AMITY UNIVERSITY
RAJASTHAN

AMITY SCHOOL OF ENGINEERING & TECHNOLOGY (ASET)

B.Tech (Civil Engineering) Programme

Code: BCE

12158

Duration – 4 Years Full Time

(Programme Structure & Syllabus)

Choice Based Credit System (CBCS)

2021-25

AMITY UNIVERSITY RAJASTHAN

Amity School of Engineering & Technology

Amity University Rajasthan-Jaipur

B.Tech. (Civil Engg.)

Programme Learning Outcome (PLO)

- Apply principles of engineering mechanics and using appropriate tools to solve problems in Civil Engineering.
- Design and assess diverse structural components and systems by using various codal provisions.
- Identify his/her ability to apply knowledge of engineering so as to examine and solve transportation and traffic engineering issues.
- Examine suitable CADD tools to solve multifarious civil and construction engineering problems effectively.
- Associating knowledge of project and cost management to manage diverse projects.
- Summarize realistic and practical design solutions as per client requirements.

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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)

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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**

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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

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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 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 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 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 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 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 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.

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**

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 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 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 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:

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 **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 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:

- 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 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:

- 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 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

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 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 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 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 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 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 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 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 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 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

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, 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 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:

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 – 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

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 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 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 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 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 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 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 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

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 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 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

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 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 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 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, 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 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

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 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 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 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 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.Objectis 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

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

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 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.

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 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 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

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 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
- 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 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)

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 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

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 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 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 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 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 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-Bligh's 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 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.

HYDROLOGY AND FLOOD CONTROL (Domain Elective)

Course Code: BCE 508 **Credit Units: 02**

Course Objective:

This course deals with advanced concept of hydrology.

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.

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 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 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 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 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 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 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 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 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 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 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 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 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 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 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 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 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 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 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 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

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 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 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

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 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 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 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 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 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 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 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 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 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 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 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 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.