
10. To design a cascade connection of 2 two-port networks and determine its T- (ABCD) parameters.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

DIGITAL CIRCUITS AND SYSTEMS LAB – I

Course Code: BRI 325 **Credit Units: 01**

List of Experiments:

1. To verify the truth tables of NOT, OR, AND, NOR, NAND, XOR, XNOR gates.
2. To obtain half adder, full adder using gates and verify their truth tables.
3. To obtain half subtractor, full subtractor using gates and verify their truth tables.
4. To implement control circuit using multiplexer.
5. To convert BCD code into excess 3 code and verify the truth table.
6. To verify the truth tables of RS, D, JK and T flip- flops.
7. To implement and verify 3-bit bi-directional shift register.
8. To design and study asynchronous/ripple counter.
9. To design and study synchronous counter.
10. To design and study a sequence detector.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

COMMUNICATION SKILLS - I

Course Code: BCS 301 **Credit Units: 01**

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Inculcating creative thinking skills
CLO 2	Construct and showcase their communication skills in a creative manner.
CLO 3	Comprehending and demonstrating ways of self-introduction
CLO 4	Outlining and illustrating presentation Skills

Course Objective:

To form written communication strategies necessary in the workplace

Course Contents:

Module I: Introduction to Writing Skills
Effective Writing Skills
Avoiding Common Errors
Paragraph Writing
Note Taking
Writing Assignments

Module II: Letter Writing
Types
Formats

Module III
Memo
Agenda and Minutes
Notice and Circulars

Module IV: Report Writing
Purpose and Scope of a Report
Fundamental Principles of Report Writing
Project Report Writing
Summer Internship Reports

Examination Scheme:

Components	**CT1**	**CT2**	**CAF**	**V**	**GD**	**GP**	**A**
Weightage (%)	20	20	25	10	10	10	5

CAF – Communication Assessment File
GD – Group Discussion
GP – Group Presentation

Text & References:

Text

- Business Communication, Raman – Prakash, Oxford
- Creative English for Communication, Krishnaswamy N, Macmillan
- Textbook of Business Communication, Ramaswami S, Macmillan
- Working in English, Jones, Cambridge

Reference

- A Writer's Workbook Fourth edition, Smoke, Cambridge
- Effective Writing, Withrow, Cambridge
- Writing Skills, Coe/Rycroft/Ernest, Cambridge

- Welcome!, Jones, Cambridge

Course Name	Course Code	LTP	Credit	Semester
BEHAVIOURAL SCIENCE - III (INTERPERSONAL COMMUNICATION)	**BSS 304**	1	1	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	1. Demonstrate knowledge of strategies for developing a healthy interpersonal communication .
CLO 2	Recognize the importance of transactional analysis, script analysis .
CLO 3	Identify the difference between healthy and unhealthy expression of emotions and develop emotional competence necessary for conflict resolution and impression management.
CLO 4	Enhance personal effectiveness and performance through effective interpersonal communication

Course Objective:

This course provides practical guidance on

- Enhancing personal effectiveness and performance through effective interpersonal communication
- Enhancing their conflict management and negotiation skills

Course Contents:

Module I: Interpersonal Communication: An Introduction
Importance of Interpersonal Communication
Types – Self and Other Oriented
Rapport Building – NLP, Communication Mode
Steps to improve Interpersonal Communication

Module II: Behavioural Communication
Meaning and Nature of behavioiural communication
Persuasion, Influence, Listening and Questioning
Guidelines for developing Human Communication skills
Relevance of Behavioural Communication for personal and professional development

Module III: Interpersonal Styles
Transactional Analysis
Life Position/Script Analysis
Games Analysis
Interactional and Transactional Styles

Module IV: Conflict Management
Meaning and nature of conflicts
Styles and techniques of conflict management
Conflict management and interpersonal communication

Module V: Negotiation Skills
Meaning and Negotiation approaches (Traditional and Contemporary)
Process and strategies of negotiations
Negotiation and interpersonal communication

Module VI: End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

Text

- Vangelist L. Anita, Mark N. Knapp, Inter Personal Communication and Human Relationships: Third Edition, Allyn and Bacon
- Julia T. Wood. Interpersonal Communication everyday encounter
- Simons, Christine, Naylor, Belinda: Effective Communication for Managers, 1997 1st Edition Cassel
- Goddard, Ken: Informative Writing, 1995 1st Edition, Cassell

Reference

- Harvard Business School, Effective Communication: United States of America
- Foster John, Effective Writing Skills: Volume-7, First Edition 2000, Institute of Public Relations (IPR)
- Beebe, Beebe and Redmond; Interpersonal Communication, 1996; Allyn and Bacon Publishers.

Course Name	Course Code	LTP	Credit	Semester
FRENCH	**FLT 301**	2	2	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of advance level.
CLO 3	Students will be able to communicate with complex sentences.

Course Objective:

To provide the students with the know-how

- To master the current social communication skills in oral and in written.
- To enrich the formulations, the linguistic tools and vary the sentence construction without repetition.

Course Contents:

Module B: pp. 76 – 88 Unité 6

Module C: pp. 89 to103 Unité 7

Contenu lexical: **Unité 6: se faire plaisir**

1. acheter : exprimer ses choix, décrire un objet (forme, dimension, poids et matières) payer
2. parler de la nourriture, deux façons d'exprimer la quantité, commander un repas au restaurant
3. parler des différentes occasions de faire la fête

Unité 7: Cultiver ses relations

1. maîtriser les actes de la communication sociale courante (Salutations, présentations, invitations, remerciements)
2. annoncer un événement, exprimer un souhait, remercier, s'excuser par écrit.
3. caractériser une personne (aspect physique et caractère)

Contenu grammatical:

1. accord des adjectifs qualificatifs
2. articles partitifs
3. Négations avec de, ne…rien/personne/plus
4. Questions avec combien, quel…
5. expressions de la quantité
6. ne…plus/toujours - encore
7. pronoms compléments directs et indirects
8. accord du participe passé (auxiliaire « avoir ») avec l'objet direct
9. Impératif avec un pronom complément direct ou indirect
10. construction avec « que » - Je crois que/ Je pense que/ Je sais que

Examination Scheme:

Components	**CT1**	**CT2**	**C**	**I**	**V**	**A**
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- le livre à suivre : Campus: Tome 1

Course Name	Course Code	LTP	Credit	Semester
GERMAN	**FLG 301**	2	2	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of advance level.
CLO 3	Students will be able to communicate with complex sentences.

Course Objective:

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.
To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany

Course Contents:

Module I: Modal verbs
Modal verbs with conjugations and usage
Imparting the finer nuances of the language

Module II: Information about Germany (ongoing)
Information about Germany in the form of presentations or "Referat"– neighbors, states and capitals, important cities and towns and characteristic features of the same, and also a few other topics related to Germany.

Module III: Dative case
Dative case, comparison with accusative case
Dative case with the relevant articles
Introduction to 3 different kinds of sentences – nominative, accusative and dative

Module IV: Dative personal pronouns
Nominative, accusative and dative pronouns in comparison

Module V: Dative prepositions
Dative preposition with their usage both theoretical and figurative use

Module VI: Dialogues
In the Restaurant,
At the Tourist Information Office,
A telephone conversation

Module VII: Directions
Names of the directions
Asking and telling the directions with the help of a roadmap

Module VIII: Conjunctions
To assimilate the knowledge of the conjunctions learnt indirectly so far

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

Text

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3

Reference

- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

Course Name	Course Code	LTP	Credit	Semester
SPANISH	**FLG S01**	2	2	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of advance level.
CLO 3	Students will be able to communicate with complex sentences.

Course Objective:

To enable students acquire knowledge of the Set/definite expressions (idiomatic expressions) in Spanish language and to handle some Spanish situations with ease.

Course Contents:

Module I
Revision of earlier semester modules
Set expressions (idiomatic expressions) with the verb *Tener*, *Poner, Ir….*
Weather

Module II
Introduction to *Gustar*…and all its forms. Revision of *Gustar* and usage of it

Module III
Translation of Spanish-English; English-Spanish. Practice sentences.
How to ask for directions (using estar)
Introduction to IR + A + INFINITIVE FORM OF A VERB

Module IV
Simple conversation with help of texts and vocabulary
En el restaurante
En el instituto
En el aeropuerto

Module V
Reflexives

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

Text

- Español, En Directo I A

Reference

- Español Sin Fronteras -Nivel Elemental

Course Name	Course Code	LTP	Credit	Semester
CHINESE	**FLC 301**	2	2	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of advance level.
CLO 3	Students will be able to communicate with complex sentences.

Course Objective:

Foreign words are usually imported by translating the concept into Chinese, the emphasis is on the meaning rather than the sound. But the system runs into a problem because the underlying name of personal name is often obscure so they are almost always transcribed according to their pronciation alone. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I
Drills
Dialogue practice
Observe picture and answer the question.
Introduction of written characters.
Practice reading aloud
Practice using the language both by speaking and by taking notes.
Character writing and stroke order

Module II
Measure words
Position words e.g. inside, outside, middle, in front, behind, top, bottom, side, left, right, straight.
Directional words – beibian, xibian, nanbian, dongbian, zhongjian.
Our school and its different building locations.
What game do you like?
Difference between “hii” and “neng”, “keyi”.

Module III
Changing affirmative sentences to negative ones and vice versa
Human body parts.
Not feeling well words e.g.; fever, cold, stomach ache, head ache.
Use of the modal particle “le”
Making a telephone call
Use of “jiu” and “cal” (Grammar portion)
Automobiles e.g. Bus, train, boat, car, bike etc.
Traveling, by train, by airplane, by bus, on the bike, by boat.. etc.

Module IV
The ordinal number “di”
“Mei” the demonstrative pronoun e.g. mei tian, mei nian etc.
use of to enter to exit
Structural particle “de” (Compliment of degree).
Going to the Park.
Description about class schedule during a week in school.
Grammar use of “li” and “cong”.
Comprehension reading followed by questions.

Module V

Persuasion-Please don't smoke.
Please speak slowly
Praise – This pictorial is very beautiful
Opposites e.g. Clean-Dirty, Little-More, Old-New, Young-Old, Easy-Difficult, Boy-Girl, Black-White, Big-Small, Slow-Fast … etc.
Talking about studies and classmates
Use of "it doesn't matter"
Enquiring about a student, description about study method.
Grammar: Negation of a sentence with a verbal predicate.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- "Elementary Chinese Reader Part I, Part-2" Lesson 21-30
-

Course Name	Course Code	LTP	Credit	Semester
Anandam	**AND003**	**2**	2	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Awareness and empathy regarding community issues
CLO 2	Interaction with the community and impact on society
CLO 3	Interaction with mentor and development of Student teacher relationship
CLO 4	Interaction among students, enlarge social network
CLO 5	Cooperative and Communication skills and leadership qualities
CLO 6	Critical thinking, Confidence and Efficiency

Course Objectives:

After the completion of this course, students will be able to:

1. apply their knowledge and skills to solve specific community problem
2. learn to plan, lead, and organize community events have a sense of belonging to their college campus and community and find something they are interested in doing during their free time
3. make new friends, expand social network, and boost social skills and mental health.
4. be useful to society as it will protect them against stress, frustration, and depression

Course Contents:

The project report should be guided by the mentor and shall contain:

1. **Synopsis**: clearly stating objectives and activities to be undertaken. Problem identifying and problem-solving projects to be taken up.
2. Details of the **Mentor and the Participants are to** be given (name of mentor, name of participants, phone number/mobile no, email, and address)
3. Location / community where the work was carried out
4. Details of Activities performed are to be given with date
5. Number of beneficiaries and impact on the society (the object should be to empower the community and make them self-reliant)
6. Photographs taken for documentation of work should be submitted
7. Media coverage of the projects should be attached if any
8. The Group Community Service Project Report will be submitted by the Student group leader under the guidance of the mentor to the Director/HoIs of the Department.
9. The Director/HoIs should get the best report (more than one if required) of the Group Community Service Project uploaded on the HTE website and on the University page
10. The Director/HoIs will forward the best report of the department to the Nodal Officer of the University.
11. University will forward the report to the state level committee.

1. Each member of the group shall write one blog about the decided topic of 500 words (minimum) along with any relevant photos/diagrams/statistical data (with reference).
2. The group member shall write his/her name at the end of the blog.
3. The blog shall be posted on Instagram and Facebook (apart from these any other website wherever the group seems necessary).
4. Print out of the blog where date of when the content is posted, number of followers, comments, name of the writer shall be visible will be taken and file will be maintained for the same.
5. In the cover page of the project mention heading **"Group Community Service Project"**, and the filled format of final project report given by Anandam Scheme.
6. For the topic chosen by the group, students are recommended to cover the following points:

1. Current scenario (Regional, national and international level as applicable)
2. Future predictions
3. Duty of the government
4. Government policies (related to the topic), if any
5. Duty of public
6. Conclusion

Evaluation Scheme:

Project Participation: 2 hours X 8 days (per month) X 4 months = 64 hours

1. C grade =32 hrs (Below 20 marks)
2. B grade >32 hrs to <=44hrs (20-30 marks)
3. A grade >44 hrs to<=54hrs (30-40 marks)
4. O grade >54 hrs to<=64hrs (40-50 marks)

Evaluation Criteria:

Respective Departmental Anandam mentors are requested to evaluate the project (out of 50) as per the following criteria:

1. Position and exceptions, if any, are clearly stated. The organization of the blog is completely and clearly outlined and implemented.
2. The body of the blog is coherently organized, original and the logic is easy to follow. There is no spelling or grammatical errors and terminology is clearly defined. Writing is clear, concise, and persuasive.
3. Conclusion is clearly stated. The underlying logic is explicit.

Course Code BRI 401 **Course Credit 03**

Course Name	Course Code	LTP	Credit	Semester
COMPUTER AIDED DESIGN AND ANALYSIS	**BRI 401**	3	3	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	identify an optimization problem
CLO 2	apply a nonlinear optimization procedure

CLO 3	compare different optimization algorithms
CLO 4	define floating point precision standard
CLO 5	describe the problem of solving differential equations systems
CLO 6	

Module I: INTRODUCTION TO COMPUTER AIDED DESIGN

The design process-Application of computers in design-typical CAD System-CAE-Benefits of CAD-Concept of CAD as drafting and designing facility-drawing features in CAD-Translation, rotation, scaling-Layering-CAD Hardware-Design workstation-Graphic Terminal-Operator input devices-Output devices-CPU

Module II: INTERACTIVE COMPUTER GRAPHICS

Creation of Graphic primitives-Output primitives(Points,Lines,Curves)- Windowing, view ports-Clipping transformation- Data exchange standards-Geometric modelling- Wireframe, Surface, Solid Modelling –Data Structures-Engineering Data Management System-Hierarchical,Network,Relational data structure

Module III: VISUAL REALISM

Fundamentals -rendering techniques-lines and shaded images, dynamics, stereopsis, Improved display, aliasing and ant-aliasing.

Module IV: ASSEMBLY OF PARTS

Assembly of parts, tolerance analysis, mass property calculations, mechanisms simulation.

Module V: SOLID MODELING

Solid modeling- Rapid Prototyping -CSG and B-REP Techniques-Features of Solid Modeling Packages- Case Studies

Examination Scheme:

Components	**A**	**CT**	**S/V/Q**	**HA**	**EE**
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance.

REFERENCES :

1. William .M. Neumann and Robert .F. Sproul (1989) “Principle of Computer Graphics” , McGraw Hill Book Co. Singapore.
2. Donald Hearn and .M. Pauline Baker (1992) “Computer Graphics”, Prentice Hall, Inc.
3. Mikell .P. Grooves and Emory .W. Zimmers Jr. (1995) “CAD/CAM Computer -- Aided Design and Manufacturing”, Prentice Hall, Inc.
4. Ibrahim Zeid (1998) “CAD/CAM -- Theory and Practice”, McGraw Hill, International Edition

Course Name	Course Code	LTP	Credit	Semester

MICROPROCESSOR AND MICROCONTROLLER SYSTEM	**BRI 402**	3	3	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Obtain basic development skills for microprocessor / microcontroller applications.
CLO 2	They can Gain a detailed understanding of any system for a specific application.
CLO 3	3Student are able to design a any hardware based on application.
CLO 4	4To familiarize the Architecture of 8085 and 8086microprocessor.
CLO 5	To classify the types and characteristics of buses in microprocessor.

Module I : 8086 architecture:

8086 architecture- functional diagram, Register organization, memory segmentation, programming model, Memory addresses, physical memory organization, Signal descriptions of 8086-common function signals, timing diagrams, Interrupts of 8086.

Module -II Instruction set and assembly language programming of 8086:

Instruction formats. Addressing modes, instruction set, assembler directives. Macros, Simple programs involving logical, branch and call instructions.Sorting, evaluating arithmetic expressions, string manipulations.

Module -III I/O Interface:

8255 PPI, various modes of operation and interfacing to 8086, interfacing of key board, display. Stepper motor interfacing, D/A &A/D converter. Interfacing With advanced devices: Memory interfacing to 8086,Interrupts of 8086, Vector interrupt table, Interrupt service routine, Serial communication standards, serial data transfer schemes, 8251 USART architecture and Interfacing.

Module -IV Introduction to microcontrollers:

overview of 8051 microcontroller, Architecture, I/O ports, Memory organization, addressing modes and instruction set of 8051, Simple programs.

Module -V 8051 Real Time Control:

Programming Timer interrupts, programming external hardware interrupts, Programming the serial communication interrupts, Programming 8051 timers and counters.

Examination Scheme:

Components	**A**	**CT**	**S/V/Q**	**HA**	**EE**
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

TEXT BOOKS:

1.D.V.Hall, Microprocessors and Interfacing. TMGH, 2nd edition 2006.

2.Kenneth.J.Ayala. The 8051 microcontroller, 3rd edition, Cengage learning,2010

3.Advanced microprocessors and peripherals-A.K ray and K.M.Bhurchandani, TMH, 2nd edition 2006.

REFERENCE BOOKS:

1. The 8051 microcontrollers, architecture and programming and applications-K.Uma Rao, AndhePallavi., Pearson, 2009.

2. Micro computer system 8086/8088 family architecture, programming and design- By Liu and GA Gibson, PHI, 2nd Ed.,

3. Microcontrollers and application, Ajay.V.Deshmukh,TMGH,2005

4. The 8085 microprocessor: Architecture, programming and interfacing- K.Uday Kumar, B.S.Umashankar,2008,Pearson

5. Microprocessors and microcontrollers- S.V.Altaf

Course Name	Course Code	LTP	Credit	Semester
SENSOR AND TRANSDUCER	BRI 403	3	3	3

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	students will be able to understand the operation principles of different sensors for industrial and environmental use.
CLO 2	They will be able to characterize them in terms of metrological criteria and evaluate their performance.
CLO 3	students will be provided the knowledge they need to choose the appropriate sensor for measurement, process control and environmental monitoring applications and apply it in a correct way.
CLO 4	Students able to implement simple data acquisition systems and to analyze and evaluate the acquired data

Module-1: Mechanical and Electromechanical sensor:
Definition, principle of sensing & transduction, classification. Resistive (potentiometric type): Forms, material, resolution, accuracy, sensitivity. Strain gauge: Theory, type, materials, design consideration, sensitivity, gauge factor, variation with temperature, adhesive, rosettes. Inductive sensor: common types Reluctance change type, Mutual inductance change type, transformer action type, Magnetostrictive type, brief discussion with respect to material, construction and input output variable, Ferromagnetic plunger type, short analysis. LVDT: Construction, material, output input relationship, I/O curve, discussion. Proximity sensor

Module-2 Capacitive sensors:
Variable distance-parallel plate type, variable area- parallel plate, serrated plate/teeth type and cylindrical type, variable dielectric constant type, calculation of sensitivity. Stretched diaphragm type: microphone, response characteristics. Piezoelectric element: piezoelectric effect, charge and voltage co-efficient, crystal model, materials, natural & synthetic type, their comparison, force & stress sensing, ultrasonic sensors.

Module-3 Thermal sensors:
Material expansion type: solid, liquid, gas & vapor Resistance change type: RTD materials, tip sensitive & stem sensitive type, Thermister material, shape, ranges and accuracy specification. Thermo emf sensor: types, thermoelectric power, general consideration, Junction semiconductor type IC and PTAT type. Radiation sensors: types, characteristics and comparison. Pyroelectric type.

Module-4 Magnetic sensors:
Sensor based on Villari effect for assessment of force, torque, proximity, Wiedemann effect for yoke coil sensors, Thomson effect, Hall effect, and Hall drive, performance characteristics. Radiation sensors: LDR, Photovoltaic cells, photodiodes, photo emissive cell types, materials, construction, response. Geiger counters, Scintillation detectors, Introduction to smart sensors.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Recommended Books:
1. Sensor & transducers, D. Patranabis, 2nd edition, PHI
2. Instrument transducers, H.K.P. Neubert, Oxford University press.
3. Measurement systems: application & design, E.A.Doebelin, Mc Graw Hill

Course Name	Course Code	LTP	Credit	Semester
LINEAR INTEGRATED CIRCUIT	BRI404	3	3	3

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	o learn the fundamentals of the op-amp and describe mathematical operation and modern techniques used in it
CLO 2	Students will be able to analyse application of op-amp like log and antilog amplifier, precision rectifier , comparator etc.
CLO 3	Discuss different types of oscillator circuit with applications.
CLO 4	Students will be able to understand the knowledge of active filter with their response.
CLO 5	Students will be able to analyse the Illustrate linear integrated circuit applications like timer 555, fixed and variable regulated ic of electronics and recent trends in it.
CLO 6	o learn the fundamentals of the op-amp and describe mathematical operation and modern techniques used in it

Module- I BASICS OF OPERATIONAL AMPLIFIERS

Current mirror and current sources, Current sources as active loads, Voltage sources, Voltage References, BJT Differential amplifier with active loads, Basic information about op-amps – Ideal Operational Amplifier - General operational amplifier stages -and internal circuit diagrams of IC 741, DC and AC performance characteristics, slew rate, Open and closed loop configurations – JFET Operational Amplifiers – LF155 and TL082.

Module II APPLICATIONS OF OPERATIONAL AMPLIFIERS

Sign Changer, Scale Changer, Phase Shift Circuits, Voltage Follower, V-to-I and I-to-V converters, adder, subtractor, Instrumentation amplifier, Integrator, Differentiator, Logarithmic amplifier, Antilogarithmic amplifier, Comparators, Schmitt trigger, Precision rectifier, peak detector, clipper and clamper, Low-pass, high-pass and band-pass Butterworth filters.

Module III ANALOG MULTIPLIER AND PLL

Analog Multiplier using Emitter Coupled Transistor Pair - Gilbert Multiplier cell – Variable transconductance technique, analog multiplier ICs and their applications, Operation of the basic PLL, Closed loop analysis, Voltage controlled oscillator, Monolithic PLL IC 565, application of PLL for AM detection, FM detection, FSK modulation and demodulation and Frequency synthesizing and clock synchronisation.

Module IV ANALOG TO DIGITAL AND DIGITAL TO ANALOG CONVERTERS

Analog and Digital Data Conversions, D/A converter – specifications - weighted resistor type, R-2R Ladder type, Voltage Mode and Current-Mode R - 2R Ladder types - switches for D/A converters, high speed sample-and-hold circuits, A/D Converters – specifications - Flash type - Successive Approximation type - Single Slope type – Dual Slope type - A/D Converter using Voltage-to-Time Conversion - Over-sampling A/D Converters, Sigma – Delta converters.

Module V WAVEFORM GENERATORS AND SPECIAL FUNCTION ICS

Sine-wave generators, Multivibrators and Triangular wave generator, Saw-tooth wave generator, ICL8038 function generator, Timer IC 555, IC Voltage regulators – Three terminal fixed and adjustable voltage regulators - IC 723 general purpose regulator - Monolithic switching regulator, Low Drop – Out(LDO) Regulators - Switched capacitor filter IC MF10, Frequency to Voltage and Voltage to Frequency converters, Audio Power amplifier, Video Amplifier, Isolation Amplifier, Optocouplers and fibre optic IC.

TEXT BOOKS:

1. D.Roy Choudhry, Shail Jain, ―Linear Integrated Circuits‖, New Age International Pvt. Ltd., 2018, Fifth Edition.
2. Sergio Franco, ―Design with Operational Amplifiers and Analog Integrated Circuits‖, 4th Edition, Tata Mc Graw-Hill, 2016

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance.

REFERENCES:

1. Ramakant A. Gayakwad, ―OP-AMP and Linear ICs‖, 4th Edition, Prentice Hall / Pearson Education, 2015.
2. Robert F.Coughlin, Frederick F.Driscoll, ―Operational Amplifiers and Linear Integrated Circuits‖, Sixth Edition, PHI, 2001.
3. B.S.Sonde, ―System design using Integrated Circuits‖ , 2nd Edition, New Age Pub, 2001.
4. Gray and Meyer, ―Analysis and Design of Analog Integrated Circuits‖, Wiley International,5th Edition, 2009.
5. William D.Stanley, ―Operational Amplifiers with Linear Integrated Circuits‖, Pearson Education,4th Edition,2001.
6. S.Salivahanan & V.S. Kanchana Bhaskaran, ―Linear Integrated Circuits‖, TMH,2nd Edition, 4 th Reprint, 2016.

Course Name	Course Code	LTP	Credit	Semester
SIGNALS AND SYSTEM	BRI 405	3	3	3

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Learn & understand about the of signal & systems
CLO 2	2. Understand the different types of transformation on signal and their need.
CLO 3	3. Learn to fundamental functioning of time to frequency domain analysis and implementation.
CLO 4	4. Understand the various industrial applications in of signal and systems.

Course Contents:

Module I: Signals and Systems
Introduction of signals and systems; classification of signal, continuous time and discrete time signals, operations performed on them, even and odd signals, periodic and non periodic signals, deterministic and random signals, energy signals, power signals, elementary signals: impulse, step, ramp and exponentials, classification of systems.

Module II: LTI system
Response of LTI system for continuous and discrete time systems, Impulse response, Step response, properties of continuous LTI and discrete LTI systems, LTI systems described by differential and difference equation, analysis of LTI Systems, interconnection of systems.

Module III: Fourier series
Representation of continuous time periodic signal, properties of continuous time Fourier series, representation of discrete time periodic signals, convergence of the Fourier series, properties of discrete time Fourier series, Fourier series and LTI systems.

Module IV: Fourier Transform
Continuous time Fourier transform, properties of continuous time Fourier transform, discrete time Fourier transform, properties of discrete time Fourier transform; applications; Bandwidth determination of signals and systems.

Module V: z-Transform
Definition of z-transform, region of convergence, properties of z-transform, first order system, second order system, inverse z-transform, analysis of LTI system using z-transform

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

TEXT BOOK:
1. Allan V.Oppenheim, S.Wilsky and S.H.Nawab, ―Signals and Systems‖, Pearson, 2015.
REFERENCES
1. B. P. Lathi, ―Principles of Linear Systems and Signals‖, Second Edition, Oxford, 2009.
2. R.E.Zeimer, W.H.Tranter and R.D.Fannin, ―Signals & Systems - Continuous and Discrete‖, Pearson, 2007.
3. John Alan Stuller, ―An Introduction to Signals and Systems‖, Thomson, 2007.

Course code BRI 406 **Credit Units 04**

Course Name	Course Code	LTP	Credit	Semester
VIRTUAL INSTRUMENTS	**BRI 406**	4	4	4

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	demonstrate the working of LabVIEW.
CLO 2	explain the various types of structures used in LabVIEW.
CLO 3	analyze and design different type of programs based on data acquisition.
CLO 4	demonstrate the use of LabVIEW for signal processing, image processing etc

Module- I INTRODUCTION

Virtual Instrumentation - Definition and Flexibility - Block diagram and Architecture for Virtual Instruments versus Traditional Instruments Instrumentation -VI Programming techniques - VI, sub VI, Loop and Charts, Arrays, Clusters and Graphs, Case and Sequence Structures, Formula nodes, String and File Input / Output

Module - II DATA ACQUISTITION IN VI

A/D and D/A converters, Plug-in Analog Input / Output cards – Digital Input and Output Cards, Organization of the DAQ VI system – Opto-isolation – Performing analog input and analog output – Scanning multiple analog channels – Issues involved in selection of Data acquisition cards – Data acquisition modules with serial communication – Design of digital voltmeter with transducer input –Timers and Counters.

Module –III COMMUNICATION NETWORKED MODULES

Introduction to PC Buses – Local busses:- ISA, PCI, RS232, RS422 and RS485 – Interface Buses:- USB, PCMCIA, VXI, SCXI and PXI –Instrumentation Buses :- Modbus and GPIB – Networked busses – ISO/OSI Reference model, Ethernet and TCP/ IP Protocols.

Module - IV REAL TIME CONTROL IN VI

Designs using VI Software - ON/OFF controller – Proportional controller – Modeling and basic control of level and reactor processes – Case studies on development of HMI, SCADA in VI

Module - V OPERATING SYSTEM AND HARDWARE OVERVIEW

PC architecture, current trends, operating system requirements, PC based instrumentation, analog and digital interfaces, PXI and SCXI main frame - modular instruments – Transducers – power, speed and timing considerations.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance.

Text Books: 1. LabVIEW Graphical Programming, Gary W. Johnson, Richard Jennings 3rd edition , McGraw-Hill Professional Publishing

2. Lisa K Wells, Lab view for Everyone‖, Prentice Hall of India.

References:

1. Barry Paton, ―Sensor, transducers and Lab view‖, Prentice Hall of India 2000
2. Buchanan, W. ―Computer buses‖, CRC Press 2000
3. https://www.ni.com/

COMPUTER AIDED DESIGN AND ANALYSIS LAB

Course code BRI 421 Credit Units 01

List of experiment

1. Introduction to CAD and Graphics Hardware
2 Study and Application of Computer Graphics in CAD
3 Algorithms Used for Generating 2D Output Primitives
4 Geometric Transformations
5 Design of Machine Elements
6 Geometric Modeling (Part Modeling)
7 Geometric Modeling (Assembly Modeling)
8 Mathematical Elements of Curves
9 Reverse Engineering
10 Case-Study on Applications of CAD

Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

Text and Reference:

Text:

Design of Machine Elements by Sharma Purohit
Computer Aided Design by Dr. S S Khandare
PSG Design Data Book

Reference:
1. Reverse Engg. Set-up (MODROB-AICTE)
2. http://www.rolanddga.com/asd/products/scanners/LPX60/
3. http://www.npd-solutions.com/reoverview.html
4. Reversing: Secrets of Reverse Engineering by Eldad Eilamv. Publisher: Wiley
5. Rapidform XOR/Redesign tutorials.
6. http://nptel.iitm.ac.in/courses/Webcourse-contents/IIT-Delhi/ComputerAidedDesign ManufacturingII

MICROPROCESSOR AND MICROCONTROLLER SYSTEM LAB

Course Code BRI 422 **Credit Units 01**

List of experiments

1. Programming for Data Transfer Operations
2. Programming for Arithmetical Operations
3. Programming for Logical Operations
4. Programming for String Operations
5. Programming for Sorting (Ascending & Descending Order)
6. Code Conversion programs
7. String Comparison program
8. Read a Character and Display the string using MASM
9. Reverse the String using MASM
10. Key board Interfacing
11. Display Interfacing
12. Stepper motor Interfacing
13. DAC Interfacing (Sine, Square, Saw tooth, Triangular)
14. ADC Interfacing
15. 8259 Interrupt Controller interfacing
16. Arithmetical Operations using 8051 microcontroller
17. Logical Operations using 8051 microcontroller
18. Bit manipulation Operations using 8051 microcontroller
19. Writing data to Parallel Port of 8051 microcontroller
20. Experiment on Timers and Interrupts of 8051 microcontroller

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

SENSOR AND TRANSDUCER LAB

Course code BRI 423 Credit Units 01

List of experiments

1.Characteristics of resistance transducer (i.) Potentiometer (ii.) Strain Gauge/ Measurement of Strain using quarter, half and full bridge.
2. Characteristics of LVDT.
3. Characteristics of capacitance transducer: (i) Variable area (ii) Variable distance.
4. Characteristics of Thermisters
5. Characteristics of RTD
6. Thermocouples and AD590.
7. Characteristics of LDR, Photo Diode, and Phototransistor: (i) Variable Illumination. (ii) Linear Displacement.
8. Measurement of resistance by Wheatstone bridge and measurement of bridge sensitivity.
9. Measurement of self-inductance by – Maxwell and Anderson Bridge.
10. Measurement of Capacitance by desautys and Schering Bridge.
11. Measure of low resistance by Kelvin's double bridge.
12. Calibration of ammeter, voltmeter using DC potentiometer.
13. Characteristics of diaphragm type pressure transducer.
14. Study of Storage Oscilloscope & Transient response of RLC.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

LINEAR INTEGRATED CIRCUIT LAB

Course code BRI424 Credit units 01

List of experiments

1.Inverting, Non inverting and differential amplifiers.
2. Integrator and Differentiator.
3. Instrumentation amplifier
4. Active low-pass, High-pass and band-pass filters.
5. Astable & Monostable multivibrators using Op-amp
6. Schmitt Trigger using op-amp.
7. Phase shift and Wien bridge oscillators using Op-amp.
8. Astable and Monostable multivibrators using NE555 Timer.
9. PLL characteristics and its use as Frequency Multiplier, Clock synchronization
10. R-2R Ladder Type D- A Converter using Op-amp.
11. DC power supply using LM317 and LM723.
12. Study of SMPS

Course Name	Course Code	LTP	Credit	Semester
COMMUNICATION SKILLS - II	**BCS 401**	1	1	4

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Identify steps to professional communication
CLO 2	Identify the key components of meeting, agendas and meeting minutes
CLO 3	Understand the key skills and behaviors required to facilitate a group discussion/presentation
CLO 4	Polish current affairs & rapport building

Course Objective:

To teach the participants strategies for improving academic reading and writing.
Emphasis is placed on increasing fluency, deepening vocabulary, and refining academic language proficiency.

Course Contents:

Module I: Social Communication Skills
Small Talk
Conversational English
Appropriateness
Building rapport

Module II: Context Based Speaking
In general situations
In specific professional situations
Discussion and associated vocabulary
Simulations/Role Play

Module III: Professional Skills
Presentations
Negotiations
Meetings
Telephony Skills

Examination Scheme:

Components	CT1	CT2	CAF	V	GD	GP	A
Weightage (%)	20	20	25	10	10	10	5

CAF – Communication Assessment File
GD – Group Discussion
GP – Group Presentation

Text & References:

Text

- Essential Telephoning in English, Garside/Garside, Cambridge
- Working in English, Jones, Cambridge
- Business Communication, Raman – Prakash, Oxford

Reference

- Speaking Personally, Porter-Ladousse, Cambridge
- Speaking Effectively, Jermy Comfort, et.al, Cambridge
- Business Communication, Raman – Prakash, Oxford

Course Name	Course Code	LTP	Credit	Semester
BEHAVIOURAL SCIENCE - IV (RELATIONSHIP MANAGEMENT)	**BSS 404**	1	1	4

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Identify the basis of interpersonal relationship.

CLO 2	Describe the importance of interpersonal relationship and bridging individual differences.
CLO 3	Recognize the development and strategies for effective interpersonal relationship.
CLO 4	Explain and apply the theories of relationship concepts of impression management

Course Objective:

To understand the basis of interpersonal relationship
To understand various communication style
To learn the strategies for effective interpersonal relationship

Course Contents:

Module I: Understanding Relationships
Importance of relationships
Role and relationships
Maintaining healthy relationships

Module II: Bridging Individual Differences
Understanding individual differences
Bridging differences in Interpersonal Relationship – TA
Communication Styles

Module III: Interpersonal Relationship Development
Importance of Interpersonal Relationships
Interpersonal Relationships Skills
Types of Interpersonal Relationships

Module IV: Theories of Interpersonal Relationships
Theories: Social Exchange, Uncertainty Reduction Theory
Factors Affecting Interpersonal Relationships
Improving Interpersonal Relationships

Module V: Impression Management
Meaning & Components of Impression Management
Impression Management Techniques (Influencing Skills)
Impression Management Training-Self help and Formal approaches

Module VI: End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

Text

- Vangelist L. Anita, Mark N. Knapp, Inter Personal Communication and Human Relationships: Third Edition, Allyn and Bacon
- Julia T. Wood. Interpersonal Communication everyday encounter
- Simons, Christine, Naylor, Belinda: Effective Communication for Managers, 1997 1st Edition Cassell
- Goddard, Ken: Informative Writing, 1995 1st Edition, Cassell

Reference

- Harvard Business School, Effective Communication: United States of America
- Foster John, Effective Writing Skills: Volume-7, First Edition 2000, Institute of Public Relations (IPR)
- Beebe, Beebe and Redmond; Interpersonal Communication, 1996; Allyn and Bacon Publishers.

Course Code: **Credit Units: 02**

Course Name	Course Code	LTP	Credit	Semester
FRENCH - IV	**FLT 401**	2	2	4

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of advance level.
CLO 3	Students will be able to communicate with complex sentences.

Course Objective:

To enable students:

- To develop strategies of comprehension of texts of different origin
- To present facts, projects, plans with precision

Course Contents:

Module C: pp. 104 – 139: Unités 8, 9

Contenu lexical: **Unité 8: Découvrir le passé**

1. parler du passé, des habitudes et des changements.
2. parler de la famille, raconter une suite d'événements/préciser leur date et leur durée.
3. connaître quelques moments de l'histoire

Unité 9: Entreprendre

1. faire un projet de la réalisation: (exprimer un besoin, préciser les étapes d'une réalisation)
2. parler d'une entreprise
3. parler du futur

Contenu grammatical:

1. Imparfait
2. Pronom « en »
3. Futur
4. Discours rapporté au présent
5. Passé récent
6. Présent progressif

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- le livre à suivre : Campus: Tome 1

Course Name	Course Code	LTP	Credit	Semester
GERMAN - IV	**FLG 401**	2	2	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of advance level.
CLO 3	Students will be able to communicate with complex sentences.

Course Objective:

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.
To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany.
Introduction to Advanced Grammar Language and Professional Jargon

Course Contents:

Module I: Present perfect tense
Present perfect tense, usage and applicability
Usage of this tense to indicate near past
Universal applicability of this tense in German

Module II: Letter writing
To acquaint the students with the form of writing informal letters.

Module III: Interchanging prepositions
Usage of prepositions with both accusative and dative cases
Usage of verbs fixed with prepositions
Emphasizing on the action and position factor

Module IV: Past tense
Introduction to simple past tense
Learning the verb forms in past tense
Making a list of all verbs in the past tense and the participle forms

Module V: Reading a Fairy Tale
Comprehension and narration
- Rotkäppchen
- Froschprinzessin
- Die Fremdsprache

Module VI: Genitive case
Genitive case – Explain the concept of possession in genitive
Mentioning the structure of weak nouns

Module VII: Genitive prepositions
Discuss the genitive propositions and their usage: (während, wegen, statt, trotz)

Module VIII: Picture Description
Firstly recognize the persons or things in the picture and identify the situation depicted in the picture;
Secondly answer questions of general meaning in context to the picture and also talk about the personal experiences which come to your mind upon seeing the picture.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

Text

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3

Reference

- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

Course Name	Course Code	LTP	Credit	Semester
SPANISH - IV	**FLS 401**	2	2	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of advance level.
CLO 3	Students will be able to communicate with complex sentences.

Course Objective:

To enable students acquire working knowledge of the language; to give them vocabulary, grammar, voice modulations/intonations to handle everyday Spanish situations with ease.

Course Contents:

Module I
Revision of earlier semester modules
Introduction to Present Continuous Tense (Gerunds)

Module II
Translation with Present Continuous Tense
Introduction to Gustar, Parecer, Apetecer, doler

Module III
Imperatives (positive and negative commands of regular verbs)

Module IV
Commercial/business vocabulary

Module V
Simple conversation with help of texts and vocabulary
En la recepcion del hotel
En el restaurante
En la agencia de viajes
En la tienda/supermercado

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español Sin Fronteras (Nivel – Elemental)

Course Name	Course Code	LTP	Credit	Semester
Anandam	**AND004**	**2**	2	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Awareness and empathy regarding community issues
CLO 2	Interaction with the community and impact on society
CLO 3	Interaction with mentor and development of Student teacher relationship
CLO 4	Interaction among students, enlarge social network
CLO 5	Cooperative and Communication skills and leadership qualities
CLO 6	Critical thinking, Confidence and Efficiency

Course Objectives:

After the completion of this course, students will be able to:

5. apply their knowledge and skills to solve specific community problem
6. learn to plan, lead, and organize community events have a sense of belonging to their college campus and community and find something they are interested in doing during their free time
7. make new friends, expand social network, and boost social skills and mental health.
8. be useful to society as it will protect them against stress, frustration, and depression

Course Contents:

The project report should be guided by the mentor and shall contain:

12. **Synopsis**: clearly stating objectives and activities to be undertaken. Problem identifying and problem-solving projects to be taken up.
13. Details of the **Mentor and the Participants are to** be given (name of mentor, name of participants, phone number/mobile no, email, and address)
14. Location / community where the work was carried out
15. Details of Activities performed are to be given with date
16. Number of beneficiaries and impact on the society (the object should be to empower the community and make them self-reliant)
17. Photographs taken for documentation of work should be submitted
18. Media coverage of the projects should be attached if any
19. The Group Community Service Project Report will be submitted by the Student group leader under the guidance of the mentor to the Director/HoIs of the Department.
20. The Director/HoIs should get the best report (more than one if required) of the Group Community Service Project uploaded on the HTE website and on the University page
21. The Director/HoIs will forward the best report of the department to the Nodal Officer of the University.
22. University will forward the report to the state level committee.

7. Each member of the group shall write one blog about the decided topic of 500 words (minimum) along with any relevant photos/diagrams/statistical data (with reference).
8. The group member shall write his/her name at the end of the blog.
9. The blog shall be posted on Instagram and Facebook (apart from these any other website wherever the group seems necessary).
10. Print out of the blog where date of when the content is posted, number of followers, comments, name of the writer shall be visible will be taken and file will be maintained for the same.
11. In the cover page of the project mention heading **"Group Community Service Project"**, and the filled format of final project report given by Anandam Scheme.
12. For the topic chosen by the group, students are recommended to cover the following points:

7. Current scenario (Regional, national and international level as applicable)
8. Future predictions
9. Duty of the government
10. Government policies (related to the topic), if any
11. Duty of public
12. Conclusion

Evaluation Scheme:

Project Participation: 2 hours X 8 days (per month) X 4 months = 64 hours

9. C grade =32 hrs (Below 20 marks)
10. B grade >32 hrs to <=44hrs (20-30 marks)
11. A grade >44 hrs to<=54hrs (30-40 marks)
12. O grade >54 hrs to<=64hrs (40-50 marks)

Evaluation Criteria:

Respective Departmental Anandam mentors are requested to evaluate the project (out of 50) as per the following criteria:

4. Position and exceptions, if any, are clearly stated. The organization of the blog is completely and clearly outlined and implemented.
5. The body of the blog is coherently organized, original and the logic is easy to follow. There is no spelling or grammatical errors and terminology is clearly defined. Writing is clear, concise, and persuasive.
6. Conclusion is clearly stated. The underlying logic is explicit.

Course Name	Course Code	LTP	Credit	Semester
CHINESE – IV	**FLC 401**	2	2	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of advance level.
CLO 3	Students will be able to communicate with complex sentences.

Course Objective:

How many characters are there? The early Qing dynasty dictionary included nearly 50,000 characters the vast majority of which were rare accumulated characters over the centuries. An educate person in China can probably recognize around 6000 characters. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I
Dialogue Practice
Observe picture and answer the question
Pronunciation and intonation
Character writing and stroke order.
Electronic items

Module II
Traveling – The Scenery is very beautiful
Weather and climate
Grammar question with – "bu shi …. Ma?"
The construction "yao … le" (Used to indicate that an action is going to take place)
Time words "yiqian", "yiwai" (Before and after).
The adverb "geng".

Module III
Going to a friend house for a visit meeting his family and talking about their customs.
Fallen sick and going to the Doctor, the doctor examines, takes temperature and writes prescription.
Aspect particle "guo" shows that an action has happened some time in the past.
Progressive aspect of an actin "zhengzai" Also the use if "zhe" with it.
To welcome someone and to see off someone …. I cant go the airport to see you off… etc.

Module IV
Shipment. Is this the place to checking luggage?
Basic dialogue on – Where do u work?
Basic dialogue on – This is my address
Basic dialogue on – I understand Chinese
Basic dialogue on – What job do u do?
Basic dialogue on – What time is it now?

Module V
Basic dialogue on – What day (date) is it today?
Basic dialogue on – What is the weather like here.
Basic dialogue on – Do u like Chinese food?
Basic dialogue on – I am planning to go to China.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- "Elementary Chinese Reader, Part-2" Lesson 31-38
-

Course Name	Course Code	LTP	Credit	Semester
ARDUINO AND ITS INTERFACING	**BRI 501**	3	3	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Create sketches, libraries inside the Arduino Development Environment.
CLO 2	Measure various physical parameters using sensors.
CLO 3	Implement various communication protocols for wired and wireless communication.

Course Objective:

This course is intended for enthusiastic students or hobbyists. With Arduino, one can get to know the basics of micro-controllers and sensors very quickly and can start building prototype with very little investment. This course is intended to make you comfortable in getting started with Arduino.

Course Contents:

Module I: Introduction
Introduction to embedded system, Understanding Embedded System,Overview of basic electronics and digital electronics, Microcontroller vs. Microprocessor, Common features of Microcontroller, Comparison between the two, Different types of microcontrollers.
Module II: Getting Started with Arduino
Introduction to Arduino, Pin configuration and architecture, Device and platform features, Concept of digital and analog ports, Familiarizing with Arduino Interfacing Board, Introduction to Embedded C and Arduino platform.
Module III: Review of Basic Concepts
Arduino data types, Variables and constants, Operators, Control Statements, Arrays, Functions.
Module IV: Arduino i/o Functions
Pins Configured as INPUT, Pull-up Resistors, Pins Configured as OUTPUT, pinMode() Function, digitalWrite() Function, analogRead() function, Arduino Interrupts.
Module V: Arduino Time
Incorporating Arduino time, delay() function, delayMicroseconds() function, millis() function, micros() function .
Module VI: Arduino Displays
Working with Serial Monitor, Line graph via serial monitor, Interfacing a 8 bit LCD to Arduino, Fixed one line static message display, Running message display, Using the LCD Library of Arduino.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
A: Attendance.

Text & References:

Text
- Exploring Arduino: Tools and Techniques for Engineering Wizardry 1st Edition by wiley, ISBN-10: 1118549368

Reference
- Arduino: A Technical Reference by J. M. Hughes Released May 2016 Publisher(s): O'Reilly Media, Inc. ISBN: 9781491921760

Course Name	Course Code	LTP	Credit	Semester
ROBOTICS & AUTOMATION	**BRI 502**	3	3	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	. Introduce the fundamental aspects of Autonomous Vehicles.
CLO 2	Gain Knowledge about the Sensing Technology and Algorithms applied in Autonomous vehicles.
CLO 3	Understand the Connectivity Aspects and the issues involved in driverless cars.

Course Objective:

To introduce the concepts of Robotic system, its components and instrumentation and control related to robotics.

Course Contents:

Module I: Introduction
Definition, Automation and robotics, Robot anatomy, Basic structure of robots, Resolution, Accuracy and repeatability, and Classification and Structure of robots, Point to point and continuous path systems, automation principles and strategies, scope of automation, socio-economic consideration, low cost automation, basic elements of advanced functions, Information processing in manufacturing industry, Production concepts and automation strategies. Fixed Automation: Automated Flow lines, Methods of Work part Transport, Transfer Mechanism – Continuous transfer, intermittent transfer, Indexing mechanism, Operator-Paced Free Transfer Machine, Buffer Storage, Control Functions, Automation for Machining Operations, Design and Fabrication Considerations. Analysis of Automated Flow Lines: General Terminology and Analysis, Analysis of Transfer Lines without Storage, Partial Automation, Automated Flow Lines with Storage Buffers.

Module II: Assembly Systems and Line Balancing
The Assembly Process, Assembly Systems, Manual Assembly Lines, The Line Balancing Problem, Methods of Line Balancing, Computerized Line Balancing Methods, Other ways to improve the Line Balancing, Flexible Manual Assembly Lines. Automated Assembly Systems: Design for Automated Assembly, Types of Automated Assembly Systems, Vibratory bowl feeder and Non vibratory bowl feeder, Part Orienting Systems, Feed tracks, Escapements and part placing mechanism, Analysis of Multi-station Assembly Machines, Analysis of a Single Station Assembly
Machine.

Module III: Automated Materials Handling
The material handling function, Types of Material Handling Equipment, Analysis for Material Handling Systems, Design of the System, Conveyor Systems, Automated Guided Vehicle Systems. Automated Storage Systems: Storage System Performance, Automated Storage/Retrieval Systems, Carousel Storage Systems, Work-in-process Storage, Interfacing Handling and Storage with Manufacturing.

Module IV: Automated Inspection and Testing
Inspection and testing, Statistical Quality Control, Automated Inspection Principles and Methods, Sensor Technologies for Automated Inspection, Coordinate Measuring Machines, Other Contact Inspection Methods, Machine Vision, Other optical Inspection Methods. Modeling Automated Manufacturing Systems: Role of Performance Modeling, Performance Measures, Performance Modeling Tools: Simulation Models, Analytical Models.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
A: Attendance.

Text & References:

Text

- Mikell P.Grover, "Automation, Production Systems and Computer Integrated Manufacturing", Pearson Education Asia, 2001.
- C.RayAsfahl, "Robots and manufacturing Automation", John Wiley and Sons New York, 1992.

Reference

- Aanadham and Y.Narahari, "Performance Modeling of Automated Manufacturing Systems", Prentice Hall India Pvt. Ltd, 1992.
- Stephen J. Derby, "Design of Automatic Machinery", Special Indian Edition, Marcel Decker, New York, Yesdee publishing Pvt. Ltd, Chennai, 2004.

Course Name	Course Code	LTP	Credit	Semester
CONTROL SYSTEM/DSP	**BRI 503**	3	3	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Ability to express the basic elements and structures of feedback control systems.
CLO 2	Apply the basic mathematical tools to simplify and analyze the transfer function of the feedback systems.
CLO 3	Use the time and frequency domain techniques to analyse the performance of the systems.
CLO 4	Design a suitable PID Controller to improve the performance the controlled systems
CLO 5	Design a suitable compensator to achieve the desired performance of the controlled systems.

Course Objective:

The basic objective of this course is to provide the students the core knowledge of control systems, in which time & frequency domain analysis, concept of stability. The objective of the course in Digital signal processing is to provide the student with significant skills in general as well as advanced theories and methods for modification, analysis, detection and classification of analog and digital signals. Furthermore the objective is to give the student a broad knowledge of central issues regarding design, realisation and test of analog and in particular digital signal processing systems consisting of hardware and/or software components. The specialization in signal processing makes it possible to study practical or theoretic fields, ranging from mathematics/signal theory over algorithmic design to development of instruments based on hardware and/or software for real time signal

Course Contents:

Module I: Input / Output Relationship

Introduction of open loop and closed loop control systems, mathematical modeling and representation of physical

systems (Electrical Mechanical and Thermal), derivation of transfer function for different types of systems, block diagram & signal flow graph, Reduction Technique, Mason's Gain Formula.

Module II: Time – Domain Analysis
Time domain performance criteria, transient response of first, second & higher order systems, steady state errors and static error constants in unity feedback control systems, error criteria, generalized error constants, performance indices, response with P, PI and PID Controllers.

Module III: Frequency Domain Analysis
Polar and inverse polar plots, frequency domain specifications, Logarithmic plots (Bode Plots),gain and phase margins, relative stability, Correlation with time domain, constant close loop frequency responses, from open loop response, Nyquist Plot.

Module IV: Concept of Stability
Asymptotic stability and conditional stability, Routh – Hurwitz criterion, Root Locus plots and their applications. Compensation Techniques: Concept of compensation, Lag, Lead and Lag-Lead networks, design of closed loop systems using compensation techniques. P, PI, PID controllers.

Module VI: Discrete time signals and systems in time domain
Classification of signal, signal processing operations, classification of systems, discrete time systems, examples of types of signal, sampling process, time domain characterization of LTI discrete- time systems, state space representation of LTI discrete time systems.

Module VII: Discrete time signals in transform domain
DTFT, properties, applications, inverse DTFT, DFT, properties, applications, inverse DFT, Z-transform, properties, applications, inverse Z-transform, frequency response, transfer function, Fast Fourier transform algorithms: DIT algorithm, DIF algorithm.

Module VIII
Discrete time processing of continuous time signals: sampling, analog filter design, antiliasing filter design.

Module IX: Discrete time processing of discrete- time signals
Digital filters: Digital filter structure: FIR filter structure, IIR filter structure,Digital filter design: Impulse invariance method, bilinear transform method of IIR filter design, FIR filter design.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text:
- Dr. N.K Jain, 2005,"Automatic Control System Engineering", Dhanpat Rai Publication.
- J. Nagrath & M. Gopal, 2000, "Control System Engineering", New Age International.
- Prokis, Manolakis: Digital signal processing
- Oppenheim & Schaffer : Digital Signal Processing

References:
- M, K. Ogata, 2002, "Modern Control Engineering, PHI.
- B. C. Kuo, 2001, "Automatic Control system, Prentice Hall of India.
- Fafael C. Gonzalez, Richrd E. Woods: Digital Image Processing
- Anil Kumar Jain Fundamentals of Digital Image Processing

Course Name	Course Code	LTP	Credit	Semester
INDUSTRIAL TRAINING (Evaluation)	**BEC 550**	6	6	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Safely wire and operate electronics devices and their associated metering and starting equipment.
CLO 2	Develop a practical approach for the construction, characteristics, operation and application of electronics devices.
CLO 3	Able to solve problems relating to generated voltage, terminal voltage, currents, torque, speed, input and output power, efficiency, and voltage/speed regulation in ECE fields.
CLO 4	Capable of solving problems relating to analog, digital, control and instrumentation engineering.

CLO 5	To acquire the knowledge about the results of laboratory tests on various ECE under various conditions.
CLO 6	Able to identify, formulate, and solve the electronics engineering related problems.

Methodology:

Practical training is based on the theoretical subjects studied by students. It can be arranged within the college or in any related industrial unit. The students are to learn various industrial, technical and administrative processes followed in the industry. In case of on-campus training the students will be given specific task of fabrication/assembly/testing/analysis. On completion of the practical training the students are to present a report covering various aspects learnt by them and give a presentation on same.

Examination Scheme:

Feedback from industry/work place	20
Training Report	40
Viva	15
Presentation	25
Total	**100**

ARDUINO AND ITS INTERFACING LAB

Course Code: BRI 521 **Credit Units: 01**

List of Experiments:

1. Basics of Arduino Programming.
2. To understand how to install Arduino software integrated development environment and connecting the Arduino to the computer.
3. Interfacing of temperature and humidity sensor (DHT11) with Arduino.
4. Interfacing of high voltage device with Arduino.
5. Interfacing of LDR, relay and bulb with Arduino.
6. Interfacing of Optical sensor, relay and bulb with Arduino.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva, A - Attendance.

ROBOTICS & AUTOMATION LAB

Course Code: BRI 522 **Credit Units: 01**

List of Experiments:

1. Determination of maximum and minimum position of links.
2. Verification of transformation (Position and orientation) with respect to gripper and world coordinate system
3. Estimation of accuracy, repeatability and resolution.
4. Robot programming and simulation for pick and place
5. Robot programming and simulation for Colour identification
6. Robot programming and simulation for Shape identification
7. Robot programming and simulation for machining (cutting, welding)
8. Robot programming and simulation for writing practice
9. Robot programming and simulation for any industrial process (Packaging, Assembly)
10. Robot programming and simulation for multi process.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva, A - Attendance.

CONTROL SYSTEM LAB/DSP

Course Code: **BRI 523** **Credit Units: 01**

List of Experiments:

1. Study and draw
a) Step response of open Loop system (linear 1st order, 2nd order
b) Step response of closed loop systems (1st order)
2. Study and draw temperature control system the open loop response and closed loop response with different values of gains
3. Study of operations and characteristics of a stepper motor
4. To Study a D.C. motor speed control system.
5. Performance evaluation and design of PID controller.
6. Study of microprocessor control of a simulated linear system.
7. To design a suitable cascade compensator for the given system and verify the resulting improvement.
8. Note: three experiments in MATLAB have to be performed in the slot of MATLAB.
Using MATLAB obtain the unit-step response and unit impulse response of the following system:

$$\frac{C(s)}{R(s)} = \frac{16}{s^2 + 1.6s + 16}$$

9. For a 2nd order transfer function using MATLAB
a) Bode Plot
b)Root locus plot
c)Nyquist plot.
10. To generate unit step sequence, exponential sequence and sinusoidal sequence
11. To determine convolution of two given sequences.
12. To plot the frequency response of an FIR system
13. To compute DFT and IDFT of a given sequence
14. To determine the circular convolution of two given sequences
15. To design various analog filters
16. To design FIR filter using Hamming window
17. To convert Analog filter into Digital Filter using bilinear transformation
18. To determine z and inverse z transform of a given sequence
19. To verify 8 points FFT algorithm in decimation in time (DIT) & decimation in frequency (DIF).
20. To determine the filter coefficient using Ramez exchange algorithm.
21. To design an IIR digital filter and its parallel realization.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva, A - Attendance.

Course Name	Course Code	LTP	Credit	Semester
PYTHON FOR DATA SCIENCE	**BRI 504**	3	3	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Know basic data types in Python.
CLO 2	Know operators, how to clean and merge datasets.
CLO 3	Know pandas library, the main methods for DataFrames.
CLO 4	Know how to import data in Python
CLO 5	Know how to work in Jupyter Notebook.

Course Code: **Credit Units: 03**

Course Objective:

Basic process of data science .Python and Jupyter notebooks. An applied understanding of how to manipulate and analyze uncurated datasets. Basic statistical analysis and machine learning methods. How to effectively visualize results. By the end of the course, you should be able to find a dataset, formulate a research question, use the tools and techniques of this course to explore the answer to that question, and share your findings.

Course Contents:

Module I: Introduction
Welcome and overview of the course. Introduction to the data science process and the value of learning data science. Background: In this optional week, we provide a brief background in python or unix to get you up and running. If you are already familiar with python and/or unix, feel free to skip this content.

Module II: Jupyter and Numpy
Jupyter notebooks are one of the most commonly used tools in data science as they allow you to combine your research notes with the code for the analysis. After getting started in Jupyter, we'll learn how to use numpy for data analysis. numpy offers many useful functions for processing data as well as data structures which are time and space efficient.

Module III: Pandas
Pandas, built on top of numpy, adds data frames which offer critical data analysis functionality and features.

Module IV: Visualization
When working with large datasets, you often need to visualize your data to gain a better understanding of it. Also, when you reach conclusions about the data, you'll often wish to use visualizations to present your results.

Module V: Machine Learning
To take your data analysis skills one step further, we'll introduce you to the basics of machine learning and how to use sci-kit learn - a powerful library for machine learning.

Module VI: Working with Text and Databases
Working with text data or data from databases. This module will give you the skills to access that data. For text data, we'll also give you a preview of how to analyze text data using ideas from the field of Natural Language Processing and how to apply those ideas using the Natural Language Processing Toolkit (NLTK) library.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
A: Attendance.

Text & References:

Text

- Python Data Science Handbook by Jake VanderPlas published by O 'Reilly.
- Introducing Data Science by Davy Cielen et.al published by Manning Publications

Reference

- Data Science from Scratch by Joel Grus published by O'Reilly
- The Art of Statistics Learning from Data by David Spiegelhalter published by pelican publications

Course Name	Course Code	LTP	Credit	Semester
R FOR DATA SCIENCE	**BRI 505**	3	3	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will demonstrate proficiency with statistical analysis of data..
CLO 2	Students will develop the ability to build and assess data-based models.
CLO 3	Students will execute statistical analyses with professional statistical software.
CLO 4	Students will demonstrate skill in data management

Course Objective:

The course begins with developing a basic understanding of the R working environment. To introduce the necessary arithmetic and logical operators, salient functions for manipulating data, and getting help using R. Next, the common data structures, variables, and data types used in R will be demonstrated and applied. By the end of the course students you shall be confident and equipped with all the knowledge required to perform analytical activities in R

Course Contents:

Module I: Introduction to R programming
What is R, Installing R and RStudio, RStudio Overview, Working in the Console, Arithmetic Operators, Logical Operations, Using Functions, Getting Help in R and Quitting RStudio.

Module II: Data structures, variables, and data types
Creating Variables, Numeric, Character and Logical Data, Vectors, Data Frames, Factors, Sorting Numeric, Character, and Factor Vectors, Special Values.

Module III: R packages and scripts
Installing and loading packages, Setting up your working directory, Downloading and importing data, Working with missing data, Extracting a subset of a data frame, Writing R scripts, Adding comments and documentation,

Creating reports.

Module IV: Descriptive statistics in R
Measures of central tendency, Measures of variability, Skewness and kurtosis, Summary functions, describe functions, and descriptive statistics by group, Correlations.

Module V: Data exploration and visualization
Using the ggplot2 package to visualize data, Applying themes from ggthemes to refine and customize charts and graphs, Building data graphics for dynamic reporting.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
A: Attendance.

Text & References:

Text
- Wickham, H. & Grolemund, G. (2018). for Data Science. O'Reilly: New York.

Reference
- R for Data Science by Hadley Wickham & Garrett Grolemund published by O' Reilly
- Sosulski, K. (2018). R Fundamentals. Bookdown: New York.

Course Name	Course Code	LTP	Credit	Semester
INDUSTRIAL AUTOMATION	**BRI 506**	3	3	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Differentiate the various types of Industrial Robots and their architecture.
CLO 2	. Apply the concepts of image processing for robotic inspection systems.
CLO 3	Analyze the applications of robots in various industrial application.
CLO 4	Design and fabricate simple grippers for pick and place application.
CLO 5	Identify the right Robot for a given industrial application

CLO 6	. Select the right material handling system for a given application

Course Objective:

Analysis of Manufacturing systems & Mathematical models of production lines. To know Industrial Automated production lines and work part transfer mechanism and buffer storage analysis. To understand Cellular Manufacturing, Flexible manufacturing Systems, planning implementation issues and implementation quality programs in production systems.

Course Contents:

Module I: Introduction

Introduction , Automation In Production System, Manual Labor in production systems ,Principles and Strategies of Automation, Basic Elements of An Automated System, Levels of Automation, production concepts and mathematical models. Material Handling: Introduction to Material Handling, Material Handling Equipment's, Principles and Design Consideration in material handling, Material Transport Equipment, Automated Storage systems. SLE: Lean Manufacturing.

Module II: Fluid Power and Pneumatic Systems:

Introduction to Fluid power, Pascal's Law, Hydraulic Circuit Design and Analysis-Introduction, Control of A Single-Acting Hydraulic Cylinder Circuit, Control of a Double Acting Hydraulic Cylinder Circuit, Regenerative Cylinder Circuit. Basic Pneumatic systems, Types of Cylinders-Single acting Cylinder- Double acting Cylinder, Direction Control Valves- Valve position, Shuttle Valve, Basic Pneumatic Circuits- Control of Single acting Cylinder Circuit- Control of Double acting circuit, Impulse operation- Pilot operation of single acting and Double acting cylinder. SLE: Solenoid Operated Valve.

Module III: Manufacturing Systems

Introduction to Manufacturing systems, Components of Manufacturing systems, Classification scheme for Manufacturing systems, Simple problems using Mathematic models of production performance, single station manufacturing cells, fundamentals of manual assembly lines, automated production lines. SLE: Alternative Assembly lines.

Module IV: Automated Production Lines and Assembly systems

Fundamentals of Automated Production Lines, Applications Of Automated production lines, System configurations, Work Part Transfer Mechanisms, Storage Buffers, Power Transmission Systems- Gears, Power Screws(Linear Guideways), Other Transmissions Systems such as chains and ropes. SLE: System Design Considerations.

Module V: Cellular Manufacturing and Flexible Manufacturing Systems

Introduction, Part Families, Manufacturing Cells, Cellular Manufacturing, Part classification and coding, Production Flow Analysis, Group Technology and its applications. Introduction to FMS, FMS Industrial Applications and its benefits, FMS components. SLE: Planning and implementation issues.

Module VI: Inspection and Quality control

Introduction, Inspection, Specifying limits of variability, dimensions and tolerances, selection of gauging equipment's, gauge control, quality control and quality assurance, statistical quality control, total quality management, six sigma, quality standards, Simple numerical problems. SLE: Coordinate Measuring Machines.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
A: Attendance.

Text & References:

Text

Automation, Production Systems and Computer Integrated Manufacturing- M. P. Groover, Pearson Education. Third edition/Fifth edition, 2009.

Reference
- Computer Based Industrial Control- Krishna Kant, EEE-PHI,2nd edition,2010
- An Introduction to Automated Process Planning Systems- Tiess Chiu Chang & Richard A. Wysk.

Course Name	Course Code	LTP	Credit	Semester
COMMUNICATION SKILLS - III	**BCS 501**	1	1	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Create right selection of words and ideas while also choosing the appropriate channelof formalcommunication.

CLO 2	Demonstrate the ability to analyse a problem and devise a solution in a group.
CLO 3	Demonstrate proficiency in the use of written communication.
CLO 4	Recognize the mannerisms and methodology of Interview and GD to become more expressive in their body language and verbal performance.
CLO 5	Create right selection of words and ideas while also choosing the appropriate channelof formalcommunication.

Course Objective:

To equip the participant with linguistic skills required in the field of science and technology while guiding them to excel in their academic field.

Course Contents:

Module I
Reading Comprehension
Summarising
Paraphrasing

Module II
Essay Writing
Dialogue Report

Module III
Writing Emails
Brochure
Leaflets

Module IV: Introduction to Phonetics
Vowels
Consonants
Accent and Rhythm
Accent Neutralization
Spoken English and Listening Practice

Examination Scheme:

Components	CT1	CT2	CAF	V	GD	GP	A
Weightage (%)	20	20	25	10	10	10	5

CAF – Communication Assessment File
GD – Group Discussion
GP – Group Presentation

Text & References:

Text

- Effective English for Engineering Students, B Cauveri, Macmillan India
- Creative English for Communication, Krishnaswamy N, Macmillan

Reference

- A Textbook of English Phonetics, Balasubramanian T, Macmillan

Course Name	Course Code	LTP	Credit	Semester
BEHAVIOURAL SCIENCE - V (UNDERSTANDING SELF FOR EFFECTIVENESS)	**BSS 504**	1	1	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Demonstrate awareness of self and the process of self-exploration. Recognize their personality and individual differences and identify its importance of diversity at workplace and ways to enhance it.
CLO 2	Demonstrate knowledge of strategies for developing a healthy self-esteem.
CLO 3	Recognize the importance of attitudes and its effect on personality.
CLO 4	Identify the difference between healthy and unhealthy expression of emotions and develop emotional competence necessary for personal and professional life.

Course Objective:

To inculcate in the students an elementary level of understanding of group/team functions
To develop team spirit and to know the importance of working in teams

Course Contents:

Module I: Group formation
Definition and Characteristics
Importance of groups
Classification of groups
Stages of group formation
Benefits of group formation

Module II: Group Functions
External Conditions affecting group functioning: Authority, Structure, Org. Resources, Organizational policies etc.
Internal conditions affecting group functioning: Roles, Norms, Conformity, Status, Cohesiveness, Size, Inter group conflict.
Group Cohesiveness and Group Conflict
Adjustment in Groups

Module III: Teams
Meaning and nature of teams
External and internal factors effecting team
Building Effective Teams
Consensus Building
Collaboration

Module IV: Leadership
Meaning, Nature and Functions
Self leadership
Leadership styles in organization
Leadership in Teams

Module V: Power to empower: Individual and Teams
Meaning and Nature
Types of power
Relevance in organization and Society

Module VI: End-of-Semester Appraisal

Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

Text

- Organizational Behaviour, Davis, K.
- Hoover, Judhith D. Effective Small Group and Team Communication, 2002,Harcourt College Publishers
- Dick, Mc Cann & Margerison, Charles: Team Management, 1992 Edition, viva books
- Bates, A. P. and Julian, J.: Sociology - Understanding Social Behaviour
- Dressers, David and Cans, Donald: The Study of Human Interaction

Reference

- Lapiere, Richard. T – Social Change
- Lindzey, G. and Borgatta, E: Sociometric Measurement in the Handbook of Social Psychology, Addison – Welsley, US.
- Rose, G.: Oxford Textbook of Public Health, Vol.4, 1985.
- LaFasto and Larson: When Teams Work Best, 2001, Response Books (Sage), New Delhi
- J William Pfeiffer (ed.) Theories and Models in Applied Behavioural Science, Vol 2, Group (1996); Pfeiffer & Company
- Smither Robert D.; The Psychology of Work and Human Performance, 1994, Harper Collins College Publishers

Course Name	Course Code	LTP	Credit	Semester
FRENCH - V	**FLT 501**	2	2	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of advance level.
CLO 3	Students will be able to communicate with complex sentences.

Course Objective:

To furnish some basic knowledge of French culture and civilization for understanding an authentic document and information relating to political and administrative life

Course Contents:

Module D: pp. 131 – 156 Unités 10, 11

Contenu lexical: **Unité 10:** Prendre des décisions

1. Faire des comparaisons
2. décrire un lieu, le temps, les gens, l'ambiance
3. rédiger une carte postale

Unité 11: faire face aux problèmes

1. Exposer un problème.
2. parler de la santé, de la maladie
3. interdire/demander/donner une autorisation
4. connaître la vie politique française

Contenu grammatical:

1. comparatif - comparer des qualités/ quantités/actions
2. supposition : Si + présent, futur
3. adverbe - caractériser une action
4. pronom "Y"

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- le livre à suivre : Campus: Tome 1

Course Name	Course Code	LTP	Credit	Semester
GERMAN - V	**FLG 501**	2	2	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of advance level.
CLO 3	Students will be able to communicate with complex sentences.

Course Objective:
To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.
To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany
Introduction to Advanced Grammar and Business Language and Professional Jargon

Course Contents:

Module I: Genitive case
Genitive case – Explain the concept of possession in genitive
Mentioning the structure of weak nouns

Module II: Genitive prepositions
Discuss the genitive propositions and their usage: (während, wegen, statt, trotz)

Module III: Reflexive verbs
Verbs with accusative case
Verbs with dative case
Difference in usage in the two cases

Module IV: Verbs with fixed prepositions
Verbs with accusative case
Verbs with dative case
Difference in the usage of the two cases

Module V: Texts
A poem 'Maxi'
A text Rocko

Module VI: Picture Description
Firstly recognize the persons or things in the picture and identify the situation depicted in the picture;
Secondly answer questions of general meaning in context to the picture and also talk about the personal experiences which come to your mind upon seeing the picture.

Examination Scheme:

Components	**CT1**	**CT2**	**C**	**I**	**V**	**A**
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

Text

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer

Reference

- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

Course Name	Course Code	LTP	Credit	Semester
SPANISH - V	**FLS 501**	2	2	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of advance level.
CLO 3	Students will be able to communicate with complex sentences.

Course Objective:

To enable students acquire working knowledge of the language; to give them vocabulary, grammar, voice modulations/intonations to handle everyday Spanish situations with ease.

Course Contents:

Module I
Revision of earlier semester modules

Module II
Future Tense

Module III
Presentations in English on
Spanish speaking countries'
Culture
Sports
Food
People
Politics
Society
Geography

Module IV
Situations:
En el hospital
En la comisaria
En la estacion de autobus/tren
En el banco/cambio

Module V
General revision of Spanish language learnt so far.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español Sin Fronteras, Greenfield

Course Name	Course Code	LTP	Credit	Semester
CHINESE – V	**FLC 501**	2	2	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of advance level.
CLO 3	Students will be able to communicate with complex sentences.

Course Objective:

What English words come from Chinese? Some of the more common English words with Chinese roots areginseng, silk, dim sum, fengshui, typhoon, yin and yang, T'al chi, kung-fu. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I
Drills
Dialogue practice
Observe picture and answer the question.
Pronunciation and intonation.
Character writing and stroke order

Module II
Intonation
Chinese foods and tastes – tofu, chowmian, noodle, Beijing duck, rice, sweet, sour….etc. Learning to say phrases like – Chinese food, Western food, delicious, hot and spicy, sour, salty, tasteless, tender, nutritious, god for health, fish, shrimps, vegetables, cholesterol is not high, pizza, milk, vitamins, to be able to cook, to be used to, cook well, once a week, once a month, once a year, twice a week……
Repetition of the grammar and verbs taught in the previous module and making dialogues usingit.
Compliment of degree "de".

Module III
Grammar the complex sentence "suiran … danshi…."
Comparison – It is colder today than it was yesterday…..etc.
The Expression "chule….yiwai". (Besides)
Names of different animals.
Talking about Great Wall of China
Short stories

Module IV
Use of "huozhe" and "haishi"
Is he/she married?
Going for a film with a friend.

Having a meal at the restaurant and ordering a meal.

Module V
Shopping – Talking abut a thing you have bought, how much money you spent on it? How many kinds were there? What did you think of others?
Talking about a day in your life using compliment of degree “de”. When you get up? When do you go for class? Do you sleep early or late? How is Chinese? Do you enjoy your life in the hostel?
Making up a dialogue by asking question on the year, month, day and the days of the week and answer them.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

“Elementary Chinese Reader ” Part-II Lesson 39-46

Course Name	Course Code	LTP	Credit	Semester
Anandam	**AND005**	**2**	2	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Awareness and empathy regarding community issues
CLO 2	Interaction with the community and impact on society
CLO 3	Interaction with mentor and development of Student teacher relationship
CLO 4	Interaction among students, enlarge social network
CLO 5	Cooperative and Communication skills and leadership qualities
CLO 6	Critical thinking, Confidence and Efficiency

Course Objectives:

After the completion of this course, students will be able to:

13. apply their knowledge and skills to solve specific community problem
14. learn to plan, lead, and organize community events have a sense of belonging to their college campus and community and find something they are interested in doing during their free time
15. make new friends, expand social network, and boost social skills and mental health.
16. be useful to society as it will protect them against stress, frustration, and depression

Course Contents:

The project report should be guided by the mentor and shall contain:

Synopsis: clearly stating objectives and activities to be undertaken. Problem identifying and problem-solving projects to be taken up.

Details of the **Mentor and the Participants are to** be given (name of mentor, name of participants, phone number/mobile no, email, and address)

Location / community where the work was carried out

Details of Activities performed are to be given with date

Number of beneficiaries and impact on the society (the object should be to empower the community and make them self-reliant)

Photographs taken for documentation of work should be submitted

Media coverage of the projects should be attached if any

The Group Community Service Project Report will be submitted by the Student group leader under the guidance of the mentor to the Director/HoIs of the Department.

The Director/HoIs should get the best report (more than one if required) of the Group Community Service Project uploaded on the HTE website and on the University page

The Director/HoIs will forward the best report of the department to the Nodal Officer of the University.

University will forward the report to the state level committee.

GUIDELINES FOR GCSP (Group Community Service Project)
ASSIGNMENT OF ANANDAM FOR SOCIAL AWARENESS (for students)

Each member of the group shall write one blog about the decided topic of 500 words (minimum) along with any relevant photos/diagrams/statistical data (with reference).
The group member shall write his/her name at the end of the blog.
The blog shall be posted on Instagram and Facebook (apart from these any other website wherever the group seems necessary).
Print out of the blog where date of when the content is posted, number of followers, comments, name of the writer shall be visible will be taken and file will be maintained for the same.
In the cover page of the project mention heading **"Group Community Service Project"**, and the filled format of final project report given by Anandam Scheme.
For the topic chosen by the group, students are recommended to cover the following points:
Current scenario (Regional, national and international level as applicable)
Future predictions
Duty of the government
Government policies (related to the topic), if any
Duty of public
Conclusion

Evaluation Scheme:

Project Participation: 2 hours X 8 days (per month) X 4 months = 64 hours

7. C grade =32 hrs (Below 20 marks)
8. B grade >32 hrs to <=44hrs (20-30 marks)
9. A grade >44 hrs to<=54hrs (30-40 marks)
10. O grade >54 hrs to<=64hrs (40-50 marks)

Evaluation Criteria:

Respective Departmental Anandam mentors are requested to evaluate the project (out of 50) as per the following criteria:

Position and exceptions, if any, are clearly stated. The organization of the blog is completely and clearly outlined and implemented.

The body of the blog is coherently organized, original and the logic is easy to follow. There is no spelling or grammatical errors and terminology is clearly defined. Writing is clear, concise, and persuasive.

Conclusion is clearly stated. The underlying logic is explicit.

Course Name	Course Code	LTP	Credit	Semester
ROBOTICS MOTOR AND DRIVES	**BRI** 601	3	3	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Describe the characteristics of a robotic system from its dynamic model.
CLO 2	Analyze the stability of robotic systems with the help of theorems.
CLO 3	Illustrate the various task space control schemes available.

Course Objective:

The course aims to introduce them to the theory of operation, analytical and circuit models and basic design concepts of Robotics motors and drives.

Course Contents:

Module I:

Robotic systems

History, Present status, and future trends in Robotics and automation - Laws of Robotics-Robot definitions, Degrees of Freedom of Serial and Parallel Manipulators- resolution, repeatability, and accuracy of a manipulator.

Module II:

Motor Systems

Various kinds of Robotics Motors viz Servo motor, Principle of operation, types and selection of Position & velocity sensors, switches – Tactile sensors -Touch sensors - Force and torque sensors, Robot End Effectors. Vision Systems.

Module III:

Robotics Drive Systems

Types of Actuators, Mechanical Drive Systems, Electric Drive System, Hydraulic Drive System and Pneumatic Drive System

Module IV:

Applications of Robots in Manufacturing and Processing Industries

Autonomous drone, Agricultural areas, Nanobots, Domestic Robotics, Page making industries and Industrial safety domains and live projects.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text book

Deh S R., "Robotics Technology and Flexible Automation", Second Edition TataMcGraw Hill Publishing, Company Ltd., 2010.

Reference book

Mikell P Grooveret. al., "Industrial Robots - Technology, Programming and Applications", McGraw Hill, New York, 2012.
Saeed B Niku," Introduction to Robotics Analysis,Systems,Applications""PHI Pvt

Course Name	Course Code	LTP	Credit	Semester
MECHATRONICS AND ROBOTICS APPLICATION	**BRI** 602	3	3	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	To acquire the knowledge on advanced algebraic tools for the description of motion.
CLO 2	To develop the ability to analyses and design the motion for articulated systems.
CLO 3	To develop an ability to use software tools for analysis and design of robotic systems.

Module I:

Systems and Design: Mechatronic approach, Integrated Product Design, Modelling, Analysis and Simulation, Man-Machine Interface. Sensors and transducers: classification, Development in Transducer technology, Opto-Electronics-Shaft encoders, CD Sensors, Vision System, etc. Industrial Robot & Service Robot, Anatomy, Spatial coordinates, Geometric configurations and work envelope, Machine intelligence, Criteria for robot selection, Safety standards for Industrial Robot, Economic justification, Robot Applications-Material handling, Machine loading and unloading, Assembly, Inspection, Welding, Spray painting, Medical Industry, Future of Robotics.

Module II:

Robot Programming: Introduction, On-line programming: Manual input, Lead through -programming, Teach pendant programming, Off-line programming language, Simulation, Introduction to ROS Concept. Microsensors, Micro actuators; Microfabrication techniques LIGA Process: Lithography, etching, Micro-joining etc. Application examples; Case studies Examples of Mechatronic Systems from Robotics Manufacturing, Machine Diagnostics, Road vehicles and Medical Technology.

Module-III:

Control of Robot Manipulator: Open and closed loop control system, Control system concepts, Linear control schemes, PID control system, Types of motion control, drives and control, Planning of trajectories, Human Robot Collaboration. Replacement Programmable Logic Controllers: Basic Structure, Types and Working Principle, Concept of Scan Cycle and Scan Time, IO's and its Types, Selection Criteria and Applications Programming Techniques: Ladder diagram –Concept of Contacts and Coil, Latching/ Holding Circuit, Memory Bits, Timers and Counter.Micro mechatronic systems: Microsensors, Microactuators; Microfabrication techniques LIGA Process: Lithography, etching, Micro-joining etc. Application examples; Case studies Examples of Mechatronic Systems from Robotics Manufacturing, Machine Diagnostics, Road vehicles and Medical Technology.

Module V:

Control Components and Sensors: Mechanical control by stops and cams, Solenoids, Relays; Internal Sensors, potentiometers, resolvers and encoders; External sensing: Simple touch sensing, strain sensing, tactile sensing, acoustic sensing, magnetic sensing, capacitive sensing, laser sensing & machine vision

Textbooks/References:

1. Mechatronics System Design, Devdas Shetty & Richard A. Kolk, PWS Publishing Company (Thomson Learning Inc.).
2. Mechatronics: A Multidisciplinary Approach, William Bolton, Pearson Education. 3. A Textbook of Mechatronics, R.K.Rajput, S. Chand & Company Private Limited.
3. K.S Fu, R.C. Gonzalez, C.S.G. Lee, Robotics, McGraw Hill, 1987.
4. Y. Koren, Robotics for Engineers, McGraw Hill, 1985. AICTE Model Curriculum for UG Degree Course in Mechatronics 128
5. J.J. Craig, Robotics, Addison-Wesley, 1986.
6. Saeed B. Niku, "Introduction to Robotics – Analysis, Systems and Application" : PHI 2006.
7. Richard D, Klafter, Thomason A ChmielOwski, Michel Nagin "Robotics Engg-an Integrated Approach" PHI 2005.

8. R.K. Mittal & I.J. Nagrath, “Robotics & Control” TMH-2007.
9. Saha, S.K., “Introduction to Robotics, 2nd Edition, McGraw-Hill Higher Education, New Delhi, 2014.
8. Ghosal, A., “Robotics”, Oxford, New Delhi, 2006.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Course Name	Course Code	LTP	Credit	Semester
IOT AND CLOUD COMPUTING	BRI 603	3	3	1

A.

ARNING OUTCOMES (CLO)

CLO 1	Understand the various concept of the IoT and their technologies.
CLO 2	Develop the IoT application using different hardware platforms
CLO 3	Implement the various IoT Protocols
CLO 4	Understand the basic principles of cloud computing.
CLO 5	Develop and deploy the IoT application into cloud environment

Course Objective:

The basic objective of this course is to provide the students the core knowledge of IoT and cloud computing with practical expertise.

Course Contents:

Module I:

Introduction of IoT

Introduction to IoT. Understanding IoT fundamentals, Arduino Simulation Environment. Arduino Uno Architecture, and Sensor & Actuators with Arduino and Overview of Sensors working.

Module II:

Updation in IoT Systems

Basic Networking with ESP8266 WiFi module. Basics of Wireless Networking, IoT Protocols, and Cloud Platforms for IOT with some real live minor projects.

Module III:

Cloud Computing:

Introduction, Management, storage and processing of data on networks of the internet server, and On-demand IT resources over the internet etc. Introduction to platforms such as Amazon Web Services, Microsoft Azure and Google Cloud Platform.

Module IV:

Advancement in Cloud Computing:

Brief on AWS Architecture and different models of Cloud Computing. Compute Services: AWS Lambda, Elastic Beanstalk, AWS EC2, Auto Scaling, and Load Balancing. Storage Services: Amazon EBS, Amazon S3, Amazon EFS, Amazon Glacier, Amazon Global Accelerator, Amazon FSx, and Storage Gateway.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

TEXT BOOKS:

1. Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547

2. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014, ISBN: 9789350239759

3. Raspberry Pi Cookbook, Software and Hardware Problems and solutions, Simon Monk, O'Reilly (SPD), 2016, ISBN 7989352133895

REFERENCE BOOKS:

1. Peter Waher, 'Learning Internet of Things', Packt Publishing, 2015 3. Editors Ovidiu Vermesan
2. Peter Friess,'Internet of Things – From Research and Innovation to Market Deployment', River Publishers, 2014
3. N. Ida, Sensors, Actuators and Their Interfaces, SciTech Publishers, 2014.

Course Name	Course Code	LTP	Credit	Semester
DIGITAL COMMUNICATIONS	BRI 604	3	3	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Develop a comparatively approach for analysis of various digital modulation schemes.
CLO 2	Able to calculate practical parameters for better signal reception of baseband signal.
CLO 3	Able to analysis of various techniques to transmit analog samples along, signal reception and signalling schemes.
CLO 4	Capable of analysis different digital modulations schemes and their comparison.
CLO 5	To acquire the knowledge about the multiplexing techniques used worldwide

Course Objective:

The purpose of this course is to provide a thorough introduction to digital communications with an in depth study of various modulation techniques, receiver design & performance analysis are discussed.

Module I:

Overview of Random variables and Random process: Random variables– continuous and Discrete, random process- Stationarity, Autocorrelation and power spectral density, Transmission of Random Process through LTI systems, PSD, AWGN Pulse Code Modulation (PCM): Pulse Modulation, Sampling process, Performance comparison of various sampling techniques Aliasing, Reconstruction, PAM, Quantization, Noise in PCM system Modifications of PCM: Delta modulation, DPCM, ADPCM, ADM, Performance comparison of various pulse modulation schemes, Line codes, PSD of various Line codes

Module II:

Transmission over baseband channel: Matched filter, Inter Symbol Interference (ISI), Nyquist Criteria for zero ISI, Ideal solution, Raised cosine spectrum, Eye Pattern Correlative Level Coding - Duobinary coding, precoding, Modified duobinary coding, Generalized Partial response signaling 7

Module III:

Signal Space Analysis: Geometric representation of signals, Gram Schmidt orthogonization procedure Transmission Over AWGN Channel: Conversion of the continuous AWGN channel into a vector channel, Likelihood function, Maximum Likelihood Decoding, Correlation Receiver 7

Module IV:

Digital Modulation Schemes: Pass band transmission model, Coherent Modulation Schemes- BPSK, QPSK, BFSK. Non-Coherent orthogonal modulation schemes, Differential Phase Shift Keying (DPSK) Detection of Binary modulation schemes in the presence of noise, BER for BPSK, QPSK, BFSK 9

Module V:

Pseudo–noise sequences: Properties of PN sequences. Generation of PN Sequences, generator polynomials, Maximal length codes and Gold Codes. Importance of synchronization: Carrier, frame and symbol/chip synchronization techniques. Spread spectrum communication: Direct sequence spread spectrum with coherent binary phase shift keying, Processing gain, Probability of error, Antijam Characteristics, Frequency Hop spread spectrum with MFSK, Slow and Fast frequency hopping. 9

Module VI:

Multipath channels: classification, Coherence time, Coherence bandwidth, Statistical characterization of multi path channels, Binary signalling over a Rayleigh fading channel. Diversity techniques: Diversity in time, frequency and space. Multiple Access Techniques: TDMA, FDMA, CDMA and SDMA – RAKE receiver, Introduction to Multicarrier communication- OFDM

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text/reference books:

1. T/R BOOK TITLE/AUTHORS/PUBLICATION 1 John G. Proakis, Masoud Salehi, Digital Communication, McGraw Hill Education Edition, 2014
2. Nishanth N, Digital Communication, Cengage Learning India , 2017
3. Ramakrishna Rao, Digital communication, Tata McGraw Hill Education Pvt. Limited.
4. Simon Haykin, Communication Systems, 4/e Wiley India, 2012.
5. Couch: Analog and Digital Communication. 8e, Pearson Education India, 2013.
6. H.Taub and Schilling Principles of Communication Systems, , TMH, 2007
7. K.Sam Shanmugham, Digital and Analog Communication Systems, John Wiley & Sons
8. Pierre Lafrance ,Fundamental Concepts in Communication, Prentice Hall India.
9. Sheldon.M.Ross, "Introduction to Probability Models", Academic Press, 7th edition.
10. Sklar: Digital Communication, 2E, Pearson Education
11. T L Singal, Digital Communication, McGraw Hill Education (India) Pvt Ltd, 2015

Course Name	Course Code	LTP	Credit	Semester
TOOLS AND TECHNIQUE FOR DATA SCIENCE	**BRI** 605	3	3	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will develop relevant **programming** abilities.
CLO 2	Students will demonstrate proficiency with statistical **analysis of data**
CLO 3	Students will develop the ability to build and assess data-based **models**.
CLO 4	Students will execute statistical analyses with professional statistical **software**.
CLO 5	Students will demonstrate skill in **data management**. Students will apply data science concepts and methods to **solve** problems in real-world contexts and
CLO 6	will **communicate** these solutions effectively

Course Objective:

Students will learn how Data Science Helps Scale Predictive Models & Adjust Fraudulent Claims. Use a Diverse Set of Tools and Techniques on the IBM Data Science Platform. Interactive Content. Deploy Models Faster. Modernized Dashboarding. Simple Intuitive UI and Smarter Capabilities.

Course Contents:

Module I:

The concept of data types; variables, assignments; immutable variables; numerical types; arithmetic operators and expressions; comments in the program; and understanding error messages.

Module II:

Introduction to D3, MATLAB, Excel, ggplot2, Tableau and some more relevant tools and concepts used in Data Science.

Module III:

Scientific methods, processes, algorithms, and systems to gather knowledge and some live projects work on the same using most popular tool such as SAS and MatLab.

Module IV:

Flexible and user-friendly tools handling. Various business analytics tools and techniques like Python, R, SAS, Tableau, Statistical concepts, and building of analytical models on experimental level.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text:

Dhar, V. (2013). "Data science and prediction". Communications of the ACM. 56 (12): 64–73. doi:10.1145/2500499. S2CID 6107147. Archived from the original on 9 November 2014. Retrieved 2 September 2015.
Jeff Leek (12 December 2013). "The key word in "Data Science" is not Data, it is Science". Simply Statistics. Archived from the original on 2 January 2014. Retrieved 1 January 2014.

References:

Hayashi, Chikio (1 January 1998). "What is Data Science? Fundamental Concepts and a Heuristic Example". In Hayashi, Chikio; Yajima, Keiji; Bock, Hans-Hermann; Ohsumi, Noboru; Tanaka, Yutaka; Baba, Yasumasa (eds.). Data Science, Classification, and Related Methods. Studies in Classification, Data Analysis, and Knowledge Organization. Springer Japan. pp. 40–51. doi:10.1007/978-4-431-65950-1_3. ISBN 9784431702085.
Cao, Longbing (29 June 2017). "Data Science: A Comprehensive Overview". ACM Computing Surveys. 50 (3): 43:1–43:42. doi:10.1145/3076253. ISSN 0360-0300

Course Name	Course Code	LTP	Credit	Semester
DEEP LEARNING	**BRI** 606	3	3	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	To present the mathematical, statistical, and computational challenges of building neural networks
CLO 2	To study the concepts of deep learning
CLO 3	To introduce dimensionality reduction techniques
CLO 4	To enable the students to know deep learning techniques to support real-time applications
CLO 5	To examine the case studies of deep learning techniques

Course Objective:

This course covers the basics of machine learning, neural networks, and deep learning. Model for deep learning technique and the various optimization and generalization mechanisms are included. Major topics in deep learning and dimensionality reduction techniques are covered. The objective of this course is:

Module I:

Introduction to machine learning- Linear models (SVMs and Perceptrons, logistic regression)- Intro to Neural Nets: What a shallow network computes- Training a network: loss functions, back propagation, and stochastic gradient descent- Neural networks as universal function approximates

Module II:

History of Deep Learning- A Probabilistic Theory of Deep Learning- Backpropagation and regularization, batch normalization- VC Dimension and Neural Nets-Deep Vs Shallow Networks Convolutional Networks- Generative Adversarial Networks (GAN), Semi-supervised Learning

Module III: Dimensionality Reduction

Linear (PCA, LDA) and manifolds, metric learning - Auto encoders and dimensionality reduction in networks - Introduction to Convnet - Architectures – AlexNet, VGG, Inception, ResNet - Training a Convnet: weights initialization, batch normalization, hyperparameter optimization

Module IV: Optimization and Generalization

Optimization in deep learning– Non-convex optimization for deep networks- Stochastic Optimization Generalization in neural networks- Spatial Transformer Networks- Recurrent networks, LSTM - Recurrent Neural Network Language Models- Word-Level RNNs & Deep Reinforcement Learning - Computational & Artificial Neuroscience

Module V: **Case Study and Applications**

ImageNet- Detection-Audio WaveNet-Natural Language Processing Word2Vec - Joint DetectionBioInformatics- Face Recognition- Scene Understanding- Gathering Image Captions

Examination Scheme:

Components	**A**	**CT**	**S/V/Q**	**HA**	**EE**
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text/Reference Books:

1. Cosma Rohilla Shalizi, Advanced Data Analysis from an Elementary Point of View, 2015.
2. Deng & Yu, Deep Learning: Methods and Applications, Now Publishers, 2013.
3. Ian Goodfellow, Yoshua Bengio, Aaron Courville, Deep Learning, MIT Press, 2016.
4. Michael Nielsen, Neural Networks and Deep Learning, Determination Press, 2015.

Course Code: **Credit Units: 03**

Course Name	Course Code	LTP	Credit	Semester
INDUSTRIAL IOT 4.0	**BRI** 607	3	3	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Comprehend Business model innovation through Industry 4.0
CLO 2	Comprehend IoT, cyber-physical systems, cloud computing and big data, smart factories and their role in Industry 4.0
CLO 3	Understand drivers and enablers of Industry 4.0, including policy support
CLO 4	Understand the nature of the fourth industrial revolution and theoretical concept
CLO 5	Understand the opportunities, and challenges brought through Industry 4.0

Course Objective:

Industrial IoT is next generation multi-purpose concepts that allows different users to create applications of various domains with respect to personal and industrial domain and expertise. Students will be able to learn primary fundamentals of various programming languages and potential of those is to achieve modern computing requirements

Course Contents:

Module I:

Introduction to Arduino, ESp8266, Introduction to raspberry Pi. · 2. Measurement of temperature & pressure values of the process.

Module II:

Basics of Networking, Communication Protocols, Sensor Networks and some live project terminal concepts related to the above said domains.

Module III:

Analytics and applications, Business information from raw data; storage for the data , IIoT devices etc.

Module IV:

Introduction to Industrial Internet of Things, Using Sensor data mining and analytics, Designing and developing various IIoT systems and Various Industrial cloud platforms.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text:

Boyes, Hugh; Hallaq, Bil; Cunningham, Joe; Watson, Tim (October 2018). "The industrial internet of things (IIoT): An analysis framework". Computers in Industry. 101: 1–12. doi:10.1016/j.compind.2018.04.015. ISSN 0166-3615.
"Why Edge Computing Is an IIoT Requirement: How edge computing is poised to jump-start the next industrial revolution". iotworldtoday.com. Retrieved 2019-06-03.

References:

"Target Hackers Broke in Via HVAC Company — Krebs on Security". krebsonsecurity.com. Retrieved 11 May 2017.
Mullin, Rick (22 May 2017). "The drug plant of the future". Chemical & Engineering News. Vol. 95, no. 21. Retrieved 29 October 2018.

ROBOTICS MOTOR AND DRIVES LAB

Course Code: BRI 621 **Credit Units: 01**

Course Objective:

The course aims to introduce them to the theory of operation, analytical and circuit models and basic design concepts of Robotics motors and drives systems.

List of Experiments:

1. Introduction to LabVIEW with live examples
2. Hands on LabVIEW for finding Robotic parameters
3. Overview and hands on DaNI for finding in IoT.
4. Hands on DaNI
5. Ultrasonic Transducer Characterization
6. Hands on for finding DoF in UT
7. Characterization with the Roaming VI Graph
8. Calibrating PING’s Orientation
9. Calibrating PING’s File IO

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

Text & References:

Text book

Deh S R., "Robotics Technology and Flexible Automation", Second Edition TataMcGraw Hill Publishing, Company Ltd., 2010.

Reference book

Mikell P Grooveret. al., "Industrial Robots - Technology, Programming and Applications", McGraw Hill, New York, 2012**.**

Saeed B Niku," Introduction to Robotics Analysis,Systems,Applications""PHI Pvt.

MECHATRONICS AND ROBOTICS APPLICATION LAB

Course Code: **BRI** 622 **Credit Units: 01**

List of Experiments:

1. Familiarization with the following components: CRO, transformer, function generator, Multimeter, power supply.
2. Familiarization with the following mechanical components: gears, gear train, bearings, couplings, tachometer
3. To measure the characteristics of LVDT using linear displacement trainer kit.
4. To introduce different types of robotics and demonstrate them to identify different parts and components.
5. Study the major equipment/Software/Components in Robotics Lab, e.g. Robotic Arm components, Arena etc.
6. Study components of a real robot and its DH parameters.
7. Integration of assorted sensors (IR, Potentiometer, strain gages etc.), micro controllers and ROS (Robot Operating System) in a robotic system
8. Determination of maximum and minimum position of links.
9. Study Forward kinematics and validation. 3. Study Inverse kinematics o and validation.
10. Measure the knowledge of Robotic arm, material handling, Scorable Software and Homing and Moving Robot
11. Recoding Robot positions (Absolute positions, Delete Positions, Save and load positions and Move the Robot to recorded positions.)
12. Verification of transformation (Position and orientation) with respect to gripper and world coordinate system.
13. Robot Programming and Simulation using linear and nonlinear paths.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

Text/Reference Books:

1. Bolton, “Mechatronics”, Pearson, Singapore.
2. Mahalik, “Principles, concepts and applications Mechatronics”, TMH.
3. Ramesh Gaonkar, “Introduction to 8085-PENRAM”, International Publishing.
4. Muzumdar, “Pneumatics” –Tata McGraw-Hill Education.
5. Saha, S.K., “Introduction to Robotics, 2nd Edition, McGraw-Hill Higher Education, New Delhi, 2014.
6. Richard D, Klafter, Thomason A ChmielOwski, Michel Nagin “Robotics Engg-an Integrated Approach” PHI 2005.
7. R.K. Mittal & I.J. Nagrath, “Robotics & Control” TMH-2007

IOT AND CLOUD COMPUTING LAB

Course Code: **BRI** 623 **Credit Units: 01**

List of Experiments:

1. Study of AT89S52 Ultra Development Kit
2. Study of AT89S52 Ultra Development Kit with Development Tool
3. Environment of Kiel Software for Microcontroller programming.
4. To familiarize with Intel Galileo Gen2 board.
5. Understand the procedure of creation and compilation of C source code.
6. Wifi module interfacing with Intel Galileo Gen2 Board.
7. To study of IoT Data Logging using Beaglebone Black and Thingspeak.
8. Turn your smartphone into an IoT device using the IBM Watson IoT.
9. Platform cloud-hosted service.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

Text & References:

TEXT BOOKS:

1. Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547
2. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014, ISBN: 9789350239759
3. Raspberry Pi Cookbook, Software and Hardware Problems and solutions, Simon Monk, O'Reilly (SPD), 2016, ISBN 7989352133895

REFERENCE BOOKS:

1. Peter Waher, 'Learning Internet of Things', Packt Publishing, 2015 3. Editors Ovidiu Vermesan
2. Peter Friess,'Internet of Things – From Research and Innovation to Market Deployment', River Publishers, 2014
3. N. Ida, Sensors, Actuators and Their Interfaces, SciTech Publishers, 2014.

Digital Communications lab

Course Code : BRI 624 **Credit Units: 03**

List of Experiments:

1. Verification of Sampling Theorem.
2. Study of generation of Unipolar NRZ, Polar NRZ, Unipolar RZ and Polar RZ line code.
3. Study of generation and detection of Pulse Code Modulation (PCM).
4. Study of generation and detection of Delta Modulation.
5. Study of generation and detection of Amplitude Shift Keying (ASK).
6. Study of generation and detection of Phase Shift Keying (PSK).
7. Study of generation and detection of Frequency Shift Keying (FSK).
8. Analysis of the process of Time Division Multiplexing and demultiplexing.

Course Contents:

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE - External Exam, PR- Performance, LR – Lab Record, V – Viva.

Text & References:

1. Simon Haykin: “Digital Communication”, John Wiley / 4th Ed.
2. Bernard SKLAR: “Digital communication”, Pearson education.
3. Lathi, B.P / “Modern Digital & Analog Communication Systems” / Oxford University Press /.
4. Prokis J.J / “Digital Communications” / McGraw Hill /
5. Wayne Tomasi: ”Electronic Communication systems”, Pearson Education,5th edition
6. Principles of Communications By Taub and Schilling

Course Name	Course Code	LTP	Credit	Semester
COMMUNICATION SKILLS - IV	**BCS 601**	1	1	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Create right selection of words and ideas while also choosing the appropriate channelof formalcommunication.
CLO 2	Demonstrate the ability to analyse a problem and devise a solution in a group.
CLO 3	Demonstrate proficiency in the use of written communication.
CLO 4	Recognize the mannerisms and methodology of Interview and GD to become more expressive in their body language and verbal performance.
CLO 5	Create right selection of words and ideas while also choosing the appropriate channelof formalcommunication.

Course Objective:

To enhance the skills needed to work in an English-speaking global business environment.

Course Contents:

Module I: Business/Technical Language Development

Advanced Grammar: Syntax, Tenses, Voices

Advanced Vocabulary skills: Jargons, Terminology, Colloquialism

Individualised pronunciation practice

Module II: Social Communication

Building relationships through Communication

Communication, Culture and Context

Entertainment and Communication

Informal business/ Technical Communication

Module III: Business Communication

Reading Business/ Technical press

Listening to Business/ Technical reports (TV, radio)

Researching for Business /Technology

Module IV: Presentations

Planning and getting started

Design and layoutof presentation

Information Packaging

Making the Presentation

Examination Scheme:

Components	**A**	**CT**	**S/V/Q**	**HA**	**EE**
Weightage (%)	5	15	5	5	70

CAF – Communication Assessment File

GD – Group Discussion

GP – Group Presentation

Text & References:

- Business Vocabulary in Use: Advanced Mascull, Cambridge
- Business Communication, Raman – Prakash, Oxford
- Business Communications, Rodgers, Cambridge
- Working in English, Jones, Cambridge
- New International Business English, Jones/Alexander, Cambridge

Course Code: **Credit Units: 01**

Course Name	Course Code	LTP	Credit	Semester
BEHAVIOURAL SCIENCE - (STRESS AND COPING STRATEGIES)	**BSS 604**	1	1	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Identify stress and that an individual come across.
CLO 2	Recognize the causes of stress in their lives.
CLO 3	Analyze symptoms and how they are affecting lives.
CLO 4	Create ways to effectively cope with it.
CLO 5	Identify stress and that an individual come across.
CLO 6	

Course Objective:

To develop an understanding the concept of stress its causes, symptoms and consequences.
To develop an understanding the consequences of the stress on one's wellness, health, and work performance.

Course Contents:

Module I: Stress
Meaning & Nature
Characteristics
Types of stress

Module II: Stages and Models of Stress
Stages of stress
The physiology of stress
Stimulus-oriented approach.
Response-oriented approach.
The transactional and interact ional model.
Pressure – environment fit model of stress.
Module III: Causes and symptoms of stress
Personal
Organizational
Environmental

Module IV: Consequences of stress

Effect of stress on performance
Individual and Organizational consequences with special focus on health
Module V: Strategies for stress management
Importance of stress management
Healthy and Unhealthy strategies
Peer group and social support
Happiness and well-being
Module VI: End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

- Blonna, Richard; Coping with Stress in a Changing World: Second edition
- Pestonjee, D.M, Pareek, Udai, Agarwal Rita; Studies in Stress And its Management
- Pestonjee, D.M.; Stress and Coping: The Indian Experience
- Clegg, Brian; Instant Stress Management – Bring calm to your life now

Course Name	Course Code	LTP	Credit	Semester
FRENCH - VI	**FLT 601**	2	2	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of advance level.
CLO 3	Students will be able to communicate with complex sentences.

Course Objective:

To strengthen the language of the students both in oral and written so that they can:

i) express their sentiments, emotions and opinions, reacting to information, situations;

ii) narrate incidents, events ;

iii) perform certain simple communicative tasks.

Course Contents:

Module D: pp. 157 – 168 – Unité 12

Unité 12: s'évader

1. présenter, caractériser, définir
2. parler de livres, de lectures
3. préparer et organiser un voyage
4. exprimer des sentiments et des opinions
5. téléphoner
6. faire une réservation

Contenu grammatical:

1. proposition relative avec pronom relatif "qui", "que", "où" - pour caractériser
2. faire + verbe

Examination Scheme:

Components	**CT1**	**CT2**	**C**	**I**	**V**	**A**
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

Text & References:

- le livre à suivre : Campus: Tome 1

Course Name	Course Code	LTP	Credit	Semester
GERMAN - VI	**FLG 601**	2	2	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of advance level.
CLO 3	Students will be able to communicate with complex sentences.

Course Objective:

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.

To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany

Introduction to Advanced Grammar and Business Language and Professional Jargon

Course Contents:

Module I: Adjective endings

Adjective endings in all the four cases discussed so far

Definite and indefinite articles

Cases without article

Module II: Comparative adverbs

Comparative adverbs as and like

Module III: Compound words

To learn the structure of compound words and the correct article which they take

Exploring the possibility of compound words in German

Module IV: Infinitive sentence

Special usage of 'to' sentences called zu+ infinitive sentences

Module V: Texts

A Dialogue: 'Ein schwieriger Gast'

A text: 'Abgeschlossene Vergangenheit'

Module VI: Comprehension texts

Reading and comprehending various texts to consolidate the usage of the constructions learnt so far in this semester.

Module VII: Picture Description

Firstly recognize the persons or things in the picture and identify the situation depicted in the picture;

Secondly answer questions of general meaning in context to the picture and also talk about the personal experiences which come to your mind upon seeing the picture.

Examination Scheme:

Components	CT1	CT2	C	I	V	A

Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

Course Name	Course Code	LTP	Credit	Semester
SPANISH – VI	**FLS 601**	2	2	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of advance level.
CLO 3	Students will be able to communicate with complex sentences.

Course Objective:

To enable students acquire working knowledge of the language; to give them vocabulary, grammar, voice modulations/intonations to handle everyday Spanish situations in Present as well as in Present Perfect Tense with ease.

Course Contents:

Module I

Revision of the earlier modules

Module II

Present Perfect Tense

Module III

Commands of irregular verbs

Module IV

Expressions with **Tener que** and **Hay que**

Module V

En la embajada

Emergency situations like fire, illness, accident, theft

Examination Scheme:

Components	**CT1**	**CT2**	**C**	**I**	**V**	**A**
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

Text & References:

- Español, En Directo I A
- Español Sin Fronteras

Course Name	Course Code	LTP	Credit	Semester
CHINESE – VI	**FLC 601**	2	2	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of advance level.
CLO 3	Students will be able to communicate with complex sentences.

Course Objective:

Chinese emperor Qin Shi Huang – Ti who built the great wall of China also built a network of 270 palaces, linked by tunnels, and was so afraid of assassination that he slept in a different palace each night. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I

Drills
Dialogue practice
Observe picture and answer the question.
Pronunciation and intonation.
Character writing and stroke order.

Module II

Going out to see a science exhibition
Going to the theatre.
Train or Plane is behind schedule.
Indian Economy-Chinese Economy
Talking about different Seasons of the Year and Weather conditions. Learning to say phrases like-spring, summer, fall, winter, fairly hot, very cold, very humid, very stuffy, neither hot nor cold, most comfortable, pleasant …. etc.

Module III

Temperature – how to say – What is the temperature in May here?

– How is the weather in summer in your area?
– Around 30 degrees
– Heating, air-conditioning
– Is winter is Shanghai very cold?

Talking about birthdays and where you were born?
The verb "shuo" (speak) saying useful phrases like speak very well, do not speak very well, if speak slowly then understand if speak fast then don't understand, difficult to speak, difficult to write, speak too fast, speak too slow, listen and can understand, listen and cannot understand … etc.
Tell the following in Chinese – My name is …. I was born in … (year). My birthday is …… Today is … (date and day of the week). I go to work (school) everyday. I usually leave home at . (O'clock). In the evening, I usually ……. (do what)? At week end, I ……. On Sundays I usually …… It is today….. It will soon be my younger sisters birthday. She was born in ….. (year). She lives in ……. (where). She is working (or studying)…… where… She lives in …….. (where.)

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Elementary Chinese Reader Part-2, 3; Lesson 47-54

Course Name	Course Code	LTP	Credit	Semester
Anandam	**AND006**	**2**	2	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Awareness and empathy regarding community issues
CLO 2	Interaction with the community and impact on society
CLO 3	Interaction with mentor and development of Student teacher relationship
CLO 4	Interaction among students, enlarge social network
CLO 5	Cooperative and Communication skills and leadership qualities
CLO 6	Critical thinking, Confidence and Efficiency

Course Objectives:

After the completion of this course, students will be able to:

17. apply their knowledge and skills to solve specific community problem
18. learn to plan, lead, and organize community events have a sense of belonging to their college campus and community and find something they are interested in doing during their free time
19. make new friends, expand social network, and boost social skills and mental health.
20. be useful to society as it will protect them against stress, frustration, and depression

Course Contents:

The project report should be guided by the mentor and shall contain:

Synopsis: clearly stating objectives and activities to be undertaken. Problem identifying and problem-solving projects to be taken up.

Details of the **Mentor and the Participants are to** be given (name of mentor, name of participants, phone number/mobile no, email, and address)

Location / community where the work was carried out

Details of Activities performed are to be given with date

Number of beneficiaries and impact on the society (the object should be to empower the community and make them self-reliant)

Photographs taken for documentation of work should be submitted

Media coverage of the projects should be attached if any

The Group Community Service Project Report will be submitted by the Student group leader under the guidance of the mentor to the Director/HoIs of the Department.

The Director/HoIs should get the best report (more than one if required) of the Group Community Service Project uploaded on the HTE website and on the University page

The Director/HoIs will forward the best report of the department to the Nodal Officer of the University.

University will forward the report to the state level committee.

GUIDELINES FOR GCSP (Group Community Service Project)
ASSIGNMENT OF ANANDAM FOR SOCIAL AWARENESS (for students)

Each member of the group shall write one blog about the decided topic of 500 words (minimum) along with any relevant photos/diagrams/statistical data (with reference).
The group member shall write his/her name at the end of the blog.
The blog shall be posted on Instagram and Facebook (apart from these any other website wherever the group seems necessary).
Print out of the blog where date of when the content is posted, number of followers, comments, name of the writer shall be visible will be taken and file will be maintained for the same.
In the cover page of the project mention heading **"Group Community Service Project"**, and the filled format of final project report given by Anandam Scheme.
For the topic chosen by the group, students are recommended to cover the following points:
Current scenario (Regional, national and international level as applicable)
Future predictions
Duty of the government
Government policies (related to the topic), if any
Duty of public
Conclusion

Evaluation Scheme:

Project Participation: 2 hours X 8 days (per month) X 4 months = 64 hours

11. C grade =32 hrs (Below 20 marks)
12. B grade >32 hrs to <=44hrs (20-30 marks)
13. A grade >44 hrs to<=54hrs (30-40 marks)
14. O grade >54 hrs to<=64hrs (40-50 marks)

Evaluation Criteria:

Respective Departmental Anandam mentors are requested to evaluate the project (out of 50) as per the following criteria:

Position and exceptions, if any, are clearly stated. The organization of the blog is completely and clearly outlined and implemented.

The body of the blog is coherently organized, original and the logic is easy to follow. There is no spelling or grammatical errors and terminology is clearly defined. Writing is clear, concise, and persuasive.

Conclusion is clearly stated. The underlying logic is explicit

Course Name	Course Code	LTP	Credit	Semester
Raspberry Pi and Its interfacing	**BRI 701**	3	3	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Wire Raspberry Pi and create a fully functional computer
CLO 2	Use Python-based IDE and trace and debug Python code on the device and Measure physical parameter using sensors.
CLO 3	Implement various communication protocols for wired and wireless communication. And Interfaces different motors and create robots

Course Objective:

This course introduces the basics of contemporary IoT application development using Swift as the development platform and a Raspberry Pi as the deployment platform. The objective of the course is to enable to the student to build an IoT application using the standard Swift tool chain and then deploy it securely using standard tools such as docker. Requirements for the course will be met by the student demonstrating an ability to develop an application which implements a docker container which can be deployed to a Raspberry Pi which interacts with a) the cloud, b) mobile devices via Bluetooth and c) its environment via GPIO input and output devices.

Course Contents:

UNIT I:
Getting Started with Raspberry Pi
Basic functionality of the Raspberry Pi board and its Processor,setting and configuring the board, differentiating Raspberry Pi from other platform like arduino, begal, asus thinker etc., Overclocking, Component overview.

UNIT II:
Introduction to Linux
Implications of an operating system on the behaviour of the Raspberry Pi, Overview of Linux and its terminal command, aptget-update, aptget-upgrade, navigating the file system and managing processes, text-based user interface through the shell, overview of graphic user interface.

UNIT III:
Programming the Raspberry Pi
Python : Introducing to Python programming language : Python Programming Environment, Python Expressions, Strings, Functions, Function Arguments, Lists, List Methods, Control Flow, Numpy, PIP (Python Installation Package) and customized libraries.C+ + programming : Basic C+ + programming approach, header file structure and library organization, Cross Compiler and its configuration.

UNIT IV:
Exploring Electronics with the Raspberry Pi
Communication facilities on raspberry Pi (I2C, SPI, UART), working with RPi I. GPIO library, Interfacing of Sensors and Actuators.
UNIT V:

Communication Using Raspberry PI
Wired and Wireless communication, TCP IP configurations, SSH, Putty Terminal usage.

UNIT VI:
Robotic Motion PI
DC, Servo, Stepper, Motor Drivers, Motor Shields, Camera Interfacing, remote data logging.
Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	5	5	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

Text:

1. Raspberry Pi 3 An Introduction to Using with PythonScratch, Javascript and more, Gary Mitnick, CreateSpace Independent Publishing Platform, 2017.

2. Raspberry Pi for Python Programmers Cookbook, Tim Cox, Packt Publishing Limited; 2nd Revised edition, 2016.

Course Name	Course Code	LTP	Credit	Semester
Cloud development IoT applications	**BRI 702**	3	3	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	To become familiar with Cloud Computing and its ecosystem
CLO 2	To learn basics of virtualization and its importance
CLO 3	To evaluate in-depth analysis of Cloud Computing capabilities
CLO 4	To give a technical overview of Cloud Programming and Services.
CLO 5	To understand security issues in cloud computing

Course Objective:

This course introduces Cloud computing to enable transformation, business development and agility in an organization.

Course Contents:

UNIT I:
Introduction to cloud computing
Introduction to Cloud Computing: Recent trends in Computing, Grid Computing, Cluster Computing, Distributed Computing, Utility Computing, Evolution of cloud computing.

UNIT II:
Architecture of cloud computing
Cloud Computing Architecture: Cloud versus traditional architecture, Infrastructure as aService(IaaS), Platform as a Service(PaaS), Software as a Service(SaaS), , Public cloud,Private cloud, Hybrid cloud, Community cloud, Google Cloud architecture, The GCP Console, Understanding projects, Billing in GCP, Install and configure Cloud SDK, Use Cloud Shell, GCP APIs.

UNIT III:
Infrastructure as a Service (IaaS):
Introduction to IaaS, Introduction to virtualization, Different approaches to virtualization, Hypervisors, Machine Image, Virtual Machine(VM), Compute Final Year B Tech Computer Engineering Syllabus Page 38 options in the cloud, Exploring IaaS with Compute Engine, Configuring elastic apps with autoscaling, Storage options in the cloud, Structured and unstructured storage in the cloud, unstructured storage using Cloud Storage, SQL managed services, Exploring Cloud SQL, Cloud Spanner as a managed service, NoSQL managed service options, Cloud Datastore, a NoSQL document store, Cloud Bigtable as a NoSQL option.

UNIT IV:
Platform as a Service (PaaS)
Introduction to PaaS, Service Oriented Architecture (SOA).Cloud Platform and Management, Exploring PaaS with App Engine, Event driven programswith Cloud Functions, Containerizing and orchestrating apps with Google Kubernetes EngineSoftware as a Service (SaaS): Introduction to SaaS, Web services, Web 2.0, Web OS, Service Management in Cloud Computing: Service Level Agreements(SLAs), Billing andaccounting, Billing in GCPActuators.

UNIT V:
Cloud Security:
Introduction to security in the cloud, the shared security model, Encryption options, Authentication and authorization with Cloud IAM, Identify Best Practices for Authorization using Cloud IAM..

UNIT VI:
Cloud Network :
Introduction to networking in the cloud, Defining a Virtual Private Cloud, Public and private IP address basics, Google's network architecture, Routes and firewall rules in the cloud, Multiple VPC networks, Building hybrid clouds using VPNs, interconnecting, and direct peering, Different options for load balancing. Protocols for IoT – Infrastructure protocol (IPV4/V6/RPL), Identification (URIs), Transport (Wifi, Lifi, BLE), Discovery, Data Protocols, Device Management Protocols. – A Case Study with MQTT/CoAP usage-IoT privacy, security and vulnerability solutions.Case studies with architectural analysis: IoT applications – Smart City – Smart Water – Smart Agriculture – Smart Energy – Smart Healthcare – Smart Transportation – Smart Retail – Smart waste management

Exam

Components	**A**	**CT**	**S/V/Q**	**HA**	**EE**
Weightage (%)	5	15	5	5	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

Text:

1. The Internet of Things: Enabling Technologies, Platforms, and Use Cases", by Pethuru Raj and Anupama C. Raman, CRC Press.
2. Adrian McEwen, Designing the Internet of Things, Wiley, 2013.
3. Judith Hurwitz, R.Bloor, M.Kanfman, F.Halper, "Cloud Computing for Dummies", Wiley,India.
4. Ronald Krutz and Russell Dean Vines, "Cloud Security", Wiley-India
5. Gautam Shroff. "Enterprise Cloud Computing", Cambridge

References:

6. Barrie Sosinsky, “Cloud Computing Bible”, Wiley India
7. Antohy T Velte, et.al, “Cloud Computing : A Practical Approach”, McGraw Hill.
8. Michael Miller, “Cloud Computing”, Que Publishing.
9. Tim Malhar, S.Kumaraswammy, S.Latif, “Cloud Security & Privacy”, SPD,O’REILLY
10. Scott Granneman, “Google Apps”, Pearson

Course Name	Course Code	LTP	Credit	Semester
Advanced Robotics	**BRI 703**	3	3	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	An ability to work professionally in mechanical systems including design, analysis, production, measurement and quality control.
CLO 2	An ability to work on diverse disciplinary tasks including manufacturing, materials, thermal, automobile, robotics, mechatronics, engineering software tools, automation and computational fluid dynamics.

Course Objective:

To understand the importance of robotics in scientific and industrial domains. To introduce mathematical aspects of robotics such as spatial transformations, kinematics, dynamics, trajectory generation, actuators, and control.

Course Contents:

Module I: Basic of robotics

Introduction to robotics; Elements of robots; Kinematics of serial and parallel robots; Velocity and static analysis of robots; Dynamics of robots; Motion planning and control; Flexible manipulators; Wheeled mobile robots; Basic concepts of industrial automation and communication protocols for PLC, DCS, SCADA systems

Module II: Advanced Concepts

Advanced concepts in robotics; Introduction to Cloud and Fog robotics.

Module III: Automation

Basic concepts of industrial automation and communication protocols for PLC, DCS, SCADA systems

Module IV: IoT

Introduction to Internet of Things, Protocols and real time applications and all other operation over arrays, matplotlib: plotting of line graph, pi chart and box plot etc.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	5	5	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

Text:

1. Bruno S and Sciavicco L, Robotics: Modelling, Planning and Control, Springer (2009).

2. John J C, Introduction to Robotics: Mechanics and Control , Addison-Wesley (1989).

References:

1. Fu K S, Ralph G and Lee C S G, Robotics: Control Sensing. Vision, and Intelligence , Tata McGraw-Hill (1987).

2. Mukhopadhyay S, Sen S and Deb A K, Industrial Instrumentation, Control and Automation, Jaico (1999).

3. Rajkumar B and Dastjerdi A V, Internet of Things: Principles and Paradigms , Morgan Kaufmann (2016).

Raspberry Pi and Its interfacing Lab

Course Code: BEC 711 Credit Units: 01

List of Experiments:

(1) Assignment On Introduction to Robot Configuration

(2) Demonstration Of Robot With 2 Dof, 3 Dof, 4 Dof Etc.

(3) Two Assignments on Programming the Robot for Applications

(4) Two Assignments on Programming the Robot for Applications

(5) Two Programming Exercises for Robots

(6) Two Case Studies of Applications in Industry

(7) Exercise On Robotic Simulation Software

Examination Scheme:

IA				EE		
A	Practical (Mid-Term)	PR	V	LR	PR (End Term)	V

5	20	10	15	10	25	15

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

Cloud development IoT applications lab

Course Code: BEC 722 **Credit Units: 01**

List of Experiments:

1. Install Oracle Virtual box and create two VMs on your laptop.
2.Install Turbo C in guest OS and execute C program.
3. Test ping command to test the communication between the guest OS and Host OS
4. Install Hadoop single node setup.
5. Hopkinson‘s test on DC shunt machines
6.Develop hadoop application to count no of characters, no of words and each
character frequency.
7.Develop hadoop application to process given data and produce results such as
finding the year of maximum usage, year of minimum usage.
8.Develop hadoop application to process given data and produce results such as
how many female and male students in both schools the results should be in
following format.
GP-F #number
GP-M #numbers
MS-F #number
MS-M #number
9.Establish an AWS account. Use the AWS Management Console to launch an EC2
instance and connect to it.
10. Design a protocol and use Simple Queue Service(SQS)to implement the barrier
synchronization after the first phase
11. Use the Zookeeper to implement the coordination model in

Problem 10.
12 Develop a Hello World application using Google App Engine
13. Develop a Guestbook Application using Google App Engine
14.Develop a Windows Azure Hello World application using.
15.Create a Mashup using Yahoo! Pipes.

Examination Scheme:

IA				EE		
A	Practical (Mid-Term)	PR	V	LR	PR (End Term)	V
5	20	10	15	10	25	15

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

Advanced Robotics Lab

Course Code: **BDS 224** **Credit Units: 01**

List of Experiments:

(1) Assignment On Introduction to Robot Configuration

(2) Demonstration Of Robot With 2 Dof, 3 Dof, 4 Dof Etc.

(3) Two Assignments on Programming the Robot for Applications

(4) Two Assignments on Programming the Robot for Applications

(5) Two Programming Exercises for Robots

(6) Two Case Studies of Applications in Industry

(7) Exercise On Robotic Simulation Software

Examination Scheme:

IA				EE		
A	Practical (Mid-Term)	PR	V	LR	PR (End Term)	V
5	20	10	15	10	25	15

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

Course Name	Course Code	LTP	Credit	Semester
COMMUNICATION SKILLS - V	**BCS 701**	1	1	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Investigate their personal strengths and insights to be revealed in a Formal Setup of Communication.

CLO 2	Create right selection of words and ideas while choosing the appropriate channel of formal communication
CLO 3	Apply acquired knowledge with the appropriate selection of channel of formal communication.
CLO 4	Develop and empower self with the ease of using appropriate medium of communication.
CLO 5	Investigate their personal strengths and insights to be revealed in a Formal Setup of Communication.

Course Objective:

To facilitate the learner with Academic Language Proficiency and make them effective users of functional language to excel in their profession.

Course Contents:

Module I
Introduction to Public Speaking
Business Conversation
Effective Public Speaking
Art of Persuasion

Module II: Speaking for Employment
Types of Interview
Styles of Interview
Facing Interviews-Fundamentals and Practice Session
Conducting Interviews- Fundamentals and Practice Session
Question Answer on Various Dimensions

Module III
Resume Writing
Covering Letters
Interview Follow Up Letters

Module IV: Basic Telephony Skills
Guidelines for Making a Call
Guidelines for Answering a Call

Module V: Work Place Speaking
Negotiations
Participation in Meetings
Keynote Speeches

Examination Scheme:

Components	CT1	CT2	CAF	V	GD	GP	A
Weightage (%)	20	20	25	10	10	10	5

CAF – Communication Assessment File
GD – Group Discussion
GP – Group Presentation

Text & References:

Text

- Jermy Comfort, Speaking Effectively, et.al, Cambridge
- Krishnaswamy, N, Creative English for Communication, Macmillan

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Reference

- Raman Prakash, Business Communication, Oxford.
- Taylor, Conversation in Practice

Course Name	Course Code	LTP	Credit	Semester
BEHAVIOURAL SCIENCE - VII (INDIVIDUAL, SOCIETY AND NATION)	**BSS 704**	1	1	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Recognize their personality and individual differences and identify its importance of diversity at workplace and ways to enhance it.
CLO 2	Recognize effective socialization strategies and importance of patriotism and taking accountability of integrity.
CLO 3	Recognize different types of human rights and its importance.

Course Objective:

This course aims at enabling students towards:Understand the importance of individual differences..Better understanding of self in relation to society and nation,Facilitation for a meaningful existence and adjustment in society,Inculcating patriotism and national pride

Course Contents:

Module I: Individual differences & Personality
Personality: Definition& Relevance
Importance of nature & nurture in Personality Development
Importance and Recognition of Individual differences in Personality
Accepting and Managing Individual differences (adjustment mechanisms)
Intuition, Judgment, Perception & Sensation (MBTI)
BIG5 Factors

Module II: Managing Diversity
Defining Diversity
Affirmation Action and Managing Diversity
Increasing Diversity in Work Force
Barriers and Challenges in Managing Diversity

Module III: Socialization
Nature of Socialization
Social Interaction
Interaction of Socialization Process
Contributions to Society and Nation

Module IV: Patriotism and National Pride
Sense of pride and patriotism
Importance of discipline and hard work
Integrity and accountability

Module V: Human Rights, Values and Ethics
Meaning and Importance of human rights
Human rights awareness
Values and Ethics- Learning based on project work on Scriptures like- Ramayana, Mahabharata, Gita etc.

Module VI: End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

Text

- Davis, K. Organizational Behaviour,
- Bates, A. P. and Julian, J.: Sociology - Understanding Social Behaviour
- Dressler, David and Cans, Donald: The Study of Human Interaction
- Lapiere, Richard. T – Social Change

Reference

- Lindzey, G. and Borgatta, E: Sociometric Measurement in the Handbook of Social Psychology, Addison – Welsley, US.
- Rose, G.: Oxford Textbook of Public Health, Vol.4, 1985.
- Robbins O.B.Stephen;. Organizational Behaviour

Course Name	Course Code	LTP	Credit	Semester
FRENCH – VII	**FLG 701**	2	2	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of advance level.
CLO 3	Students will be able to communicate with complex sentences.

Course Contents:

Module A: Unités 1 – 3: pp. 06 - 46

Contenu lexical:

Unité 1: Rédiger et présenter son curriculum vitae
Exprimer une opinion
Caractériser, mettre en valeur
Parler des rencontres, des lieux, des gens

Unité 2: Imaginer - Faire des projets
Proposer - conseiller
Parler des qualités et des défauts
Faire une demande écrite
Raconter une anecdote
Améliorer son image

Unité 3: Exprimer la volonté et l'obligation
Formuler des souhaits
Exprimer un manque/un besoin
Parler de l'environnement, des animaux, des catastrophes naturelles

Contenu grammatical:

1. Le passé : passé composé/imparfait
2. Pronoms compléments directs/indirects, y/en (idées/choses)
3. Propositons relatives introduites par qui, que, où
4. Comparatif et superlatif
5. Le conditionnel présent
6. Situer dans le temps
7. Féminin des adjectifs
8. La prise de paroles : expressions
9. Le subjonctif : volonté, obligation

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- le livre à suivre : Campus: Tome 2

Course Name	Course Code	LTP	Credit	Semester
GERMAN - VII	**FLG 701**	2	2	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of advance level.
CLO 3	Students will be able to communicate with complex sentences.

Course Contents:

Module I: Dass- Sätze
Explain the use of the conjunction "-that", where verb comes at the end of the sentence

Module II: Indirekte Fragesätze
To explain the usage of the "Question Pronoun" as the Relative Pronoun in a Relative Sentence, where again the verb falls in the last place in that sentence.

Module III: Wenn- Sätze
Equivalent to the conditional "If-" sentence in English. Explain that the verb comes at the end of the sentence.

Module IV: Weil- Sätze
Explain the use of the conjunction "because-" and also tell that the verb falls in the last place in the sentence.

Module V: Comprehension texts
Reading and comprehending various texts to consolidate the usage of the constructions learnt so far in this semester.

Module VI: Picture Description
Firstly recognize the persons or things in the picture and identify the situation depicted in the picture;
Secondly answer questions of general meaning in context to the picture and also talk about the personal experiences which come to your mind upon seeing the picture.

Examination Scheme:

Components	**CT1**	**CT2**	**C**	**I**	**V**	**A**
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

Text
- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant - 1, 2 & 3

Reference
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

Course Name	Course Code	LTP	Credit	Semester
SPANISH - VII	**FLG 701**	2	2	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of advance level.
CLO 3	Students will be able to communicate with complex sentences.

Course Objective:

To enable students acquire working knowledge of the language; to give them vocabulary, grammar, expressions used on telephonic conversation and other situations to handle everyday Spanish situations with ease.

Course Contents:

Module I
Revision of earlier semester modules

Module II
Zodiac signs. More adjectives…to describe situations, state of minds, surroundings, people and places.

Module III
Various expressions used on telephonic conversation (formal and informal)

Module IV
Being able to read newspaper headlines and extracts (Material to be provided by teacher)

Module V
Negative commands (AR ending verbs)

Module VI
Revision of earlier sessions and introduction to negative ER ending commands, introduction to negative IR ending verbs

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

Text
- Español En Directo I A, 1B
- Español Sin Fronteras

Reference
- Material provided by the teacher from various sources

Course Name	Course Code	LTP	Credit	Semester
CHINESE – VII	FLG 701	2	2	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
CLO 2	Students will be able to read and interpret small texts of advance level.
CLO 3	Students will be able to communicate with complex sentences.

Course Contents:

Module I
Drills
Dialogue practice
Observe picture and answer the question.
About china part –I Lesson 1, 2.

Module II
Pronunciation and intonation
Character Writing and stroke order.

Module III
Ask someone what he/she usually does on weekends?
Visiting people, Party, Meeting, After work….etc.

Module IV
Conversation practice
Translation from English to Chinese and vise-versa.
Short fables.

Module V
A brief summary of grammar.
The optative verb "yuanyi".
The pronoun "ziji".

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- "Kan tu shuo hua" Part-I Lesson 1-7

Course Name	Course Code	LTP	Credit	Semester
Anandam	**AND007**	**2**	2	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Awareness and empathy regarding community issues
CLO 2	Interaction with the community and impact on society
CLO 3	Interaction with mentor and development of Student teacher relationship
CLO 4	Interaction among students, enlarge social network
CLO 5	Cooperative and Communication skills and leadership qualities
CLO 6	Critical thinking, Confidence and Efficiency

Course Objectives:

After the completion of this course, students will be able to:

21. apply their knowledge and skills to solve specific community problem
22. learn to plan, lead, and organize community events have a sense of belonging to their college campus and community and find something they are interested in doing during their free time
23. make new friends, expand social network, and boost social skills and mental health.
24. be useful to society as it will protect them against stress, frustration, and depression

Course Contents:

The project report should be guided by the mentor and shall contain:

Synopsis: clearly stating objectives and activities to be undertaken. Problem identifying and problem-solving projects to be taken up.

Details of the **Mentor and the Participants are to** be given (name of mentor, name of participants, phone number/mobile no, email, and address)

Location / community where the work was carried out

Details of Activities performed are to be given with date

Number of beneficiaries and impact on the society (the object should be to empower the community and make them self-reliant)

Photographs taken for documentation of work should be submitted

Media coverage of the projects should be attached if any

The Group Community Service Project Report will be submitted by the Student group leader under the guidance of the mentor to the Director/HoIs of the Department.

The Director/HoIs should get the best report (more than one if required) of the Group Community Service Project uploaded on the HTE website and on the University page

The Director/HoIs will forward the best report of the department to the Nodal Officer of the University.

University will forward the report to the state level committee.

GUIDELINES FOR GCSP (Group Community Service Project)
ASSIGNMENT OF ANANDAM FOR SOCIAL AWARENESS (for students)

Each member of the group shall write one blog about the decided topic of 500 words (minimum) along with any relevant photos/diagrams/statistical data (with reference).
The group member shall write his/her name at the end of the blog.
The blog shall be posted on Instagram and Facebook (apart from these any other website wherever the group seems necessary).
Print out of the blog where date of when the content is posted, number of followers, comments, name of the writer shall be visible will be taken and file will be maintained for the same.
In the cover page of the project mention heading **"Group Community Service Project"**, and the filled format of final project report given by Anandam Scheme.
For the topic chosen by the group, students are recommended to cover the following points:
Current scenario (Regional, national and international level as applicable)
Future predictions
Duty of the government
Government policies (related to the topic), if any
Duty of public
Conclusion

Evaluation Scheme:

Project Participation: 2 hours X 8 days (per month) X 4 months = 64 hours

15. C grade =32 hrs (Below 20 marks)
16. B grade >32 hrs to <=44hrs (20-30 marks)
17. A grade >44 hrs to<=54hrs (30-40 marks)
18. O grade >54 hrs to<=64hrs (40-50 marks)

Evaluation Criteria:

Respective Departmental Anandam mentors are requested to evaluate the project (out of 50) as per the following criteria:

Position and exceptions, if any, are clearly stated. The organization of the blog is completely and clearly outlined and implemented.

The body of the blog is coherently organized, original and the logic is easy to follow. There is no spelling or grammatical errors and terminology is clearly defined. Writing is clear, concise, and persuasive.

Conclusion is clearly stated. The underlying logic is explicit.

Course Name	Course Code	LTP	Credit	Semester
Project design based upon patent and copyright	BRI 801	4:0:0	24	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	To introduce fundamental aspects of Intellectual property Rights to students who are going to play a major role in development and management of innovative projects in industries.
CLO 2	To disseminate knowledge on patents, patent regime in India and abroad and registration aspects
CLO 3	To disseminate knowledge on copyrights and its related rights and registration aspects
CLO 4	To disseminate knowledge on trademarks and registration aspects
CLO 5	To disseminate knowledge on Design, Geographical Indication (GI), Plant Variety and Layout Design Protection and their registration aspects
CLO 6	To aware about current trends in IPR and Govt. steps in fostering IPR

Group Structure: Working in supervisor/mentor – monitored groups. The students plan, manage and complete a task/project/activity which addresses the stated problem. • There should be team/group of 5 -6students • A supervisor/mentor teacher assigned to individual groups Selection of

Project/Problem: The problem-based project-oriented model for learning is recommended using patent. copyright. The model begins with the identifying of a problem, often growing out of a question or "wondering". This formulated problem then stands as the starting point for learning. Student's design and analyze the problem within an articulated interdisciplinary or subject frame. A problem can be theoretical, practical, social, technical, symbolic, cultural and/or scientific and grows out of students' wondering within different disciplines and professional environments. A chosen problem has to be exemplary. The problem may involve an interdisciplinary approach in both the analysis and solving phases. By exemplarity, a problem needs to refer back to a particular practical, scientific, social and/or technical domain. The problem should stand as one specific example or manifestation of more general learning outcomes related to knowledge and/or modes of inquiry. There are no commonly shared criteria

for what constitutes an acceptable project. Projects vary greatly in the depth of the questions explored, the clarity of the learning goals, the content and structure of the activity. • A few hands-on activities that may or may not be multidisciplinary • Use of technology in meaningful ways to help them investigate, collaborate, analyze, synthesize and present their learning. • Activities may include-Solving real life problem, investigation /study and Writing reports of in depth study, field work..

Examination Scheme:	
patent/Copyright/Trademark:	40
Report	30
Viva	15
Presentation	25
Total :100	

AMITY UNIVERSITY
RAJASTHAN

AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY

(ASET)

Bachelor of Technology

in

MechatronicsEngineering
(BMT)

Programme Code:

Duration – 4 Years Full Time

(Programme Structure)

Choice Based Credit System (CBCS)

AMITY UNIVERSITY RAJASTHAN

Program Learning Outcomes – PLO

- Students will be able to apply knowledge of mathematics, science, engineering, and technology to engineering technology problems that equire the application of principles and applied procedures or methodologies.
- Students will be able to use current techniques, skills, and modern tools of mechatronics engineering technology to broadly defined engineering technology activities including proficiency in mechanical design, materials, manufacturing processes, and automation.
- Students will be able to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes.
- Students will be able to demonstrate an ability to design systems, components, or processes for broadly defined engineering technology problems.
- Students will be able to analyze the impact of engineering technology solutions in a societal and global context.
- Students will be able to manage projects related to Mechatronics Engineering in multidisciplinary environments.

Credits Summary

B.Tech-Mechatronics (Bachelor of Technology) (04 Years/ 08 Semesters)						
Semester	**Core Course (CC+PC)**	**Domain Electives (DE)**	**Value Added Course (VAC)**	**Open Electives (OE)**	**Non-Teaching Credit Courses (NTCC)**	**Total**
I	24	-	4	-	-	28
II	25	-	4	3	-	32
III	19	3	4	3		29
IV	18	3	4	3		28
V	11	3	4	3	5	26
VI	19	3	4	3		29

VII	09	3	4	-	6	22
VIII	15	3	-	-		18
Total	**140**	**18**	**28**	**15**	**11**	**212**

CC = Core Course

DE = Domain Elective

OE = Open Elective

VA = Value Added Course

NTCC = Non - Teaching Credit Courses (NTCC)

AMITY UNIVERSITY
RAJASTHAN

AMITY SCHOOL OF ENGINEERING TECHNOLOGY (ASET)

Program Name: B.Tech. – MECHATRONICS ENGINEERING

FIRST SEMESTER

Code	Title	Category	L	T	P	Credit
Core Courses						
AM101	Applied Mathematics – I	CC	3	1	-	4
AP 102	Applied Physics-I – Fields & Waves	CC	2	1	-	3
AC 203	Applied Chemistry	CC	2	1	-	3
BME 205	Elements of Mechanical Engineering	CC	2	1	-	3
BCS 104	Introduction to Computers & Programming in C	CC	2	1	-	3
BEE 105	Basics of Electrical and Electronics Engineering	CC	2	1	-	3
PracticalCourses						
AP 122	Applied Physics-I – Fields & Waves Lab	PC	-	-	2	1
AC 223	Applied Chemistry Lab	PC	-	-	2	1
BME 225	Elements of Mechanical EngineeringLab	PC	-	-	2	1
BCS 124	Programming in C Lab	PC	-	-	2	1
BEE 125	Basics of Electrical and Electronics Engineering Lab	PC	-	-	2	1
Value Added Courses						
BCS 101	English	VA	1	-	-	1
BSS 104	Behavioral Science-I Understanding Self For Effectiveness- I	VA	1	-	-	1
 FLT 101 FLG 101 FLS 101 FLC 101	Foreign Language - I French German Spanish Chinese	VA	2	-	-	2
TOTAL						**28**

AMITY UNIVERSITY
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AMITY SCHOOL OF ENGINEERING TECHNOLOGY (ASET)

Program Name: B.Tech. – MECHATRONICS ENGINEERING

SECOND SEMESTER

Code	Title	Category	L	T	P	Credit
Core Courses						
AM 201	Applied Mathematics – II	CC	3	1	-	4
AP 202	Applied Physics-II – Modern Physics	CC	2	1	-	3
BCS 203	Object Oriented Programming using C^{++}	CC	2	1	-	3
BME 204	Engineering Mechanics	CC	2	1	-	3
BME 205	Engineering Graphics	CC	1	-	-	1
BMT 205	Introduction to Engineering and Design	CC	2	-	-	2
EVS 001	Environment Studies	CC	3	1	-	4
BMT 206	Domain Workshop	CC	1	-	-	1
Practical Courses						
AP 222	Applied Physics-II – Modern Physics Lab	PC	-	-	2	1
BCS 223	Object Oriented Programming using C^{++} Lab	PC	-	-	2	1
BME 224	Engineering Mechanics Lab	PC	-	-	2	1
BME 225	Engineering Graphics Lab	PC	-	-	2	1
						25
Open Elective						
	OpenElective-1	OE	3	-	-	3
Value Added Courses						
BCS 201	English	VA	1	-	-	1
BSS 204	Behavioral Science – II Problem Solving & Creative Thinking	VA	1	-	-	1
 FLT 201 FLG 201 FLS 201 FLC 201	Foreign Language – II French German Spanish Chinese	VA	2	-	-	2
TOTAL						**32**

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AMITY SCHOOL OF ENGINEERING TECHNOLOGY (ASET)

Program Name: B.Tech. – MECHATRONICS ENGINEERING

THIRD SEMESTER

Code	Title	Category	L	T	P	Credit
Core Courses						
BMT 301	Numerical Analysis & Programming	CC	3	-	-	3
BMT 302	Mechanics of Machine	CC	2	1	-	3
BMT 303	Manufacturing Processes	CC	2	1	-	3
BMT 304	Introduction to Automation	CC	3	-	-	3
BMT 305	Microprocessor-I	CC	2	-	-	2
Practical Courses						
BMT 321	Numerical Analysis & Programming Lab	PC	-	-	2	1
BMT 322	Mechanics of Machine lab	PC	-	-	2	1
BMT 323	Manufacturing Processes Lab	PC	-	-	2	1
BMT 324	Computer Aided Drafting & Design Lab	PC	-	-	2	1
BMT 325	Microprocessor-I Lab	PC	-	-	2	1
						19
DE Electives 1: Student has to select 1 course from the list of following DE electives						
BMT 307	Alternative Source of Energy	DE	3	-	-	3
BMT 308	Computer Graphics	DE	3	-	-	
BMT 309	Electronic Devices and Circuits	DE	3	-	-	
Open Elective						
	OpenElective-2	OE	3	-	-	3
Value Added Courses						
BCS 301	Communication Skills – I	VA	1	-	-	1
BSS 304	Behavioral Science-III, Interpersonal Communication	VA	1	-	-	1
	Foreign Language - III	VA	2	-	-	2
FLT301	French					
FLG301	German					
FLS301	Spanish					
FLC301	Chinese					
TOTAL						**29**

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AMITY SCHOOL OF ENGINEERING TECHNOLOGY (ASET)

Program Name: B.Tech. – MECHATRONICS ENGINEERING FOURTH SEMESTER

Code	Title	Category	L	T	P	Credit
Core Courses						
BMT 401	Applied Thermodynamics	CC	3	-	-	3
BMT 402	Fluid Mechanics	CC	2	1	-	3
BMT 403	Metrology	CC	3	-	-	3
BMT 404	Introduction to Smart Materials	CC	2	-	-	2
BMT 405	Microprocessor-II	CC	2	-	-	2
Practical Courses						
BMT 421	Thermodynamics Lab	PC	-	-	2	1
BMT 422	Fluid Mechanics Lab	PC	-	-	2	1
BMT 423	Metrology Lab	PC	-	-	2	1
BMT 424	Measurement and Control Lab	PC	-	-	2	1
BMT 425	Microprocessor-II Lab	PC	-	-	2	1
						18
DE Electives 2: Student has to select 1 course from the list of following DE electives						
BMT 406	Materials Science and Metallurgy	DE	3	-	-	
BMT 407	Quality Control & Quality Assurance	DE	3	-	-	
BMT 408	Artificial Intelligence & Robotics	DE	3	-	-	3
Open Elective						
	OpenElective-3	OE	3	-	-	3
Value Added Courses						
BCS 401	Communication Skills - II	VA	1	-	-	1
BSS 404	Behavioral Science – IV, Relationship Management	VA	1	-	-	1
FLT 401 FLG 401 FLS 401 FLC 401	Foreign Language - IV French German Spanish Chinese	VA	2	-	-	2
TOTAL						**28**

INDUSTRIAL TRAINING – I: 6-8 Weeks

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AMITY SCHOOL OF ENGINEERING TECHNOLOGY (ASET)

Program Name: B.Tech. – MECHATRONICS ENGINEERING FIFTH SEMESTER

Code	Title	Category	L	T	P	Credit
Core Courses						
BMT 501	Machine Design – I	CC	3	-	-	3
BMT 502	Design of Mechatronics System	CC	3	-	-	3
BMT 503	Heat & Mass Transfer	CC	2	-	-	2
Practical Courses						
BMT 521	Heat & Mass Transfer Lab	CC	-	-	2	1
BMT 522	Design of Mechatronics SystemLab	CC	-	-	2	1
BMT 523	Practical Training(Evaluation)	NTCC	-	-	-	6
						16
DE Electives 3: Student has to select 1 course from the list of following DE electives						
BMT 505	Advanced Manufacturing Process	DE	3	-	-	3
BMT 506	Metal Cutting & Tool Design	DE	3	-	-	
BMT 507	Management of Manufacturing Systems	DE	3	-	-	
BMT 508	Embedded System	DE	3	-	-	
Open Elective						
	OpenElective-4	OE	3	-	-	3
Value Added Courses						
BCS 501	Communication Skills - III	VA	1	-	-	1
BSS 504	Behavioral Science –V Group Dynamics & TeamBuilding	VA	1	-	-	1
	Foreign Language – V	VA	2	-	-	2
FLT 501	French					
FLG 501	German					
FLS 501	Spanish					
FLC 501	Chinese					
TOTAL						**26**

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AMITY SCHOOL OF ENGINEERING TECHNOLOGY (ASET)

Program Name: B.Tech. – MECHATRONICS ENGINEERING SIXTH SEMESTER

Code	Title	Category	L	T	P	Credit
Core Courses						
BMT 601	*Modelling and Control of Mechatronics System*	CC	3	0	-	3
BMT 602	Electrical Machines	CC	3	0	-	3
BMT 603	Sensors and Motion Control	CC	2	1	-	3
BMT 604	Automotive Engineering	CC	3	0	-	3
BMT 605	Machine Learning and Computer vision	CC	3	0	-	3
Practical Courses						
BMT 621	*Modelling and Control of Mechatronics SystemLab*	PC	-	-	2	1
BMT 622	Electrical Machines Lab	PC	-	-	2	1
BMT 623	Sensors and Motion Control Lab	PC	-	-	2	1
BMT 624	Automotive Engineering Lab	PC	-	-	2	1
						19
DE Electives 4: Student has to select 1 course from the list of following DE electives						
BMT 607	Aerial Robots	DE	3	-	-	3
BMT 608	Industrial Instrumentation	DE	3	-	-	
BMT 609	Industrial Electronics	DE	3	-	-	
Open Elective						
	OpenElective-5	OE	3	-	-	3
Value Added Courses						
BCS 601	Communication Skill – IV	VA	1	-	-	1
BSS 604	Behavioral Science – VI, Stress & Coping Strategies	VA	1	-	-	1
	Foreign Language – VI	VA	2	-	-	2
FLT601	French					
FLG601	German					
FLS601	Spanish					
FLC601	Chinese					
TOTAL						**29**

INDUSTRIAL TRAINING – II: 6-8 Weeks

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AMITY SCHOOL OF ENGINEERING TECHNOLOGY (ASET)

Program Name: B.Tech. – MECHATRONICS ENGINEERING SEVENTH SEMESTER

Code	Title	Category	L	T	P	Credit
Core Courses						
BMT 701	Hydraulics and Pneumatics	CC	2	-	-	2
BMT 702	Computer Aided Manufacturing	CC	2	-	-	2
Practical Courses						
BMT 721	Hydraulics and Pneumatics Lab	PC	-	-	2	1
BMT 722	Computer Aided Manufacturing Lab	PC	-	-	2	1
BMT 723	Industrial Training (Evaluation)	NTCC	-	-	-	6
BMT 724	Seminar/Minor Project Stage- I	CC	-	-	-	3
						15
DE Electives 5: Student has to select 1 course from the list of following DE electives						
BMT 705	Automation in Industries	DE	3	-	-	
BMT 706	Marketing Management	DE	3	-	-	
BMT 707	Electric and Hybrid Vehicles	DE	3	-	-	
BMT 708	*Mechatronics Systems and Applications*	DE	3	-	-	
		DE	3	-	-	3
Value Added Courses						
BCS 701	Communication Skills – V	VA	1	-	-	1
BSS 704	Behavioral Science – VII, Individual Society & Nation	VA	1	-	-	1
	Foreign Language – VII	VA	2	-	-	2
FLT 701	French					
FLG 701	German					
FLS 701	Spanish					
FLC 701	Chinese					
TOTAL						**22**

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AMITY SCHOOL OF ENGINEERING TECHNOLOGY (ASET)

Program Name: B.Tech. – MECHATRONICS ENGINEERING EIGHTH SEMESTER

Code	Title	Category	L	T	P	Credit
Core Courses						
BMT 801	Robotic Process Automation	CC	3	-	-	3
Practical Courses						
BMT 811	Project Stage – II	CC	-	-	-	12
DE Electives 6: Student has to select 1 course from the list of following DE electives						
BMT 805	Fuel Cells and Applications	DE	3	-	-	3
BMT 806	Entrepreneurship Development	DE	3	-	-	
BMT 807	Flexible Manufacturing Systems	DE	3	-	-	
BMT 808	Fundamentals of Signal Processing	DE	3	-	-	
BMT 809	Automotive Sensors and Applications	DE	3	-	-	
TOTAL						**18**

28+32+29+28+26+29+22+18=212

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
APPLIED MATHEMATICS – I	AM 101	3 1 0	4	I

A. Course Learning Outcomes:

CLO 1	Investigate the basic concept about Calculus and differential equations.
CLO 2	Create an interest in finding the solution of problem, length, area, volume etc of the curve and application of Vector calculus.
CLO 3	Apply the basic concepts of Calculus to find Asymptotes, curvature, tangents & normal's, maxima & minima, partial derivatives and approximate calculation of a function.
CLO 4	Develop the formulation of the problem and differential equation, define its nature by using the fundamental of calculus and its applications.

B. Syllabus:

Module I: Differential Calculus

Successive differentiation, Leibnitz's theorem (without proof), Mean value theorem, Taylor's theorem (proof), Remainder terms, Asymptote & Curvature, Partial derivatives, Chain rule, Differentiation of Implicit functions, Exact differentials, Tangents and Normals, Maxima, Approximations, Differentiation under integral sign, Jacobians and transformations of coordinates.

Module II: Integral Calculus

Fundamental theorems, Reduction formulae, Properties of definite integrals, Applications to length, area, volume, surface of revolution, improper integrals, Multiple Integrals-Double integrals, Applications to areas, volumes.

Module III: Ordinary Differential Equations

Formation of ODEs, Definition of order, degree & solutions, ODE of first order : Method of separation of variables, homogeneous and non homogeneous equations, Exactness & integrating factors, Linear equations & Bernoulli equations, General linear ODE of n^{th} order, Solution of homogeneous equations, Operator method, Method of undetermined coefficients, Solution of simple simultaneous ODE.

C. Evaluation:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

D. Text & References:

Text:

- Differential Calculus by Shanti Narain
- Integral Calculus by Shanti Narain

References:

- Differential Equation by A.R. Forsyth
- Higher Engineering Mathematics by H.K. Dass

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
APPLIED PHYSICS - I - FIELDS AND WAVES	AP 102	2 1 0	3	I

A. Course Learning Outcomes:

CLO 1	develop an understanding of the various concepts of simple harmonic motion for with and without damping.
CLO 2	solve simple problems on simple harmonic motion and related topics.
CLO 3	explain and interpret the wave nature of light.
CLO 4	solve simple problems on the applications of wave nature of light
CLO 5	define and understand vector calculus and electromagnetics.
CLO 6	solve numerical problems on vector calculus and electromagnetic

SYLLABUS

Module I: Oscillations & Waves

Oscillations: Introduction to S.H.M. Damped Oscillations: Differential Equation and its solution, logarithmic decrement, Quality Factor, Different conditions of damping of harmonic oscillations. Forced oscillations: Amplitude and Frequency Response, Resonance, Sharpness of Resonance

Plane Progressive Waves: Differential Equation and Solution, Superposition of Progressive Waves stationary waves.

Ultrasonics: Generation and application of ultrasonicwaves.

Module II: Wave Nature of Light

Interference: Coherent Sources, Conditions of interference, Interference due to division of wavefront, Fresnels biprism Interference due to division of amplitude, Newton's rings, Interference due to thin films, .

Diffraction: Fresnel and Fraunhofer diffraction, Fraunhofer diffraction at a single slit, double slit, N Slits, Transmission grating, Rayleigh criterion and Resolving power of grating.

Polarization: Birefringence, Nicol prism, Production and analysis of plane, circularly and elliptically polarized light, Half and quarter wave plates, Optical rotation, Polarimeter.

Module III: Electromagnetics

Scalar and vector fields, gradient of a scalar field, physical significance of gradient, equipotential surface. Line, surface and volume integrals, Divergence and curl of vector field and mathematical analysis physical significance, Electric flux, Gauss' law, Proof and Applications, Gauss divergence and Stokes theorems.

Differential form of Gauss' Law, Amperes' Law, Displacement current, Faradays Law, Maxwell equations in free space & isotropic media (Integral form & differential form), EM wave propagation in free space, Poynting vector.

Evaluation:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text & References:

- Waves & oscillation, A. P. French
- Physics of waves, W. C. Elmore & M. A. Heald
- Introduction to Electrodynamics, D. J. Griffith

- Electrodynamics, Gupta, Kumar & Singh
- Optics, A. K. Ghatak
- Engineering Physics, Satya Prakash

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
APPLIED CHEMISTRY	AC 203	2 1 0	3	I

A. Course Learning Outcomes:

CLO 1	to understand the characateriziaton of materials.
CLO 2	to demonstrate the experimental techniques and methods of their area of specialization in Chemisry.
CLO 3	to use the evidence based comparative chemistry approach to explain the chemical synthesis and analysis.

B. Syllabus

Module I: Water Technology

Introduction and specifications of water,
Hardness and its determination (EDTA method only),
Alkalinity,
Boiler feed water, boiler problems – scale, sludge, priming & foaming: causes & prevention, Boiler problems – caustic embrittlement & corrosion : causes & prevention,
Carbonate & phosphate conditioning, colloidal conditioning & calgon treatment
Water softening processes : Lime – soda process, Ion exchange method,
Water for domestic use.

Module II: Fuels

Classification, calorific value of fuel, (gross and net),
Determination of calorific value of fuels, bomb calorimeter,
Solid fuels - Proximate and ultimate analysis,
Octane & Cetane No. and its significance.
Numericals on combustion

Module III: Instrumental Methods of analysis

Introduction; Principles of spectroscopy; Laws of absorbance
IR: Principle, Instrumentation, Application
UV: Principle, Instrumentation, Application
NMR: Principle, Instrumentation, Application

Module IV: Lubricants

Introduction; Mechanism of Lubrication;
Types of Lubricants; Chemical structure related to Lubrication;
Properties of lubricants; Viscosity and Viscosity Index; Iodine Value; Aniline Point; Emulsion number; Flash Point; Fire Point; Drop Point; Cloud Point; Pour Point.
Selection of Lubricants.

Module V: Corrosion

Introduction, Mechanism of dry and wet corrosion,
Types of corrosion-Galvanic, Concentration cell, soil, pitting, intergranular, waterline. Passivity.
Factors influencing corrosion.
Corrosion control.

Evaluation:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text & References:

Text:

- Engineering Chemistry- Jain and Jain
- Engineering Chemistry- Sunita Rattan
- Engineering Chemistry - Shashi Chawla

References:

- Engineering Chemistry – Dara and Dara
- Spectroscopy- Y.R Sharma
- Corrosion Engineering – Fontenna and Greene

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
ELEMENTS OF MECHANICAL ENGINEERING	BME 205	2 1 0	3	I

A. Course Learning Outcomes:

CLO 1	[Identify, formulate and solve basic mechanical engineering problems]
CLO 2	[Analyse and critically evaluate design and basic components of machines]
CLO 3	[Select and implement knowledge of modern engineering tools and techniques in engineering practice]
CLO 4	[Demonstrate awareness of use of basic mechanical tools in day to day life]

B. Syllabus

Module I: Materials: Classification of engineering material, composition of cast iron and carbon steels on iron- carbon diagram and their mechanical properties; Alloy steel and their applications; stress-strain diagram, Hooks law and modulus of elasticity. Tensile, shear, hardness and fatigue testing of materials.

Module II: Measurement:
Temperature, pressure, velocity, flow, strain, force and torque measurement, measurement by Vernier caliper, micrometer, dial gauges, slip gauges, sine-bar and combination set;

Module III: Mechanical Machines:
Introduction to Lathe, Drilling, Milling and Shaping machines, NC machine, CNC machine and DNC machine..

Module IV: Fluids: Fluid properties, pressure, density and viscosity; pressure variation with depth, static and kinetic energy; Euler and Bernouli's equation for incompressible fluids, viscous and turbulent flow, working principle of pumps, compressors and turbines,

Module V: Thermodynamics:
First and second law of thermodynamics; Formation of steam, steam properties, classification and working of boilers, efficiency & performance analysis, natural and induced draught, Refrigeration, vapor absorption & compression cycles, coefficient of perform (COP), Refrigerants

Module VI: I. C. Engines:
Construction, Nomenclature; working of two stroke & four stroke petrol & diesel IC engines, Carnot cycle and ideal efficiency; Otto and diesel cycles;

Module VII: Introduction to Fabrication Processes
Casting Process, Welding & allied process, Forging process.

Evaluation:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text & References:

- S Trymbaka Murthy (2011) Elements of Mechanical Engineering- I K International Publishing House Pvt. Ltd;
- R.K. Rajput (, 2005) Elements of Mechanical Engineering- Firewall Media
- P.K. Nag,(2005) Engineering thermodynamics- Tata McGraw-Hill Education,
- Automation, Productions systems, and computer Integrated manufacturing by Mikell P. Groover

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
INTRODUCTION TO COMPUTERS AND PROGRAMMING IN C	BCS 104	2 1 0	3	I

A. Course Learning Outcomes:

CLO 1	Attempting algorithmic solutions to problems
CLO 2	Designing and coding moderate sized programs running to the order of a few hundred lines of code
CLO 3	Reading, understanding, and modifying code written by others

Course Contents:

Module I: Introduction
Introduction to computer, history, von-Neumann architecture, memory system (hierarchy, characteristics and types), H/W concepts (I/O Devices), S/W concepts (System S/W & Application S/W, utilities). Data Representation: Number systems, character representation codes, Binary ,octal, hexadecimal and their interconversions. Binary arithmetic, floating point arithmetic, signed and unsigned numbers, Memory storage unit.

Module II: Programming in C
History of C, Introduction of C, Basic structure of C program, Concept of variables, constants and data types in C, Operators and expressions: Introduction, arithmetic, relational, Logical, Assignment, Increment and decrement operator, Conditional, bitwise operators, Expressions, Operator precedence and associativity. Managing Input and output Operation, formatting I/O.

Module III: Fundamental Features in C
C Statements, conditional executing using if, else, nesting of if, switch and break Concepts of loops, example of loops in C using for, while and do-while, continue and break. Storage types (automatic, register etc.), predefined processor, Command Line Argument.

Module IV: Arrays and Functions
One dimensional arrays and example of iterative programs using arrays, 2-D arrays Use in matrix computations. Concept of Sub-programming, functions Example of user defined functions. Function prototype, Return values and their types, calling function, function argument, function with variable number of argument, recursion.

Module V: Advanced features in C
Pointers, relationship between arrays and pointers Argument passing using pointers, Array of pointers. Passing arrays as arguments.
Strings and C string library.
Structure and Union. Defining C structures, Giving values to members, Array of structure, Nested structure, passing strings as arguments.
File Handling.

Evaluation:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text & References:

Text:
- "ANSI C" by E Balagurusamy

- Yashwant Kanetkar, “Let us C”, BPB Publications, 2nd Edition, 2001.
- Herbert Schildt, “C: The complete reference”, Osbourne McGraw Hill, 4th Edition, 2002.
- V. Raja Raman, “Computer Programming in C”, Prentice Hall of India, 1995.

***References*:**

- Kernighan & Ritchie, “C Programming Language”, The (Ansi C Version), PHI, 2nd Edition.
- J. B Dixit, “Fundamentals of Computers and Programming in ‘C’.
- P.K. Sinha and Priti Sinha, “Computer Fundamentals”, BPB publication.

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING	BEE 105	2 1 0	3	I

A. Course Learning Outcomes:

CLO 1	Develop a practical approach for analysis of resistive circuits and solution of resistive circuits with independent sources
CLO 2	Able to apply two terminal element relationships for inductors and capacitors in an electrical network.
CLO 3	Capable of analysis ofsingle phase AC circuits, the representation of alternating quantities and determining the power in these circuits.
CLO 4	To acquire the knowledge about the constructional concepts & working principles for the applications of DC machines, AC machines & measuring instruments
CLO 5	Able to identify, formulate, and solve the electrical engineering problems

Course Contents:

Module I: Basic Electrical Quantities
Basic Electrical definitions-Energy, Power, Charge, Current, Voltage, Electric Field Strength, Magnetic Flux Density, etc., Resistance, Inductance and Capacitance. Ideal Source, Independent Source and Controlled Source

Module II: Network Analysis Techniques & Theorems
Circuit Principles: Ohm's Law, Kirchoff's Current Law, Kirchoff's Voltage Law Network Reduction: Star–Delta Transformation, Source Transformation, Nodal Analysis, Loop analysis. Superposition theorem, Thevenin's Theorem, Norton's theorem and Reciprocity theorem.

Module III: Alternating Current Circuits
Peak, Average and RMS values for alternating currents, Power calculation:
reactive power, active power, Complex power, power factor, impedance, reactance, conductance, susceptance
Resonance: series Resonance, parallel resonance, basic definition of Q factor & Band-width.

Module IV: Transformers
Basic Transformer Operation principle, Construction, Voltage relations, current relations, Linear circuit models, open circuit test, short circuit test, Transformer Efficiency.

Evaluation:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text & References:

- R.J. Smith, R.C. Dorf: Circuits, devices and Systems
- B.L. Thareja: Electrical Technology : Part -1 & 2

- V. Deltoro: Electrical Engineering fundamentals
- Schaum’s Series: Electrical Circuits

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
APPLIED PHYSICS LAB - I	AP 122	0 0 2	1	I

A. Course Learning Outcomes:

CLO 1	To gain practical knowledge by applying the experimental methods to correlate with the Physics theory.
CLO 2	To learn the usage of electrical and optical systems for various measurements.
CLO 3	Apply the analytical techniques and graphical analysis to the experimental data.
CLO 4	To develop intellectual communication skills and discuss the basic principles of scientific concepts in a group.

List of Experiments:

1. To determine the wavelength of sodium light by Newton's rings method.
2. To determine the dispersive power of the material of prism with the help of a spectrometer.
3. To determine the specific rotation of sugar by Bi-quartz or Laurent half shade polarimeter.
4. To determine the speed of ultrasonic waves in liquid by diffraction method.
5. To determine the width of a narrow slit using diffraction phenomena.
6. To determine the temperature coefficient of platinum wire, using a platinum resistance thermometer and a Callender & Griffth's bridge.
7. To determine the value of specific charge (ratio of e/m) of an electron by Thomson method.
8. To determine the internal resistance of Leclanche cell with the help of Potentiometer.
9. To determine the resistance per unit length of a Carey Foster's bridge wire and also to find out the specific resistance of a given wire.
10. To plot graph showing the variation of magnetic field with distance along the aixs of a circular coil carrying current, and hence estimate the radius of the coil.
11. To determine the value of acceleration due to gravity ('g') in the laboratory using bar pendulum.
12. To determine the moment of inertia of a flywheel about its own axis of rotation.
13. To determine the density of material of the given wire with the help of sonometer.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

APPLIED CHEMISTRY LAB

Course Code: AC 223 P:02,C:01

Course Contents:

List of Experiments:

(Any 10 Experiments)

1. To determine the ion exchange capacity of a given cation exchanger.
2. To determine the temporary, permanent and total hardness of a sample of water by complexometric titration method.
3. To determine the type and extent of alkalinity of given water sample.
4. To determine the number of water molecules of crystallization in Mohr's salt (ferrous ammonium sulphate) provided standard potassium dichromate solution (0.1N) using diphenylamine as internal indicator.
5. To determine the ferrous content in the supplied sample of iron ore by titrimetric analysis against standard $K_2Cr_2O_7$ solution using potassium ferricyanide $[K_3Fe(CN)_6]$ as external indicator.
6. To determine the surface tension of a given liquid by drop number method.
7. To determine the composition of a liquid mixture A and B (acetic acid and water) by surface tension method.
8. To prepare and describe a titration curve for phosphoric acid – sodium hydroxide titration using pH-meter.
9. To find the cell constant of conductivity cell.
10. Determine the strength of hydrochloric acid solution by titrating it against standard sodium hydroxide solution conduct metrically
11. Determination of Dissolved oxygen in the given water sample.
12. To determine the total residual chlorine in water.
13. Determination of amount of oxalic acid and H_2SO_4 in 1 L of solution using N/10 NaOH and N/10 $KMnO_4$ solution.
14. Determination of viscosity of given oil by means of Redwood viscometer I.
15. To determine flash point and fire point of an oil by Pensky Martin's Apparatus
16. To determine the Iodine value of the oil.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

ELEMENTS OF MECHANICAL ENGINEERING LAB

Course Code: BME 225 **P:02,C:01**

Course Contents:

- Tensile testing of standard mild steel specimen.
- To verify Bernoulli's theorem.
- Flow measurements by venturi and orifice meters.
- Linear and angular measurement using, Vernier; Micrometer, slip gauge, dial gauge and sine-bar.
- Study of different types of boilers and mountings.
- Study of 4 – Stroke Petrol and Diesel Engines
- Study of 2 – Stroke Petrol and Diesel Engines
- To find COP of a Vapour Compression Refrigeration system
- To perform various operations on Lathe and Study of Lathe.
- ***Welding:***
  Introduction of welding processes, classification, gas welding, arc welding, resistance welding.
- ***Sheet metal working:***
  Introduction to sheet metal shop, Shearing, trimming, blanking, piercing, shaving, notching, stretch forming, nibbling coining, embossing and drawing.
- ***Casting****:*
  Introduction of casting, pattern, mould making procedures, sand mould casting, casting defects, allowances of pattern.
- ***Forging:***
  Forging-introduction, upsetting & drawing out, drop forging, press forging & m/c forging

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

PROGRAMMING IN C LAB

Course Code: **BCS 124** **P:02,C:01**

Software Required: Turbo C

Course Contents:

- C program involving problems like finding the nth value of cosine series, Fibonacci series. Etc.
- C programs including user defined function calls
- C programs involving pointers, and solving various problems with the help of those.
- File handling

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING LAB

Course Code: BEE 125 P:02, C:01

List of Experiments:

1. To verify KVL & KCL in the given network.
2. To verify Superposition Theorem.
3. To verify Maximum Power Transfer Theorem.
4. To verify Reciprocity Theorem.
5. To determine and verify RTh, VTh, RN, IN in a given network.
6. To perform open circuit & short circuit test on a single-phase transformer.
7. To study transient response of a given RLC Circuit.
8. To perform regulation, ratio & polarity test on a single-phase transformer.
9. To measure power & power factor in a three phase circuit by two wattmeter method.
10. To measure power & power factor in a three phase load using three ammeter & three voltmeter method.

Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

AMITY UNIVERSITY
RAJASTHAN

AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY (ASET)

Course Name	Course Code	LTP	Credit	Semester
General English	BCS 101	1:0:0	1	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	**Identify** the basic elements of grammar required for good and effective communication.
CLO 2	**Interpret and discuss** key ideas of grammar, diction and communication.
CLO 3	**Develop** Creative & Literary Sensitivity in all communication.
CLO 4	**Design** and create texts for a variety of purposes and audiences, evaluating and assessing the effectiveness of grammatical aspects.

B. SYLLABUS

Topic
Vocabulary development- Root Words, Affixes, Synonyms, Antonyms, One Word Substitution
Grammar: Fluency and Expression
Tenses
Voices
Tag Questions
Sentence Formation
Communication Essentials, Basics of Communication, Communication Circle

EXAMINATION SCHEME:

Components	CT/Mid-term	Project/ Presentation	Assignment 1	Quiz	Attendance	EE
Weightage (%)	15	10	10	10	5	50

SUGGESTED READINGS

- Martin Hewings, *Advance English Grammar*. Cambridge University Press
- J.V.Vilanilam. *More Effective Communication*. Response Books:NewDelhi

- Wren and Martin, *English Grammar & Comosition*. S.Chand & Co. Ltd.
- Dr. P.Prasad. *Communication Skills*.S.K.Kataria &Sons
- Kavita Sharma, *New Upgraded Encyclopedia of English Grammar & Composition.* English Edition Publishers
- Raman, Meenakshi and Sangeeta Sharma, *Technical Communication: Principles and Practice.* OUP: New Delhi, 2004.Print.
- Koneru, Aruna. *Professional Communication.* The McGraw Hill: New Delhi, 2008. Print
- Krishnaswamy N, *Creative English for Communication***.** Delh**i:** Macmillan Publishers India Ltd. Print. 2007.

BEHAVIOURAL SCIENCE - I
(UNDERSTANDING SELF FOR EFFECTIVENESS)

Course Code: BSS 104 C: 01

Course Objective:

This course aims at imparting:

- Understanding self & process of self exploration
- Learning strategies for development of a healthy self esteem
- Importance of attitudes and its effective on personality
- Building Emotional Competence

Course Contents:

Module I: Self: Core Competency
Understanding of Self
Components of Self – Self identity
Self concept
Self confidence
Self image

Module II: Techniques of Self Awareness
Exploration through Johari Window
Mapping the key characteristics of self
Framing a charter for self
Stages – self awareness, self acceptance and self realization

Module III: Self Esteem & Effectiveness
Meaning and Importance
Components of self esteem
High and low self esteem
Measuring your self esteem

Module IV: Building Positive Attitude
Meaning and nature of attitude
Components and Types of attitude
Importance and relevance of attitude

Module V: Building Emotional Competence
Emotional Intelligence – Meaning, components, Importance and Relevance
Positive and Negative emotions
Healthy and Unhealthy expression of emotions

Module VI: End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

- Organizational Behaviour, Davis, K.
- Hoover, Judhith D. Effective Small Group and Team Communication, 2002,Harcourt College Publishers
- Dick, Mc Cann & Margerison, Charles: Team Management, 1992 Edition, viva books
- Bates, A. P. and Julian, J.: Sociology - Understanding Social Behaviour
- Dressler, David and Cans, Donald: The Study of Human Interaction
- Lapiere, Richard. T – Social Change
- Lindzey, G. and Borgatta, E: Sociometric Measurement in the Handbook of Social Psychology, Addison – Welsley, US.
- Rose, G.: Oxford Textbook of Public Health, Vol.4, 1985.

- LaFasto and Larson: When Teams Work Best, 2001, Response Books (Sage), New Delhi
- J William Pfeiffer (ed.) Theories and Models in Applied Behavioural Science, Vol 2, Group (1996); Pfeiffer & Company
- Smither Robert D.; The Psychology of Work and Human Performance, 1994, Harper Collins College Publishers

French

Semester 1 Course Code: FLT 101 Credit Units: 02

Program Learning Outcomes:

- To produce global citizens speaking an International language in keeping with the institutional vision.
- To give students a platform to understand Culture and Society of a different world.
- To enhance the possibilities of jobs in MNCs established in/outside the country.

To enhance the possibilities of Studying Abroad

Course Learning Objective:

- Students will hone Basic language skills such as reading, writing, speaking, listening & interactive in the language
- Students will be able to read and interpret small texts.
- Students will be able to communicate in small sentences in writing, self introduction, family description etc.
- Students will be able to communicate in small sentences in oral, self introduction, family description etc.
- To tell ones name and to spell it
- To understand the French keyboard
- To wish/welcome/identify/name someone
- To present oneself and someone else
- To fill a form
- To ask for information
- To understand and ask simple questions

Course Contents:

Unité 1 Premiers pas en France. Page: 1-17 Leçons 0, 1, 2 & 3

Contenu Lexical:

1. Les mots transparent (en sciences)
2. Quelquesprénomsfrançais
3. La prise de contact
4. La politesse
5. Les salutations
6. La famille
7. Les présentations
8. Quelquesspécialitésscientifiques
9. Les Chiffres de 0 à 20
10. Les ordinaux
11. L'adressepostale
12. L'adresse mail
13. Le numéro de téléphone

Contenu Grammatical:

1. Les accents
2. Etre au présent
3. Les articles indéfinis
4. Les pronomspersonnels
5. Le feminin et le masculin
6. Les prépositions de lieu
7. Les articles définis
8. Avoir, étudier, habiter au présent, Les verbs du 1 er groupe au présent
9. Les adjectifspossessifs au singulier
10. Les pronomstoniques
11. L'interrogation

EXAMINATION SCHEME

Total: 100 marks

Continuous Evaluation (Total 50 Marks)					End Sem Evaluation (Total 50 Marks)
Quiz	**Mid Term Test**	**Presentation**	**Viva Voce**	**Attendance**	**End-Term Exam**
10	**15**	**10**	**10**	**5**	**50**

Text & References:

- Le Gargasson, I. Naik, S. Chaize, C. (2012) Tech French, Delhi : Goyal Publications
- Ray. A, Robert (2010) Le Petit Robert French Dicitionary, Paris: Le Robert
- Robert, Collins (2006) Collins Robert French Dictionary, Paris : Harper Collins

Foreign Language German

Semester 1:Course Code: FLG 101/111

Credit units : 02

Program Learning Outcomes :

- To produce global citizens speaking an International language in keeping with the institutional vision .
- To give students a platform to understand Culture and Society of a different world.
- To enhance the possibilities of jobs in MNCs established in/outside the country.
- To enhance the possibilities of Studying Abroad

Course Learning Objective:

- Students will hone Basic language skills such as reading, writing, speaking, listening & interactive in the language
- Students will be able to read and interpret small texts .
- Students will be able to communicate in small sentences in writing, self introduction, family description etc.
- Students will be able to communicate in small sentences in oral, self introduction, family description etc.

After successful completion of the course, students will be able to express simple vocabulary in oral and writingGerman language.

After successful completion of this semester, students will be able to:

- greeting formally and informally.
- self introduction
- countings from 1 To 100
- make simple sentences using present tense
- spelling names.
- describing objects with articles in the classroom

Course Contents:
Vocabulary:

- Personal information like age, name etc.
- Alphabets
- Greetings: Good morning, good afternoon, good evening,
- partinggood bye Etc.
- describing objects with articles in the classroom

Grammar:

- Personal Pronouns
- Use of verbs>**to be**< and >**to have**<in simple present tense
- Use of regular verbs liketo live, to go, to learn etc.
- Using definite and indefinite article in German in nominative case
- Interrogative pronouns> **who, what, where, where from, where to**<
- talk about gender, numbers and articles.
- Singular and plural

- Basic Phonetics: Consonants and Vowels

EXAMINATION SCHEME

Total: 100 marks

Continuous Evaluation (Total 50 Marks)					End Sem Evaluation (Total 50 Marks)
Quiz	**Mid Term Test**	**Presentation**	**Viva Voce**	**Attendance**	**End-Term Exam**
10	**15**	**10**	**10**	**5**	**50**

PrescribedText-Book:First 10 LessonsfromDeutschalsFremdsprache -1A, IBH & Oxford, New Delhi, 1977

References: Studio D A1 by Hermann Funk, Christina Kuhn and Silke Demme, Cornelsen, 2013

Tangram A1by Rosa Maria Dallapiazza, Eduard von Jan & Till Schoenherr, Max Hueber, 2007

Sprachtraining A1 by Rita Maria Niemann, Dong Ha Kim, Cornelsen, 2013

Dictionaries for reference: Studio D: Glossar A1 - Deutsch – Englisch, Cornelsen, 2013

http://www.duden.de/woerterbuch

Materials are given in form of photocopies if felt to be necessary

Foreign Language Spanish

Semester 1: Course Code: FLS 101/111 Credit units : 02

Program Learning Outcomes :

- To produce global citizens speaking an International language in keeping with the institutional vision .
- To give students a platform to understand Culture and Society of a different world.
- To enhance the possibilities of jobs in MNCs established in/outside the country.
- To enhance the possibilities of Studying Abroad

Course Learning Objective:

- Students will hone Basic language skills such as reading, writing, speaking, listening & interactive in the language
- Students will be able to read and interpret small texts .
- Students will be able to communicate in small sentences in writing, self introduction, family description etc.
- Students will be able to communicate in small sentences in oral, self introduction, family description etc.

After successful completion of the course, students will be able to express simple vocabulary in oral and writing. Students will be able to:

- Greet Formally and Informally
- Talk about gender, numbers and articles.
- Deal withbasicPhonetics
- Introduce oneself and others
- Talk about Professions and nationalities
- Count from 1 To 20
- Get introduced to Hispanic Culture

Course Contents:
Vocabulary: Passport Form, personal information, age, Interrogative pronouns, Alphabets, to be able to spell names, surnames, Good morning, good afternoon, Good bye Etc. different professions, countries, nationalities, languages.

Grammar:
Subject pronouns
Use of verbs SER/ESTAR/TENER in simple present tense
Use of regular AR /ER/IR ending verbs.
Llamarse y dedicarse
Simple Negativesenteses

ExaminationScheme:

Total: 100 marks

ContinuousEvaluation (Total 50 Marks)	EndSemEvaluation (Total 50 Marks)

Quiz	MidTerm Test	Presentation	Viva Voce	Attendance	End-TermExam
10	15	10	10	5	50

Text &References:

Nuevo Español Sin Fronteras (ESF1) by Jesús sánchez Lobato, Concha Moreno Garcia, Concha Moreno Garcia, Isabel Santos Gargallo, Sociedad General Española De Librería, S.A 2005

Pasaporte Nivel (A1) byMatideCerraloza Aragón, oscarCerraloza Gilli, Begoña Llovet Barquero, EdelsaGroup didascalia, S.A. 2005

Dictionaries for reference: Collins, www.wordreferences.com.

Essential materials are given in the form of photocopies.

FOREIGN LANGUAGE CHINESE

Semester I **Course Code: FLC- 101/111** **Credit Units : 02**

Program Learning Outcomes :

- To produce global citizens speaking an International language in keeping with the institutional vision .
- To give students a platform to understand Culture and Society of a different world.
- To enhance the possibilities of jobs in MNCs established in/outside the country.
- To enhance the possibilities of Studying Abroad

Aim: The Aims of Chinese language course at AUR is to equip students with the basic knowledge & skills in Chinese language so as to enable them to interact with Chinese speaking people and efficiently work in the Chinese environment and also to build a solid foundation for further studies in the language.

Course Learning Objectives:

- Students will hone Basic language skills such as reading, writing, speaking, listening & interactive in the language
- Students will be able to read and interpret small texts .
- Students will be able to communicate in small sentences in writing, self introduction, family description etc.
- Students will be able to communicate in small sentences in oral, self introduction, family description etc.

On the completion of first semester the students will be able to:

- Understand the nature and characteristics of Chinese language.
- Read Chinese Pinyin and Chinese Characters.
- Write Chinese Characters and sentences related to greetings & personal information.
- Speak Chinese dialogues related to greetings & personal information.
- Listen and understand simple Chinese words and dialogues of the text.
- Manipulate basic grammatical structures.
- Master and use most essential vocabulary items of day to day use; approx 70 Characters including 50 characters of HSK level -I.
- Understand China as a powerful nation.

COURSE CONTENT

1. Introduction to Chinese Language
2. Introduction to the Sound System , Initials and Finals
3. Table of sounds of Beijing Dialect
4. Tones
5. Writing System & Basic Strokes of Chinese Character
6. Rules of Stroke-Order of Chinese Character,
7. Expression of Greetings & Good wishes
8. Farewell
9. Asking & telling Personal Information : Name & Age
10. Personal Information : Residence
11. Personal Information : Family Members
12. Listening Skill & Practice
13. Conversation based on dialogues
14. China; an emerging world power (In English)

VOCABULARY CONTENT

Vocabulary will have approx 70 Characters including 50 characters of HSK-I level.

1. Vocab related to greetings & farewell; 你， 好，再见。。。
2。Vocab related to personal information; 名字，年纪， 家， 住，爸爸。。

GRAMMATICAL CONTENT

1. Introduction to the sound system, initials and finals, sound table & tones.
2. Basic strokes of Chinese Character & stroke- order.
3. Conjunction 和.
4. Word order in Chinese sentence.
5. Adjective Predicate sentence.
6. 是sentence type (1).
7. Interrogative sentence with 吗.
8. Attributive & structural particle 的.

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
APPLIED MATHEMATICS – II	AM 201	3 1 0	4	II

A. Course Learning Outcomes:

CLO 1	Solve system of linear equations; be familiar with the definition and properties of matrix; find the eigenvalues and eigenvectors of a square matrix.
CLO 2	Investigate the convergence of infinite series using different tests.
CLO 3	Calculate the measure of central tendency, moments, skewness and kurtosis.
CLO 4	Develop knowledge of basic discrete and continuous distributions (Binomial, Poisson, Normal) and how to work with them.
CLO 5	Apply the method to use complex variable and complex valued functions and able to perform their differentiation and integration.

Course Contents:

Module I: Linear Algebra
Hermitian and Skew Hermitian Matrix, Unitary Matrix, Orthogonal Matrix, Elementary Row Transformation, Reduction of a Matrix to Row Echelon Form, Rank of a Matrix, Consistency of Linear Simultaneous Equations, Gauss Elimination Method, Gauss-Jordan Method, Eigen Values and Eigen Vectors of a Matrix, Caley-Hamilton Theorem, Diagonalization of a Matrix, Vector Space, Linear Independence and Dependence of Vectors, Linear Transformations.

Module II: Infinite Series
Definition of Sequence, Bounded Sequence, Limit of a Sequence, Series, Finite and Infinite Series, Convergence and Divergence of Infinite series, Cauchy's Principle of Convergence, Positive Term Infinite Series, Comparison test, D'Alembert's Ratio test. Raabe's Test, Cauchy's nth root Test. Logarithmic Test, Alternating Series, Leibnitz's Test, Absolute and conditioinal convergence, Uniform Convergence, Power Series and its Interval of Convergence.

Module III: Complex Analysis
De Moivre's Theorem and Roots of Complex Numbers, Logarithmic Functions, Circular, Hyperbolic Functions and their Inverses.
Functions of a Complex Variables, Limits, Continuity and Derivatives, Analytic Function, Cauchy-Riemann Equations (without proof), Harmonic Function, Harmonic Conjugates, Conformal Mapping, Bilinear Transformations, Complex Line Integral, Cauchy Integral Theorem, Cauchy Integral Formula, Derivative of Analytic Function, Power Series, Taylor Series, Laurent Series, Zeroes and Singularities, Residues, Residue Theorem, Evaluation of Real Integrals of the Form $\int_0^{2\pi} F(\cos\theta, \sin\theta)\, d\theta$ and $\int_{-\infty}^{\infty} \frac{f(x)}{F(x)} dx$.

Module IV: Statistics and Probability
Moments, Skewness, Kurtosis, Random Variables and Probability Distribution, Mean and Variance of a Probability Distribution, Binomial Distribution, Poisson Distribution and Normal Distribution.

Evaluation:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text & References:

- Engineering Mathematics by Erwin Kreyszig.
- Engineering Mathematics by R.K. Jain and S.R.K. Iyengar.
- Higher Engineering Mathematics by H.K. Dass.
- Engineering Mathematics by B.S. Grewal.
- Differential Calculus by Shanti Narain.
- Integral Calculus by Shanti Narain.
- Linear Algebra- Schaum Outline Series.

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
APPLIED PHYSICS - II - MODERN PHYSICS	AP 202	2 1 0	3	II

A. Course Learning Outcomes:

CLO 1	Define and understand space and time and the variations in other related fundamental quantities such as mass, velocity and force.
CLO 2	Solve simple problems relating to the above concepts.
CLO 3	Explain by extending the understanding as laid down in Quantum theory to other phenomenon as observed in sub-atomic Physics and also to solve simple problems in Quantum Theory
CLO 4	Appreciate and understand the various spectra as observed during electronic transitions
CLO 5	Understand the way nature has endowed properties to materials.

Module I: Special Theory of Relativity
Michelson-Morley experiment, Importance of negative result, Inertial & non-inertial frames of reference, Einstein's postulates of Special theory of Relativity, Space-time coordinate system, Relativistic Space Time transformation (Lorentz transformation equation), Transformation of velocity, Addition of velocities, Length contraction and Time dilation, Mass-energy equivalence (Einstein's energy mass relation) & Derivation of Variation of mass with velocity,

Module II: Wave Mechanics
Wave particle duality, De-Broglie matter waves, phase and group velocity, Heisenberg uncertainty principle, wave function and its physical interpretation, Operators, expectation values. Time dependent & time independent Schrödinger wave equation for free & bound states, square well potential (rigid wall), Step potential.

Module III: Atomic Physics
Vector atom model, LS and j-j coupling, Zeceman effect (normal & anomalous), Paschen-Bach effect, X-ray spectra and energy level diagram, Moseleys Law, Lasers – Einstein coefficients, conditions for light amplification, population inversion, optical pumping, three level and four level lasers, He-Ne and Ruby laser, Properties and applications of lasers.

Module IV: Solid State Physics
Sommerfield's free electron theory of metals, Fermi energy, Introduction to periodic potential & Kronig-Penny model (Qualitative) Band Theory of Solids, Semi-conductors: Intrinsics and Extrinsic Semiconductors, photoconductivity and photovotaics, Basic aspects of Superconductivity, Meissner effect.

Evaluation:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text & References:

- Concept of Modern Physics, A. Beiser
- Applied Physics II, Agarawal & Goel
- Solid State Physics, S. O. Pallai
- Physics of Atom, Wehr & Richards

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
OBJECT ORIENTED PROGRAMMING USING C++	BCS 203	2 1 0	3	II

A. Course Learning Outcomes:

CLO 1	Understand object-oriented programming and advanced C++ concepts.
CLO 2	Improve your problem-solving skills
CLO 3	Goal: to make you a good programmer. Apply methods to analyse running time of essential data structures and estimate efficiency of the algorithms and implementations.

Syllabus:

Module I: Introduction
Review of C, Difference between C and C++, Procedure Oriented and Object Oriented Approach. Basic Concepts: Objects, classes, Principals like Abstraction, Encapsulation, Inheritance and Polymorphism. Dynamic Binding, Message Passing. Characteristics of Object-Oriented Languages. Introduction to Object-Oriented Modeling techniques (Object, Functional and Dynamic Modeling).

Module II: Classes and Objects
Abstract data types, Object & classes, attributes, methods, C++ class declaration, Local Class and Global Class, State identity and behaviour of an object, Local Object and Global Object, Scope resolution operator, Friend Functions, Inline functions, Constructors and destructors, instantiation of objects, Types of Constructors, Static Class Data, Array of Objects, Constant member functions and Objects, Memory management Operators.

Module III: Inheritance
Inheritance, Types of Inheritance, access modes – public, private & protected, Abstract Classes, Ambiguity resolution using scope resolution operator and Virtual base class, Aggregation, composition vs classification hiérarchies, Overriding inheritance methods, Constructors in derived classes, Nesting of Classes.

Module IV: Polymorphism
Polymorphism, Type of Polymorphism – Compile time and runtime, Function Overloading, Operator Overloading (Unary and Binary) Polymorphism by parameter, Pointer to objects, this pointer, Virtual Functions, pure virtual functions.

Module V: Strings, Files and Exception Handling
Manipulating strings, Streams and files handling, formatted and Unformatted Input output. Exception handling, Generic Programming – function template, class Template Standard Template Library: Standard Template Library, Overview of Standard Template Library, Containers, Algorithms, Iterators, Other STL Elements, The Container Classes, General Theory of Operation, Vectors.

Evaluation:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text & References:

Text:

- A.R. Venugopal, Rajkumar, T. Ravishanker "Mastering C++", TMH, 1997
- R. Lafore, "Object Oriented Programming using C++", BPB Publications, 2004.
- "Object Oriented Programming with C++" By E. Balagurusamy.

- Schildt Herbert, “C++: The Complete Reference”, Wiley DreamTech, 2005.

References:

- Parasons, “Object Oriented Programming with C++”, BPB Publication, 1999.
- Steven C. Lawlor, “The Art of Programming Computer Science with C++”, Vikas Publication, 2002.
- Yashwant Kanethkar, “Object Oriented Programming using C++”, BPB, 2004

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
ENGINEERING MECHANICS	BME 204	2 1 0	3	II

A. Course Learning Outcomes:

CLO 1	Able to analyse the force system and its effects.
CLO 2	Explain the nature of forces acting upon a system.
CLO 3	Evaluate the static and dynamic system's problem.

Syllabus:

Module I: Force system & Structure
Free body diagram, Equilibrium equations and applications. Plane truss, perfect and imperfect truss, assumption in the truss analysis, analysis of perfect plane trusses by the method of joints, method of section.

Module II: Friction
Static and Kinetic friction, laws of dry friction, co-efficient of friction, angle of friction, angle of repose, cone of friction, friction lock, efficiency of screw jack, transmission of power through belt, Ratio of tension, centrifugal tension, condition of maximum power transmission., Initial tension

Module III: Distributed Force
Determination of center of gravity, center of mass and centroid by direct integration and by the method of composite bodies, area moment of inertia by direct integration and composite bodies method, radius of gyration, parallel axis theorem, perpendicular axis theorem, polar moment of inertia.

Module IV: Stress Strain Analysis
Simple stress and strain: introduction, normal shear, and stresses-strain diagrams for ductile and brittle materials. Elastic constants, Strain Energy, Properties of material-strength, elasticity, stiffness, malleability, ductility, brittleness, hardness and plasticity etc; Concept of stress and strain.

Examination Scheme:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

MTE- Mid-term Examination

Text & References:

- D.S. Kumar (2009) Engineering Mechanics – S. K. Kataria & Sons
- Dr. R.K. Bansal (2008) Engineering Mechanics – Laxmi Publication
- J. L. Meriam, L. G. Kraige (2012) Engineering Mechanic-Don Fowley
- Timoshenko, Engineering Mechanics, McGraw Hill
- R. S. Khurmi, Engineering Mechanics, S. Chand Publication
- H. Shames & G. K. M. Rao, Engineering Mechanics, Pearson Education, 2006

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
ENGINEERING GRAPHICS	BME 205	1 0 0	3	II

A. Course Learning Outcomes:

CLO 1	Describe the theory of scales, engineering curves, different Projection used in engineering drawing.
CLO 2	Draw the different engineering curves, maps and projection of planes and solid accurately.
CLO 3	Identify different geometrical shape and their application used in engineering application.

Syllabus

Module 1: Scales & Curves

Representative factor, Plain Scales, Diagonal Scales, Comperative Scales and Scale of chords. Construction of ellipse, Parabola, Hyperbola, Cycloid, Epicycloid, Hypocycloid, Involutes and Spirals by various methods.

Module 2: Projection of Points & Straight lines

Projection of points, Projection of straight lines. True inclinations and true length of straight lines.

Module 3: Projection of planes and solids

Projection of circle, triangle, polygons, polyhedrons, pyramids, cylinders and cones in different positions.

Module 1: Section of solids and Isometric projections

Section of right solids by normal and inclined planes, Orthographic projection, first angle & third angle projection. Isometric scale, Isometric axes, Isometric projection from orthographic drawing.

Examination Scheme:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

MTE- Mid-term Examination

Text & References:

- Engineering Graphics – Basant Agrawal and Dr. C. M. Agrawal, Tata McGraw-Hill Publishing Company Ltd.
- Engineering Drawing – by N. D. Bhatt
- Engineering Drawing and Graphics – by Veenugopal
- Engineering Drawing – by T. Jeyopoovan

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
INTRODUCTION TO ENGINEERING AND DESIGN	BMT 205	1 0 0	3	II

A. Course Learning Outcomes:

CLO 1	Describe the theory of scales, engineering curves, different Projection used in engineering drawing.
CLO 2	Draw the different engineering curves, maps and projection of planes and solid accurately.
CLO 3	Identify different geometrical shape and their application used in engineering application.

Syllabus

Module I: -Introduction to Mechatronics System Design
Design and its objectives; Design constraints, Design functions, Design means and Design from; Role of Science, Engineering and Technology in design; Engineering as a business proposition; Functional and Strength Designs. Design form, function and strength;

Module II: Processes in Design for Mechatronics Systems
Design process- Different stages in design and their significance; Defining the design space; Analbgies and "thinking outside of the box"; Quality function deployment-meeting what the customer wants; Evaluation and choosing of a design. Design Communication; Detailed 2D drawings; Tolerance; Use of standard items in design; Research needs in design; Energy needs of the design, both in its realization and in the applications

Module III: Prototype for Mechatronics Systems
Prototyping- rapid prototyping; testing and evaluation of design; Design modifications; Freezing the design; Cost analysis. Engineering the design - From prototype to product. Planning; Scheduling; Supply chains; inventory; handling; manufacturing/construction operations; storage; packaging; shipping; marketing; feed-back on design

Module III: Quality Aspects in Mechatronic Systems
Design for "X"; covering quality, reliability, safety, manufacturing/construction, assembly, maintenance, logistics, handling; disassembly; recycling; re-engineering etc.

Evaluation:

Components	Other Components	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text & References:

Text:

- Balmer, R. T., Keat, W. D., Wise, G., and Kosky, P., Exploring Engineering, Third Edition: An Introduction to Engineering and Design - [Part 3 - Chapters 17 to 27], ISBN13: 978-0124158917 ISBN-10: 0124158919
- Haik, Y. And Shahin, M. T., Engineering Design Process, Cengage Learning, ISBN-13: 978-0-

495- 66816-9.

- Dym, C. L., Little, P. and Orwin, E. J., Engineering Design - A Project based introduction - Wiley, ISBN-978-1-118-32458-5
- Eastman, C. M. (Ed.), Design for X Concurrent engineering imperatives, 1996, XI, 489 p. ISBN 97894-011-3985-4 Springer

References:

- Pahl, G., Beitz, W., Feldhusen, J. and Grote, K. H., Engineering Design: A Systematic Approach, 3rd ed. 2007, XXI, 617p., ISBN 978-1-84628-319-2
- Voland, G., Engineering by Design, ISBN 978-93-325-3505-3, Pearson India

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
DOMAIN WORKSHOP	BMT 206	1 0 0	1	II

A. Course Learning Outcomes:

CLO 1	To get acquainted with various basic technical skills.
CLO 2	To develop and enhance relevant technical skills required in the various engineering industries and workshops

Syllabus

Module I: Introduction to workshop
Workshop layout, Importance of various sections/shops of workshop , Types of jobs done in each shop , General safety rules and work procedure in workshop.

Module II: Fitting and Carpentry Shop

Introduction , various types of woods. different types of tools, machines and accessories. various marking, measuring, cutting, holding and striking tools, different fitting operation like chipping ,filing, right angle, marking, drilling, tapping etc

Module III: Sheet Metal Shop
Introduction, Various types of tools, equipments and accessories, Different types of operations in sheet metal shop, Safety precautions.

Module IV: Welding Shop
Introduction types of welding ,ARC welding, Gas Welding, Gas Cutting. welding of dissimilar materials, Selection of welding rod material Size of welding rod and work piece, different types of flame, Elementary Symbolic representation , Safety precautions in welding safety equipments and its use in welding processes..

Examination Scheme:

Components	Other Components	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text & References:

Text:

- Elements of Workshop Technology", Vol. I 2008 and Vol. II 2010, Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy S.K., , Media promoters and publishers private limited,Mumbai.
- "Manufacturing Technology", Vol. I and Vol. II, 2017, Rao P.N., Tata McGraw Hill House.

References:

- "Workshop Technology" Vol. 1 and 2,1998 by Raghuvanshi B.S. Dhanpat Rai & Sons
- "Workshop Technology", 1998, Chapman W.A. J and Arnold E. Viva low priced student edition,
- "Workshop Practices", 2009, H S Bawa, Tata McGraw-Hill

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
APPLIED PHYSICS LAB - II	AP 222	0 0 2	1	II

A. Course Learning Outcomes:

CLO 1	To gain practical knowledge by applying the experimental methods to correlate with the Physics theory.
CLO 2	Apply the analytical techniques and graphical analysis to the experimental data.
CLO 3	To learn the usage of electrical and optical systems for various measurements.
CLO 4	To develop intellectual communication skills and discuss the basic principles of scientific concepts in a group.

APPLIED PHYSICS LAB - II

Course Code: AP 222 **P:02 C: 01**

List of Experiments:

1. To determine the wavelength of prominent lines of mercury spectrum using plane transmission grating.
2. To determine the thickness of a given wire by Wedge method.
3. To determine the wavelength of He-Ne laser light using single slit.
4. To determine the frequency of an electrically maintained tunning fork by Melde's method.
5. To study the variation of magnetic field along the axis of Helmholtz coil and to find out reduction factor.
6. To draw the V – I characteristics of a forward and reverse bias PN junction diode.
7. To determine the frequency of AC mains using sonometer.
8. To determine the energy band-gap of Germanium crystal using four probes method.
9. To draw V – I characteristics of a photocell and to verify the inverse square law of radiation.
10. To determine the acceleration due to gravity ('g') using Keter's reversible pendulum.
11. To study the characteristics of photo voltaic cell (solar cell).

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

OBJECT ORIENTED PROGRAMMING USING C++ LAB

Course Code: **BCS 223** **P:02 C: 01**

Software Required: Turbo C++

Course Contents:

- Creation of objects in programs and solving problems through them.
- Different use of private, public member variables and functions and friend functions.
- Use of constructors and destructors.
- Operator overloading
- Use of inheritance in and accessing objects of different derived classes.
- Polymorphism and virtual functions (using pointers).
- File handling.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

ENGINEERING MECHANICS LAB

Course Code: BME 224 P:02 C: 01

Course Contents:

- To verify the law of Force Polygon.
- To verify the law of Moments using Parallel Force apparatus. (Simply supported type)
- To determine the co-efficient of friction between wood and various surface (like Leather, Wood, Aluminum) on an inclined plane.
- To find the forces in the members of Jib Crane.
- To determine the mechanical advantage, Velocity ratio and efficiency of a screw jack.
- To determine the mechanical advantage, Velocity ratio and Mechanical efficiency of the Wheel and Axle
- To determine the MA, VR, of Worm Wheel (2-start)
- Verification of force transmitted by members of given truss.
- To verify the law of moments using Bell crank lever
- To find CG and moment of Inertia of an irregular body using Computation method

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

ENGINEERING GRAPHICS LAB

Course Code: BME 225 **P:02 C: 01**

List of Experiments:

- Sketching and drawing of scale & Curve
- Sketching and drawing of Cycloidal Curve
- Sketching and drawing of Involute & Spirals
- Sketching and drawing of points & line
- Sketching and drawing of projection of planes
- Sketching and drawing of projection of solids
- Sketching and drawing of intersection of surfaces
- Sketching and drawing of development of surfaces
- Sketching and drawing of orthographic and isometric projection

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

Text & References:

- M.B. Shah & B.C. Rana, Engineering Drawing, Pearson Education, 2007
- PS Gill, Engineering Drawing, Kataria Publication
- ND Bhatt, Engineering Drawing, Charotar publications
- N Sidheshwar, Engineering Drawing, Tata McGraw Hill
- CL Tanta, Mechanical Drawing, “Dhanpat Rai”

AMITY UNIVERSITY
RAJASTHAN

AMITY SCHOOL OF ENGENEERING AND TECHNOLOGY (ASET)

Course Name	Course Code	LTP	Credit	Semester
General English	BCS 201	1:0:0	1	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Participate in conversation and in small- and whole-group discussion
CLO 2	Explore and use English as medium of communication in real life situation
CLO 3	Discuss topics and themes of a reading, using the vocabulary and grammar of the lesson
CLO 4	Identify features of a reading textbook and utilize them as needed
CLO 5	Prepare and deliver organized presentations in small groups and to whole class
CLO 6	Apply sentence mechanics and master spelling of high frequency words

B. SYLLABUS

Developing Listening Skills
Developing Speaking Skills
Developing Reading Skills
Developing Writing Skills
Principles of Good Writing - L Hill
Toasted English -R. K. Narayan
On Saying Please- A G Gardiner
All the World's a Stage : Shakespeare
Where the Mind is without Fear: R N Tagore
O Captain, My Captain: W. Whitman
Psalm of Life: H. Longfellow
Go Kiss the World by Subroto Bagchi; Steve Jobs By Walter Isaacson; Rich Dad, Poor Dad by Robert Kiyosaki; The Road Ahead by Bill Gates; What You See, Is What You Get By Alan Sugar (Non detailed study; any of books)

EXAMINATION SCHEME:

Components	CT/Mid-term	Project/Presentation/ Assignment/Viva	Book Review	Quiz	Attendance	EE
Weightage (%)	15	10	10	10	5	50

SUGGESTED READINGS

Bhardwaj, Ashu. *A Course Book of English & Communication Skills*. Paragon: New Delhi,2011.

Farhanthullah, T M. *Communication Skills for Technical Students*. Orient Black PVT: 2008.

Jha, Madhulika. *Echoes.* Orient Blackswan: New Delhi, 2007.

Koneru, Aruna. *Professional Communication.* The McGraw Hill: New Delhi, 2008.

Prasad, Dr P. *The Functional Aspects of Communication Skills*.SK & Sons: New Delhi, 2003.

Raman, Meenakshi and Sangeeta Sharma, *Technical Communication: Principles and Practice*. OUP: New Delhi, 2004.

BEHAVIOURAL SCIENCE - II
(PROBLEM SOLVING AND CREATIVE THINKING)

Course Code: BSS 204 C: 01

Course Objective:

To enable the students:

- Understand the process of problem solving and creative thinking.
- Facilitation and enhancement of skills required for decision-making.

Course Contents:

Module I: Thinking as a tool for Problem Solving
What is thinking: The Mind/Brain/Behaviour
Critical Thinking and Learning:
Making Predictions and Reasoning
Memory and Critical Thinking
Emotions and Critical Thinking
Thinking skills

Module II: Hindrances to Problem Solving Process
Perception
Expression
Emotion
Intellect
Work environment

Module III: Problem Solving
Recognizing and Defining a problem
Analyzing the problem (potential causes)
Developing possible alternatives
Evaluating Solutions
Resolution of problem
Implementation
Barriers to problem solving:
Perception
Expression
Emotion
Intellect
Work environment

Module IV: Plan of Action
Construction of POA
Monitoring
Reviewing and analyzing the outcome

Module V: Creative Thinking
Definition and meaning of creativity
The nature of creative thinking
Convergent and Divergent thinking
Idea generation and evaluation (Brain Storming)
Image generation and evaluation
Debating
The six-phase model of Creative Thinking: ICEDIP model

Module VI: End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

- Michael Steven: How to be a better problem solver, Kogan Page, New Delhi, 1999
- Geoff Petty: How to be better at creativity; Kogan Page, New Delhi, 1999
- Richard Y. Chang and P. Keith, Kelly: Wheeler Publishing, New Delhi, 1998.
- Phil Lowe Koge Page: Creativity and Problem Solving, New Delhi, 1996
- J William Pfeiffer (ed.) Theories and Models in Applied Behavioural Science, Vol 3, Management (1996); Pfeiffer & Company
- Bensley, Alan D.: Critical Thinking in Psychology – A Unified Skills Approach, (1998), Brooks/Cole Publishing Company.

Semester 2 Course Code: FLT 201 (Tech French) Credit Units: 02

Course Learning Objective:

- Students will hone Basic language skills such as reading, writing, speaking, listening & interactive in the language
- Students will be able to read and interpret small texts .
- Students will be able to communicate in small sentences in writing, self introduction, family description etc.
- Students will be able to communicate in small sentences in oral, self introduction, family description etc
- To speak about the activities and hobbies
- To express ones tastes
- To excuse oneself
- To understand a mail
- To ask ones way
- To indicate the direction
- To express a wish
- To ask for information
- To give an order or a suggestion
- To read a plan of metro and RER.

Course Contents:

Unité 1 (Leçon 4) and Unité 2 Université et les grandes écoles : 18-39 Leçons 4, 5 & 6.

Contenu Lexical:

1. Les loisirs
2. Les saisons
3. Les nombres
4. Le logement et la ville
5. Les prépositions de lieu
6. Les verbes de direction
7. Les lieux de l'université
8. Les documents administratifs
9. Les expressions utiliseés en classe par le professeur
10. Quelquesraccourcis: diminutis et sigles

Contenu Grammatical:

1. Aimer, faire et savoir au present
2. La negation
3. Les adjectifs possessives au pluriel
4. Le partitifs
5. Aller au présent
6. <<il y a>>
7. L'usage des prepositions de lieu
8. Vouloir et pouvoir au présent
9. L'impératif
10. Le conditionnel de politesse

EXAMINATION SCHEME

Total: 100 marks

Continuous Evaluation (Total 50 Marks)					**End Sem Evaluation (Total 50 Marks)**
Quiz	**Mid Term Test**	**Presentation**	**Viva Voce**	**Attendance**	**End-Term Exam**
10	**15**	**10**	**10**	**5**	**50**

Text & References:

- Le Gargasson, I. Naik, S. Chaize, C. (2012) Tech French, Delhi : Goyal Publications
- Ray. A, Robert (2010) Le Petit Robert French Dicitionary, Paris: Le Robert
- Robert, Collins (2006) Collins Robert French Dictionary, Paris : Harper Collins

Foreign Language German

Semester 2:Course Code: FLG 201 **Credit units : 02**

Course Learning Objective:

- Students will hone Basic language skills such as reading, writing, speaking, listening & interactive in the language
- Students will be able to read and interpret small texts .
- Students will be able to communicate in small sentences in writing, self introduction, family description etc.
- Students will be able to communicate in small sentences in oral, self introduction, family description etc.

After successful completion of this semester, students will be able to:

- Recognizing geographical locations.
- Know famous places in Germany and Europe.
- To be able to form basic questions
- use of past participle of verb was/were and make sentences.
- able to conjugate irregular verbs
- use possessive article for the nominative case
- Use of adjectives in sentences.
- They can describe their house like number of bedroom, kitchen etc
-

Course Content:

Vocabulary

- Verb was/were
- Types of Houses and Apartments,
- State and cities
- directions like north, south etc.,
- Neighboring countries of Germany and their respective languages.
- Description of house: Bedroom, bathroom, kitchen etc.

Grammar:

- Interrogatives – what, which, why, how, who, when
- Yes - no question
- Introduction of irregular verbs
- Article in accusative (definite and indefinite)
- Possessive article

EXAMINATION SCHEME

Total: 100 marks

Continuous Evaluation (Total 50 Marks)					End Sem Evaluation (Total 50 Marks)
Quiz	Mid Term Test	Presentation	Viva Voce	Attendance	End-Term Exam
10	15	10	10	5	50

PrescribedText-Book: Lesson 11 onwardsfromDeutschalsFremdsprache -1A, IBH & Oxford, New Delhi, 1977

References: **Studio D A1** by Hermann Funk, Christina Kuhn and Silke Demme, Cornelsen, 2013

Tangram A1by Rosa Maria Dallapiazza, Eduard von Jan & Till Schoenherr, Max Hueber, 2007
SprachtrainingA1 by Rita Maria Niemann, Dong Ha Kim, Cornelsen, 2013
Dictionaries for reference: **Studio D: Glossar** A1 - Deutsch –Englisch, Cornelsen, 2013
http://www.duden.de/woerterbuch
Materials are given in form of photocopies if felt to be necessary

Foreign Language Spanish

Semester 2: **Course Code: FLS 201 Credit units : 02**

Course Learning Objective:

- Students will hone Basic language skills such as reading, writing, speaking, listening & interactive in the language
- Students will be able to read and interpret small texts .
- Students will be able to communicate in small sentences in writing, self introduction, family description etc.
- Students will be able to communicate in small sentences in oral, self introduction, family description etc.
- To enhance all five skills of the language: Reading, Writing, Listening, Interacting and speaking.
- Adjectives to describe people
- To talk about locations and places.
- To be able to form basic questions
- Counting till 100
- To be able to speak about daily Routine and verbs of daily usage both regular & irregular verbs.

Course Content:
Vocabulary:

Home, Classroom, Neighborhood, hotel, Restaurant, Market, Days name, Months name, Colors names etc. Interrogatives.

Grammar:

Use of SER/ESTAR/TENER/ HAY
Difference between Estar and Hay
Demonstrative pronouns
Interrogatives – what, which, why, how, who, when
Introduction of irregular verbs
Possessive pronouns

ExaminationScheme:

Total: 100 marks

ContinuousEvaluation (Total 50 Marks)					EndSemEvaluation (Total 50 Marks)
Quiz	MidTerm Test	Presentation	Viva Voce	Attendance	End-TermExam
10	15	10	10	5	50

Skills Evaluated: Writing, Comprehension, grammar, and Vocabulary
Text &References:
Nuevo Español Sin Fronteras (ESF1) by Jesús sánchez Lobato, Concha Moreno Garcia, Concha Moreno Garcia, Isabel Santos Gargallo, Sociedad General Española De Librería, S.A 2005
Pasaporte Nivel (A1) byMatideCerraloza Aragón, oscarCerraloza Gilli, Begoña Llovet Barquero, EdelsaGroup didascalia, S.A. 2005
Dictionaries for reference: Collins, www.wordreferences.com.
Essential materials are given in the form of photocopies.

FOREIGN LANGUAGE CHINESE

Semester - II **Course Code: 201** **Credit Units: 02**

Course Learning Objectives:

- Students will hone Basic language skills such as reading, writing, speaking, listening & interactive in the language
- Students will be able to read and interpret small texts .
- Students will be able to communicate in small sentences in writing, self introduction, family description etc.
- Students will be able to communicate in small sentences in oral, self introduction, family description etc.

On the completion of second semester the students will be able to:

- Read Chinese words, phrases and simple sentences both in Pin Yin and Characters.
- Write Chinese Characters and sentences.
- Speak Chinese dialogues with correct pronunciation & tone.
- Listen and understand simple Chinese words and dialogues used in syllabi.
- Manipulate basic grammatical structures such as questions type (2), 有 sentence, verbal predicate, 们， numeration, time etc.
- Master and use most essential vocabulary items of day to day use; approx 110 Characters including 50 characters of HSK level -I.
- Understand Sino-Indian Relations.

COURSE CONTENT

1. Personal information : hobbies & habits
2. Personal information : abilities
3. Expression of gratitude
4. Expression of apology
5. Numbers & currencies
6. Expression of time
7. Description of weather
8. Description of direction,
9. Listening of dialogues
10. Conversation based on dialogues
11. Chinese CBT package /video clipping
12. Sino-Indian relations (in English)

VOCABULARY CONTENT

Vocabulary will include approx 110 Characters including 50 Characters of HSK-I level.

1. Vocab related to hobbies, abilities, gratitude, apology numbers, time, weather, direction, etc will be covered.

GRAMMAR CONTENT

1. Question of type (2) & (3)
2. 有sentence
3. Auxiliary verbs:要,会,能, 可以
3. The sentence with a verb as its predicate.
4. 们: a plural suffix
5. Numeration
6. Interrogative pronoun 多少
7. Counting Money
8. A numeral-measure word as the attributive

9. Time words: Time, month, day & date
10. The demonstrative pronoun as the attributive
11. The adverbial adjunct:
12. Words of location

EXAMINATION SCHEME

Total: 100 marks

Continuous Evaluation (Total 50 Marks)					End Sem Evaluation (Total 50 Marks)
Quiz	Mid Term Test	Presentation	Viva Voce	Attendance	End-Term Exam
10	15	10	10	5	50

Text books & References

1. Learn Chinese with me book-I (Major Text book), People's Education Press

2. Elementary Chinese Reader Book-I (suggested reading)

2. Chinese Reader (HSK Based) book-I (suggested reading)

3. Practical Chinese Grammar for foreigners (suggested reading)

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
NUMERICAL ANALYSIS AND PROGRAMMING	BMT 301	3 0 0	3	III

A. Course Learning Outcomes:

CLO 1	Able to create numerical methods to obtain approximate solutions to mathematical problems.
CLO 2	Explain the numerical methods for various mathematical operations
CLO 3	Evaluate the accuracy of common numerical methods.

Syllabus

Module I: Solution of Algebraic and Transcendental Equation
Error in a series approximation, Bisection Method, Iteration method, Method of false position, Newton-Raphson method
Solutions of Simultaneous equation
Gauss elimination method, Jacobi iteration method, Gauss Seidal method

Module II: Interpolation
Finite Differences, Difference tables
Polynomial Interpolation**:** Newton's forward and backward formula
Central Difference Formulae: Gauss forward and backward formula.
Interpolation with unequal intervals: Lagrange's Interpolation, Newton Divided difference formula

Module III: Numerical Integration and Differentiation
Introduction, Numerical differentiation Numerical Integration: Trapezoidal rule, Simpson's 1/3 and 3/8 rules.

Module IV: Solution of differential Equations
Euler's Method, Runga-Kutta Methods.

Module V: Statistical Computation
Frequency chart, Curve fitting by method of least squares, fitting of straight lines, polynomials, exponential curves etc, Data fitting with Cubic splines.

Evaluation:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text & References:

Text:

- Rajaraman V, "Computer Oriented Numerical Methods", Pearson Education
- Gerald & Whealey, "Applied Numerical Analyses", AW
- Jain, Iyengar and Jain, "Numerical Methods for Scientific and Engineering Computations", New Age Int.
- Grewal B S, "Numerical methods in Engineering and Science", Khanna Publishers, Delhi

References:

- T Veerarajan, T Ramachandran, "Theory and Problems in Numerical Methods, TMH
- Pradip Niyogi, "Numerical Analysis and Algorithms", TMH
- Francis Scheld, " Numerical Analysis", TMH
- Sastry S. S, "Introductory Methods of Numerical Analysis", Pearson Education.
- Gupta C.B., Vijay Gupta, "Introduction to Statistical Methods", Vikas Publishing.
- Goyal, M, "Computer Based Numerical and Statistical Techniques", Firewall Media, New Delhi.

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
MECHANICS OF MACHINES	BMT 302	2 1 0	3	III

A. Course Learning Outcomes:

CLO 1	Understand rigid body motion, force, momentum expression in vectorial form
CLO 2	Analyze balancing problems in rotating and reciprocating machinery
CLO 3	Perform static and dynamic analysis to attain equilibrium in mechanisms and synthesize mechanisms for motion, path, and function generation
CLO 4	Analyze velocity and acceleration of different links of a given mechanism

Course Contents:

Module I: ***BASICS OF MECHANISMS***

Terminology and Definitions-Degree of Freedom Mobility-Kutzbach criterion- Grashoff's law- Kinematic Inversions of 4-bar chain and slider crank chains-Mechanical Advantage-Transmission angle Description of common Mechanisms-Single, double and offset slider mechanisms - Quick return mechanisms - Ratchets and escapements - Indexing Mechanisms

Module II: ***KINEMATICS***

Displacement, velocity and acceleration and analysis in simple mechanisms - Graphical Method velocity and acceleration polygons - Computer applications in the kinematic analysis of simple mechanisms-Coincident points

Module III: ***BALANCING OF ROTATING MASSES***

Static and dynamic balancing – Balancing of rotating masses – Balancing a single cylinder engine – Balancing of Multi-cylinder inline, V-engines – Partial balancing in engines – Balancing of linkages – Balancing machines-Field balancing of discs and rotors.

Module III: ***BASIC CONCEPTS OF VIBRATION***

Vibration and oscillation, causes and effects of vibrations, Vibration parameters –spring, mass damper, Damper models, Motion – periodic, non-periodic, harmonic, non- harmonic, – Degree of freedom, –static equilibrium position, –Vibration classification, Steps involved in vibration analysis.

Module III: ***FORCED VIBRATION***

Response of one degree freedom systems to periodic forcing – Harmonic disturbances –Disturbances caused by unbalance – Support motion –transmissibility – Vibration isolation vibration measurement.

Evaluation:

Components	Other Components	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text & References:

Text:

- Rattan S.S, Theory of Machines, Tata McGraw-Hill Publishing Company Ltd., New Delhi, 2009
- R. S. Khurmi, J.K. Gupta, Theory Of Machines, Eurasia Publishing House, 2005

References:

- Thomas Bevan, Theory of Machines, CBS Publishers and Distributors, 2005
- Ghosh A and A.K.Mallick, Theory of Mechanisms and Machines, Affiliated East - West Pvt. Ltd., New Delhi, 1998.

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
MANUFACTURING PROCESS	BMT 303	3 0 0	3	III

Course Learning Outcomes

CLO 1	Illustrate the basic principles of foundry practices and special casting processes, their Advantages, Limitations and Applications
CLO 2	Explain and relate the basics of hot and cold working process, their advantages, Limitations and Applications
CLO 3	Demonstrate the various types of joining processes and select the appropriate one according to the application
CLO 4	Illustrate basic principles of working of machine tools viz. Lathe, Milling, Grinding, Drilling machines etc.
CLO 5	Distinguish between basic manufacturing processe

Course Contents:

Module I: Introduction to Machine Tools

Classification of machine tools, kinds of motion in machine tool operations, definition of cutting speed, feed and depth of cut

Module II: Lathe

Classification and various parts of Lathe, specification, Description of important mechanism viz. apron, tail stock, head stock, work holding, devices and operations, e.g. taper, turning, eccentric turning and screw-cutting, Geometry of a single point cutting tool. Capstan and turret lathe, cutting speed, feed, depth of cut and calculation machining time in lathe machine

Module III: Drilling Machine

Geometry and nomenclature of a twist drill, specification and classification of drilling machines, tool holding devices, work holding devices, different types of operations performed on a drilling machine, cutting speed, feed, depth of cut and calculation machining time in drilling

Module IV: Milling Machine

Working principle, milling methods, classification of milling machines, different types of operations e.g. slab, face, Angular, form, straddle, gang, end, T-slot, saw milling operations, Dividing Head e.g. Plain, universal and optical, Indexing methods e.g. simple, compound and differential indexing

Module V: Shaper, Slotter & Planer

Principal part of a shaper, classification, Quick Return mechanism, table feed mechanism of a shaper, Operations, e.g. horizontal, vertical and inclined shaping, Principal part of a Planer, Types of planer, Planer Operations, Principal part of a Slotter, Types of slotter, Difference between a shaper, planer and slotter.

Module VI: Grinding Machines

Abrasive machining, surface finishing parameters, grinding wheels selection parameters, wheel turning and dressing, Types of grinding machines e.g. Rough grinders, Cylindrical grinders, Internal grinders, surface grinder, Tool and cutter grinder, special purpose grinding machines.

Module VII: Special Machines

Introduction of NC, DNC and CNC machines, Broaching machines, Gear hobbing machine, Lapping, honing and super finishing processes.

EXAMINATION SCHEME:

Components	Other Components	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

MTE: Mid-term Examination, **ESE**: End Semester Examination**; A:** Attendance

Text & References:

Text:

- P.N. Rao, "Manufacturing Technology: Metal Cutting & Machine Tools", Tata McGraw Hill, Delhi, 2004.
- B.S. Raghuwanshi, "Workshop Technology", Vol.2, Dhanpat Rai & Sons, 2003.
- Hazra Chandhari S.K., "Elements of Workshop Technology", Vol.2, Media Promoters, 2003.

References:

- P.C. Sharma, "A Text Book of Production. Engineering", S. Chand, New Delhi, 2004.
- Bawa H.S., "Workshop Technology", Vol.2, Tata McGraw Hill, 2004.
- Juneja & Shekhon, "Fundamental of Metal Cutting", New Age Publications
- S.F. Krar Stevan F. and Check A.F., "Technology of M/C Tools", McGraw Hill Book Co., 1986.
- Kibbe Richard et al, "M/c Tool practices", Prentice Hall India, 2003.
- Bangalore HMT, "Production Technology", Tata McGraw Hill, 1980.
- R.K. Jain, "Production Technology", Khanna Publishers

Gerling Heinrich, "All about Machine Tools", New Age Publication, 2003.

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
Introduction to Automation	BMT 304	2 1 0	3	III

A. Course Learning Outcomes:

CLO 1	To introduce the importance of automation techniques manufacturing and process industries
CLO 2	To impart the role of PLC in industry automation
CLO 3	To expose to various control techniques employed in process automation
CLO 4	To develop automation system for manufacturing and process industries

B. Syllabus

Module-I: Introduction
Concept of optimization – classification of optimization – problems.

Module-II: Linear Programming
Examples of linear programming problems – formulation simplex methods variable with upper bounds – principleduality -dual simplex method - sensitivity analysis – revised simplex procedure – solution of the transportation problem – assignment – network minimization – shortest route problem – maximal two problem – L.P. representation of networks

Module-III: Queuing Theory
Queuing Model, poison and exponential distributions -Queues with combined arrivals and departures-random and series queues.

Module-IV: Unconstrained Optimization
Maximization and minimization of convex functions. Necessary and sufficient conditions for local minima – speed and order of convegence – unibariate search – steepest and desent methods- metcher reeves method -conjugate gradient method.

Module-V: Constrained Optimization
Necessary and sufficient condition – equality constraints, inequality constraints -kuhu – tucker conditions – gradient projection method – penalty function methods – cutting plane methods of sibel directions.

Examination Scheme:

Components	Internal assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

MTE: Mid Term Exam, ESE: End Semester Examination;

Text & References

Text

1. Rao S.S,"Optimization – Theory and applications", Wiley Easter Ltd., 1979

References

1. David G.Luerbeggan, "Introduction to Linear and Non Linear Programming", Addison Wesley Publishing Co. 1973.
2. Hadley G. "Nonlinear and – dynamic programming" Addison Wesley Publishing Co. 1964.
3. Cordan C.C. Beveridge and Robert S. Schedther, "Optimization, Theory and Practice" McGraw Hill Co.1970.
4. HarndyA.Tahh. "operations Research, An Introduction", Macmillan Publishers

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
MICROPROCESSOR-I	BMT 305	2 0 0	2	III

Course Learning Outcomes

CLO 1	Obtain basic development skills for microprocessor / microcontroller applications
CLO 2	To familiarize the Architecture of 8085 and 8086microprocessor.
CLO 3	To classify the types and characteristics of buses in microprocessor.
CLO 4	To analyze the features, addressing mode and programming of Intel 8085 and 8086 microprocessor

B. Syllabus

Module-I

Introduction: Microprocessor evolution and types, microprocessor architecture and operation of its components, addressing modes, interrupts, data transfer schemes, instruction and data flow, timer and timing diagram. Interfacing devices. Architectural advancement of microprocessor. Typical microprocessor development schemes.

Module-II

*-bit Microprocessors: Pin diagram and internal architecture of 8085 microprocessor, registers, ALU, Control & statu, interrupt and machine cycle. Instruction sets. Addressing modes. Instruction formats Instruction Classification: data transfer, arithmetic operations, logical operations, branching operations, machine control and assembler directives.

Module-III

16-bit Microprocessor: Architecture of 8086 microprocessor: register organization, bus interface unit, execution unit, memory addressing, memory segmentation. Operating modes. Instruction sets, instruction format, Types of instructions. Interrupts: hardware and software interrupts.

Module-IV

Programming: Assembly language programming based on intel 8085/8086. Instructions, data transfer, arithmetic, logic, branch operations, looping, counting, indexing, programming techniques, counters and time delays, stacks and subroutines, conditional call and return instructions Unit-V Peripheral Interfacing: Peripheral Devices: 8237 DMA Controller, 8255 programmable peripheral interface, 8253/8254programmable timer/counter, 8259 programmable interrupt controller, 8251 USART and RS232C.

Evaluation:

Components	Other Components	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text & References:

Text:

- Gaonkar , Ramesh S , “Microprocessor Architecture, Programming and Applications with 8085”, Penram International Publishing
- Ray A K , Bhurchandi K M , “Advanced Microprocessors and Peripherals”, TMH

References:

- Renu Sigh & B.P.Sigh, “Microprocessor, Interfacing and Applications 8. M Rafiqzzaman, “Microprocessors, Theory and Applications”,

Amity School of Engineering and Technology (ASET)

Course Learning Outcomes

Course Name	Course Code	L T P	Credit	Semester
ALTERNATIVE SOURCES OF ENERGY	BMT 307	3 0 0	3	III

CLO 1	Conceptual knowledge of the technology, economics and regulation related issues associated with wind and alternative sources of energy
CLO 2	Ability to analyse the viability of wind and alternative energy projects
CLO 3	Capability to integrate various options and assess the business and policy environment regarding wind and alternative energy projects

Course Contents:

Module I: Introduction
Energy source, India's production and reserves of commercial energy sources, need for non-conventional energy sources, energy alternatives, solar, thermal, photovoltaic. Water power, wind biomass, ocean temperature difference, tidal and waves, geothermal, tarsands and oil shale, nuclear (Brief descriptions); advantages and disadvantages, comparison (Qualitative and Quantitative).

Module II: Solar Thermal Conversion: Collection and storage, thermal collection devices, liquid flat plate collectors, solar air heaters concentrating collectors (cylindrical, parabolic, paraboloid) (Quantitative analysis); sensible heat storage, latent heat storage, application of solar energy water heating. Space heating and cooling, active and passive systems, power generation, refrigeration. Distillation (Qualitative analysis) solar pond, principle of working, operational problems.

Module III: Wind Energy: Properties of wind, availability of wind energy in India, wind velocity and power from wind; major problems associated with wind power, wind machines; Types of wind machines and their characteristics, horizontal and vertical axis wind mills, elementary design principles; coefficient of performance of a wind mill rotor, aerodynamic considerations of wind mill design, numerical examples.

Module IV: Geothermal and Tidal Energy: Geothermal Energy Conversion : Principle of working, types of geothermal station with schematic diagram, geothermal plants in the world, problems associated with geothermal conversion, scope of geothermal energy.
Tides and waves as energy suppliers and their mechanics; fundamental characteristics of tidal power, harnessing tidal energy, limitations. Ocean Thermal Energy Conversion : Principle of working, Rankine cycle, OTEC power stations in the world, problems associated with OTEC.

Module V: Energy from Biomass: Photosynthesis, photosynthetic oxygen production, energy plantation, bio gas production from organic wastes by anaerobic fermentation, description of bio-gas plants, transportation of bio-gas, problems involved with bio-gas production, application of bio-gas, application of bio-gas in engines, advantages.

Evaluation:

Components	Other Components	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text & References:

- Non-Convention Energy Resources B H Khan McGraw Hill Education (India) Pvt. Ltd. 3rd Edition
- Solar energy Subhas P Sukhatme T ata McGraw Hill 2nd Edition, 1996.
- Non-Conventional Energy Sources G.D Rai Khanna Publishers 2003

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
NUMERICAL ANALYSIS & PROGRAMMING LAB	**BMT 321**	0 0 2	1	3

A. Course Learning Outcomes:

CLO 1	Use the bisection method, false position, Newton's, Secant method to estimate the number of iterations in the algorithm to achieve desired accuracy with the given tolerance;
CLO 2	Programming Skills: write numerical programs, such as C Language programs, to solve the above problems;
CLO 3	Use polynomial interpolations including the Lagrange polynomial, Newton's cotes ,cubic spline functions, for curve fitting method to evaluate the interpolations;

B. Syllabus

NUMERICAL ANALYSIS & PROGRAMMING LAB

Course Code: **BMT 321** **Credit Units: 01**

Software Required: Turbo C/C++

Course Contents:

Assignments will be provided for the following:

1. Analysis of various numerical and statistical techniques

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	10	10	5	35	35

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
Mechanics of Machines Lab	**BMT 322**	0 0 2	1	3

A. Course Learning Outcomes:

CLO 1	Analyze the planar mechanisms for positional synthesis
CLO 2	Understand rigid body motion, force, momentum expression in vectorial form
CLO 3	Analyze balancing problems in rotating and reciprocating machinery.
CLO 4	Understand free and forced vibrations of single degree freedom systems

B. Syllabus

List of Experiments:

1. To study various types of Kinematic links, pairs, chains and Mechanisms.
2. To study inversions of 4 Bar Mechanisms, Single and double slider crank mechanisms.
3. Create various types of linkage mechanism in CAD and simulate their motions
4. Analysis of velocity and acceleration for mechanical linkages of different mechanisms - Use of kinematics and dynamics simulation software like ADAMS, MATLAB
5. Balancing of reciprocating masses.
6. Balancing of rotating masses.
7. Vibrating system-Spring mass system-Determination of damping co-efficient of single degree of freedom system using MATLAB.
8. Transverse vibration –free- Beam. Determination of natural frequency and deflection of Beam.
9. Determination of moment of inertia by oscillation method for connecting rod and flywheel.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
MANUFACTURING PROCESS LAB	BMT 323	0 0 2	1	3

A. Course Learning Outcomes:

CLO 1	apply some of the manufactures process directly in the industry for preparation of complicated jobs.
CLO 2	learn preparation of various jobs using various manufacturing process
CLO 3	implement similar features in preparation of jobs can be extended to implement in the preparation of complicated jobs

B. Syllabus

1. Operations on the Lathe Machine.
2. Operations on the Shaper Machine.
3. Operations on the Planner Machine.
4. Operations on the Drilling Machine.
5. Operations on the Grinding Machine.
6. Operations on the Milling Machine.
7. To make a Single point cutting tool

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
COMPUTER AIDED DRAFTING AND DESIGN LAB	BMT 324	0 0 2	1	3

A. Course Learning Outcomes:

CLO 1	Create, modify, analyze, and optimize any design
CLO 2	Improve quality of design and improve communication through documentation
CLO 3	Basics of manufacturing systems and current theories of manufacturing.

B. Syllabus

1. Basics of Auto CAD
2. Modeling of machine Components such as Connecting Rod, Piston etc.
3. 2D modeling for different Geometrics such as Hexagon, Pentagon etc.
4. 3D modeling for Nuts and Bolts.
5. Modeling of Gear.
6. Modeling of Compound Geometrics such as Hollow Cylinder containing Sphere, Triangle etc.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
MICROPROCESSOR-I LAB	BMT 325	0 0 2	1	3

A. Course Learning Outcomes:

CLO 1	Learn importance of Microprocessors 8086 in designing real time applications
CLO 2	Develop interfacing to real world devices like LED displays, Keyboards, DAC/ADC, and various other devices.
CLO 3	Learn use of hardware & software tools

B. Syllabus

List of Experiments:

1. To study 8085 microprocessor System
2. To study 8086 microprocessor System
3. To develop and run a programme to find out largest and smallest number
4. To develop and run a programme for converting temperature from F to C degree
5. To develop and run a programme to compute square root of a given number
6. To develop and run a programme for computing ascending/descending order of a number.
7. To perform interfacing of RAM chip to 8085/8086
8. To perform interfacing of keyboard controller
9. To perform interfacing of DMA controller
10. To perform interfacing of UART/USART

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
ALTERNATIVE SOURCES OF ENERGY	BMT 307	3 0 0	3	3

A. Course Learning Outcomes:

CLO 1	To Understand the need of energy conversion and the various methods of energy storage
CLO 2	Explain the conversion process and field applications of solar energy
CLO 3	Identify Winds energy as alternate form of energy and to know how it can be tapped .
CLO 4	To Understand the Geothermal &Tidal energy, its mechanism of production and its applications
CLO 5	Illustrate the concepts of Direct Energy Conversion systems & their applications.

B. Syllabus

Module I: Introduction
Energy source, India's production and reserves of commercial energy sources, need for non-conventional energy sources, energy alternatives, solar, thermal, photovoltaic. Water power, wind biomass, ocean temperature difference, tidal and waves, geothermal, tarsands and oil shale, nuclear (Brief descriptions); advantages and disadvantages, comparison (Qualitative and Quantitative).

Module II: Solar Thermal Conversion: Collection and storage, thermal collection devices, liquid flat plate collectors, solar air heaters concentrating collectors (cylindrical, parabolic, paraboloid) (Quantitative analysis); sensible heat storage, latent heat storage, application of solar energy water heating. Space heating and cooling, active and passive systems, power generation, refrigeration. Distillation (Qualitative analysis) solar pond, principle of working, operational problems.

Module III: Wind Energy: Properties of wind, availability of wind energy in India, wind velocity and power from wind; major problems associated with wind power, wind machines; Types of wind machines and their characteristics, horizontal and vertical axis wind mills, elementary design principles; coefficient of performance of a wind mill rotor, aerodynamic considerations of wind mill design, numerical examples.

Module IV: Geothermal and Tidal Energy: Geothermal Energy Conversion : Principle of working, types of geothermal station with schematic diagram, geothermal plants in the world, problems associated with geothermal conversion, scope of geothermal energy.
Tides and waves as energy suppliers and their mechanics; fundamental characteristics of tidal power, harnessing tidal energy, limitations. Ocean Thermal Energy Conversion : Principle of working, Rankine cycle, OTEC power stations in the world, problems associated with OTEC.

Module V: Energy from Biomass: Photosynthesis, photosynthetic oxygen production, energy plantation, bio gas production from organic wastes by anaerobic fermentation, description of bio-gas plants, transportation of bio-gas, problems involved with bio-gas production, application of bio-gas, application of bio-gas in engines, advantages.

Evaluation:

Components	Other Components	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text & References:

- Non-Convention Energy Resources B H Khan McGraw Hill Education (India) Pvt. Ltd. 3rd Edition
- Solar energy Subhas P Sukhatme T ata McGraw Hill 2nd Edition, 1996.
- Non-Conventional Energy Sources G.D Rai Khanna Publishers 2003

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
COMPUTER GRAPHICS	BMT 308	3 0 0	3	3

A. Course Learning Outcomes:

CLO 1	To understands the core concepts and mathematical foundations of computer graphics
CLO 2	To knows fundamental computer graphics algorithms and data structures
CLO 3	Understand overview of different modeling approaches and methods
CLO 4	To Understands light interaction with 3D scenes
CLO 5	Distinguish between basic manufacturing processes

B. Syllabus
C.

Module I: Introduction to Graphics and Graphics Hardware System
Video display devices, CRT, LCD Display devices Raster scan displays, Random scan displays, Raster scan systems, Random scan Systems. Input devices, keyboard, mouse, Trackball and spaceball, Joystick, Data glove, Digitizers, Image scanners, Touch panels, Light pens, Voice systems.Hardcopy devices, Printers, Plotters.

Module II: Output Primitives and Clipping operations
Algorithms for drawing 2D Primitives lines (DDA and Bresenham's line algorithm),circles (bresenham's and midpoint circle algorithm),ellipses(midpoint ellipse algorithm),other curves(conic sections, polynomials and spline curves). Antialiasing and filtering techniques Line clipping (cohen-sutherland algorithm), clip windows, circles, ellipses, polygon, clipping with Sutherland Hodgeman algorithm.

Module III: Geometric transformation
2D Transformation: Basic transformation, Translation, Rotation, scaling, Matrix Representations and Homogeneous coordinates, window to viewport transformation. 3D Concepts: Parallel projection and Perspective projection, 3D Transformation.

Module IV: 3D object Representation, Colour models and rendering
Polygon meshes in 3D, Spheres, Ellipsoid, Bezier curves and Bezier surfaces, Bspline curves and surfaces, solid modeling, sweep representation, constructive solid geometry methods. Achromatic and color models.
Shading ,rendering techniques and visible surface detection method: Basic illumination, diffuse reflection, specular reflection. Polygon rendering method, Gouraud & Phong shading. Depth-buffer method, A-buffer method, Depth-sorting method(painter's algorithm).

Module V: Introduction to multimedia
File formats for BMP, GIF, TIFF, IPEG, MPEG-II, Animation techniques and languages.

Evaluation:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text & References*:*

Text:

- Foley et. al., "Computer Graphics Principles & practice", 2nd ed. AWL., 2000.
- D. Hearn and P. Baker, "Computer Graphics", Prentice Hall, 1986.
- R. Plastock and G. Kalley, "Theory and Problems of Computer Graphics", Schaum's Series, McGraw Hill, 1986

References:

- R.H. Bartels, J.C. Beatty and B.A. Barsky, "An Introduction to Splines for use in Computer Graphics and Geometric Modeling", Morgan Kaufmann Publishers Inc., 1987.
- C.E. Leiserson, T.H. Cormen and R.L. Rivest, "Introduction to Algorithms", McGraw-Hill Book Company, 1990.
- W. Newman and R. Sproul, "Principles of Interactive Computer Graphics, McGraw-Hill, 1973.
- F.P. Preparata and M.I. Shamos, "Computational Geometry: An Introduction", Springer-Verlag New York Inc., 1985.

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
ELECTRONICS DEVICES AND CIRCUITS	BMT 309	2 0 0	2	3

A. Course Learning Outcomes:

CLO 1	Know the characteristics of diodes and transistors
CLO 2	Design simple circuits and mini projects.
CLO 3	know the benefits of feedback in amplifier
CLO 4	Compare and classify oscillators

B. Syllabus

Module I
Review of Diodes LED, Zener and Tunnel Diode and their characteristics, Applications of diodes-Rectifiers (Half and full wave, Bridge).

Module II
BJT-construction and characteristics, Transistor as an amplifier, CE, CB and CC configurations, Introduction to MOSFET.

Module III
Coupling, RC coupled Amplifiers, Transformer coupling,, Introduction to feedback-Positive and negative, Introduction to oscillators.

Module IV
Introduction to OPAMP characteristics and specifications, OPAMP as adder, subtractor. Integrator, differentiator.

Module V
Introduction to digital electronics, logic gates, basic laws and theorems of Boolean algebra, Introduction to Combinational Circuits, Concept of memory cell and introduction to Flip-flops R S, J K, D and T.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	15	20	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

Text:

- Boylestead & Neshlesky, “Electronics Devices & Circuits”. PHI
- Millman & Halkias, “Integrated Electronics”, TMH.

References:

- Schilling & Belove “Electronics”.
- R P Jain, Digital Electronics.

AMITY UNIVERSITY
RAJASTHAN

AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY(ASET)

Course Name	Course Code	LTP	Credit	Semester
Professional Communication Skills	BCS 301	1:0:0	1	1

B. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Inculcating creative thinking skills
CLO 2	Construct and showcase their communication skills in a creative manner.
CLO 3	Comprehending and demonstrating ways of self-introduction
CLO 4	Outlining and illustrating presentation Skills

B. SYLLABUS

Topic
Self-Actualization (Baseline, Self-Image Building, SWOT, Goal Setting)
Telephone Etiquette
GD-1 (Basics, Do's & Don'ts, Mannerism, Dynamics, GD Markers)
Book Review Presentation

EXAMINATION SCHEME:

Components	Self Introduction	GD	Book Review Presentation	Attendance
Weightage (%)	30	35	30	5

SUGGESTED READINGS

- Business Communication, Raman – Prakash, Oxford
- Creative English for Communication, Krishnaswamy N, Macmillan
- Textbook of Business Communication, Ramaswami S, Macmillan
- Writing Skills, Coe/Rycroft/Ernest, Cambridge

BEHAVIOURAL SCIENCE - III
(INTERPERSONAL COMMUNICATION)

Course Code: BSS304 **Credit Units: 01**

Course learning outcomes (CLOs):

At the successful completion of this course you (the student) should be able to:

1. Demonstrate knowledge of strategies for developing a healthy interpersonal communication .
2. Recognize the importance of transactional analysis, script analysis .
3. Identify the difference between healthy and unhealthy expression of emotions and develop emotional competence necessary for conflict resolution and impression management.
4. Enhance personal effectiveness and performance through effective interpersonal communication .

Course Objective:

This course provides practical guidance on

- Enhancing personal effectiveness and performance through effective interpersonal communication
- Enhancing their conflict management and negotiation skills

Course Contents:

Module I: Interpersonal Communication: An Introduction
Importance of Interpersonal Communication
Types – Self and Other Oriented
Rapport Building – NLP, Communication Mode
Steps to improve Interpersonal Communication

Module II: Behavioural Communication
Meaning and Nature of behavioiural communication
Persuasion, Influence, Listening and Questioning
Guidelines for developing Human Communication skills
Relevance of Behavioural Communication for personal and professional development

Module III: Interpersonal Styles
Transactional Analysis
Life Position/Script Analysis
Games Analysis
Interactional and Transactional Styles

Module IV: Conflict Management
Meaning and nature of conflicts
Styles and techniques of conflict management
Conflict management and interpersonal communication

Module V: Negotiation Skills
Meaning and Negotiation approaches (Traditional and Contemporary)
Process and strategies of negotiations
Negotiation and interpersonal communication

Examination Scheme:

Components	SAP	JOS	FC/MA/CS/HA	P/V/Q	A
Weightage (%)	25	15	30	25	05

SAP- Social Awareness Programme; **JOS**-Journal of Success; **HA**-Home Assignment; **P**-Presentation; **V**-Viva; **Q**-Quiz; **FC**- Flip class; **MA**- Movie Analysis; **CS**- Case study; **A**-Attendance

Text & References:

- Vangelist L. Anita, Mark N. Knapp, Inter Personal Communication and Human Relationships: Third Edition, Allyn and Bacon
- Julia T. Wood. Interpersonal Communication everyday encounter
- Simons, Christine, Naylor, Belinda: Effective Communication for Managers, 1997 1st Edition Cassel
- Goddard, Ken: Informative Writing, 1995 1st Edition, Cassell
- Harvard Business School, Effective Communication: United States of America
- Foster John, Effective Writing Skills: Volume-7, First Edition 2000, Institute of Public Relations (IPR)

Beebe, Beebe and Redmond; Interpersonal Communication, 1996; Allyn and Bacon Publishers

Semester 3 Course Code: FLT 301/311 (Tech French) Credit Units: 02

Course Learning Objective:

- Students will hone Basic language skills such as reading, writing, speaking, listening & interactive in the language
- Students will be able to read and interpret small texts .
- Students will be able to communicate in small sentences in writing, self introduction, family description etc.
- Students will be able to communicate in small sentences in oral, self introduction, family description etc
- To understand and present the time schedule and to tell the time
- To understand and draft a short biography and to present a scientist
- To understand an online conversation and read a program and the timings.
- To propose an outing and to accept an outing.
- To leave a message on the answering machine

Course Contents:

Unité 3 La science au quotidien Page : 40-61 Leçons 7, 8 & 9

Contenu Lexical:

1. L'heure
2. Les jours de la semaine
3. Les mois de l'année
4. Les matières et types de cours
5. Les spécialitésscientifiques.
6. L'annéeuniversitaire
7. Les nationalités
8. Les noms de pays
9. Les métiers scientifiques
10. Les chiffres de 69 à l'infini
11. Quelquesunités de mesure
12. Quelquestermesscientifques
13. Les termes de l'exposition
14. Les expression familières pour accepter une invitation.

Contenu Grammatical:

1. Finir, commencer au présent
2. Les prepositions de temps
3. Féminins et masculine des noms de métiers scientifiques
4. Les adjectifs de nationalité.
5. Le future proche
6. Les adjectifs demonstratives
7. Le but: pour + infinitive
8. Le register familier

EXAMINATION SCHEME

Total: 100 marks

Continuous Evaluation (Total 50 Marks)					End Sem Evaluation (Total 50 Marks)
Quiz	**Mid Term Test**	**Presentation**	**Viva Voce**	**Attendance**	**End-Term Exam**
10	**15**	**10**	**10**	**5**	**50**

Text & References:

- Le Gargasson, I. Naik, S. Chaize, C. (2012) Tech French, Delhi : Goyal Publications
- Ray. A, Robert (2010) Le Petit Robert French Dicitionary, Paris: Le Robert
- Robert, Collins (2006) Collins Robert French Dictionary, Paris : Harper Collins

Foreign Language German

Semester 3:Course Code: FLG 301/311 **Credit units : 02**

Course Learning Objective:

- Students will hone Basic language skills such as reading, writing, speaking, listening & interactive in the language
- Students will be able to read and interpret small texts .
- Students will be able to communicate in small sentences in writing, self introduction, family description etc.
- Students will be able to communicate in small sentences in oral, self introduction, family description etc.

After successful completion of this semester, students will be able to:

- describe furniture in a room.
- ask question related to time like when, from when etc.
- tell time (formal and informal)
- how to make calls on phone
- can excuse for cancel appointments.
- speak about their daily routine.

Course Contents

Vocabulary:

- Furniture
- Days and months name
- Time vocabulary like 15 min, quarter, minute, seconds.
- Adjectives use to describe furniture.

Grammar:

- Past participle of verb had
- Usage of negation like **not = nicht; kein= not a single.**
- Preposition of time.
- Use of adjective in sentences.
- Introduction and use of separable verbs

EXAMINATION SCHEME

Total: 100 marks

Continuous Evaluation (Total 50 Marks)					End Sem Evaluation (Total 50 Marks)
Quiz	Mid Term Test	Presentation	Viva Voce	Attendance	End-Term Exam
10	15	10	10	5	50

PrescribedText-Book: First 10 LessonsfromDeutschalsFremdsprache -1B, INBH & Oxford, New Delhi, 1977

References: **Studio D A1** by Hermann Funk, Christina Kuhn and Silke Demme, Cornelsen, 2013

Tangram A1by Rosa Maria Dallapiazza, Eduard von Jan & Till Schoenherr, Max Hueber, 2007

SprachtrainingA1 by Rita Maria Niemann, Dong Ha Kim, Cornelsen, 2013
Dictionaries for reference: **Studio D: Glossar** A1 - Deutsch –Englisch, Cornelsen, 2013
http://www.duden.de/woerterbuch
Materials are given in form of photocopies if felt to be necessary

Foreign Language Spanish

Semester 3: Course Code: FLS 301/311 Credit units : 02

Course Learning Objective:

- Students will hone Basic language skills such as reading, writing, speaking, listening & interactive in the language
- Students will be able to read and interpret small texts .
- Students will be able to communicate in small sentences in writing, self introduction, family description etc.
- Students will be able to communicate in small sentences in oral, self introduction, family description etc.
  - To enable the students to talk about a place like, class room, market, neighborhood and location of thing with the use of prepositions.
  - To talk about one's likes/dislikes, how one is feeling, to express opinions, pain and illness.
  - Time and date
  - Speaking about prices/currency/ market and quantity.
  - Counting above 100,
  - To discuss near future plans

Course Content

Vocabulary:

Vocabulary pertaining to describe people/ place /objects, Illness, Currency, Market etc. preferences, opinions , body parts etc.

Grammar:
Introduction of stem changing irregular verbs
Introductionofprepositions (Cerca de/ lejos de/ encima de etc.)
Present continuous tense **(Estar+ gerundio)**
Introduction of third person verbs Gustar/Parecer/Encantar/ Doleretc
Interrogatives – How much/ How many
Introduction of irregular verbs.
Immediate uture plans (Ir a + verbo)

ExaminationScheme:

Total: 100 marks

ContinuousEvaluation (Total 50 Marks)					EndSemEvaluation (Total 50 Marks)
Quiz	MidTerm Test	Presentation	Viva Voce	Attendance	End-TermExam
10	15	10	10	5	50

Skills Evaluated: Writing, Comprehension, grammar, and Vocabulary
Text &References:
Nuevo Español Sin Fronteras (ESF1) by Jesús sánchez Lobato, Concha Moreno Garcia, Concha Moreno Garcia, Isabel Santos Gargallo, Sociedad General Española De Librería, S.A 2005
Pasaporte Nivel (A1) byMatideCerraloza Aragón, oscarCerraloza Gilli, Begoña Llovet Barquero, EdelsaGroup didascalia, S.A. 2005
Dictionaries for reference: Collins, www.wordreferences.com.

Essential materials are given in the form of photocopies.

FOREIGN LANGUAGE CHINESE

Semester - III **Course Code: FLC- 301/311** **Credit Units: 02**

Course Learning Objectives:

- Students will hone Basic language skills such as reading, writing, speaking, listening & interactive in the language
- Students will be able to read and interpret small texts .
- Students will be able to communicate in small sentences in writing, self introduction, family description etc.

Students will be able to communicate in small sentences in oral, self introduction, family description etc

On the completion of third semester the students will be able to attain the proficiency of HSK-I and they will be able to

- Read Chinese words, phrases and simple sentences both in Pin Yin and Characters given in the text.
- Write Chinese Characters and sentences.
- Speak Chinese dialogues from various fields of day to day life.
- Listen and understand simple Chinese words and dialogues used in syllabi.
- Carry out conversation in the target language.
- Manipulate basic grammatical structures such as: 在， 是, 有 sentence, etc.
- Master and use most essential vocabulary items of day to day use and programme specific vocabulary; approx 100 Characters including 50 characters of HSK level -I.

COURSE CONTENTS

1. Description of size
2. Description of quantity
3. Asking and replying questions on shopping
4. Asking and replying questions on Communication
5. Conversation Related to Study
6. Conversation Related to Work
7. Expression of Simple Feelings
8. Listening of dialogues
9. Conversation based on dialogues
10. Programme Specific Vocabulary & Expressions
11. Chinese CBT Package
12. Chinese Festivals (In English)

VOCABULARY CONTENTS

1. Vocabulary will include approx 100 Characters including 50 Characters of HSK-I level.

2. Vocab related to size, quantity, shopping, communication, study, work and simple feelings and Programme Specific Vocabulary will be covered during this semester.

3. By the end of third semester the students will be able to master all 150 characters set for the HSK level-I.

GRAMMATICAL CONTENTS

1. Antonyms
2. Prepositional phrases
3. The object of 在， 从
4. Complement of degree

5. Preposed object
6. Verb 在
7. 有 and 是 indicating existence
8. Question of type (4)
9. The 是 sentence type (2).
10. Sentence with a verb taking two objects

EXAMINATION SCHEME

Total: 100 marks

Continuous Evaluation (Total 50 Marks)					End Sem Evaluation (Total 50 Marks)
Quiz	Mid Term Test	Presentation	Viva Voce	Attendance	End-Term Exam
10	15	10	10	5	50

Text & References

1. Learn Chinese with me book-I (Major Text book), People's Education Press

2. Elementary Chinese Reader Book-I

2. Chinese reader (HSK Based) book-I

3. Module on Programme specific vocab.

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
APPLIED THERMODYNAMICS	BMT 401	3 0 0	3	IV

Course Learning Outcomes

CLO 1	To relate the zeroth, first and second laws to basic thermodynamic properties, like energy, temperature, and entropy, and to interactions like work and heat
CLO 2	To interpret entropy change and entropy production and the related terms isentropic and reversible
CLO 3	To derive property relations in an easy manner, and get used to the steam tables
CLO 4	Solve problems by applying the first and second law of thermodynamics

B. Syllabus

Module I: Basic concepts of thermodynamics
Thermodynamic system, intensive and extensive properties, cyclic process, Zeroth Law of Thermodynamics, Work and heat, Flow work,First law of thermodynamics, Mechanical equivalent of heat, internal energy, Analysis of non-flow system, flow process and control volume, steady flow, energy equation, flow processes
Module II: Second Law of Thermodynamics and Entropy
Heat Engine, heat pump, Kelvin Planck and Clausius statement of Second Law of Thermodynamics, Perpetual motion machine, Reversible cycle- Carnot Cycle, Clausius inequality, entropy, Principle of entropy increase, concepts of availability, irreversibility,Carnot theorem, Max-well-relation,
Module III: Air-Standard Cycles
Carnot cycle, Otto cycle, Diesel cycle, Dual cycle, Stirling cycle, Erricsson cycle, Brayton cycle; Reversed Carnot cycle.
Module IV: Steam
Use of steam tables, wet steam, superheat steam, different processes of vapour, Mollier Diagram,steam Nozzle, calorimeter.
Module V : Compressors
Introduction,Types of compressors, Isothermal efficiency, adiabatic efficiency, clearance volume, volumetric efficiency, and multi-stage compression with intercooling.

Evaluation:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text & References:

Text:
- P.K. Nag, “Engineering Thermodynamics”, Tata McGraw Hill
- Incropera, “Engineering Thermodynamics”, John Willy

References:
- Engel, T. and Reid, P., Thermodynamics, Statistical Thermodynamics & Kinetics, Pearson Education, 2006
- Cengel & Boles, “Thermodynamics”, Tata McGraw Hill.
- Sonntag/Vanhylene, Fundamentals of Thermodynamics, Wiley
- Rahul Gupta, Engineering Thermodynamics, Asian Books P. Ltd.
- Y.V.C. Rao, Engineering Thermodynamics, Khanna Publications
- Onkar Singh, Applied Thermodynamics, New Age Publications.
- Dhomkundwar Kothandaraman, “A Course in Thermal Engineering”, Dhanpat Rai Publications

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
FLUID MECHANICS	BMT 402	2 1 0	3	IV

A. Course Learning Outcomes

CLO 1	Define the different types of fluid and its properties
CLO 2	Understand and analyze the different types of flow
CLO 3	Solve simple problems relating to flui
CLO 4	Define, analyze boundary layer and solve simple problems relating to the above concepts.

B. Syllabus

Module I: Fluid Properties and Fluid Statics

Newtonian and Non-Newtonian Fluids; Viscosity; Incompressible and compressible fluids, compressibility. Forces on plane surfaces, forces on curved surfaces, buoyant forces, and stability of floating bodies, metacentre and metacentre height.

Module II: Kinematics of Fluid Motion

Steady and unsteady flow; uniform and non-uniform flow; Laminar and turbulent flow; streamline, path line and streak line; continuity equation, irrotational and rotational flow, velocity potential and stream function, vortex flow, free and forced vortex, sink and source flow.

Module III: Dynamics of Fluid Flow

Euler's equation of motion and its integration to yield Bernoulli's equation, its practical applications – Pilot tube, Venturi meter; steady flow momentum equation, force exerted on a pipe bend. Measurement of flow using Venturi meter, orifice meter, Pitot tube, measurement of flow in open channels – rectangular, triangular

Module IV: Dimensional Analysis and Principles of Similarity

Buckingham -Theorem and its applications, Geometric, Kinematics and Dynamic similarity; Dimensionless numbers-Reynolds, Froude, Euler, Mach, Weber Number and their significance.

Module V: Laminar and Turbulent Flow

Reynold's experiment, critical velocity, steady laminar flow through a circular tube, flow between parallel plates. Transition from laminar to turbulent flow, courses of turbulence, velocity distribution law near a solid boundary, velocity distribution in rough pipes, Hazen – Williams's formula. Boundary layer theory.

Module VI: Analysis of Pipe Flow

Energy losses, minor losses in pipe lines, concept of equivalent length, flow between two reservoirs, and multiple pipe systems – in series and parallel, siphon.

Evaluation:

Components	Internal Assessment	Attendance	MTE	ESE
Weight age (%)	30	5	15	50

Text & References:

Text:

- R.K. Bansal, "Fluid Mechanics & Hydraulic Machines", Laxmi Publications (P) Ltd., 2002.
- Gupta, S. C., Fluid Mechanics and Hydraulic Machines, Pearson Education, 2007
- D.S. Kumar, "Fluid Mechanics and Fluid Power Engineering", S.K. Kataria & Sons, 2000.

References:

- F. M. White, Introduction to Fluid Mechanics, McGraw Hill
- I.H. Shames, "Mechanics of Fluids", Tata McGraw Hill
- Douglas, J. F., Gasiorek, J.M. and Swaffield, J., Fluid Mechanics, Pearson Education, 4/e, 2006
- V.L. Streeter and E.B. Wylie, "Fluid Mechanics", Tata McGraw Hill
- Massey B S, Mechanics of Fluids, Van Nostrand Reinhold Co

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
METROLOGY	BMT 403	3 0 0	3	IV

Course Learning Outcomes

CLO 1	Investigate – various national and international organizations from which we get many of our metrology references, resources, and standards
CLO 2	Create – mathematical models of fundamental physical phenomenon and apply them to predict the behaviour of engineering systems
CLO 3	Apply – dimensional analysis concepts correctly by looking up reference values for unit conversions; accurately perform associated mathematics, and present final values with the correct units/symbols
CLO 4	Develop – Ability to perform and conduct basic experiments and evaluate the results of the same

Course Contents:

Module I: Principles of measurement

Definition of Metrology, difference between precision and accuracy. Sources of errors: Controllable and Random Errors, Effects of Environment and Temperature, Effects of support, alignment errors.

Length Standards: Line standards, end standards and wavelength standards, transfer from line standards to end standards. Numerical based on line standards. Slip gauges – its use and care, methods of building different heights using different sets of slip gauges.

Limits, fits and tolerances: Various definitions, different types of fits and methods to provide these fits. Numerical to calculate the limits, fits and tolerances, ISO system of limits and fits; Gauges and its types, limit gauges – plug and ring gauges. Gauge Design – Taylor's Principle, wear allowance on gauges.

Module II: Comparators

Principles and working of Mechanical, Electrical, Optical and Pneumatic Comparators.

Angular Measurement: Sine Bar – different types of sine bars, use of sine bars in conjunction with slip gauges, Use of angle gauges, spirit level, errors in use of sine bars. Numericals.Principle and working of autocollimator.

Module III: Straightness and flatness

Definition of Straightness and Flatness error.Numericals based on determination of straightness error of straight edge with the help of spirit level and auto collimator

Screw Thread Measurement: Errors in threads, Measurement of elements of screw threads – major diameter, minor diameter, pitch, flank angle and effective diameter (Two and three wire methods). Effect of errors in pitch and flank angles

Gear Measurement: Measurement of tooth thickness – Gear tooth vernier caliper, Constant chord method, base tangent method and derivation of mathematical formulae for each method.Parkinson Gear Tester.

Module IV

Coordinate measuring machine (CMM)- Constructional features – types, applications – digital devices- computer aided inspection.

Surface texture: Introduction, types of irregularities, Elements of surface Texture, Measurement of surface finish, Examination of surface Roughness.

EXAMINATION SCHEME:

Components	Other Components	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

MTE: Mid-term Examination, **ESE**: End Semester Examination**; A:** Attendance

Text and Reference Books:

1. Engineering Metrology and Measurement, N V Raghavendra and Krishnamurthy, Oxford University Press,
2. Engineering Metrology and Measurements, Bentley, Pearson Education
3. Theory and Design for Mechanical Measurements, 3 rd Edition,Richard S Figliola, Donald E Beasley, Wiley India
4. Metrology and Measurement, AnandBewoor&VinayKulkarni McGraw-Hill
5. Doebelin's Measurement Systems Ernest Doebelin, DhaneshManik McGraw-Hill
6. A Text book of Engineering Metrology, I C Gupta, DhanpatRai Publications 8. A course in Mechanical Measurements and Instrumentation, A K Sawhney, DhanpatRai Publications
7. Mechanical Measurements and Instrumentations, Er. R K Rajput, Kataria Publication(KATSON)
8. Mechanical Measurement and Metrology by R K Jain, KhannaPublisherMechanical Measurement & Control by D.S. Kumar.
9. Industrial Instrumentation & Control by S K Singh, McGrawHill
10. Mechanical Measurements by Beckwith & Buck, Narosa publishing House

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
INTRODUCTION TO SMART MATERIALS	BMT 404	2 0 0	2	IV

Course Learning Outcomes

CLO 1	Understand the concepts of functional material, smart material and smart system
CLO 2	Master the techniques for the synthesis of functional and smart materials
CLO 3	Judge the appropriate application of smart materials with respect to the feasibility of their fabrication and implementation, and to the economic aspects
CLO 4	Innovatively apply the above knowledge to selected applications, particularly electronics, data storage, sensing and automation

Course Contents:

Module 1: Introduction: Closed loop and Open loop Smart Structures. Applications of Smart structures, Piezoelectric properties. Inchworm Linear motor, Shape memory alloys, Shape memory effect-Application, Processing and characteristics.

Module 2: Shape Memory Alloys: Introduction, Phenomenology, Influence of stress on characteristic temperatures, Modelling of shape memory effect. Vibration control through shape memory alloys. Design considerations, multiplexing embedded NiTiNOL actuators.

Module 3: Biomimetics: Characteristics of Natural structures. Fibre reinforced: organic matrix natural composites, Natural creamers, Mollusks. Biomimetic sensing, Challenges and oppurtunities.

Module 4: MEMS: History of MEMS, Intrinsic Characteristics, Devices: Sensors and Actuators. Microfabrication: Photolithography, Thermal oxidation, Thin film deposition, etching types, Doping, Dicing, Bonding. Microelectronics fabrication process flow, Silicon based, Process selection and design

Module 5: Polymer MEMS & Microfluidics: Introduction, Polymers in MEMS(Polyimide, SU-8,LCP,PDMS,PMMA,Parylene, Others) Applications(Acceleration, Pressure, Flow, Tactile sensors). Motivation for micro fluidics, Biological Concepts, Design and Fabrication of Selective components. Channels and Valves

Examination Scheme:

Components	Other Components	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

MTE: Mid Term Examination, ESE: End Semester Examination;

Text & References:

Text:

- "Smart Structures –Analysis and Design", A.V.Srin ivasan, Cambridge University Press, New York, 2001, (ISBN:0521650267).
- "Smart Materials and Structures", M.V.Gandhi and B.S.Thompson Chapmen & Hall, London, 1992 (ISBN:0412370107)

References:

- "Foundation of MEMS, by Chang Liu. Pearson Educa tion. (ISBN:9788131764756)

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
MICROPROCESSOR-II	BMT 405	2 0 0	2	IV

Course Learning Outcomes

CLO 1	Describe basic concept of microcomputers.
CLO 2	Understand the memory system and interface design
CLO 3	To understand the working of transistor at high frequency

Course Contents:

Module I: Introduction to Microcomputer Systems

Introduction to Microprocessors and microcomputers, Study of 8 bit Microprocessor, 8085 pin configuration, Internal Architecture and operations, interrupts, Stacks and subroutines, various data transfer schemes.

Module II: ALP and timing diagrams

Introduction to 8085 instruction set, advance 8085 programming, Addressing modes, Counters and time Delays, Instruction cycle, machine cycle, T-states, timing diagram for 8085 instruction.

Module III: Memory System Design & I/O Interfacing

Interfacing with 8085.Interfacing with input/output devices (memory mapped, peripheral I/O), Cache memory system. Study of following peripheral devices 8255, 8253, 8257, 8255, 8251.

Module IV: Architecture of 16-Bit Microprocessor

Difference between 8085 and 8086, Block diagram and architecture of 8086 family, pin configuration of 8086, Minimum mode & Maximum mode Operation. Internal architecture of 8086, Bus Interface Unit, Register Organization, Instruction Pointer, Stack & Stack pointer, merits of memory segmentation, Execution Unit, Register Organization.

Module V: Pentium Processors

Internal architecture of 8087, Operational overview of 8087, Introduction to 80186, 80286, 80386 & 80486 processors, Pentium processor.

Examination Scheme:

Components	Other Components	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

MTE: Mid Term Examination, ESE: End Semester Examination;

Text & References:

Text:

- Ramesh. S. Gaonkar, "Microprocessor architecture Programming and Application with 8085" Penram International Publishing, 4th Edition
- B.Ram, "Fundamentals of microprocessors and microcomputer" Dhanpat Rai, 5th Edition.
- Douglas V Hall.

References:

- M. Rafiquzzaman, "Microprocessor Theory and Application" PHI – 10th Indian Reprint.
- Naresh Grover, "Microprocessor comprehensive studies Architecture, Programming and Interfacing" Dhanpat Rai, 2003.

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
MATERIAL SCIENCE AND METALLURGY	BMT 406	3 0 0	3	IV

Course Learning Outcomes

CLO 1	To apply the concept of miller indices and types of materials .
CLO 2	To study properties and dislocation theory of materials
CLO 3	To study alloys and composite materials and also analyse equilibrium and non equilibrium diagram of alloy.
CLO 4	Define application of various materials

B. Syllabus

Module I

Crystal Atoms of Solid: Structure of atom binding in solids metallic, Vander walls, ionic and covalent, Space lattice and crystal system arrangement of atoms in BCC, FCC and HCP crystal. Manufacture of Refractory and Ferrous Metals: Properties uses and selection of acid, basic and natural refractory, metallurgical coke, Properties, types, uses and brief description of the manufacturing processes for iron and steel making.

Module II

Plastic deformation of Metals: Point and line defects in crystals, their relation to mechanical properties, deformation of metal by slip and twinning stress strain curves of poly crystalline materials viz. mild steel cast iron and brass yield point phenomenon. Cold and hot working of metals and their effect on mechanical properties, annealing of cold worked metals, principles of re-crystallization and grain growth phenomenon, fracture in metal and alloys, ductile and brittle fracture, fatigue failure

Module III

Alloy Formation and Binary Diagram: Phase in metal system solution and inter-metallic compounds. Hume-Rottery's rules, solidification of pure metals and alloy equilibrium diagrams of isomorphous, eutectic peritectic and eutectoid system, non-equilibrium cooling and coring iron, iron carbon equilibrium diagram.

Module IV

Principles and applications of heat treatment processes viz. annealing, normalizing hardening, tempering; harden ability & its measurement, surface hardening processes. Defects in heat treatment and their remedies; effects produced by alloying elements on the structures and properties of steel. Distribution of alloying elements (Si, Mn. Ni. Cr. Mo. TL. Al) in steel.

EXAMINATION SCHEME:

Components	Other Components	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text & References:

Text:

- V. Raghavan, “Material Science & Engineering”, Prentice Hall India Ltd., 2001.
- Shackelford, J.F. and Muralidhara, M.K., Introduction to Material Science for Engineers (6/e), Pearson Education, 2007
- S.K. Hazra Chaudhuri, “Material Science & Processes”, Indian Book Publishers, Calcutta, 1983.
- R.B. Gupta, “Material Science Processes”, Satya Prakashan, New Delhi, 2000.

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
QUALITY CONTROL & QUALITY ASSURANCE	BMT 407	3 0 0	3	IV

Course Learning Outcomes

CLO 1	Explain different meaning of quality concepts and their different dimensions
CLO 2	Describe and distinguish different stastical method and chart to optimize the given sample.
CLO 3	Distinguish types of customers and also able to define different types of risk measured in quality and inspection process
CLO 4	Explain different assurance term such as quality audit, ISO 9000, six sigma

B. Syllabus

Unit-I: Quality Concepts: Evolution of Quality control, concept change, TQM Modern concept, Quality concept in design, Review off design, Evolution of proto type. **Control on Purchased Product:** Procurement of various products, evaluation of supplies, capacity verification, Development of sources, procurement procedure. **Manufacturing Quality:**Methods and Techniques for manufacture, Inspection and control of product, Quality in sales and services, Guarantee, analysis of claims.

Unit-II: Quality Management: Organization structure and design, Quality function, decentralization, Designing and fitting organization for different types products and company, Economics of quality value and contribution, Quality cost, optimizing quality cost, seduction programme. **Human Factor in Quality:**Attitude of top management, co-operation of groups, operators attitude, responsibility, causes of operators error and corrective methods.

Unit-III:Control Charts Theory of control charts, measurement range, construction and analysis of R charts, process capability study, use of control charts. **Attributes of Control Charts**Defects, construction and analysis off-chart, improvement by control chart, variable sample size, construction and analysis of C-chart.

Unit-IV:Defects Diagnosis and Prevention Defect study, identification and analysis of defects, corrective measure, factors affecting reliability, MTTF, calculation of reliability, Building reliability in the product, evaluation of reliability, interpretation of test results, reliability control, maintainability, zero defects, quality circle.

Unit-V:IS0-9000 and its concept of Quality Management:

ISO 9000 series, Taguchi method, JIT in some details

EXAMINATION SCHEME:

Components	Other Components	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

References:

1. Lt. Gen. H.LaI, "Total Quality management", Wiley Eastern Limited, 1990.
2. Greg Bounds. “Beyond Total Quality Management”. McGraw Hill, 1994.
3. Menon, H.G, "TQM in New Product manufacturing McGraw Hill 1992",

References:

- Degarmo E. Paul et.al, “Materials & Processes in Manufacture”, Prentice Hall India, New Delhi, 2001.
- Raymond A Higgim., “Engineering Metallurgy Part 1”, Prentice Hall India, New Delhi, 1998.
- L. Krishna Reddi, “Principles of Engineering Metallurgy”, New Age Publication, New Delhi, 2001.
- Buduisky et al, “Engineering Materials & Properties”, Prentice Hall India, New Delhi, 2004.
- Peter Haasten, “Physical Metallurgy”, Cambridge Univ. Press, 1996.

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
ARTIFICIAL INTELLIGENCE AND ROBOTICS	BMT 408	3 0 0	3	IV

Course Learning Outcomes

CLO 1	Identify problems where artificial intelligence techniques are applicable
CLO 2	Apply selected basic AI techniques; judge applicability of more advanced techniques
CLO 3	Participate in the design of systems that act intelligently and learn from experience

B. Syllabus

Module I: Scope of AI
Games, theorem proving, natural language processing, vision and speech processing, robotics, expert systems, AI techniques- search knowledge, abstraction.
Problem solving
State space search; Production systems, search space control: depth-first, breadth-first search, heuristic search - Hill climbing, best-first search, branch and bound. Problem Reduction, Constraint Satisfaction End, Means-End Analysis

Module II: Knowledge Representation
Predicate Logic: Unification, modus ponens, resolution, dependency directed backtracking. Rule based Systems: Forward reasoning: conflict resolution, backward reasoning: use of no backtracks.
Structured Knowledge Representation: Semantic Nets: slots, exceptions and default frames, conceptual dependency, scripts.
Expert Systems
Need and justification for expert systems, knowledge acquisition, Case studies: MYCIN, RI.
Learning: Concept of learning, learning automation, genetic algorithm, learning by inductions, neural nets.

Module III: Manipulator kinematics
Kinematics: Introduction, solvability, algebraic solution by reduction to polynomial, standard frames, repeatability and accuracy, computational considerations.

Module IV: Manipulator dynamics
Introduction, acceleration of rigid body, mass distribution, Newton's equation, Euler's equation, Iterative Newton-Euler dynamic formulation, closed dynamic equation, Lagrangian formulation of manipulator dynamics, dynamic simulation, computational consideration.

Module V: Trajectory Generation
Introduction, general considerations in path description and generation, joint space schemes, Cartesian space schemes, Path generation in runtime, Planning path using dynamic model.

Module VI: Linear control of manipulators
Introduction, feedback and closed loop control, second order linear systems, control of second-order systems, Trajectory following control, modeling and control of a single joint, sensor and vision system.
Robot Programming languages & systems: Introduction, the three level of robot programming, requirements of a robot programming language, problems peculiar to robot programming languages.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	20	15	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att:

Attendance

Text & References:

Text:

- E. Rich and K. Knight, “Artificial intelligence”, TMH, 2nd ed., 1992.
- N.J. Nilsson, “Principles of AI”, Narosa Publ. House, 1990.
- John J. Craig, “Introduction to Robotics”, Addison Wesley publication
- Richard D. Klafter, Thomas A. Chmielewski, Michael Negin, “Robotic Engineering – An integrated approach”, PHI Publication
- Tsuneo Yoshikawa, “Foundations of Robotics”, PHI Publication

References:

- D.W. Patterson, “Introduction to AI and Expert Systems”, PHI, 1992.
- Peter Jackson, “Introduction to Expert Systems”, AWP, M.A., 1992.
- R.J. Schalkoff, “Artificial Intelligence - an Engineering Approach”, McGraw Hill Int. Ed., Singapore, 1992.
- M. Sasikumar, S. Ramani, “Rule Based Expert Systems”, Narosa Publishing House, 1994.

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
THERMODYNAMICS LAB	BMT 421	0 0 2	1	4

A. Course Learning Outcomes:

CLO 1	Ability to perform test on diesel/petrol engine
CLO 2	ility to study performance characteristic of different boilers.
CLO 3	Ability to determine the properties of the fuels.

B. Syllabus

- To study about the different Boilers.
- To study different types of Boilers mountings.
- To study different boilers accessories.
- To study two-stroke and four stroke petrol engine.
- To study two-stroke and four storke diesel engine.
- To study air reciprocation compressor unit.
- To determine the CV of fuel using bomb calorimeter.

Examination Schedule:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
FLUID MECHANICS LAB	BMT 422	0 0 2	1	4

A. Course Learning Outcomes:

CLO 1	Ability to perform test on diesel/petrol engine
CLO 2	Ability to study performance characteristic of different boilers.
CLO 3	Ability to determine the properties of the fuels.

B. Syllabus

FLUID MECHANICS LAB

1. Verification of Bernoulli's Theorem
2. Experiment using Venturimeter
3. Determination of coefficient of Discharge C_d, C_c, $C_!$ Using
4. Circular/triangular/rectangular orifice
5. To find major head losses in a pipe line
6. To find minor head losses in a pipe line (sudden expansion/contraction/bend)

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

Course Name	Course Code	L T P	Credit	Semester
METROLOGY LAB	BMT 423	0 0 2	1	4

A. Course Learning Outcomes:

CLO 1	Demonstrate and use different length measuring instruments like vernier calipers and micrometers.
CLO 2	Explain different angle measuring instrument like universal bevel protractor, sine bar.
CLO 3	Formulate some unknown quantity or parameter of engineering interest.
CLO 4	Evaluate the surface quality of a given specimen which is important in all kind of manufacturing..

B. Syllabus

1 Set up a dimension by slip gauges (example 36.936; 14.727…..) Measure this set up by micrometer (least count 0.01) several times and read dimensions. Find statistical mean and record the expected variation between the actual dimension and dimension measured by micrometer.

2 To check the roundness of a circular bar with the help of dial gauge.

3 To calibrate the micrometer using slip gauges.

4 Check the bore in a component by a bore-indicator. Set the bore indicator by micrometer and measure the deviation in the bore. Measure several times and obtain the mean value at three positions along the length of the bore.

5 Set – up a sine bar for measuring the angle of an inclined surface (of a bracket, milling cutter arbor with 7/24 taper, ….). Measure the angle several times and record the mean value. Use height gauge wherever necessary.

6 Performance on angular measurement using angular measuring instruments.

7 Measure the straightness of a surface (surface plate; guide way of machine tool) by using straight edge and dial gauge and dial gauge stand.

10 To machine a given surface and study its roughness characteristics

11 Measure the dimensions of a mechanical component using profile projector

12 Measure the dimensions of a mechanical component using tool maker's microscope.

13. Measurement of Temperature with different devices.

Open ended Problem:

Students will work on an industrial based problem on measurement.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
MEASUREMENT AND CONTROL LAB	BMT 424	0 0 2	1	4

A. Course Learning Outcomes:

CLO 1	Investigate the fundamental concepts of measurements.
CLO 2	Apply the knowledge of constructional details of measuring instruments for designing purpose and industrial production
CLO 3	Develop various analogue and digital measuring instruments for measuring AC and DC signals

B. Syllabus

Experiments:

1. . Measurement of resolution and sensitivity of thermocouple (study of various thermocouples J, K, T, etc.) (Calibration)
2. Measurement of resolution, sensitivity and non linearity of termistor. (termistor instability)
3. Measurement of thickness of LVDT.
4. Measurement of resolution of LVDT (and displacement measurement)
5. Study of proportional control and offset Problems.
6. Study of proportional integral control.
7. Study of proportional integral derivative (PID) control.
8. Vibration measurement by stroboscope (natural frequency of a cantilever)
9. Angular frequency (speed of rotating objects) measurement by stroboscope.
10. Pressure transducer study and calibration.
11. Proving ring (force measurement)
12. Torque cell.
13. Closed loop study of an electric circuit.
14. Young's modulus of a cantilever.
15. Young's modulus and poison's ratio of tensile test piece of M.S.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
MICROPROCESSOR-II LAB	BMT 425	0 0 2	1	4

A. Course Learning Outcomes:

CLO 1	To get exposure on microprocessors, design and coding knowledge on 80x86 family
CLO 2	To give the knowledge and practical exposure on connectivity and execute of interfacing devices with 8086 kit like LED displays, Keyboards, DAC/ADC, and various other devices

B. Syllabus

List of Experiments:

1. ALP for 8 bit addition with and without carry
2. ALP for 8 bit subtraction with and without borrow
3. ALP for 8 bit multiplication and division
4. ALP for sorting an array of numbers in ascending and descending order
5. ALP with additional instructions
6. Study of programmable peripheral interface (8255) board
7. Study of programmable interval timer (8253) board
8. Study of programmable DMA controller (8257) board
9. Study of programmable interrupt controller (8259) board
10. Study of programmable serial communication interface (8251) board
11. Study of 16 bit Microprocessor (8086) Kit

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

AMITY UNIVERSITY
RAJASTHAN

A

MITY SCHOOL OF ENGINEERING & TECHNOLOGY(ASET)

Course Name	Course Code	LTP	Credit	Semester
Professional Communication Skills	BCS 401	1:0:0	1	1

A. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Identify steps to professional communication
CLO 2	Identify the key components of meeting, agendas and meeting minutes
CLO 3	Understand the key skills and behaviors required to facilitate a group discussion/presentation
CLO 4	Polish current affairs & rapport building

B. SYLLABUS

Topic
Enhancing Speaking Skills (Public Speaking)
Resume Building-1
GD-2 (Specifically: Social & Political)
Presentations-2

EXAMINATION SCHEME:

Components	Public Speaking	GD	Poster Presentation	Attendance
Weightage (%)	30	30	35	5

SUGGESTED READINGS

- Essential Telephoning in English, Garside/Garside, Cambridge
- Working in English, Jones, Cambridge
- Dr. P.Prasad. *Communication Skills*.S.K.Kataria &Sons
- Koneru, Aruna. *Professional Communication.* The McGraw Hill: New Delhi, 2008. Print

- Krishnaswamy N, *Creative English for Communication*. Delhi: Macmillan Publishers India Ltd. Print. 2007.

BEHAVIOURAL SCIENCE - IV
(RELATIONSHIP MANAGEMENT)

Course Code: BSS 404 **Credit Units: 01**

Course Objective:

To understand the basis of interpersonal relationship
To understand various communication style
To learn the strategies for effective interpersonal relationship

Course Learning Outcomes (CLOs)

At the successful completion of this course you (the student) would be able to:

1. Identify the basis of interpersonal relationship.
2. Describe the importance of interpersonal relationship and bridging individual differences.
3. Recognize the development and strategies for effective interpersonal relationship.
4. Explain and apply the theories of relationship concepts of impression management.

Course Contents:

Module I: Understanding Relationships
Importance of relationships
Role and relationships
Maintaining healthy relationships

Module II: Bridging Individual Differences
Understanding individual differences
Bridging differences in Interpersonal Relationship – TA
Communication Styles

Module III: Interpersonal Relationship Development
Importance of Interpersonal Relationships
Interpersonal Relationships Skills
Types of Interpersonal Relationships

Module IV: Theories of Interpersonal Relationships
Theories: Social Exchange, Uncertainty Reduction Theory
Factors Affecting Interpersonal Relationships
Improving Interpersonal Relationships

Module V: Impression Management
Meaning & Components of Impression Management
Impression Management Techniques (Influencing Skills)
Impression Management Training-Self help and Formal approaches

Examination Scheme:

Components	SAP	JOS	FC/MA/CS/HA	P/V/Q	A
Weightage (%)	25	15	30	25	05

SAP- Social Awareness Programme; **JOS**-Journal of Success; **HA**-Home Assignment; **P**-Presentation; **V**-Viva; **Q**-Quiz; **FC-** Flip class; **MA-** Movie Analysis; **CS-** Case study; **A**-Attendance

Text & References:

- Vangelist L. Anita, Mark N. Knapp, Inter Personal Communication and Human Relationships: Third Edition, Allyn and Bacon
- Julia T. Wood. Interpersonal Communication everyday encounter
- Simons, Christine, Naylor, Belinda: Effective Communication for Managers, 1997 1st Edition Cassell
- Goddard, Ken: Informative Writing, 1995 1st Edition, Cassell
- Harvard Business School, Effective Communication: United States of America
- Foster John, Effective Writing Skills: Volume-7, First Edition 2000, Institute of Public Relations (IPR)

Beebe, Beebe and Redmond; Interpersonal Communication, 1996; Allyn and Bacon Publishers

Semester 4 Course Code: FLT 401/411 (Tech French) Credit Units: 02

Course Learning Objective:

- Students will hone intermediate language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of intermediate level.
- Students will be able to communicate in small sentences in Simple Future and Past tenses .
- Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.
- To do the shopping
- To ask and express one's needs
- To present one's eating habits
- To understand a label
- To ask the price
- To order at the restaurant
- To organise a meeting
- To propose to someone to do an activity
- To understand the advertisement of a conference
- To understand the names of different stations
- To speak about ones schedule
- To express one's professional wish
- To formulate a project
- To read a notice board

Course Contents:

Unité 3 La science au quotidien Page : 62-84 Leçons 10, 11 & 12

Contenu Lexical:

1. La nourriture
2. Les ingredients
3. Les expressions de quantité
4. Les expressions familières avec les noms de fruits et les legumes
5. Les expressions pour proposer une invitation
6. Le processus de fabrication de quelques elements
7. Les expressions pour parler d'un projet

Contenu Grammatical:

1. Manger et boire au présent
2. L'articlepartitif
3. Les prépositions de lieu
4. Les verbs pronominaux
5. La date, l'heure et le jour: les prépositions
6. La nominalisation

EXAMINATION SCHEME

Total: 100 marks

Continuous Evaluation (Total 50 Marks)					End Sem Evaluation (Total 50 Marks)
Quiz	Mid Term Test	Presentation	Viva Voce	Attendance	End-Term Exam
10	15	10	10	5	50

Text & References:

- Le Gargasson, I. Naik, S. Chaize, C. (2012) Tech French, Delhi : Goyal Publications
- Ray. A, Robert (2010) Le Petit Robert French Dicitionary, Paris: Le Robert
- Robert, Collins (2006) Collins Robert French Dictionary, Paris : Harper Collins

Foreign Language German

Semester 4:Course Code: FLG 401/411 **Credit units : 02**

Credit Units : 02

Course Learning Objective:

- Students will hone intermediate language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of intermediate level.
- Students will be able to communicate in small sentences in Simple Future and Past tenses .
- Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.

After successful completion of this semester, students will be able to:

- talk about different professions
- express positive and negative aspect of different professions.
- talk about daily routine of a job
- enquire about direction.
- use preposition in sentences.
- understand the visiting cards etc.

Course Content:

Vocabulary Content:

- Professions
- Workplaces
- Professional Tasks like writing mail, make phone calls etc.
- Locations (right left, etc.)
- Public places

Grammar Content:

- Possessive article in accusative.
- Introducing prepositions in dative, accusativ cases and changing prepositions in dat + acc.
- Usage of preposition : in through, to , at etc

EXAMINATION SCHEME

Total: 100 marks

Continuous Evaluation (Total 50 Marks)					End Sem Evaluation (Total 50 Marks)
Quiz	Mid Term Test	Presentation	Viva Voce	Attendance	End-Term Exam
10	15	10	10	5	50

PrescribedText-Book: Lessonsfrom 11 onwardsfromDeutschalsFremdsprache -1B, INBH & Oxford, New Delhi, 1977

References: **Studio D A1** by Hermann Funk, Christina Kuhn and Silke Demme, Cornelsen, 2013

Tangram A1by Rosa Maria Dallapiazza, Eduard von Jan & Till Schoenherr, Max Hueber, 2007

SprachtrainingA1 by Rita Maria Niemann, Dong Ha Kim, Cornelsen, 2013

Dictionaries for reference: **Studio D: Glossar** A1 - Deutsch –Englisch, Cornelsen, 2013

http://www.duden.de/woerterbuch

Materials are given in form of photocopies if felt to be necessary

Foreign Language Spanish

Semester 4: Course Code: FLS 401/411 Credit units : 02

Course Learning Objective:

- Students will hone intermediate language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of intermediate level.
- Students will be able to communicate in small sentences in Simple Future and Past tenses .
- Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.
- To talk about relations
- To express obligation
- To enquire about direction
- To be able to describe your locality
- Telephonic conversation etiquettes
- Dialogue between two friends/sales man and client etc.

Course Content:

Vocabulary Content:
Family, friends, directions, way(going straight, left, right etc.) Temple, hospital, restaurant, church, hospital, Town hall, parks, shopping mall, etc.

Grammar Content:
Revision of present indefinite, continuous and near future tense.
Doublenegation – No Nunca, Ningun/a, Nada, nadie etc.
Tener que / Hay que
Expressionswith Tener and Estar.
Use of Apetecer, Llevarse bein o mal con alguien / Caer +bien/mal + a alguien

Examination Scheme

ExaminationScheme:

Total: 100 marks

ContinuousEvaluation (Total 50 Marks)					EndSemEvaluation (Total 50 Marks)
Quiz	MidTerm Test	Presentation	Viva Voce	Attendance	End-TermExam
10	15	10	10	5	50

Skills Evaluated: Writing, Comprehension, grammar, and Vocabulary

Text &References:
Nuevo Español Sin Fronteras (ESF1) by Jesús sánchez Lobato, Concha Moreno Garcia, Concha Moreno Garcia, Isabel Santos Gargallo, Sociedad General Española De Librería, S.A 2005
Pasaporte Nivel (A1) byMatideCerraloza Aragón, oscarCerraloza Gilli, Begoña Llovet Barquero, EdelsaGroup didascalia, S.A. 2005
Dictionaries for reference: Collins, www.wordreferences.com.
Essential materials are given in the form of photocopies.

Foreign Language Chinese

Semester - IV **Course Code: FLC- 401/411** **Credit Units: 02**

Course Learning Objectives:

- Students will hone intermediate language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of intermediate level.
- Students will be able to communicate in small sentences in Simple Future and Past tenses .
- Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.

On the completion of Fourth semester the students will be able to consolidate their proficiency of HSK-I and will be able to

- Read Chinese words, phrases and simple sentences both in Pin Yin and Characters given in the text.
- Write Chinese Characters, sentences and small paragraphs.
- Speak Chinese dialogues from various fields of day to day life.
- Listen and understand simple Chinese words and dialogues used in syllabi.
- Carry out conversation in the target language.
- Manipulate basic grammatical structures such as: 疑问代词.etc.
- Master and use most essential vocabulary items of day to day use and office related vocabulary; approx 70 Characters including 50 characters of HSK level –II
- Refer Chinese dictionaries.
- Translate a Chinese paragraph with the help of dictionaries and translation software.

COURSE CONTENTS

1. Revision of Important expressions
2. Expression of welcome
3. Expression of time: past, present & future
4. Expression of right or wrong.
5. Questioning and answering simple questions about medical care
6. Questioning and answering simple questions about sports & entertainment
7. Office related vocabulary , expressions & email writing
8. Referring Chinese dictionaries (hard and electronic dictionaries)
9. Translation with the help of dictionaries & translation software
10. Practice of model test series of HSK-I
11. CBT package
12. Listening
13. Conversation based on above topics
14. Chinese poetry

VOCABULARY CONTENT

1. Vocabulary will include approx 70 Characters including 50 Characters of HSK-II level.

1. Vocab related to welcome, tenses, right wrong etc and office related vocabulary will be covered during this semester.

GRAMMATICAL CONTENT

1. Interrogative pronouns疑问代词: 什么，哪儿，谁，为什么， 怎么样，
哪，什么时候，多少，几，

2。Money表示钱数

3. Weight表示重量

4. Measure words量词

5. Adverbs副词

6. 时间副词：正在

7. 频率副词：再

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
MACHINE DESIGN	BMT 501	3 0 0	3	5

A. Course Learning Outcomes:

CLO 1	To design of machine elements under torsion, bending, axial loads and a combination of these.
CLO 2	To understand the stresses in machine members due to various types of loads and failure of components according to theories of failures.
CLO 3	To design of various joints and fasteners for a given load to be transmitted and also study various types of joints used in power transmission.
CLO 4	To inculcate an ability to design belt drives and selection of belt, rope and chain drives.

B. Syllabus:.

Module I: Variable stresses in Machine Parts

Fatigue and Endurance Limit, Factor of Safety for Fatigue Loading, Stress concentration, Notch sensitivity, Gerber Method, Goodman Method and Soderberg Method for a combination of stresses.

Module II: Power Screws

Types of screw threads, Torque required to raise and lower the load, Efficiency of square threaded screw, overhauling and self locking screw, stresses in power screw, design of screw jacks.

Module III: Shaft, Keys and Couplings

Design of shaft, Types of Keys, Splines, Strength of Sunk Key, types of shaft coupling, Sleeve and muff coupling, Flange coupling, Flexible coupling, Oldham coupling, Universal coupling.

Module IV: Cotter and Knuckle Joints

Types of cotter joints, design of socket and spigot joint, design of sleeve and cotter joint, design of jib and cotter joint, Design procedure of Knuckle joint.

Module V: Drives

Types of Belt drives, Flat Belt drives, Velocity ratio, Sleep, Creep of Belt, Length of open Belt, length of cross belt, power transmission by belt, Maximum tension in the belt. Types of V belt and Pulleys, advantages and disadvantages of V belt over Flat Belt, Ratio of Driving tensions for V belt, Rope drives. Chain drives, advantages and disadvantages of Chain drives.

Module VI: Riveted and Welded Joint

Types of Riveted joint, Lap joint, Butt Joint, Caulking and Fullering, Failure of Riveted joint, Strength of Riveted joint, Efficiency of Riveted joint. Advantages and Disadvantages of welded joint over Riveted joint, Strength of Fillet joint, strength of Butt joints.

Examination Scheme:

Components	Internal Assessment	Attendance	MTE	ESE
Weight age (%)	30	5	15	50

Text & References:

- J.E. Shigley, Mechanical Engineering Design.
- Sadhu Singh, Machine Design

- R.S. Khurmi & J.K. Gupta, Machine design
- D.K. Aggarwal & P.C. Sharma, Machine Design

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
DESIGN OF MECHATRONICS SYSTEM	BMT 502	3 0 0	3	5

A. Course Learning Outcomes:

CLO 1	Understand characteristics and the components of mechatronics systems and discuss recent trends in Mechatronics
CLO 2	Describe active & Passive electrical circuits
CLO 3	Understand the control system for mechatronic system.
CLO 4	Propose solutions for encountered problem

B. Syllabus:.

MODULE 1 – INTRODUCTION
Introduction to Mechatronics system – Key elements – Mechatronics Design process – Types of Design
MODULE 2 – INTERFACING AND DATA ACQUISITION

Sensor selection, Real-time interfacing – Introduction - Elements of data acquisition and control and Frequency Domain- Applications.
MODULE 3 – SYSTEM MODELLING
Basic building blocks of system modelling. Modelling of mechanical system- Modelling of mechanical and electrical systems - Simple exercises in linear, rotary motions.
MODULE 4 – ALGORITHMS FOR ADVANCED CONTROL
Advanced applications in Mechatronics: Mechatronic Control in Automated Manufacturing – Artificial intelligence in Mechatronics – Fuzzy Logic Applications in Mechatronics
MODULE 5 - DESIGN - CASE STUDIES

Measurement Systems, Feedback control, Advanced Control using Fuzzy Logic

Examination Scheme:

Components	Other Components	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

MTE: Mid Term Examination, ESE: End Semester Examination.

Text & References:

1. W Bolton, Mechatronics: Electronic Control Systems in Mechanical and Electrical Engineering, Pearson Education ,6th Edition,, 2015.
2. D. Shetty & R. Kolk, Mechatronics System Design, PWS Publishers., 2012
3. David G. Alciatore & Michael B Histand., Introduction to Mechatronics and Measurement systems, Tata McGraw Hill, 2003.

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
HEAT AND MASS TRANSFER	BMT 503	2 0 0	2	5

A. Course Learning Outcomes:

CLO 1	Understand basic concept of heat transfer: conduction, convection and radiation.
CLO 2	Explain the phenomena of boiling and condensation; apply LMTD and NTU methods of thermal analysis to different types of heat exchanger configurations.
CLO 3	Explain basic laws for Radiation and apply these principles to radiative heat transfer between different types of surfaces.
CLO 4	Apply diffusive and convective mass transfer equations and correlations to solve problems for different applications.

B. Syllabus:.

Module I Conduction

One-dimensional steady-state conduction through homogeneous and composite plane walls, cylinders and spheres, critical thickness of insulation; heat transfer from fins of uniform cross section.

Module II Free convection

Introduction, Laminar Boundary Layer Equations of Free convection on a vertical flat plate, Integral method for Free convection on a vertical flat plate, Empirical correlations for Natural convection, Free convection under uniform heat flux, free convection caused by centrifugal forces.

Module III Forced convection Introduction, Parllel flow over a flat plate, flow over Cylinders and Spheres, Fully developed Laminar flow in circular Tubes, Flow of Liquid Mettals, Combined free and forced convection

Module IV Radiation

Thermal radiation; Kirchoff's law; Planck's distribution law, Wien's displacement law; Stefan-Boltzmann's relation, Configuration factors; radiant interchange between black and grey surfaces; radiation shielding solar radiation.

Module V Heat exchangers

Combined heat transfer analysis; overall heat transfer co-efficient; types of heat exchangers; LMTD methods of heat exchanger design; simple heat exchanger calculations.

Module VI Mass transfer

Steady state moleculer diffusion in fluids, Mass heat momentum transfer analysis, unsteady state diffusion, diffusion in solids,Ficks law of diffusion, interface mass transfer

Evaluation:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text & References:

- Incropera, F.P. and DeWitt, D.P. (2002). Fundamentals of Heat and Mass Transfer, John Willy & Sons, New York, NY.
- Nag, P.K. (2002). Heat and Mass Transfer, TMH.
- John R.Howell & Richrd O Buckius, Fundamentals of Engg. Thermodynamics, McGraw Hill International.
- Holman, J.P. (1997). Heat Transfer, 9th edition, McGraw-Hill.
- Mills, A.F. (1999). Basic Heat and Mass Transfer. Prentice-Hall.
- Thirumaleshwar, M. (2006). Fundamentals of Heat and Mass Transfer, Pearson education.
- Ghoshdastidar, P.S. (2004). Heat Transfer. Oxford University Press.
- Arora, Domkundwar, S. and Domkundwar, A. (1988). A Course in Heat & Mass Transfer, Dhanpat Rai &

Co.

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
HEAT & MASS TRANSFER LAB	**BMT 521**	0 0 2	2	5

A. Course Learning Outcomes:

CLO 1	Perform steady state conduction experiments to estimate thermal conductivity of different materials for plane, cylindrical and spherical geometries
CLO 2	Estimate heat transfer coefficients in forced convection, free convection and determine effectiveness of heat exchangers
CLO 3	Perform radiation experiments:determine surface emissivity of a test plane and stefan-Boltzmann's constant and compare with theritical values

B. Syllabus:

1) To determine the surface heat exchanger for a vertical tube losing heat by natural convection.
2) To observe pool boiling phenomena and to determine the critical heat flux at different bulk temperature.
3) To determine Stefan Boltzmann constant.
4) To analyse the performance of an a existing multi-pass heat exchanger and calculate overall heat transfer coefficient.
5) To compare overall heat transfer coefficient for parallel and counter flow in a double pipe heat exchanger and compare practical value overall heat transfer coefficient with theoretical value
6) To determine the overall thermal conductivity of composite wall and to check that the thermal resistance in composite wall are connected in series.
7) To determine the specific heat of Air by forced convection.
8) To determine the inside and outside heat transfer co-efficient of drop wise and film wise condensation and to study the drop wise and film wise condensation phenomena.
9) To find the Emissivity of a given test plate with respect to the black plate

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva .

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
DESIGN OF MECHATRONICS SYSTEM LAB	BMT 522	0 0 2	2	5

A. Course Learning Outcomes:

CLO 1	To study various mechatronics drive system and its practical application .
CLO 2	To impart knowledge on virtual instrumentation and drive systems .
CLO 3	Optimize control systems for power drives

B. Syllabus:

List of Experiments:

1. Study of wind shield smart wiper.
2. Mini project: Develop a feedback control for a mechatronic application
3. Troubleshoot the issues with integration of systems
4. Experience model-based design of Mechatronics system.
5. Optimize the design of Mechatronics systems.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

PRACTICAL TRAINING (EVALUATION)

Course Code: BMT 523 C:06

Methodology

Practical training is based on the theoretical subjects studied by students. It can be arranged within the college or in any related industrial unit. The students are to learn various industrial, technical and administrative processes followed in the industry. In case of on-campus training the students will be given specific task of fabrication/assembly/testing/analysis. On completion of the practical training the students are to present a report covering various aspects learnt by them and give a presentation on same.

Examination Scheme:

Feedback from industry/work place	20
Training Report	40
Viva	15
Presentation	25
Total	**100**

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
ADVANCED MANUFACTURING PROCESS	BMT 505	3 0 0	3	5

A. Course Learning Outcomes:

CLO 1	To learn kinematics and dynamics of robotic system.
CLO 2	Integrate mechanical and electrical hardware for a real prototype of robotic device.
CLO 3	To understand material management system and their protocol system.

B. Syllabus:

Module I: Kinematics Analysis of Robot
Matrix algebra or coordinate transformation, kinematics analysis; geometric and dynamic analysis of robot manipulators.

Module II: Robot Control
Robot Control, RobotVision, RobotControlled, CNNC, Pathplanning, Obstruction Avoidance

Module III: Material Handling
Computer aided Materials Management-inventory control, materials requirements planning. Computer Controlled parts handling and equipments.

Module IV: Automation Protocol
Manufacturing Automation protocol, cross functional implementation Technology for system integration.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	15	20	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

Text:
- Raghuvanshi, Manufacturing Process.
- P.N. Rao, Manufacturing Technology, TMH publications

References:
- Hazra-Chowdhary , Workshop Technology
- R.K. Jain, Production Engineering

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
Metal cutting and Tool design	BMT 506	3 0 0	3	5

A. Course Learning Outcomes:

CLO 1	Explain the ASA, ORS and NRS systems of tool geometry and derive their interrelationships
CLO 2	Develop the relations for chip reduction coefficient, shear angle, shear strain, forces, power, specific energy and temperatures associated with orthogonal cutting.
CLO 3	Develop shear angle relationships for natural and controlled contact cutting and stress strain relations in orthogonal cutting
CLO 4	Develop the relations for forces in multipoint machining and oblique cutting

B. Syllabus:

Module I: Introduction
Basic shape of cutting tools, Function of different angles of cutting tools, tool geometry and Nomenclatures- ASA, ORS systems, Conversion of angles, Tool Materials.

Module II: Mechanism of chip formation
Fracture & yielding mechanism, Types of chips, Factors involved in chip formation analysis, shear plane in flat chips, chip formation in drilling and milling.

Module III: Mechanism of metal cutting
Force system during turning, merchant circle diagram, velocity relationship, stress in conventional shear plane, Energy of cutting process, Ernst& merchant angle relationship, Lee-Shafer relationship, measurement of forces, Heat generation and temperature distribution in metal cutting.

Module IV: Theory of Tool wears
Criteria of wear, machinability and tool life, Flank wear, Crater wear, Taylor's tool life equation, causes and mechanism of tool failure, cutting fluid, Economics of metal machining.

Module V: Design for sheet metal works
Press working Terminology, press operation, types of dies, clearance, cutting forces, methods of reducing cutting forces, minimum diameter of piercing, center of pressure, Drawing dies-blank diameter, drawing force.

Module VI: Jigs and Fixture design
Important considerations in jig and fixture design, Locating and clamping, principles for location purposes, principles for clamping purposes, design principles for jigs and fixtures.

Evaluation:

Components	**Internal Assessment**	**Attendance**	**MTE**	**ESE**
Weightage (%)	30	5	15	50

Text & References:

Text:

- A Bhattacharya , "Metal cutting theory& practice", C.B. Publication

References:

- Geoffrey Boothroyd, "Fundamentals of Metal Machining & Machine Tools", Tata McGraw Hill Kogakusha Ltd.
- P.N. Rao, "Manufacturing Technology", Tata McGraw Hill Publication Ltd.
- Dr. P.C. Pandey & C.K. Singh, "Production Engg. Sciences", Standard Publisher. Distributors.
- Dr. B.J. Ranganath, "Metal Cutting & Tool Design" Vikas Publishing House Pvt. Ltd.

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
MANAGEMENT OF MANUFACTURING SYSTEMS	BMT 507	3 0 0	3	5

A. Course Learning Outcomes:

CLO 1	Classify the materials and Understand the basic properties that characterize the behavior of materials.
CLO 2	Understand the type of loadings/environment that materials should withstand and Select appropriate type of material for specific application
CLO 3	Offer different approaches to modify structure/microstructure in order to get desired properties

B. Syllabus:

Module I: Introduction

Production functions, Plant Organization: Principles of organization, Organization structure-line and staff Organization

Plant Location, Layout: Process layout product layout and combination layout – methods of layout, economics of layout.

Module II: Production Planning & Control

Types of products, demand, demand forecasting, marketing strategies, scheduling and control of scheduling, production control.

Module III: Work and method study

Definition and concepts, method study procedures, symbols, advantages, Flow process charts, Motion study, micro motion, SIMO charts, system concepts, classification, analysis techniques.

Module IV: Industrial maintenance

Types, organization for maintenance department, Breakdown and preventive maintenance.

Module V: Inventory control and replacement analysis

Introduction replacement policy and method adopted, EOQ.

Module VI: Management concepts

Development of management principles, scientific management, human relation aspects. Project Management – CPM and PERT.

Examination Scheme:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text & References:

Text:

- S.K. Sharma, “Industrial Engg. & Operation Management”, S.K. Kataria & Sons.
- Dr. Ravi Shankar, “Industrial Engg. & Management”, Galgotia Publications
- M. Mahajan, “Industrial Engg. & Production Management”, Dhanpat Rai & Co.
- J Moore, Manufacturing Management, Prentice Hall
- Buffa, Modern production and operations management, E.S. Wiley eastern.

References:

- Joseph S. Martinich, “Production & Operation Management”, John Wiley & Sons.

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
EMBEDDED SYSTEM	BMT 508	3 0 0	3	5

A. Course Learning Outcomes:

CLO 1	able to acquire knowledge and understand fundamental embedded systems design paradigms, architectures, possibilities and challenges, both with respect to software and hardware.
CLO 2	Able to practically apply gained theoretical knowledge in order to design, analyze and implement embedded systems, e.g. integrating embedded subsystems and applications in building a fully functional autonomous robot.
CLO 3	Demonstrate a deeper understanding of the electronics and physical principles used for embedded biomedical measuring systems

B. Syllabus:

Module I:An introduction to embedded systems:
An Embedded system, processor in the system, other hardware units, software embedded into a system, exemplary embedded systems, embedded system – on – chip (SOC) and in VLSI circuit.

Module II: Processor and memory organization :
Structural Units in a Processor, Processor selection for an embedded system, memory devices, memory selection for an embedded systems, allocation of memory to program cache and memory management links, segments and blocks and memory map of a system, DMA, interfacing processors, memories and Input Output Devices.

Module III: Devices and buses for device networks:
I/O devices, timer and counting devices, serial communication using the "I2 C" CAN, profibus foundation field bus. and advanced I/O buses between the network multiple devices, host systems or computer parallel communication between the networked I/O multiple devices using the ISA, PCI, PCI-X and advanced buses.

Module IV: Device drivers and interrupts servicing mechanism :
Device drivers, parallel port and serial port device drivers in a system, device drivers for internal programmable timing devices, interrupt servicing mechanism.

Module V: Hardware:
software co-design in an embedded system, embedded system project management, embedded system design and co-design issues in system development process, design cycle in the development phase for an embedded system, use of target systems, use of software tools for development of an embedded system, use of scopes and logic analysis for system, hardware tests. Issues in embedded system design.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	15	15	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance.

Text & References:

Text

- M.A. Mazidi and J. G. Mazidi, 2004 "The 8051 Microcontroller and Embedded Systems", PHI.
- Dr. Prasad, 2004, "Embedded Real Time System", Wiley Dreamtech.
- P.Raghavan , "Embedded linux system design and development", auerbach publication.

Reference

- Michael barr, "Programming embedded system" oreilly publication.
- Raj Kamal, 2004, "Embedded Systems", TMH.

- Embedded systems design: Real world design be Steve Heath; Butter worth Heinenann, Newton mass USA 2002

AMITY UNIVERSITY
RAJASTHAN

AMITY School of Engineering and Technology (ASET)

Course Name	Course Code	LTP	Credit	Semester
Professional Communication Skills	BCS501	1:0:0	1	1

C. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Create right selection of words and ideas while also choosing the appropriate channelof formalcommunication.
CLO 2	Demonstrate the ability to analyse a problem and devise a solution in a group.
CLO 3	Demonstrate proficiency in the use of written communication.
CLO 4	Recognize the mannerisms and methodology of Interview and GD to become more expressive in their body language and verbal performance.

B. SYLLABUS

Topic
Email Writing (Briefing, Do's & Don'ts & Practice)
Corporate Dressing & Body Language (Verbal & Non-Verbal Cues & its role in Interview Selection)
Interview-1 (Briefing, Do's & Don'ts, Questions, Mock Sessions)
GD-3(Practice Sessions)

EXAMINATION SCHEME:

Components	Email Writing	GD	Personal Interview	Attendance
Weightage (%)	30	30	35	5

SUGGESTED READINGS

- Essential Telephoning in English, Garside/Garside, Cambridge

- Working in English, Jones, Cambridge
- Dr. P.Prasad. *Communication Skills*.S.K.Kataria&Sons
- Koneru, Aruna. *Professional Communication.* The McGraw Hill: New Delhi, 2008. Print
- Krishnaswamy N,*Creative English for Communication***.** Delh**i:** Macmillan Publishers India Ltd. Print. 2007.

BEHAVIOURAL SCIENCE - V
(GROUP DYNAMICS AND TEAM BUILDING)

Course Code: BSS504 **Credit Units: 01**

Course learning outcomes (CLOs)
At the successful completion of this course you (the student) should be able to:

1. Recognize their personality and individual differences and identify its importance of diversity at workplace and ways to enhance it.
2. Recognize effective socialization strategies and importance of patriotism and taking accountability of integrity.
3. Recognize different types of human rights and its importance.
4. Identify Indian values taught by different religions.
5. Identify long term goals and recognize their talent, strengths and styles to achieve them.

Course Objective:

To inculcate in the students an elementary level of understanding of group/team functions
To develop team spirit and to know the importance of working in teams

Course Contents:

Module I: Group formation
Definition and Characteristics
Importance of groups
Classification of groups
Stages of group formation
Benefits of group formation

Module II: Group Functions
External Conditions affecting group functioning: Authority, Structure, Org. Resources, Organizational policies etc.
Internal conditions affecting group functioning: Roles, Norms, Conformity, Status, Cohesiveness, Size, Inter group conflict.
Group Cohesiveness and Group Conflict
Adjustment in Groups

Module III: Teams
Meaning and nature of teams
External and internal factors effecting team
Building Effective Teams
Consensus Building
Collaboration

Module IV: Leadership
Meaning, Nature and Functions
Self leadership
Leadership styles in organization
Leadership in Teams

Module V: Power to empower: Individual and Teams
Meaning and Nature
Types of power
Relevance in organization and Society

Examination Scheme:

Components	SAP	JOS	FC/MA/CS/HA	P/V/Q	A
Weightage (%)	25	15	30	25	05

SAP- Social Awareness Programme; **JOS**-Journal of Success; **HA**-Home Assignment; **P**-Presentation; **V**-Viva; **Q**-Quiz; **FC**- Flip class; **MA**- Movie Analysis; **CS**- Case study; **A**-Attendance

Text & References:

- Organizational Behaviour, Davis, K.
- Hoover, Judhith D. Effective Small Group and Team Communication, 2002,Harcourt College Publishers
- Dick, Mc Cann & Margerison, Charles: Team Management, 1992 Edition, viva books
- Bates, A. P. and Julian, J.: Sociology - Understanding Social Behaviour
- Dressers, David and Cans, Donald: The Study of Human Interaction
- Lapiere, Richard. T – Social Change
- Lindzey, G. and Borgatta, E: Sociometric Measurement in the Handbook of Social Psychology, Addison –

Welsley, US.
- Rose, G.: Oxford Textbook of Public Health, Vol.4, 1985.
- LaFasto and Larson: When Teams Work Best, 2001, Response Books (Sage), New Delhi
- J William Pfeiffer (ed.) Theories and Models in Applied Behavioural Science, Vol 2, Group (1996); Pfeiffer & Company
- Smither Robert D.; The Psychology of Work and Human Performance, 1994, Harper Collins College Publishers

Semester 5 Course Code: FLT 501/511 (Tech French) Credit Units: 02

Course Learning Objective:

- Students will hone intermediate language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of intermediate level.
- Students will be able to communicate in small sentences in Simple Future and Past tenses .
- Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.
  - To understand the TP
  - To understand an experiment
  - To read the chemical equations
  - To identify the chemical formulas
  - To understand the instructions of a project
  - To express a desire
  - To understand a testimony
  - To understand and read an exercise of mathematics
  - Read and note the equations

Course Contents:

Unité 4 Formation Scientifique Page : 85-99 Leçons 13, 14 & 15

Contenu Lexical:

1. La chimie: les elements chimique et le matériel
2. La formulation des équationschimiques
3. Le corps humain
4. Les transports encommun
5. Les signes et formulations mathémathiques
6. Les verbes utilisés dans les exercises de mathémathiques

Contenu Grammatical:

1. L'infintif pour exprimer un ordre ou un conseil (dans les consignes)
2. La nominalization
3. Savoir ouconnaître au présent
4. Les pronoms relatives (qui, que, qu')
5. L'infinitif dans les consignes

EXAMINATION SCHEME

Total: 100 marks

Continuous Evaluation (Total 50 Marks)					**End Sem Evaluation (Total 50 Marks)**
Quiz	**Mid Term Test**	**Presentation**	**Viva Voce**	**Attendance**	**End-Term Exam**
10	**15**	**10**	**10**	**5**	**50**

Text & References:

- Le Gargasson, I. Naik, S. Chaize, C. (2012) Tech French, Delhi : Goyal Publications
- Ray. A, Robert (2010) Le Petit Robert French Dicitionary, Paris: Le Robert
- Robert, Collins (2006) Collins Robert French Dictionary, Paris : Harper Collins

Foreign Language German

Semester 5:Course Code: FLG 501/511 **Credit units : 02**

Course Learning Objective:

- Students will hone intermediate language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of intermediate level.
- Students will be able to communicate in small sentences in Simple Future and Past tenses .
- Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.

After successful completion of this semester, students will be able to:

- tell where they work and live
- tell location of their offices and house
- explain, how they reach their work place
- ask and tell the location of thing or person in a house like behind, in front of etc.
- describe the office things like printer, files etc

Course Content:

Vocabulary:

- Workplace
- Location like 1st floor, ground floor.
- Ordinal numbers
- Things and furniture in a office
- Means of transportation

Grammar:

- changing preposition in dative and accusative case
- Verbs related to changing prepositions like to put, to lay etc
- Dative and accusative preposition
- Modal verb : must and can

EXAMINATION SCHEME

Total: 100 marks

Continuous Evaluation (Total 50 Marks)					End Sem Evaluation (Total 50 Marks)
Quiz	**Mid Term Test**	**Presentation**	**Viva Voce**	**Attendance**	**End-Term Exam**
10	**15**	**10**	**10**	**5**	**50**

PrescribedText-Book: ZielsprachеDeutschalsFremdsprachePart 1
References: **Studio D A1** by Hermann Funk, Christina Kuhn and Silke Demme, Cornelsen, 2013

Tangram A1by Rosa Maria Dallapiazza, Eduard von Jan & Till Schoenherr, Max Hueber, 2007

SprachtrainingA1 by Rita Maria Niemann, Dong Ha Kim, Cornelsen, 2013
Dictionaries for reference: **Studio D: Glossar** A1 - Deutsch –Englisch, Cornelsen, 2013

http://www.duden.de/woerterbuch
Materials are given in form of photocopies if felt to be necessary

Foreign Language Spanish

Semester 5: Course Code: FLS 501 Credit units : 02

Course Learning Objective:

- Students will hone intermediate language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of intermediate level.
- Students will be able to communicate in small sentences in Simple Future and Past tenses .
- Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.
- To talk about a pre decided plan
- To talk about a plan yet to materialize
- Topropose a plan
- To talk about what they have done today/during vacations etc.
- Reading texts about Spanish festivals
- Writing composition about Festivals

Course Content:

Vocabulary:
Vocabulary related to leisure time, going out with friends, traveling, shopping, club, transport, decoration and celebration.

Grammar:
Introduction of direct/indirect object pronouns
(Pensar + infinitive),
(Estar pensando en + infinitive)
(Por qué no + verbo / Te Parece + Infinitivo.. etc)
(Haber + participio Pasado)
Introductionof pretérito perfecto

ExaminationScheme:

Total: 100 marks

ContinuousEvaluation (Total 50 Marks)					EndSemEvaluation (Total 50 Marks)
Quiz	MidTerm Test	Presentation	Viva Voce	Attendance	End-TermExam
10	15	10	10	5	50

Text &References:
Nuevo Español Sin Fronteras (ESF1) by Jesús sánchez Lobato, Concha Moreno Garcia, Concha Moreno Garcia, Isabel Santos Gargallo, Sociedad General Española De Librería, S.A 2005
Pasaporte Nivel (A1) byMatideCerraloza Aragón, oscarCerraloza Gilli, Begoña Llovet Barquero, EdelsaGroup didascalia, S.A. 2005
Dictionaries for reference: Collins, www.wordreferences.com.
Essential materials are given in the form of photocopies.

Foreign Language Chinese

Semester - V **Course Code: FLC- 501** **Credit Units: 02**

Course Learning Objectives:

- Students will hone intermediate language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of intermediate level.
- Students will be able to communicate in small sentences in Simple Future and Past tenses .
- Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.

On the completion of Fifth semester the students will be able to

- Read Chinese words, phrases and simple sentences both in Pin Yin and Characters given in the text.
- Write Chinese Characters and sentences and small paragraphs.
- Speak Chinese dialogues from various fields of day to day life.
- Listen and understand simple Chinese words and dialogues used in syllabi.
- Carry out conversation in the target language based on the topics learnt.
- Manipulate basic grammatical structures.
- Master and use most essential vocabulary items of day to day use, programme specific and internet related vocabulary; approx 80 Characters including 50 characters of HSK level – II
- Type Chinese document.
- Express their opinion and ask opinion of others in Chinese

COURSE CONTENT

1. Revision of vocabulary
2. Detailed study of greetings, farewell & personal information (HSK-II topics 1& 2)
3. A brief description of mood & colours
4. Expression of opinions
5. Asking the opinion of the others
6. Listening of dialogues
7. Conversation based on topics learnt
8. CBT package
9. Programme specific vocabulary and expressions
10. Chinese typing and making soft copy of a Chinese document
11. Important Chinese sites and internet related vocabulary

GRAMMAR CONTENT

1. Pattern:因为……所以……
2. Preposition 介词: 在
3. Auxiliary verbs; 助动词
4. Modal Particle 语气助词:了

EXAMINATION SCHEME

Total: 100 marks

Continuous Evaluation (Total 50 Marks)	End Sem Evaluation

					(Total 50 Marks)
Quiz	**Mid Term Test**	**Presentation**	**Viva Voce**	**Attendance**	**End-Term Exam**
10	**15**	**10**	**10**	**5**	**50**

Text Books & References

1. Learn Chinese with me book-II. (Major Text Book)

2. Module on HSK-II. (suggested reading)

3. Practical Chinese Grammar for foreigners. (suggested reading)

4. Internet Chinese. (suggested reading)

5. Office Talk (suggested reading)

6. Elementary Chinese Reader Book-I (suggested reading)

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
MODELLING AND CONTROL OF MECHATRONICS SYSTEM	BMT 601	3 0 0	3	6

A. Course Learning Outcomes:

CLO 1	understand the evolving Mechatronics systems from their underlying physical principles and properties.
CLO 2	Develop an understanding of the purpose of control systems and their use
CLO 3	Be able to understand that a plant is given and a control system is to be designed to satisfy performance specifications

B. Syllabus:

MODULE 1 – Concepts of Systems and Modelling
Concept of systems – Fundamentals of Modelling and Simulation – Types of Modelling – Mathematical Modelling, Simulation and Validation - System Identification
MODULE 2 – Modelling Approaches

Model representations - block diagram, transfer function, state space representation - system identification techniques – linearization of nonlinear models
MODULE 3 – Modelling of physical systems
Development of mathematical models: mechanical, electrical, electromechanical, Thermal, Hydraulic and Pneumatic systems.
MODULE 4 – Simulation
Simulation-basics – types – hardware in loop simulations – time response parameters - time response of 1st and 2nd order systems - simulation of systems in software environment.
MODULE 5 - Basic control systems

Basic Elements of Control System – Open loop and Closed loop systems – Characteristics of on-off, P, PI, PD and PID Controllers – Modified PID Controller – Tuning of controllers.

MODULE 6: Analysis of systems
Stability analysis of the systems using Routh Hurwitz criterion and Root locus – Frequency domain analysis - Bode Plot – Polar Plot – Nyquist stability criterion

Examination Scheme:

Components	Other Components	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

MTE: Mid Term Examination, ESE: End Semester Examination.

Text & References:

1. W Bolton, Mechatronics, Pearson Education, Fourth Edition, 2011
2. Siamak Najarian, Javad Dargahi, Ph.D, Goldis Darbemamieh, Siamak Hajizadeh Farkoush, Mechatronics in Medicine: A Biomedical Engineering Approach, 2012 McGraw-Hill Education, ISBN: 9780071768962

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
ELECTRICAL MACHINES	BMT 602	3 0 0	3	6

A. Course Learning Outcomes:

CLO 1	Analyze and apply the concept of steady state analysis and electrical transients in polyphase machines..
CLO 2	Examine the starting and running performance of single phase induction motor and revolving field theo
CLO 3	Evaluate the basic operation and performance of special machines and can select special machines for different purpose

B. Syllabus:

Module I
Introduction to Subject, Some important fundamentals, Electrical Power generation, Utilization & distribution facts & figures. Simple Loop Generator, D C Machines, Construction Features, Principle of Operation.

Module II
DC Generator Analysis & DC Motor, Classification & Characteristics & Analysis. Speed Torque Characteristics, Speed control of D C Motor. Application of D C Motor. Starters.

Module III
A C Machines, 3 phase IM, Revolving Magnetic field theory, IM as a transformer, Equivalent Circuit. 3 phase Synchronous Machines, Synchronous Motor, Synchronous Generator, Equivalent Ckt.

Module IV
Single phase Induction Motor, Double Revolving Field theory, Different types of 3 phase IM.
Characteristics & typical Applications. Fractional Kilo Watt Hour Motor, Stepper Motor, Hysterisis Motor, A C Series Motors, Universal Motors.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	15	20	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

Text:

- I J Nagrath & D P Kothari. “Electrical Machines”. TMH
- Irvin Kosow, “Electrical Machines & Transformers”, PHI.

References:

- B L Theraja “Electrical Engineering”.

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
SENSORS & MOTION CONTROL	BMT 603	3 0 0	3	6

A. Course Learning Outcomes:

CLO 1	Analyze advanced engineering problems in the fields of sensors, data acquisition and controls.
CLO 2	Apply advanced techniques and tools of sensing systems to solve multi-disciplinary challenges in industry and society
CLO 3	To exhibit independent, and collaborative research with strategic planning, while demonstrating the professional and ethical responsibilities of the engineering profession.

B. Syllabus:

MODULE 1- INTRODUCTION TO SENSORS
Classification of transducers, sensor characteristics, calibration.
MODULE 2 – SENSORS FOR FORCE, PRESSURE & STRAIN APPLICATIONS
Types, characteristics, measurement techniques and applications – Force, Pressure and Strain Sensors.
MODULE 3 – SENSORS FOR POSITION, VELOCITY & TEMPERATURE APPLICATIONS
Types, characteristics, measurement techniques and applications – Position, Velocity & Temperature Sensors.
MODULE 4 – MOTION CONTROL
Sensors for motion control, Pulse Width Modulation for DC motors, Servo Systems – Velocity & Position control
MODULE 5 – APPLICATIONS
Case Study – Industrial sensor data acquisition and motion control systems

Examination Scheme:

Components	Other Components	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

MTE: Mid Term Examination, ESE: End Semester Examination;

Text & References:

Text:

- W Bolton, Mechatronics, Pearson Education, Fourth Edition, 2011.
- David G. Alciatore & Michael B Histand., Introduction to Mechatronics and Measurement systems, Tata McGraw Hill, 2003.

References:

- Woo-Kyung Choi, Hong-Tae Jeon, Seong-Joo Kim, “Multiple Sensor Fusion and Motion Control of Snake Robot Based on Soft-Computing”, INTECH Open Access Publisher, 2007
- Dan Nesculescu, Mechatronics, Pearson Education Pvt. Ltd, 2002.

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
AUTOMOTIVE ENGINEERING	BMT 604	3 0 0	3	6

A. Course Learning Outcomes:

CLO 1	Explain the working of various parts like engine, transmission, clutch, brakes
CLO 2	Describe how the steering and the suspension systems operate
CLO 3	Develop a strong base for understanding future developments in the automobile industry
CLO 4	Understand the environmental implications of automobile emissions

B. Syllabus:

Module I

Introduction, Components of an automobile, basic engine terminology, engine cycles, working of an IC engine. Basic engine design considerations, constructional details of C.I. and S.I. engines. crank shafts, connecting rod, piston, values, cams, manifolds, air cleaners, mufflers, radiators, and oil filters.

Module II: Transmission System

Description and working of manually operated gearboxes like sliding mesh, constant mesh, synchromesh and epicycle; hydraulic torque convertor and its construction working and performance, sem-automatic and fully automatic transmission, Hydramatic transmission, analysis of differentials, live axles, construction working and requirements of overdrive.

Module III:Steering System

Introduction, Front axle, wheel alignment, Steering geometry, steering mechanisms, Ackerman steering, center point steering, power steering.

Module IV: Suspension

Objective, requirement, function, types Shock absorbers, Independent suspension, Stabilizer, air suspension, Hydroelastic suspension, Hydragas interconnected suspension.

Module V

Principle, braking requirements, brake efficiency, fading of brakes, types of brakes, bleeding of brakes, brake fluid.

Examination:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text & References:

- Kirpal Singh, “Automobile Engg.”, Vol. I & II, Standard Publishers, 2004
- N.K. Giri, “Automotive Mechanics”, Khanna Publishers
- Narang G.B.S., “Automobile Engg.”, Khanna Publishers
- Srinivasan, “Automotive Engines”, Tata McGraw Hill
- K.K. Jain & R.B. Asthana, “Automobile Engineering”, Tata McGraw Hill
- James D. Halderman and Chase D. Mitchell Jr., Automotive Engines- Theory and Servicing, Pearson Education, 2007

Course Name	Course Code	L T P	Credit	Semester
MACHINE LEARNING AND COMPUTER VISION	BMT 606	3 0 0	3	6

A. Course Learning Outcomes:

CLO 1	Understand and master basic knowledge, theories and methods in image procesing and computer vision.
CLO 2	Critically review and assess scientific literature in the field and apply theoretical knowledge to identify the novelty and practicality of proposed methods.
CLO 3	Design and develop practical and innovative image processing and computer vision applications or systems.
CLO 4	Identify, formulate and solve problems in image procecssing and computer vision.

B. Syllabus:

Module:1 Introduction to Machine Learning
Introduction, Classification, Regression, Types of Laerning – Supervised, unsupervised, reinforcement learning, Machine learning applications, Terms used in Machine Learning – features, training data and testing data, cross validation, hypothesis, noise. Introduction to supervised learning: Vapnik-Chervonenkis (VC) Dimension, Probably Approximately Correct (PAC) Learning, Model Selection and Generalization

Module:2 Dimensionality reduction and Clustering
Dimensionality reduction: Subset selection, Principle component analysis, Linear discriminate analysis, Locally linear embedding Clustering: Iterative Distance-Based Clustering, k-Means Clustering, Hierarchical Clustering, Choosing the Number of Clusters

Module:3 Parametric Classification and regression
Likelihood estimation, parameter estimation, estimation of mission values, Parametric Classification and regression, Multivariate data classification and regression.

Module:4 Non parametric Classification and Regression
Nonparametric Density Estimation, Generalization to Multivariate Data, Nonparametric Classification, Condensed Nearest Neighbor, Nonparametric Regression, Linear Models – Linear and Logistic Discrimination

Module:5 Decision trees
Introduction, Univariate Trees, Classification Trees, Regression Trees, Pruning, Rule Extraction from Trees, Learning Rules from Data, Multivariate Trees, Prediction with local linear models.

Module:6 Classification using Graphical models – Case studies
Classification using Multilayer Perceptrons, back propagation algorithms, Bayesian estimation, Hidden Markov Models, Introduction to reinforcement learning, Machine learning and Deep learning applcations in Automation - Case studies.

Examination Scheme:

Components	Other Components	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

MTE: Mid Term Examination, ESE: End Semester Examination;

Text & References:

Text:

- Etham Alpaydin, Introduction to Machine Learning, MIT Press, 2014

References:

- Andreas C. Müller & Sarah Guido, Introduction to Machine Learning with Python, Orielly Publication, 2017
- Ian H. Witten, Eibe Frank, Mark A. Hall, Data Mining Practical Machine Learning Tools and Techniques, Morgan Kaufmann Publishers, 2011

Course Name	Course Code	L T P	Credit	Semester
AERIAL ROBOTS	BMT 607	3 0 0	3	6

A. Course Learning Outcomes:

CLO 1	To synthesize autopilot for the control of unmanned aerial vehicles
CLO 2	To derive a mathematical model for aerial robot dynamics and design a controllable rotorcraft aerial vehicle
CLO 3	To analyze the dynamics of active payload

B. Syllabus:

MODULE 1 – INTRODUCTION.

Fundamentals of Aerial Robot – Classification – Applications – Design considerations

MODULE 2 – SENSORS AND ACTUATORS

Sensors for Aerial robots – Sensor Characteristics – Inertial Sensors – Classification of Sensors – Electric Actuators – DC Motors – Servo motor – Encoders – Motor Drives.

MODULE 3 – MODELING AND DYNAMICS

Frame Rotations and Representations – Dynamics of a Multirotor Micro Aerial Vehicle – Dynamics of a Fixed-Wing Unmanned Aerial Vehicle

MODULE 4 – FLIGHT CONTROLS AND MOTION PLANNING

PID Control – LQR Control – Linear Model Predictive Control – An Autopilot Solution

MODULE 5 – CASE STUDY OF AERIAL ROBOTS

Holonomic Vehicle Boundary Value Solver – Dubins Airplane model Boundary Value Solver – Collisionfree Navigation – Structural Inspection Path Planning

Examination Scheme:

Components	Other Components	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

MTE: Mid Term Examination, ESE: End Semester Examination;

Text & References:

- Kenzo Nonami, Autonomous Flying Robots: Unmanned Aerial Vehicles and Micro Aerial Vehicles, Springer, 2010
- Yasmina Bestaoui Sebbane, Planning and Decision Making for Aerial Robots, Springer, 2014

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
INDUSTRIAL INSTRUMENTATION	BMT 608	3 0 0	3	6

A. Course Learning Outcomes:

CLO 1	To illustrate the different methods for the measurement of length and angle
CLO 2	To explicate the construction and working of various industrial devices used to measure temperature, level, vibration, viscosity and humidity
CLO 3	To analyze, formulate and select suitable sensor for the given industrial applications

B. Syllabus:

MODULE 1 – INTRODUCTION.

Introduction to automation tools – PLC, SCADA, DCS, Hybrid DCS-PLC

MODULE 2 – PROGRAMMABLE LOGIC CONTROLLERS

Hardware, selection, I/O devices and programming

MODULE 3 – AUTOMATION SPECIFICATIONS

Functional design specifications for automation tool, Development of user requirement specifications.

MODULE 4 – DISTRIBUTED CONTROL SYSTEM

Architecture, specifications, sensor interfacing

MODULE 5 – APPLICATIONS

Case Study – Industrial process monitoring and automation

Examination Scheme:

Components	Other Components	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

MTE: Mid Term Examination, ESE: End Semester Examination;

Text & References:

- William C Dunn, “Fundamentals of Industrial Instrumentation and Process Control”, McGraw Hill, 2005.
- Donald P. Eckman, “Industrial Instrumentation”, CBS Publishers & Distributors, 2009

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
INDUSTRIAL ELECTRONICS	BMT 609	3 0 0	3	6

A. Course Learning Outcomes:

CLO 1	To Analyze the steady state and small signal AC response of simple electronic circuits containing diodes, transistors, and operational amplifiers
CLO 2	To Design and analyze circuits containing digital components and microprocessors.
CLO 3	To Analyze and evaluate performance parameters of AC and DC motors.

B. Syllabus:

MODULE 1 – SEMICONDUCTOR DEVICES AND APPLICATIONS
Semiconductor materials- intrinsic and extrinsic types, Ideal Diode, PN junction diode, Zener diode and applications, Rectifier Circuits, Clipping and Clamping circuits, Bipolar Junction Transistors (BJTs)- Physical structure and operation modes, Active region operation of transistor, Transistor as an amplifier, Transistor as a switch: cut-off and saturation modes, Basic BJT amplifier configuration: common emitter, common base and common collector amplifiers.

MODULE 2 – OPERATIONAL AMPLIFIER AND ITS APPLICATIONS

Basic information on Op-Amps-Ideal operational amplifier- General operational amplifier stags and internal block diagram of IC 741-Characteristics-open and closed loop configurations, Practical op amp circuits- inverting amplifier, non -inverting amplifier, weighted summer, integrator, differentiator. Other applications of op-amps: instrumentation amplifier, active filters, Schmitt triggers, comparators.

MODULE 3 – DIGITAL SYSTEMS AND MICROPROCESSORS

DACs and ADCs, memory devices (SRAM, DRAM, Flash, PLD's, ROM), microcomputer, microprocessor architecture (8085), digital communication standards.

MODULE 4 – POWER SEMI-CONDUCTOR DEVICES

Study of switching devices, - Power Diodes, Power transistors, Power MOSFET, DIAC TRIAC, IGBT -static characteristics and principle of operation, SCRs: Static and dynamic characteristics – two transistor analogy – gate characteristics.

Examination Scheme:

Components	Other Components	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

MTE: Mid Term Examination, ESE: End Semester Examination;

Text & References:

- Ramakant. A. Geakwad, Linear integrated circuits, 3rd edition, Prentice – Hall of India, New Delhi, 2001
- Microprocessor Architecture, Programming & Applications with 8085 4th edition Ramesh Gaonkar, 2009.
- P.S.Bimbra “Power Electronics” Khanna Publishers, third Edition 2003.

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
MODELLING AND CONTROL OF MECHATRONICS SYSTEM LAB	**BMT 621**	0 0 2	3	6

A. Course Learning Outcomes:

CLO 1	To Run mat lab programming for vehicle control system.
CLO 2	To analyze modeling of braking system through programming
CLO 3	To understand control system for servo and stepper motor .

B. Syllabus:

List of Experiments:

1. Modelling and simulation of vehicle passive suspension system using MATLAB/Simulink
2. Modeling and simulation of PWM controlled DC motor using MATLAB/Simulink
3. Modeling and simulation of Hydraulic braking using MATLAB/Simulink.
4. Tuning of PID controller for given system using Simulink.
5. Modelling and control of Anti-lock braking system using MATLAB/ Simulink.
6. Designing a speed control system for a DC Motor.
7. PID Controller design and performance evaluation for Multi-Process Liquid tank system.
8. Performance evaluation of control system for Servo motor system.

Examination Scheme:

IA				**EE**	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
ELECTRICAL MACHINES LAB	**BMT 622**	0 0 2	1	6

A. Course Learning Outcomes:

CLO 1	Understand 3-phase to 2-phase transformation using the Scott connection and determine the different losses of the transformers.
CLO 2	To Implement the speed control techniques for a separately excited DC motor
CLO 3	To Determine the performance characteristics of DC shunt and DC compound generators by conducting load tests.
CLO 4	Determine the performance of a single phase transformer by conducting Open Circuit (O.C) and Short Circuit (SC) tests and Sumpner's test.

B. Syllabus:

Course Contents:

S. NO.	NAME OF THE EXPERIMENTS
1.	Speed Control of DC Shunt Motor
2.	To obtain magnetization characteristics of 1) Separately excited DC Generator 2) Shunt Generator
3.	To obtain the load characteristics 1) DC Shunt Motor 2) Cumulative Compound generator
4.	To conduct Swinburne Test on a DC. Shunt Motor and hence obtain its efficiency at full load.
5.	To perform No Load Test and blocked rotor test on a three phase Induction motor and hence determine its equivalent circuit parameters.
6.	To perform load test on a three phase Induction Motor and obtain its various performance characteristics.
7.	Retardation Test on a three phase induction motor and calculate its moment of inertia.
8.	To perform No Load and Blocked Rotor Test on a single phase Induction motor and hence determine its equivalent circuit parameters.
9.	To perform open circuit and short circuit test on a three phase alternator and hence determine its voltage regulation by synchronous Impedance Method.
10.	To obtain V curves of a three phase synchronous motor at no load.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
MICROPROCESSOR-II LAB	**BMT 623**	0 0 2	1	6

A. Course Learning Outcomes:

CLO 1	Set up programming strategies and select proper mnemonics and run their program on the training boards.
CLO 2	Develop testing and experimental procedures on Microprocessor and Microcontroller analyze their operation under different cases.
CLO 3	Prepare professional quality textual and computational results, incorporating accepted data analysis and synthesis methods, simulation software, and word-processing tools.
CLO 4	Identify relevant information to supplement to the Microprocessor and Microcontroller course.

B. Syllabus:

Course Contents:

MODULE 1 –SENSORS
1. Familiarization of various sensors
2. Sensor behaviour, calibration
3. Measurement of force, pressure and strain
4. Measurement of position, velocity and temperature

MODULE 2 – MOTION CONTROL
1. Conveyor System – Uni-axial , Dual-axial control applications
2. Material Elevator - Vertical material handling application
3. Linear Operation : X-Y Table , Pushing applications
4. Rotating Operation : Indexing table /Positioning applications
5. Feeding : Feeding application like cut to length application or Labelling Application
6. Closed Loop Control of Pressure, Temperature
7. Integration Options

MATLAB ASSIGNMENTS
1. Visualize Sensor Coverage, Detections, and Tracks
2. Optical Sensor Image Generation
3. Collision Detection Using Line Sensor
4. Measure Strain using an Analog Bridge Sensor
5. Track and Follow an Object
6. Tuning of a Digital Motion Control System
7. Stepper Motor with Control
8. Power Window Control Project
9. Control Stepper Motor using Digital Outputs

Examination Scheme:

IA				**EE**	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
AUTOMOTIVE ENGINEERING LAB	**BMT 624**	0 0 2	1	6

A. Course Learning Outcomes:

CLO 1	Know the different types of automobiles, basic structure of automobile and their manufacturers in India. Understand the basic engine system working
CLO 2	Explain the steering and braking system employed in automobiles.
CLO 3	Explain the different suspension system of an automobile and selection of tyre for an automobile
CLO 4	Explain the Electrical and ignition system employed in Automobile

B. Syllabus:

Course Contents: List of Experiments:

1. Drawing Valve Timing Diagram
2. Determination of Firing Order of engine
3. Specification of engine
4. Study of different parts of engine
5. Study of Clutch
6. Study of Hydraulic Brake System
7. Study of Carburetor
8. **Study of various parts of Auxiliary systems**
9. **Study of Wheel**
10. **Study of emission system**
11. **Study of steering system**

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva

AMITY UNIVERSITY
RAJASTHAN

AMITY School of Engineering & Technology

Course Name	Course Code	LTP	Credit	Semester
Professional Communication Skills	BCS601	1:0:0	1	1

D. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Demonstrate professional attitude needed for interview preparedness, power dressing, and respectful self orientation.
CLO 2	Showcase their leadership skills with effective team work.
CLO 3	Outline the basic etiquettes in expressing their personality individually and in group.

B. SYLLABUS

Topic
Resume Building-2
GD-4 (General & Abstract Topics)
Presentations-3 (Corporate Terms, HR Policies, Rules & Regulations)
Document Preparation for Job (CV Update according to profiles, Photo, Passport, IDs)
Mock Personal Interview-2

EXAMINATION SCHEME:

Components	Resume Writing	GD	Mock Personal Interview	Attendance
Weightage (%)	30	30	35	5

SUGGESTED READINGS

- Working in English, Jones, Cambridge
- Dr. P.Prasad. *Communication Skills*.S.K.Kataria &Sons
- Koneru, Aruna. *Professional Communication.* The McGraw Hill: New Delhi, 2008. Print
- New International Business English, Jones/Alexander, Cambridge

BEHAVIOURAL SCIENCE - VI
(STRESS AND COPING STRATEGIES)

Course Code: BSS 604 **Credit Unit: 01**

Course learning outcomes (CLOs)

At the successful completion of this course you (the student) would be able to:

1. Identify stress and that an individual come across.
2. Recognize the causes of stress in their lives.
3. Analyze symptoms and how they are affecting lives.
4. Create ways to effectively cope with it.

Course Objective:

- To develop an understanding the concept of stress its causes, symptoms and consequences.
- To develop an understanding the consequences of the stress on one's wellness, health, and work performance.

Module I: Stress
Meaning & Nature
Characteristics
Types of stress

Module II: Stages and Models of Stress
Stages of stress
The physiology of stress
Stimulus-oriented approach.
Response-oriented approach.
The transactional and interactional model.
Pressure – environment fit model of stress.

Module III: Causes and symptoms of stress
Personal
Organizational
Environmental

Module IV: Consequences of stress
Effect on behaviour and personality
Effect of stress on performance
Individual and Organizational consequences with special focus on health

Module V: Strategies for stress management
Importance of stress management
Healthy and Unhealthy strategies
Peer group and social support
Happiness and well-being

Examination Scheme:

Components	**SAP**	**JOS**	**FC/MA/CS/HA**	**P/V/Q**	**A**
Weightage (%)	25	15	30	25	05

SAP- Social Awareness Programme; **JOS**-Journal of Success; **HA**-Home Assignment; **P**-Presentation; **V**-Viva; **Q**-Quiz; **FC**- Flip class; **MA**- Movie Analysis; **CS**- Case study; **A**-Attendance

Text & References:

- Blonna, Richard; Coping with Stress in a Changing World: Second edition
- Pestonjee, D.M, Pareek, Udai, Agarwal Rita; Studies in Stress And its Management

Semester 6 Course Code: FLT 601 (Tech French) Credit Units: 02

Course Learning Objective:

- Students will hone intermediate language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of intermediate level.
- Students will be able to communicate in small sentences in Simple Future and Past tenses .
- Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.
- To understand the essentials of an interview
- To present one research
- To present one university and professional course
- To speak about the professional projects
- To understand a remarkable topic
- To understand and ask questions
- To describe a person
- The content and the method of the report
- To make a plan of the report
- To write an introduction
- To understand a short technical message
- To reply to a survey

Course Contents:

Unité 5 Nouvelles technologies Page : 100-121 Leçons 16, 17 & 18

Contenu Lexical:

1. Le parcoursacadémique
2. Le monde du travail
3. Le fibreoptique
4. Les adjectifsdescriptifs
5. L'exposé
6. Les énergiesrenouvelable

Contenu Grammatical:

1. Le passé compose avec avoir
2. Quelquesadverbes
3. Quelquesindicateurstemporels
4. L'interrogation (forme standard et soutenue)
5. L'accord de l'adjectif (féminin, masculine et pluriel)
6. La place de l'adjectif
7. Les différentsniveaux de langue
8. Le future simple
9. Les questions avec << qu'est-ce que>>

EXAMINATION SCHEME

Total: 100 marks

Continuous Evaluation (Total 50 Marks)					End Sem Evaluation (Total 50 Marks)
Quiz	**Mid Term Test**	**Presentation**	**Viva Voce**	**Attendance**	**End-Term Exam**
10	**15**	**10**	**10**	**5**	**50**

Text & References:

- Le Gargasson, I. Naik, S. Chaize, C. (2012) Tech French, Delhi : Goyal Publications
- Ray. A, Robert (2010) Le Petit Robert French Dicitionary, Paris: Le Robert
- Robert, Collins (2006) Collins Robert French Dictionary, Paris : Harper Collins

Foreign Language German

Semester 6:Course Code: FLG 601 **Credit units : 02**

Course Learning Objective:

- Students will hone intermediate language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of intermediate level.
- Students will be able to communicate in small sentences in Simple Future and Past tenses .
- Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.

After successful completion of this semester, students will be able to:

- express their likes and dislikes (buying groceries)
- askprice and quantity
- express their likes and dislikes in terms of cloths
- buy cloths in the shopping mall

Course Content:

Vocabulary:

- How often- every day, sometime daily etc.
- Cloths
- Colours
- Groceries : fruits , vergetablesetc
- Groceries materials : packets, bottle etc.
- quantity and weight
- currency

Grammar:

- Make question with which, how many etc
- Comparative many, good etc
- Introduction of adjective ending in accusative with definite and indefinite article
- Verb like
- Demonstrative

EXAMINATION SCHEME

Total: 100 marks

Continuous Evaluation (Total 50 Marks)					End Sem Evaluation (Total 50 Marks)
Quiz	Mid Term Test	Presentation	Viva Voce	Attendance	End-Term Exam
10	15	10	10	5	50

Prescribed Text-Book: Zielsprache Deutsch alsFremdsprachePart 2

References: **Studio D A1** by Hermann Funk, Christina Kuhn and Silke Demme, Cornelsen, 2013

Tangram A1by Rosa Maria Dallapiazza, Eduard von Jan & Till Schoenherr, Max Hueber, 2007

SprachtrainingA1 by Rita Maria Niemann, Dong Ha Kim, Cornelsen, 2013

Dictionaries for reference: **Studio D: Glossar** A1 - Deutsch –Englisch, Cornelsen, 2013

http://www.duden.de/woerterbuch

Materials are given in form of photocopies if felt to be necessary

Foreign Language Spanish

Semester 6: Course Code: 601 **Credit Units : 02**

Course Learning Objective:

- Students will hone intermediate language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of intermediate level.
- Students will be able to communicate in small sentences in Simple Future and Past tenses .
- Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.

- To express future plans and intentions
- To talk about tourist destination in Spain and India
- Reading texts about Spanish historical monuments
- To talk about dance and music.
- Reading text about Spanish Cities
- Writing email to your friend/family members

Course Content:

Vocabulary: Names of the famous Spanish cities, monuments, dance forms (Flamenco, salsa, tango) informal greeting in letter writing.

Grammar:
Revision of Indefinite/ continuous /perfect tense
Introduction of Future Tense.

ExaminationScheme:

Total: 100 marks

ContinuousEvaluation (Total 50 Marks)					EndSemEvaluation (Total 50 Marks)
Quiz	MidTerm Test	Presentation	Viva Voce	Attendance	End-TermExam
10	15	10	10	5	50

Text &References:

Nuevo Español Sin Fronteras (ESF1) by Jesús sánchez Lobato, Concha Moreno Garcia, Concha Moreno Garcia, Isabel Santos Gargallo, Sociedad General Española De Librería, S.A 2005

Pasaporte Nivel (A1) byMatideCerraloza Aragón, oscarCerraloza Gilli, Begoña Llovet Barquero, EdelsaGroup didascalia, S.A. 2005

Dictionaries for reference: Collins, www.wordreferences.com.

Essential materials are given in the form of photocopies.

Foreign Language Chinese

Semester - VI **Course Code: FLC-601** **Credit Units: 2**

Course Learning Objectives:

- Students will hone intermediate language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of intermediate level.
- Students will be able to communicate in small sentences in Simple Future and Past tenses.
- Students will be able to communicate in oral in small sentences in Simple Future and Past tenses. etc.

On the completion of Sixth semester the students will be able to attain the proficiency of **HSK-II**. They will be able to:

- Read Chinese words, phrases and simple sentences both in Pin Yin and Characters given in the text.
- Write Chinese Characters and sentences and small paragraphs.
- Speak Chinese dialogues from various fields of day to day life.
- Listen and understand simple Chinese words and dialogues used in syllabi.
- Carry out effective conversation in the target language.
- Manipulate basic grammatical structures.
- Master and use most essential vocabulary items of day to day use: approx 70 Characters including 50 characters of HSK level –II
- Put up suggestions, explain reason, and do comparison.
- Do translation with the help of dictionaries and translation software.

COURSE CONTENT

1. Revision
2. Put up suggestions
3. Making comparison
4. Explaining the reason
5. Grammar points & exercises
6. Listening practice
7. Conversation based on dialogues
8. CBT package
9. Translation of small passages from English to Chinese
10. Practice of model test series of HSK-II
11. Chinese government system (in English)

VOCABULARY CONTENTS

1. Vocabulary will include approx 80 Characters including 50 Characters of HSK-II level.

1. Vocab related to suggestions, comparison, reason, will be covered during this semester.

2. By the end of sixth semester the students will be able to master **300 characters set for the HSK level-II .**

GRAMMAR CONTENTS

1. Aspectual particle 动态助词：**着**
2. Interjection 叹词: **喂**
3. Overlapping verbs 动词的重叠
4. Affirmative sentences肯定句
5. Negative Sentences否定句

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
HYDRAULICS & PNEUMATICS	BMT-701	3 0 0	3	VII

A. Course Learning Outcomes:

CLO 1	Understand hazards of hydraulic and pneumatic circuits and be able to work safely.
CLO 2	Understand the concepts of fluid statics and dynamics as applied to commercial and industrial control
CLO 3	Recognize standard schematic symbols for common fluid power components.

Course Contents

MODULE 1 – INTRODUCTION TO FLUID POWER

Introduction to fluid power, Advantages of fluid power, Application of fluid power system. Types of fluid power systems, Compressibility and incompressibility of fluids–Stagnation states, Mach waves and Mach cone – Effect of Mach number on compressibility – Isentropic flow through variable ducts – Nozzle and Diffusers. Ideal Gas equations - Applications of Pascal‘s Law – Laminar and Turbulent flow– Reynolds number – Darcy‘s equation – Losses in fluid power system.

MODULE 2 – SOURCE OF FLUID POWER

Basics of Hydraulics –Properties of hydraulic fluids –Sources of Hydraulic Power-Pump classifications – Construction and working of Pumps – Pump performance – comparison of pumps. An overview of Basic hydraulic system. Basics of Pneumatics - Properties of compressed air- Sources of Pneumatic Power- Types of compressor-Construction and working of compressor - Performance of compressor An overview of Basic pneumatic system- Comparison of pump and compressor – Need for compressed air conditioning – pneumatic dryer – Filter, regulator and lubricator – fluid power accumulators – purpose and types . Distribution of Fluid power and safety measures.

MODULE 3 – COMPONENTS OF HYDRAULIC AND PNEUMATIC SYSTEMS

Fluid power actuators - selection of actuators – pneumatic and hydraulic actuators – types and ISO symbols – linear and rotary. Construction and working of double acting cylinder – special actuators – rodless, tandem, impact, duplex and telescopic cylinders. – types ofactuating mechanism. sensors – limit switches, reed switches and pressure switches Cushioning mechanism in pneumatic and hydraulic cylinders . Control valves – types of valves . Construction and working of control valves - 3/2 , 4/2 , 5/3 and 4/3 Direction control valve, flow control valve, classification and working of pressure control valves ,sequencing and relief valve.

MODULE 4 – DESIGN OF HYDRAULIC AND PNEUMATIC CIRCUITS

Design of simple hydraulic and pneumatic circuits-Speed and force calculation of linear actuator. Design considerations of pneumatic and hydraulic circuits . meter in, meter out and counter balancing circuits. Design of multi cylinder pneumatic and hydraulic sequencing circuit . Fluidics–Introduction to fluidic devices, simple circuits . Design of simple Electro pneumatic and Electro hydraulic circuits Design of Multi cylinder electro pneumatic and electro hydraulic circuits – ladder diagram. Conflict signals – identification of conflict signal . Cascading method – step counter method , Karnaugh-Veitch method and combinational circuit design.

MODULE 5 - SERVO MECHANISM AND FLEXIBLE MANUFACTURING SYSTEM

Servo systems – Hydro Mechanical servo systems, Electro hydraulic servo systems and proportional valves. Pneumatic PID circuits. PLC applications in fluid power control, ladder diagrams, Timers and counters .Low Cost Automation using pneumatics and Flexible

manufacturing system. Fluid power circuits; failure and troubleshooting

Examination Scheme:

Components	Other Components	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

MTE: Mid Term Examination, ESE: End Semester Examination;

Text & References:

1. Anthony Esposito, Fluid Power with application, Prentice Hall, 2013.
2. MajumdarS.R.,Oil Hydraulics,Tata McGraw-Hill, New Delhi 2009
3. Anderson, J.D., "Modern Compressible flow", 3rd Edition, McGraw Hill, 2003

A. Course Learning Outcomes:

CLO 1	**İt can cognize CNC turn bench's code systems and CNC turn bench's general structure.**
CLO 2	**Cognizing main parts of turnery, metal fillings' calculation and mathemathical and computer processes of CNC turn bench's programming.**

Course Name	Course Code	L T P	Credit	Semester
Computer Aided Manufacuturing	BMT-702	3 0 0	3	VII

CLO 3	**Cognize main concepts of turning(turn bench pen devices, cutting geomertry, swarf, warming, abrasion.etc.)**
CLO 4	**Makes preperations about CNC turn bench's programming and for all CNC turn benchs' shared codes' programming.**

B. Syllabus:

Course Contents:

Module I
Introduction to Numerical control. Programmed automation. Nomenclature, type and features of NC machines tools. Axes designation. Point to point, straight and continuous control systems.

Module II
Machining centre and Turning centre, Automatic tool changer, Machine Tool beds and automated pallet changers**.**

Module III
Machine Control Unit, Actuation Systems, open and close loop systems, transducers for NC Systems, revolves, encoders and inductosyn.

Module IV
Manual Part Programming: Processes planning, G&M codes. Interpolation Cycles. Tool compensation, Subroutines, Introduction to Computer Aided Part Programming.

Module V
Tooling and tool presetting. Computer Aided inspection - Contact Inspection (Coordinate Measuring Machine) & Non Contact Inspection.

Examination Scheme:

Components	**A**	**CT**	**S/V/Q**	**HA**	**EE**
Weightage (%)	5	10	15	20	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

Text:

- Mikell P. Groover, "Automation, Production Systems and Computer-Integrated Manufacturing", 2nd Edition, Pentice Hall, 2001.
- Rao, Kundra & Tiwari, "Computer aided Manufacturing" Tata McGraw Hill, 2007.
- Numerical Control: by Koren, Khanna Publisher.

References:

- Mikell P. Groover, Emory W. Zimmers, "CAD/CAM", Pearson Education, 2006.
- P.N. Rao, "CAD

Course Name	Course Code	L T P	Credit	Semester
Automation in Industries	BMT-705	3 0 0	3	VII

Amity School of Engineering and Technology (ASET)

A. Course Learning Outcomes:

CLO 1	verify automation / control systems using good design practice;
CLO 2	design, install and maintain automation and control systems;
CLO 3	work at a high level in industry with automation and control systems;
CLO 4	employ high-level PLC control systems in the computer integration of a manufacturing process;

CLO 5	implement the skills required for automation, control and monitoring of industrial processes;

B. Syllabus:

Module 01

Introduction to Automation: Definition and fundamentals of automation, reasons for Automating, basic elements of an automated system: Power, Program and control system **Advanced automation functions:** safety, maintenance & repair diagnosis, error detection and recovery, **Levels of automation** Automation principles and strategies: USA principle, ten strategies of automation and production system, automation migration strategy

Module 02

Mechanization and Automation: Mechanization and automation, product cycle, hard Vs flexible automation, Capital- intensive Vs low cost automation, Types of systems-mechanical, electrical, hydraulic, pneumatic and hybrid systems, Automation using CAMS, Geneva mechanisms, gears etc., Assembly line Automation: automated assembly systems, transfer systems, vibratory bowl feeders, non-vibratory feeders, part orienting, feed track, part placing & part escapement systems Introduction to Material storage/ handling and transport systems, and its automation using AS/RS, AGVS and conveyors etc.

Module 03:

Pneumatics and hydraulics: Hydraulic and pneumatic devices-Different types of valves, Actuators and auxiliary elements in Pneumatics & hydraulics , their applications and use of their ISO symbols Synthesis and design of circuits (up to 3 cylinders)–pneumatic, electro pneumatics and hydraulics Design of Electro-Pneumatic Circuits using single solenoid and double solenoid valves; with and without grouping

Module 04:

Sensors & Actuators Sensors: Selection of sensors (Displacement, temperature, acceleration, force /pressure) based on static and dynamic characteristics, Interfacing: Concept of interfacing, bit accuracy and sampling speed, amplifying electronics, and microcontroller, Actuators: Principle and selection of mechano-electrical actuators (1) DC motors (2) Stepper Motors (3) Solenoid Actuators (4) Servo Motors (5) BLDC

Module 05:

Industrial control systems: Process industries versus discrete manufacturing industries, Continuous verses discrete control, Computer process control, Forms of computer process control. Discrete control using PLC- discrete process control, Programmable logic controller, its architecture, ladder digs, Ladder Logic, Programming for different types of logic gates, Latching, Timers, Counter, Practical Examples of Ladder Programming

Module 06:

Robots and their applications: Introduction to robots, Types, Classifications, Selection of robots, Robot Degrees of freedom, Robot configuration, Accuracy and repeatability, Specification of a robot, Robot feedback controls: Point to point control and Continuous path control, Control system for robot joint, Adaptive control, Drives and transmission systems, End effectors, Industrial robot applications of robots

C. Evaluation:-

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

D. **Text & References:**

Course Name	Course Code	L T P	Credit	Semester
Electric & Hybrid Vehicles	BMT-707	3 0 1	3	VII

Text:

- Stamatios Manesis, George Nikolakopoulos, Introduction to Industrial Automation, CRC Press, 2018

References:

- Yusuf Altintas, Manufacturing Automation, Metal Cutting Mechanics, Machine Tool Vibrations, and CNC Design, Cambridge University Press, 2012
- A.K. Gupta, S. K. Arora, Industrial automation and robotics, university science press, 2013

Amity School of Engineering and Technology (ASET)

A. Course Learning Outcomes:

CLO 1	Analyze various electric drives suitable for hybrid electric vehicles.
CLO 2	Discuss different energy storage technologies used for hybrid electric vehicles and their control.
CLO 3	Demonstrate different configurations of electric vehicles and its components, hybrid vehicle configuration by different techniques, sizing of components and design optimization and energy management.

CLO 4	Explain plug – in hybrid electric vehicle architecture, design and component sizing and the power electronics devices used in hybrid electric vehicles.
CLO 5	Explain the basics of electric and hybrid electric vehicles, their architecture, technologies and fundamentals.

B.Syllabus:

Course Name	Course Code	L T P	Credit	Semester
MECHATRONICS SYSTEM APPLICATIONS	BMT-708	3 0 0	3	VII

Module I - Introduction
Introduction to Hybrid Electric Vehicles: History of hybrid and electric vehicles, social and environmental importance of hybrid and electric vehicles, impact of modern drive-trains on energy supplies. Conventional Vehicles: Basics of vehicle performance, vehicle power source characterization, transmission characteristics.

Module II -Hybrid and Electric Drive-trains
Hybrid Electric Drive-trains: Basic concept of hybrid traction, introduction to various hybrid drive-train topologies, power flow control in hybrid drive-train topologies, fuel efficiency analysis. Electric Drive-trains: Basic concept of electric traction, introduction to various electric drive-train topologies, power flow control in electric drive-train topologies, fuel efficiency analysis.

Module III-Propulsion System
Introduction to electric components used in hybrid and electric vehicles, Configuration and control of DC Motor drives, Configuration and control of Induction Motor drives, configuration and control of Permanent Magnet Motor drives, Configuration and control of Switch Reluctance Motor drives, drive system efficiency.

Module IV- Energy Storage System

Introduction to Energy Storage Requirements in Hybrid and Electric Vehicles, Battery based energy storage and its analysis, Fuel Cell based energy storage and its analysis, Super Capacitor based energy storage and its analysis, Flywheel based energy storage and its analysis, Hybridization of different energy storage devices. .

Module V- Testing of Electric Vehicles

Homologation & its Types, Regulations overview (EEC, ECE, FMVSS, AIS, CMVR), Type approval Scheme. Types of test tracks, Hardware in The Loop (HIL) concepts for EV/HEVs. static testing of vehicle, dynamics testing of vehicle, vehicle component testing.

C.Evaluation:

Components	CT	Attendance	Assignment/ Project/Seminar/Quiz	EE
Weightage (%)	15	5	30	50

A. Text:

- Mehrdad Ehsani, Yimin Gao, Stefano Longo and Kmbiz Ebrahimi, "Modern Electric, Hybrid Electric, and Fuel Cell Vehicles", CRC Press, 3rd edition (2019)
- A.K. Babu, "Electric & Hybrid Vehicles",Khanna Publishing, 1st edition (2019).
- Tom Denton, "Electric and Hybrid Vehicles", Routledge; 1st edition (2016).
- ARAI Standards for Electric Vehicles (https://www.araiindia.com/downloads)

Amity School of Engineering and Technology (ASET)

Course Learning Outcomes:

CLO 1	Identification of key elements of mechatronics system and its representation in terms of block diagram
CLO 2	Understanding the concept of signal processing and use of interfacing

	systems such as ADC, DAC, digital I/O
CLO 3	Interfacing of Sensors, Actuators using appropriate DAQ micro-controller
CLO 4	Time and Frequency domain analysis of system model (for control application)
CLO 5	-PID control implementation on real time systems

Course Contents

MODULE 1 – INTRODUCTION
Introduction to basics mechatronics components - Sensors, Actuators, Micro-controllers, PLC's.

MODULE 2 – BIOMIMICRY USING MECHATRONICS

Biomimicry – Introduction, Concept, Advantages. Bio-Inspired Robots – Mechanisms, Controls, Actuations. Case Studies - Wall-Climbing Caterpillar Robot, Hexapedal robot inspired by cockroach locomotion.

MODULE 3 – MEDICAL APPLICATIONS

Introduction to mechatronics for medical applications, Importance of Mechatronics in Medical Applications, Applications of Mechatronics in Medicine - Robotics in Medicine, Smart Instruments and Probes. Case Studies - Handheld Snake-Like Robots, 3D Printed Skull.

MODULE 4 – SAFETY, SECURITY AND DEFENCE APPLICATIONS
Industrial safety systems, Smart security systems, Mechatronics in defence, Artificial Intelligence in security systems. Case Studies: Cobots (Collaborative Robots), Smart Doors, Heat-seeking missiles.

MODULE 5 - MANUFACTURING APPLICATIONS

Introduction to manufacturing systems, Retrofitting, CNC machines, Rapid Prototyping, Industrial Robots. Case Studies – Laser cutting, Quality inspecting robots.

Examination Scheme:

Components	Other Components	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

MTE: Mid Term Examination, ESE: End Semester Examination.

Text & References:

1. W Bolton, Mechatronics, Pearson Education, Fourth Edition, 2011
2. Siamak Najarian, Javad Dargahi, Ph.D, Goldis Darbemamieh, Siamak Hajizadeh Farkoush, Mechatronics in Medicine: A Biomedical Engineering Approach, 2012 McGraw-Hill Education, ISBN: 9780071768962

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REFRIGERATION AND AIR-CONDITIONING LAB

Course Code: BME 721 **P:02, C:01**

Course Contents:

List of Experiments:

1. Study of refrigeration testing.
2. Study of Air-Conditioning testing.
3. To calculate the COP of Refrigerator.
4. Study of Ice Making Plant
5. Study of Water Cooler.
6. To calculate total Heat Load for Air-Conditioning unit.
7. To calculate the COP of Heat Pump

EXAMINATION SCHEME:

IA				EE	
A	**V**	**LR**	**TA**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

COMPUTER INTEGRATED MANUFACTURING LAB

Course Code: BME 722 **P: 02, C: 01**

Course Contents:

1. To conduct briefly study into various aspects of CNC machines.
2. To Study the preparatory and miscellaneous function of CNC codes.
3. Study exercise on Milling operations:
   - Circular Pocketing
   - Rectangular pocketing
   - Peck Drilling cycle
   - Boring operation
   - End drilling operation

4. Study exercise on Turning operations:
   - Simple facing
   - Simple turning operation
   - Step turning operation Circular Pocketing
   - Rectangular pocketing
   - Peek Drilling cycle
   - Boring operation
   - End drilling operation

5. Study the work holding and tool holding devices in the CNC lathe and machining centre and draw up their specifications and capacities.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

INDUSTRIAL TRAINING EVALUATION

Course Code: BMT 723 C:06

Methodology:

Practical training is based on the theoretical subjects studied by students. It can be arranged within the college or in any related industrial unit. The students are to learn various industrial, technical and administrative processes followed in the industry. In case of on-campus training the students will be given specific task of fabrication/assembly/testing/analysis. On completion of the practical training the students are to present a report covering various aspects learnt by them and give a presentation on same.

Examination Scheme:

Feedback from industry/work place	20
Training Report	40
Viva	15
Presentation	25
Total	**100**

SEMINAR/MINOR PROJECT STAGE-I

Course Code: BMT 724 C:03

Methodology:

Topics of project are to be based on the latest trends, verifying engineering concepts /principle and should involve elementary research work. For that, students need to select their project title and basic requirements to accomplish their project. The projects may involve design, fabrications, testing, computer modeling, and analysis of any engineering problem. At last, the students have to submit a report and give presentation the methodology used to accomplish their project.

Examination Scheme:

Synopsis Report	50
Viva	25
Synopsis Presentation	25
Total	**100**

AMITY UNIVERSITY
RAJASTHAN

AMITY School of Engineering & Technology

Course Name	Course Code	LTP	Credit	Semester
Professional Communication Skills	BCS701	1:0:0	1	1

E. COURSE LEARNING OUTCOMES (CLO)

CLO 1	Investigate their personal strengths and insights to be revealed in a Formal Setup of Communication.
CLO 2	Create right selection of words and ideas while choosing the appropriate channel of formal communication
CLO 3	Apply acquired knowledge with the appropriate selection of channel of formal communication.
CLO 4	Develop and empower self with the ease of using appropriate medium of communication.

B. SYLLABUS

Topic
Resume-3 (Revision/Updating)
Interview-3 (Mock Sessions-Technical & CRC)
GD-5 (Overall Revision)
Video & Conference Call Etiquettes (Virtual Interviews)
Formal SMS Drafting

EXAMINATION SCHEME:

Components	Hard Copy of the Resume	Video Recording of self shot introduction	Hand Written Detailed Answers on self-understanding of questions Part 1	Hand Written Detailed Answers on self-understanding of questions Part 2	Self Drafted SMS on paper	Attendance
Weightage (%)	20	20	20	20	15	05

SUGGESTED READINGS

- Raman Prakash, Business Communication, Oxford
- Working in English, Jones, Cambridge
- Dr. P.Prasad. *Communication Skills*.S.K.Kataria&Sons
- Koneru, Aruna. *Professional Communication.* The McGraw Hill: New Delhi, 2008. Print
- New International Business English, Jones/Alexander, Cambridge

BEHAVIOURAL SCIENCE - VII
(INDIVIDUAL, SOCIETY AND NATION)

Course Code: BSS704 **Credit Units: 01**

Course learning outcomes (CLOs)

At the successful completion of this course you (the student) should be able to:

1. Recognize their personality and individual differences and identify its importance of diversity at workplace and ways to enhance it.
2. Recognize effective socialization strategies and importance of patriotism and taking accountability of integrity.
3. Recognize different types of human rights and its importance.
4. Identify Indian values taught by different religions.
   Identify long term goals and recognize their talent, strengths and styles to achieve them

Course Objective:

This course aims at enabling students towards:

- Understand the importance of individual differences
- Better understanding of self in relation to society and nation
- Facilitation for a meaningful existence and adjustment in society
- Inculcating patriotism and national pride

Course Contents:

Module I: Individual differences & Personality
Personality: Definition& Relevance
Importance of nature & nurture in Personality Development
Importance and Recognition of Individual differences in Personality
Accepting and Managing Individual differences (adjustment mechanisms)
Intuition, Judgment, Perception & Sensation (MBTI)
BIG5 Factors

Module II: Managing Diversity
Defining Diversity
Affirmation Action and Managing Diversity
Increasing Diversity in Work Force
Barriers and Challenges in Managing Diversity

Module III: Socialization
Nature of Socialization
Social Interaction
Interaction of Socialization Process
Contributions to Society and Nation

Module IV: Patriotism and National Pride
Sense of pride and patriotism
Importance of discipline and hard work
Integrity and accountability

Module V: Human Rights, Values and Ethics
Meaning and Importance of human rights
Human rights awareness
Values and Ethics- Learning based on project work on Scriptures like- Ramayana, Mahabharata, Gita etc.

Examination Scheme:

Components	SAP	JOS	FC/MA/CS/HA	P/V/Q	A
Weightage (%)	25	15	30	25	05

SAP- Social Awareness Programme; **JOS**-Journal of Success; **HA**-Home Assignment; **P**-Presentation; **V**-Viva; **Q**-Quiz; **FC**- Flip class; **MA**- Movie Analysis; **CS**- Case study; **A**-Attendance

Text & References:

- Davis, K. Organizational Behaviour,
- Bates, A. P. and Julian, J.: Sociology - Understanding Social Behaviour
- Dressler, David and Cans, Donald: The Study of Human Interaction

- Lapiere, Richard. T – Social Change
- Lindzey, G. and Borgatta, E: Sociometric Measurement in the Handbook of Social Psychology, Addison – Welsley, US.
- Rose, G.: Oxford Textbook of Public Health, Vol.4, 1985.
- Robbins O.B.Stephen;. Organizational Behaviour

Semester 7 Course Code: FLT 701 (Tech French) Credit Units: 02

Course Learning Objective:

- Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of advance level.
- Students will be able to communicate with complex sentences.

  - To express the obligation
  - To suggest and give the advices
  - To speak about the recycling
  - To understand an interview and a project of research
  - To make a survey
  - To prepare for the oral communication
  - To prepare the posters
  - To understand and give the suggestions

Course Contents:

Unité 5 (Leçon 19 and 20) and Unité 6 Les examens et le stage Page : 122-143 Leçons 19, 20 & 21

Contenu Lexical:

1. Les déchets, le recyclage et le tri
2. Les emballages
3. L'informatique
4. L'ordinateur et sespériphériques
5. Les revisions
6. Les couleurs

Contenu Grammatical:

1. Les pronoms compléments d'objets directs (COD)
2. Le pronom<<on>
3. Il faut/devoir
4. L'impératif
5. L'expression de la quantité
6. <<e train de>>/<<venir de>>
7. Le pronoms<<y>>

EXAMINATION SCHEME

Total: 100 marks

Continuous Evaluation (Total 50 Marks)					End Sem Evaluation (Total 50 Marks)
Quiz	**Mid Term Test**	**Presentation**	**Viva Voce**	**Attendance**	**End-Term Exam**
10	**15**	**10**	**10**	**5**	**50**

Text & References:

- Le Gargasson, I. Naik, S. Chaize, C. (2012) Tech French, Delhi : Goyal Publications
- Ray. A, Robert (2010) Le Petit Robert French Dicitionary, Paris: Le Robert
- Robert, Collins (2006) Collins Robert French Dictionary, Paris : Harper Collins

Foreign Language German

Semester 7:Course Code: FLG 701 **Credit units : 02**

Course Learning Objective:

- Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of advance level.
- Students will be able to communicate with complex sentences.

After successful completion of this semester, students will be able to:

describe their holidays or vacations (perfect tense)
talk about past events – What did you do yesterday? etc.
understand weather reports
express their opinion about weather.

Course Content:

Vocabulary:

Vacation places like sea shore, mountains etc.
Adjectives to describe weather
Seasons
Weather conditions

Grammar:

Perfect tense of both regular and irregular verb
Prepositions with places like sea, mountains, island etc.
Use of impersonal subject pronoun for describing weather: es

EXAMINATION SCHEME

Total: 100 marks

Continuous Evaluation (Total 50 Marks)					End Sem Evaluation (Total 50 Marks)
Quiz	Mid Term Test	Presentation	Viva Voce	Attendance	End-Term Exam
10	15	10	10	5	50

Prescribed Text-Book: Themen Part 1

References: **Studio D A1** by Hermann Funk, Christina Kuhn and Silke Demme, Cornelsen, 2013

Tangram A1by Rosa Maria Dallapiazza, Eduard von Jan & Till Schoenherr, Max Hueber, 2007

SprachtrainingA1 by Rita Maria Niemann, Dong Ha Kim, Cornelsen, 2013
Dictionaries for reference: **Studio D: Glossar** A1 - Deutsch –Englisch, Cornelsen, 2013
http://www.duden.de/woerterbuch

Materials are given in form of photocopies if felt to be necessary

Spanish-VII

Semester 7: Course Code: FLS 701 Credit units : 02

Course Learning Objective:

- Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of advance level.
- Students will be able to communicate with complex sentences.
- To be able to give order, command and make request. Formal and Informal
- Use of imperative in different types of situation: In a bar/ Classroom/ Market etc.
- To express prohibitions and permissions
- To be able to talk about actions in past indefinite tense
- Reading texts about Sports in Spain
- To be able to talk about past events – What did you do yesterday? Etc

Course Content:

Vocabulary:

Vocabulary related to bar, pub, restaurant.

Grammar:
Introduction of imperative in all forms
Affirmative and Negative Imperatives: Tú and Usted
Imperativeswith irregular verbs: Poner, venir, hacer etc.
Prohibitions and permissions: Se puede/ no se puede
Imperative with direct object pronouns
Introduction of Preteritoindefinido- Verbs conjugations

ExaminationScheme:

Total: 100 marks

ContinuousEvaluation (Total 50 Marks)					EndSemEvaluation (Total 50 Marks)
Quiz	**MidTerm Test**	**Presentation**	**Viva Voce**	**Attendance**	**End-TermExam**
10	**15**	**10**	**10**	**5**	**50**

Text &References:

Nuevo Español Sin Fronteras (ESF1) by Jesús sánchez Lobato, Concha Moreno Garcia, Concha Moreno Garcia, Isabel Santos Gargallo, Sociedad General Española De Librería, S.A 2005

Pasaporte Nivel (A1) byMatideCerraloza Aragón, oscarCerraloza Gilli, Begoña Llovet Barquero, EdelsaGroup didascalia, S.A. 2005

Dictionaries for reference: Collins, www.wordreferences.com.

Essential materials are given in the form of photocopies.

Semester - VII **Course Code: FLC-701** **Credit Units : 02**

Course Learning Objectives:

- Students will hone advanced language skills such as reading, writing, speaking, listening & interactive) in the language
- Students will be able to read and interpret small texts of advance level.
- Students will be able to communicate with complex sentences.

On the completion of Seventh semester the students will be able to consolidate the proficiency of HSK-II. They will be able to

- Read Chinese sentences and paragraphs both in Pin Yin and Characters.
- Write Chinese Characters and sentences and small paragraphs.
- Speak Chinese dialogues from various fields of day to day life.
- Listen and understand simple Chinese words and dialogues used in syllabi.
- Carry out conversation in various situations such as at restaurants, office, visits, at bank, booking office etc.
- Manipulate basic grammatical structures.
- Master and use most essential vocabulary items used in specific situations; approx 80 Characters.
- Do translation with the help of dictionaries and translation software.
- Communicate in office environment

COURSE CONTENT

1. Revision of Grammar
2. Situational Chinese : at Restaurant (eating & drinking)
3. Working in the office
4. Visit to China (related vocab & sentences)
5. Model question HSK-II
6. At bank (exchanging money)
7. Booking a rail/air ticket/ room at a hotel
8. Job interview
9. CBT package
10. Chinese culture (In English)

VOCABULARY CONTENT

1. Vocabulary will include approx 80 Characters covering fields related to visits and office related vocab.

GRAMMAR CONTENT

1. Interrogative sentences 疑问句
2. Interrogative sentences with reply of Yes/No 正反疑问句
3. Imperatives, exclamatory 祈使句, 感叹句
4. 是……的"sentences stressing time place & manner

EXAMINATION SCHEME

Total: 100 marks

Continuous Evaluation (Total 50 Marks)					End Sem Evaluation (Total 50 Marks)
Quiz	**Mid Term Test**	**Presentation**	**Viva Voce**	**Attendance**	**End-Term Exam**
10	**15**	**10**	**10**	**5**	**50**

Text Books & References

1. Learn Chinese with me book-II. (Major Text Book), People's Education Press

2. Module on HSK-II. (Suggested reading)

3. Spoken Chinese Vol-I &II. (Suggested reading)

4. Office Talks. (Suggested reading)

5. Practical Chinese Grammar for foreigners

6. Travelers' guide

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
ROBOTIC PROCESS AUTOMATION	BMT-801	3 0 0	3	VIII

A. Course Learning Outcomes:

CLO 1	Describe RPA, where it can be applied and how it's implemented.
CLO 2	Describe the different types of variables, Control Flow and data manipulation techniques
CLO 3	Identify and understand Image, Text and Data Tables Automation.
CLO 4	Describe how to handle the User Events and various types of Exceptions and strategies.
CLO 5	Understand the Deployment of the Robot and to maintain the connection.

Module 1 Robotic Process Automation (RPA) Foundation: Overview of RPA, Development of RPA, Evolution of RPA, Differentiating RPA from Automation, Assisted and unassisted automation, Defining Robotic Process Automation & its benefits, comparison to other automation technology.

Module 2 RPA Skills: On premise Vs. the cloud, Web Technology, Programming Languages and low code,

OCR, APIs, Cognitive automation, flowchart

Module 3 Process Methodologies: Lean, Six Sigma, Applying lean and Six Sigma to RPA.

Module 4 Planning and BOT Development: How Robotic Process Automation works, RPA development methodology and key considerations, Robotic Process Automation Tools. Sequence flowchart and control flow, various types of loops and decision making, Introduction to UiPath platform and its components, Types of Templates, User Interface Domains in Activities Workflow, Files in UiPath.

Automate login to your (web)Email account Recording mouse and keyboard actions to perform an operation Scraping data from website and writing to CSV/Excel Programming, Debugging and Logging Deployment and Monitoring, Data Preparation, RPA Vendors, Blue Prism, UiPath platform etc. Open Source RPA, Future of RPA.

Examination Scheme:

Components	Other Components	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

MTE: Mid Term Examination, ESE: End Semester Examination;

Text & References:

- Taulli T. Process Mining. The Robotic Process Automation Handbook 2020:A Guide to Implementing RPA System (pp. 273-292). Apress, Berkeley, CA.
- Tripathi AM. Learning Robotic Process Automation: Create Software robots and automate business processes with the leading RPA tool–UiPath. Packt Publishing Ltd; 2018 Mar 28.

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	Credit	Semester
PROJECT STAGE - II	BMT-811	12	VII

Methodology

Topics of project are to be based on the latest trends, verifying engineering concepts /principle and should involve elementary research work. The projects may involve design, fabrications, testing, computer modeling, and analysis of any engineering problem. On completion of the practical training the students are to present a report covering various aspects learnt by them and give a presentation on same.

Examination Scheme:

Literature study/ Fabrication/ Experimentation	40
Written Report	20
Viva	15
Presentation	25
Total	**100**

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
FUEL CELLS AND APPLICATIONS	BMT-805	3 0 0	3	VIII

A. Course Learning Outcomes:

CLO 1	Know the applications of fuel cells in various domains
CLO 2	Distinguish various types of fuel cells and their functionalities

Course Contents

MODULE 1 – INTRODUCTION TO FUEL CELLS:
Introduction – working and types of fuel cell – low, medium and high temperature fuel cell, liquid and methanol types, proton exchange membrane fuel cell solid oxide, hydrogen fuel cells – thermodynamics and electrochemical kinetics of fuel cells.

MODULE 2 – FUEL CELLS FOR AUTOMOTIVE APPLICATIONS:

Fuel cells for automotive applications – technology advances in fuel cell vehicle systems – onboard hydrogen storage – liquid hydrogen and compressed hydrogen – metal hydrides, fuel cell control system – alkaline fuel cell – road map to market.

MODULE 3 – FUEL CELL COMPONENTS AND THEIR IMPACT ON PERFORMANCE:

Fuel cell performance characteristics – current/voltage, voltage efficiency and power density, ohmic resistance, kinetic performance, mass transfer effects – membrane electrode assembly components, fuel cell stack, bi-polar plate, humidifiers and cooling plates.

MODULE 4 – FUELING:

Hydrogen storage technology – pressure cylinders, liquid hydrogen, metal hydrides, carbon fibers – reformer technology – steam reforming, partial oxidation, auto thermal reforming – CO removal, fuel cell technology based on removal like bio-mass

MODULE 5 - FUEL CYCLE ANALYSIS:

Introduction to fuel cycle analysis – application to fuel cell and other competing technologies like battery powered vehicles, SI engine fueled by natural gas and hydrogen and hybrid electric vehicle.

Examination Scheme:

Components	Other Components	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

MTE: Mid Term Examination, ESE: End Semester Examination;

Text & References:

1. Fuel Cells for automotive applications – professional engineering publishing UK. ISBN 1-86058 4233, 2004.
2. Fuel Cell Technology Handbook SAE International Gregor Hoogers CRC Press ISBN 0-8493-0877-1-2003.

Amity School of Engineering and Technology (ASET)

A. Course Learning Outcomes:

Course Name	Course Code	L T P	Credit	Semester
ENTREPRENEURSHIP DEVELOPMENT	BMT-807	3 0 0	3	VIII

CLO 1	Apply new ideas, methods and ways of thinking
CLO 2	Engage with a range of stakeholders to deliver creative and sustainable solutions to specific problems
CLO 3	Work effectively with colleagues with diverse skills, experiences and be able to critically reflect on own practice
CLO 4	Consider the ethical and environmental issues and responsibilities which managers take into account when making decisions

MODULE 1 – Entrepreneurship:
Definition of Entrepreneur, Internal and External Factors, Functions of an Entrepreneur, Entrepreneurial motivation and Barriers, Classification of Entrepreneurship, Theory of Entrepreneurship, Concept of Entrepreneurship, Development of entrepreneurship; Concept of entrepreneur ,Manager and Intraprenuer (differences in their roles, responsibilities and Career Opportunities)

MODULE 2 – **Creativity and Entrepreneurial Plan:**

The business plan as an entrepreneurial tool, Contents of a business plan, Idea Generation, Screening and Project Identification, Creative Performance, Feasibility Analysis: Economic, Marketing, Financial and Technical; Project Planning: Evaluation, Monitoring and Control segmentation. Creative Problem Solving: Heuristics, Brainstorming, Synectics, Value Analysis, Innovation. Project Feasibility and Project Appraisal.

MODULE 3 – Corporate entrepreneurship:

Introduction, Flavors of corporate entrepreneurship, Corporate venturing, Intrapreneurship, organizational transformation, Industry rule bending, Need for corporate entrepreneurship, domain of corporate entrepreneurship, conditions favorable for Corporate entrepreneurship, benefits of Corporate entrepreneurship, issues related to Corporate entrepreneurship.

MODULE 4 – Family and Non-Family Entrepreneur & Women entrepreneurs:

Role of Professionals, Professionalism vs family entrepreneurs, Role of Woman entrepreneur, Factors influencing women entrepreneur, Challenges for women entrepreneurs, Growth and development of women entrepreneurs in India

MODULE 5 - Project Finance:

Need for finance, sources of finance, Venture capital, Nature and Overview, Venture capital process, locating venture capitalists.

MODULE 6- International Entrepreneurship Opportunities:

The nature of international entrepreneurship, Importance of international business to the firm, International versus domestics' entrepreneurship, Stages of economic development. Institutional support for new ventures: Supporting Organizations; Incentives and facilities; Financial Institutions and Small-

scale Industries, Govt. Policies for SSIs. Case studies on Indian Start up

Examination Scheme:

Components	Other Components	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

MTE: Mid Term Examination, ESE: End Semester Examination;

Text & References:

1. Vasant Desai, Dynamics of Entrepreneurship Development ,Himalaya Publication house
2. David holt Entrepreneurship , New Venture Creation , Prentice Hall India.
3. S.S. Khanka ,Entrepreneurial Development S.Chand & Company Ltd. New Delhi
4. Peter F. Drucker , Innovation and Entrepreneurship

Course Name	Course Code	L T P	Credit	Semester
Flexible Manufacturing system	BMT-807	3 0 0	3	VIII

A. Course Learning Outcomes:

CLO 1	Apply the concepts of PPC and GT to the development of FMS.
CLO 2	Discuss the planning and scheduling methods used in manufacturing systems.
CLO 3	Identify various workstations, system support equipments.
CLO 4	Identify hardware and software components of FMS.
CLO 5	Summarize the concepts of modern manufacturing such as JIT, supply chain management and lean manufacturing etc.

B. Syllabus:-

Module-I

Understanding of FMS: Evolution of Manufacturing Systems, Definition, objective and Need, Components, Merits, Demerits and Applications Flexibility in Pull and Push type

Module- II

Classification of FMS Layout: Layouts and their Salient features, Single line, dual line, loop, ladder, robot centre type etc.

Module- III

Processing stations: Salient features Machining Centers, Turning centre, Coordinate measuring machine (CMM), Washing/ Deburring station

Module- IV

Material Handling System: An introduction, Conveyor, Robots, Automated Guided Vehicle (AGV), Automated Storage Retrieval System (ASRS) Management technology: Tool Management, tool magazine, Tool preset, identification, Tool monitoring and fault detection, routing, Production Planning and Control, Scheduling and loading of FMS

Module- V

Design of FMS: Performance Evaluation of FMS, Analytical model and Simulation model of FMS Case studies: Typical FMS problems from research papers

C. Evaluation:

Components	Other Components	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

D. Text books & References book:

1. William W Luggen, “Flexible Manufacturing Cells and System” Prentice Hall of Inc New Jersey, 1991
2. Reza A Maleki “Flexible Manufacturing system” Prentice Hall of Inc New Jersey, 1991
3. John E Lenz “Flexible Manufacturing” marcel Dekker Inc New York ,1989.

References

1. Groover, M.P “Automation, Production Systems and Computer Integrated Manufacturing”, Prentice Hall

Amity School of Engineering and Technology (ASET)

Course Name	Course Code	L T P	Credit	Semester
FUNDAMENTALS OF SIGNAL PROCESSING	BMT-808	3 0 0	3	VIII

A. Course Learning Outcomes:-

CLO 1	Explain the importance of signal processing in computing, electronics, control engineering and telecommunications
CLO 2	State and explain the Nyquist-Shannon sampling theorem
CLO 3	Analyze signals using their spectrum
CLO 4	Analyze systems using theirs transfer function and frequency response
CLO 5	Explain the equivalence between time continuous and time discrete systems

B. Syllabus:-

MODULE 1 – SIGNALS AND SYSTEMS
Introduction to continuous, Discrete and Digital signals, Classification of continuous and Discrete Time signal – Periodic, Even and Odd, Energy and Power, Deterministic and Random, Complex exponential signlas, Elementary signals – UNIT step, Ramp, Impulse, Classification of systems : Linear, Time invariant, Causal, Stable, Invertible systems, BIBO Stability criterion.

MODULE 2 – **DISCRETE FOURIER SERIES**
DFS Representation of Periodic Sequence, properties of Discrete Fourier Series. Discrete Fourier
Transforms: Properties of DFT, Linear Convolution of Sequences using DFT.

MODULE 3 – FAST FOURIER TRANSFORMS
Fast Fourier Transforms (FFT) – Radi Decimation-in-Time and Decimation-in-Frequency FFT Algorithms, Inve ITT, and FFT with General Radix-N.

MODULE 4 – DISCRETE TIME SIGNALS AND Z TRANSFORM
Baseband Sampling - DTFT – Properties of DTFT. Definition of Z transforms, Properties, Inverse Z transform.

MODULE 5 - HARDWARE IMPLEMENTATION OF DSP
Introduction to Digital Signal Processing, DSP processor, architecture of DSP processors. Bus Architecture and Memory, Data Addressing Capabilities, Address Generation Unit, Programmability and Program Execution, Features for External Interfacing

Examination Scheme:

Components	Other Components	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

MTE: Mid Term Examination, ESE: End Semester Examination;

Text & References:

1. Digital Signal Processing, Principles, Algorithms, and Applications John G. Proakis, Dimitris G.
Manolakis, Pearson Education / PHI, 2007.
2. Discrete Time Signal Processing — A. V. Oppenheim and R.W Schaffer, PHI, 2009
Fundamentals of Digital Signal Processing — Loney Ludeman, John Wiley, 20093

Course Name	Course Code	L T P	Credit	Semester
AUTOMOTIVE SENSORS AND APPLICATIONS	BMT-809	3 0 0	3	VIII

Amity School of Engineering and Technology (ASET)

A. Course Learning Outcomes:-

CLO 1	To provide in depth knowledge in physical principles applied in sensing, measurement and a comprehensive understanding on how measurement systems are designed, calibrated, characterised, and analysed.
CLO 2	To introduce the students to sources and detectors of various Optical sensing mechanisms and provide in-depth understanding of the principle of measurement, and theory of instruments and sensors for measuring velocity and acceleration
CLO 3	To give a fundamental knowledge on the basic laws and phenomena on which operation of sensor transformation of energy is based.
CLO 4	To impart a reasonable level of competence in the design, construction, and execution of mechanical measurements strain, force, torque and pressure

B. Syllabus:-

Course Contents

MODULE 1 – Introduction to Automotive Engineering, Automotive Management systems
Power-train, Combustion Engines, Transmission, Differential Gear, Braking Systems, Introduction to Modern Automotive Systems and need for electronics in Automobiles, Application areas of electronics in the automobiles, Possibilities and challenges in the automotive industry, Enabling technologies and Industry trends.

MODULE 2 – Power train Sensors

λ sensors, exhaust temperature sensor, NOx sensor, PM sensor, fuel quality sensor, level sensor, torque sensor, speed sensor, mass flow sensor, manifold pressure sensor.

MODULE 3 – Sensors for Chassis management

Wheel speed sensors/direction sensors, steering position sensor (multi turn), acceleration sensor (inertia measurement), brake pneumatic pressure sensor, ABS sensor, electronic stability sensor.

MODULE 4 – Sensors for vehicle body management, Sensors for automotive vehicle convenience and security systems Gas sensors (CO2), Temperature/humidity sensor, air bag sensor, key less entering sensor, radar sensors. Tire pressure monitoring systems, Two wheeler and Four wheeler security systems, parking guide systems, anti-lock braking system, future safety technologies, Vehicle diagnostics and health monitoring, Safety and Reliability, Traction Control, Vehicle dynamics control, Accelerators and tilt sensors for sensing skidding and anti-collision, Anti-collision techniques using ultrasonic Doppler sensors.

MODULE 5 - Air Bag and Seat Belt Pre tensioner Systems

Principal Sensor Functions, Distributed Front Air Bag sensing systems, Single-Point Sensing systems, Side-Impact Sensing, and Future Occupant Protection systems.

MODULE 6: Modern Trends and Technical Solutions

Enabling Connectivity by Networking:-In vehicle communication standards (CAN & LIN), Telematic solutions, Portable or embedded connectivity- Endorsing Dependability in Drive-bywire systems:- Terminology and concepts , Why by-wire, FLEXRAY, Requirements on cost and dependability, Drive-by-wire case studies- prototype development-future of In vehicle communication

MODULE 7: Passenger Convenience Systems

Electromechanical Seat, Seat Belt Height, Steering Wheel, and Mirror Adjustments, Central Locking Systems, Tire Pressure Control Systems, Electromechanical Window Drives.

Examination Scheme:

Components	Other Components	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

MTE: Mid Term Examination, ESE: End Semester Examination;

Text & References:

1. Automotive Electrics, Automotive Electronics: Systems & Components, 2014, 5th Edition, BOSCH.
2. 2 John Turner, Automotive Sensors, 2010, 1st Edition, Momentum Press, New York