AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY (ASET)

**Bachelor of Technology
(Mechanical Engineering)**

Programme Code: BME

12998

Duration – 4 Years Full Time

(Programme Structure)

Choice Based Credit System (CBCS)

2021-25

AMITY UNIVERSITY RAJASTHAN

Program Learning Outcomes - PLO

- Students will be able to apply knowledge of mathematics, science and engineering fundamentals to the solution of intricate engineering problems.
- Students will be able to identify, formulate and analyse complex engineering problems reaching substantiated conclusions using engineering methodology.
- Student will be able to design solutions for complex engineering problems and design systems, components, or processes that meet specified needs with appropriate consideration for societal, and environmental considerations.
- Students will be able to work effectively, as an individual or in a team effectively to solve any existing problem or working in team/individual for new innovations.
- Students will be able to demonstrate management skills and apply engineering principles, as a member and/or leader in a team to manage venture.

Credits Summary

B.Tech-M.E. (Bachelor of Technology) (04 Years/ 08 Semesters)						
Semester	Core Course (CC+PC)	Domain Electives (DE)	Value Added Course (VAC)	Open Electives (OE)	Non-Teaching Credit Courses (NTCC)	Total
I	24	-	4	-	2	30
II	19	-	8	3	2	32
III	19	3	4	3		29
IV	18	3	4	3		28
V	13	3	4	3	3	26
VI	19	3	4	3		29
VII	12	3	4	-	3	22
VIII	15	3	-	-		18
Total	139	18	32	15	10	214

CC   =   Core Course

DE   =   Domain Elective

OE   =   Open Elective

VA   =   Value Added Course

NTCC =   Non - Teaching Credit Courses (NTCC)

AMITY SCHOOL OF ENGINEERING TECHNOLOGY (ASET)

Program Name: B.Tech. – MECHANICAL ENGINEERING

FIRST SEMESTER

Code	Title	Category	L	T	P	Credit
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 Engineering	CC	2	1	-	3
Practical Courses						
AP 122	Applied Physics-I – Fields & Waves Lab	PC	-	-	2	1
AC 123	Applied Chemistry Lab	PC	-	-	2	1
BME 124	Elements of Mechanical Engineering Lab	PC	-	-	2	1
BCS 125	Programming in C Lab	PC	-	-	2	1
BEE 126	Basic Electric Engineering Lab	PC	-	-	2	1
Value Added Courses						
BCS 101	English	VA	1	-	-	1
BSS 104	Behavioral Science-I Understanding Self For Effectiveness- I	VA	1	-	-	1
	Foreign Language - I	VA	2	-	-	2
FLT 101	French					
FLG 101	German					
FLS 101	Spanish					
FLC 101	Chinese					
Non-Teaching Credit Course (NTCC)						
AND001	Anandam-I	NTCC	-	-	-	2
TOTAL						**30**

AMITY SCHOOL OF ENGINEERING TECHNOLOGY (ASET)

Program Name: B.Tech. – MECHANICAL ENGINEERING

SECOND SEMESTER

Code	Title	Category	L	T	P	Credit
Core Courses						
AM 201	Applied Mathematics – II	CC	3	1	-	4
AP 202	Applied Physics-II – Modern Physics	CC	2	1	-	3
BCS 203	Object Oriented Programming using C^{++}	CC	2	1	-	3
BME 204	Engineering Mechanics	CC	2	1	-	3
BME 205	Engineering Graphics	CC	1	-	-	1
BME 206	Domain Workshop	CC	1	-	-	1
Practical Courses						
AP 222	Applied Physics-II – Modern Physics Lab	PC	-	-	2	1
BCS 223	Object Oriented Programming using C^{++} Lab	PC	-	-	2	1
BME 224	Engineering Mechanics Lab	PC	-	-	2	1
BME 225	Engineering Graphics Lab	PC	-	-	2	1
						19
Open Elective						
	Open Elective-1	OE	3	-	-	3
Value Added Courses						
BCS 201	English	VA	1	-	-	1
BSS 204	Behavioral Science – II Problem Solving & Creative Thinking	VA	1	-	-	1
	Foreign Language – II	VA	2	-	-	2
FLT 201	French					
FLG 201	German					
FLS 201	Spanish					
FLC 201	Chinese					
EVS 001	Environment Studies	VA	4	-	-	4
Non-Teaching Credit Course (NTCC)						
AND002	Anandan-II	NTCC	-	-	2	2
TOTAL						**32**

AMITY SCHOOL OF ENGINEERING TECHNOLOGY (ASET)

Program Name: B.Tech. – MECHANICAL ENGINEERING

THIRD SEMESTER

Code	Title	Category	L	T	P	Credit
Core Courses						
BME 301	Numerical Analysis & Programming	CC	3	-	-	3
BME 302	Thermodynamics	CC	2	1	-	3
BME 303	Strength of Materials	CC	2	1	-	3
BME 304	Manufacturing Process	CC	3	-	-	3
BME 305	Computer Graphics	CC	2	-	-	2
Practical Courses						
BME 322	Thermodynamics Lab	PC	-	-	2	1
BME 323	Strength of Materials Lab	PC	-	-	2	1
BME 324	Manufacturing Process Lab	PC	-	-	2	1
BME 325	Computer Graphics Lab	PC	-	-	2	1
BME 326	Programming in MATLAB	CC	-	-	2	1
						19
DE Electives 1: Student has to select 1 course from the list of following DE electives						
BME 306	Alternative Source of Energy	DE	3	-	-	3
BME 307	Introduction to Optimization	DE	3	-	-	
BME 308	Green Vehicles Technology	DE	3	-	-	
BME 309	Solar Energy Fundamental	DE	3	-	-	
Open Elective						
	Open Elective-2	OE	3	-	-	3
Value Added Courses						
BCS 301	Communication Skills – I	VA	1	-	-	1
BSS 304	Behavioral Science-III, Interpersonal Communication	VA	1	-	-	1
	Foreign Language - III	VA	2	-	-	2
FLT 301	French					
FLG 301	German					
FLS 301	Spanish					
FLC 301	Chinese					
TOTAL						**29**

AMITY SCHOOL OF ENGINEERING TECHNOLOGY (ASET)

Program Name: B.Tech. – MECHANICAL ENGINEERING

FOURTH SEMESTER

Code	Title	Category	L	T	P	Credit
Core Courses
BME 401	Kinematics and Dynamics of Machines	CC	3	-	-	3
BME 402	Fluid Mechanics	CC	3	1	-	4
BME 403	Metrology	CC	2	-	-	2
BME 404	Measurement and Control	CC	2	-	-	2
BME 405	Materials Science and Metallurgy	CC	2	-	-	2
Practical Courses
BME 421	Kinematics and Dynamics of Machines Lab	PC	-	-	2	1
BME 422	Fluid Mechanics Lab	PC	-	-	2	1
BME 423	Metrology Lab	PC	-	-	2	1
BME 424	Measurement and Control Lab	PC	-	-	2	1
BME 425	Computer Aided Drafting & Design Lab	PC	-	-	2	1
						18
DE Electives 2: Student has to select 1 course from the list of following DE electives
BME 406	Statistical Quality Control	DE	3	-	-	
BME 407	Applied Triobolgy	DE	3	-	-	
BME 408	Non Destructive Testing Methods	DE	3	-	-	3
BME 409	Two and Three Vehicles	DE	3	-	-	
Open Elective
	Open Elective-3	OE	3	-	-	3
Value Added Courses
BCS 401	Communication Skills - II	VA	1	-	-	1
BSS 404	Behavioral Science – IV, Relationship Management	VA	1	-	-	1
FLT 401 FLG 401 FLS 401 FLC 401	Foreign Language - IV French German Spanish Chinese	VA	2	-	-	2
\multicolumn{6}{c}{TOTAL}	28

INDUSTRIAL TRAINING – I: 6-8 Weeks

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Program Name: B.Tech. – MECHANICAL ENGINEERING

FIFTH SEMESTER

Code	Title	Category	L	T	P	Credit
Core Courses						
BME 501	Machine Design – I	CC	3	-	-	3
BME 502	Advanced Manufacturing Process	CC	3	-	-	3
BME 503	Heat & Mass Transfer	CC	2	-	-	2
BCS-510	Web Development	CC	2	-	-	2
Practical Courses						
BME 521	Machine Design – I Lab	CC	-	-	2	1
BME 522	Advanced Manufacturing Process Lab	CC	-	-	2	1
BME 550	Practical Training (Evaluation)	NTCC	-	-	-	3
BCS-530	Web Development Lab	CC	-	-	2	1
						16
DE Electives 3: Student has to select 1 course from the list of following DE electives						
BME 504	Product Design and Development	DE	3	-	-	
BME 505	MIS, ERP and Business	DE	3	-	-	
BME 506	Fuel Cells	DE	3	-	-	3
BME 507	Management of Manufacturing Systems	DE	3	-	-	
Open Elective						
	Open Elective-4	OE	3	-	-	3
Value Added Courses						
BCS 501	Communication Skills - III	VA	1	-	-	1
BSS 504	Behavioral Science –V Group Dynamics & Team Building	VA	1	-	-	1
	Foreign Language – V	VA	2	-	-	2
FLT 501	French					
FLG 501	German					
FLS 501	Spanish					
FLC 501	Chinese					
TOTAL						26

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Program Name: B.Tech. – MECHANICAL ENGINEERING

SIXTH SEMESTER

Code	Title	Category	L	T	P	Credit
Core Courses						
BME 601	Machine Design – II	CC	3	0	-	3
BME 602	Industrial Engineering & Operational Research	CC	3	1	-	4
BME 604	Automotive Engineering	CC	3	0	-	3
BME 605	Internal Combustion Engines	CC	3	-	-	3
BCS-610	Programming with Python	CC	2	-	-	2
Practical Courses						
BME 621	Machine Design – II Lab	PC	-	-	2	1
BME 622	Industrial Engineering & Operational Research Lab	PC	-	-	2	1
BME 624	Automotive Engineering Lab	PC	-	-	2	1
BCS-630	Programming with Python Lab	CC	-	-	2	1
						19
DE Electives 4: Student has to select 1 course from the list of following DE electives						
BME 606	Power Plant Engineering	DE	3	-	-	3
BME 607	Total Quality Management	DE	3	-	-	
BME 608	Creativity and Entrepreneurship Develpoment	DE	3	-	-	
BME 609	Finite Element Analysis	DE	3	-	-	
Open Elective						
	Open Elective-5	OE	3	-	-	3
Value Added Courses						
BCS 601	Communication Skill – IV	VA	1	-	-	1
BSS 604	Behavioral Science – VI, Stress & Coping Strategies	VA	1	-	-	1
	Foreign Language - VI	VA	2	-	-	2
FLT 601	French					
FLG 601	German					
FLS 601	Spanish					
FLC 601	Chinese					
TOTAL						29

INDUSTRIAL TRAINING – II: 6-8 Weeks

AMITY SCHOOL OF ENGINEERING TECHNOLOGY (ASET)

Program Name: B.Tech. – MECHANICAL ENGINEERING

SEVENTH SEMESTER

Code	Title	Category	L	T	P	Credit
— **Core Courses**						
BME 701	Refrigeration & Air-conditioning	CC	2	-	-	2
BME 702	Computer Integrated Manufacturing	CC	2	-	-	2
BCS-710	Advanced Programming with Python	CC	2	-	-	2
Practical Courses						
BME 721	Refrigeration & Air-conditioning Lab	PC	-	-	2	1
BME 722	Computer Integrated Manufacturing Lab	PC	-	-	2	1
BCS-730	Advanced Programming with Python Lab	CC	-	-	2	1
BME 750	Industrial Training (Evaluation)	NTCC	-	-	-	3
BME 760	Seminar/Minor Project Stage- I	CC	-	-	-	3
						15
DE Electives 5: Student has to select 1 course from the list of following DE electives						
BME 703	Automation in Industries	DE	3	-	-	
BME 704	Quality Engineering & Management Systems	DE	3	-	-	
BME 705	Rapid Prototyping	DE	3	-	-	3
BME 706	Disaster Management	DE	3	-	-	
BME 707	Electric and Hybrid Vehicles	DE	3	-	-	
Value Added Courses						
BCS 701	Communication Skills – V	VA	1	-	-	1
BSS 704	Behavioral Science – VII, Individual Society & Nation	VA	1	-	-	1
	Foreign Language – VII	VA	2	-	-	2
FLT 701	French					
FLG 701	German					
FLS 701	Spanish					
FLC 701	Chinese					
TOTAL						**22**

AMITY SCHOOL OF ENGINEERING TECHNOLOGY (ASET)

Program Name: B.Tech. – MECHANICAL ENGINEERING

EIGHTH SEMESTER

Code	Title	Category	L	T	P	Credit
Core Courses						
BME 801	Plant Maintenance & Safety	CC	3	-	-	3
Practical Courses						
BME 860	Project Stage - II	CC	-	-	-	12
DE Electives 6: Student has to select 1 course from the list of following DE electives						
BME 802	Robotics	DE	3	-	-	3
BME 803	Project Management	DE	3	-	-	
BME 804	Flexible Manufacturing Systems	DE	3	-	-	
BME 805	Lean Manufacturing	DE	3	-	-	
BME 806	Automotive Safety and Ergonomics	DE	3	-	-	
TOTAL						**18**

Total Credits (30+32+29+28+26+29+22+18) = 214

AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY (ASET)

Bachelor of Technology
(Mechanical Engineering)

Programme Code: BME

12998

Duration –4 Years Full Time

(Programme Syllabus)

Choice Based Credit System (CBCS)

2021-25

AMITY UNIVERSITY RAJASTHAN

APPLIED MATHEMATICS – I

Course Code: **AM 101**   **L:3 T:1 C:4**

Course Objective:

The knowledge of Mathematics is necessary for a better understanding of almost all the Engineering and Science subjects. Here our intention is to make the students acquainted with the concept of basic topics from Mathematics, which they need to pursue their Engineering degree in different disciplines.

Course Contents:

Module I: Differential Calculus

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

Module II: Integral Calculus

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

Module III: Ordinary Differential Equations

Formation of ODEs, Definition of order, degree & solutions, ODE of first order : Method of separation of variables, homogeneous and non homogeneous equations, Exactness & integrating factors, Linear equations & Bernoulli equations, General linear ODE of nth order, Solution of homogeneous equations, Operator method, Method of undetermined coefficients, Solution of simple simultaneous ODE.

Evaluation:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

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**   **L:2 T:1 C:3**

Course Objective:
Aim of this course is to introduce the students to fundamentals of graduate level physics, which form the basis of all applied science and engineering

Course Contents:

Module I: Oscillations & Waves

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

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

Ultrasonics: Generation and application of ultrasonic waves.

Module II: Wave Nature of Light

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

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

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

Module III: Electromagnetics

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

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

Evaluation:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text & References:

- Waves & oscillation, A. P. French

- Physics of waves, W. C. Elmore & M. A. Heald

- Introduction to Electrodynamics, D. J. Griffith

- Electrodynamics, Gupta, Kumar & Singh

- Optics, A. K. Ghatak

- Engineering Physics, Satya Prakash

APPLIED CHEMISTRY

Course Code: **AC 103**   **L:02 T:01 C:03**

Course Objective:
Four basic sciences, Physics, Chemistry, Mathematics and Biology are the building blocks in engineering and technology. Chemistry is essential to develop analytical capabilities of students, so that they can characterize, transform and use materials in engineering and apply knowledge in their field. All engineering fields have unique bonds with chemistry whether it is Aerospace, Mechanical, Environmental and other fields the makeup of substances is always a key factor, which must be known. For electronics and computer science engineering, apart from the material, computer modeling and simulation knowledge can be inherited from the molecule designing. The upcoming field of technology like Nanotechnology and Biotechnology depends fully on the knowledge of basic chemistry. With this versatile need in view, course has been designed in such a way so that the student should get an overview of the whole subject.

Course Contents:

Module I: Water Technology

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

Module II: Fuels

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

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

Module IV: Lubricants

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

Module V: Corrosion

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

Evaluation:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text & References:

Text:

- Engineering Chemistry- Jain and Jain

- Engineering Chemistry- Sunita Rattan
- Engineering Chemistry - Shashi Chawla

References:

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

ELEMENTS OF MECHANICAL ENGINEERING

Course Code: BME 104 L:02,T:01,C: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: Materials: Classification of engineering material, composition of cast iron and carbon steels on iron- carbon diagram and their mechanical properties; Alloy steel and their applications; stress-strain diagram, Hooks law and modulus of elasticity. Tensile, shear, hardness and fatigue testing of materials.

Module II: Measurement:

Temperature, pressure, velocity, flow, strain, force and torque measurement, measurement by Vernier caliper, micrometer, dial gauges, slip gauges, sine-bar and combination set;

Module III: Mechanical Machines:

Introduction to Lathe, Drilling, Milling and Shaping machines, NC machine, CNC machine and DNC machine..

Module IV: Fluids: Fluid properties, pressure, density and viscosity; pressure variation with depth, static and kinetic energy; Euler and Bernouli's equation for incompressible fluids, viscous and turbulent flow, working principle of pumps, compressors and turbines,

Module V: Thermodynamics:

First and second law of thermodynamics; Formation of steam, steam properties, classification and working of boilers, efficiency & performance analysis, natural and induced draught, Refrigeration, vapor absorption & compression cycles, coefficient of perform (COP), Refrigerants

Module VI: I. C. Engines:

Construction, Nomenclature; working of two stroke & four stroke petrol & diesel IC engines, Carnot cycle and ideal efficiency; Otto and diesel cycles;

Module VII: Introduction to Fabrication Processes

Casting Process, Welding & allied process, Forging process.

Evaluation:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text & References:

- S Trymbaka Murthy (2011) Elements of Mechanical Engineering- I K International Publishing House Pvt. Ltd;
- R.K. Rajput (, 2005) Elements of Mechanical Engineering- Firewall Media
- P.K. Nag,(2005) Engineering thermodynamics- Tata McGraw-Hill Education,
- Automation, Productions systems, and computer Integrated manufacturing by Mikell P. Groover

INTRODUCTION TO COMPUTERS AND PROGRAMMING IN C

Course Code: **BCS 105**   **L:02 T:01 C:03**

Course Objective:
The objective of this course module is to acquaint the students with the basics of computers system, its components, data representation inside computer and to get them familiar with various important features of procedure oriented programming language i.e. C.

Course Contents:

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

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

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

Module IV: Arrays and Functions

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

Module V: Advanced features in C

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

Evaluation:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text & References:

Text:
- "ANSI C" by E Balagurusamy
- Yashwant Kanetkar, "Let us C", BPB Publications, 2nd Edition, 2001.
- Herbert Schildt, "C: The complete reference", Osbourne McGraw Hill, 4th Edition, 2002.
- V. Raja Raman, "Computer Programming in C", Prentice Hall of India, 1995.

References:

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

ELECTRICAL SCIENCE

Course Code: **BEE 106**   **L:02,T:01,C:03**

Course Objective:
The objective of the course is to provide a brief knowledge of Electrical Engineering to students of all disciplines. This Course includes some theorems related to electrical, some law's related to flow of current, voltages, basic knowledge of Transformer, basic knowledge of electromagnetism, basic knowledge of electrical network.

Course Contents:

Module I: Basic Electrical Quantities

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

Module II: Network Analysis Techniques & Theorems

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

Module III: Alternating Current Circuits

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

Module IV: Transformers

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

Evaluation:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text & References:

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

APPLIED PHYSICS LAB - I

Course Code: **AP 122**   **P:02,C:01**

List of Experiments:

1. To determine the wavelength of sodium light by Newton's rings method.

2. To determine the dispersive power of the material of prism with the help of a spectrometer.

3. To determine the specific rotation of sugar by Bi-quartz or Laurent half shade polarimeter.

4. To determine the speed of ultrasonic waves in liquid by diffraction method.

5. To determine the width of a narrow slit using diffraction phenomena.

6. To determine the temperature coefficient of platinum wire, using a platinum resistance thermometer and a Callender & Griffth's bridge.

7. To determine the value of specific charge (ratio of e/m) of an electron by Thomson method.

8. To determine the internal resistance of Leclanche cell with the help of Potentiometer.

9. To determine the resistance per unit length of a Carey Foster's bridge wire and also to find out the specific resistance of a given wire.

10. To plot graph showing the variation of magnetic field with distance along the aixs of a circular coil carrying current, and hence estimate the radius of the coil.

11. To determine the value of acceleration due to gravity ('g') in the laboratory using bar pendulum.

12. To determine the moment of inertia of a flywheel about its own axis of rotation.

13. To determine the density of material of the given wire with the help of sonometer.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

APPLIED CHEMISTRY LAB

Course Code:　　　**AC 123**　　　　　　　　　**P:02,C:01**

　　Course Contents:

List of Experiments:

(Any 10 Experiments)

1. To determine the ion exchange capacity of a given cation exchanger.

2. To determine the temporary, permanent and total hardness of a sample of water by complexometric titration method.

3. To determine the type and extent of alkalinity of given water sample.

4. To determine the number of water molecules of crystallization in Mohr's salt (ferrous ammonium sulphate) provided standard potassium dichromate solution (0.1N) using diphenylamine as internal indicator.

5. To determine the ferrous content in the supplied sample of iron ore by titrimetric analysis against standard $K_2Cr_2O_7$ solution using potassium ferricyanide $[K_3Fe(CN)_6]$ as external indicator.

6. To determine the surface tension of a given liquid by drop number method.

7. To determine the composition of a liquid mixture A and B (acetic acid and water) by surface tension method.

8. To prepare and describe a titration curve for phosphoric acid – sodium hydroxide titration using pH-meter.

9. To find the cell constant of conductivity cell.

10. Determine the strength of hydrochloric acid solution by titrating it against standard sodium hydroxide solution conduct metrically

11. Determination of Dissolved oxygen in the given water sample.

12. To determine the total residual chlorine in water.

13. Determination of amount of oxalic acid and H_2SO_4 in 1 L of solution using N/10 NaOH and N/10 $KMnO_4$ solution.

14. Determination of viscosity of given oil by means of Redwood viscometer I.

15. To determine flash point and fire point of an oil by Pensky Martin's Apparatus

16. To determine the Iodine value of the oil.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

ELEMENTS OF MECHANICAL ENGINEERING LAB

Course Code: BME 124   **P:02,C:01**

Course Contents:

- Tensile testing of standard mild steel specimen.

- To verify Bernoulli's theorem.

- Flow measurements by venturi and orifice meters.

- Linear and angular measurement using, Vernier; Micrometer, slip gauge, dial gauge and sine-bar.

- Study of different types of boilers and mountings.

- Study of 4 – Stroke Petrol and Diesel Engines

- Study of 2 – Stroke Petrol and Diesel Engines

- To find COP of a Vapour Compression Refrigeration system

- To perform various operations on Lathe and Study of Lathe.

  - **Welding:**
  Introduction of welding processes, classification, gas welding, arc welding, resistance welding.

  - **Sheet metal working:**
  Introduction to sheet metal shop, Shearing, trimming, blanking, piercing, shaving, notching, stretchforming, nibbling coining, embossing and drawing.

  - **Casting**:
  Introduction of casting, pattern, mould making procedures, sand mould casting, casting defects, allowances of pattern.

  - **Forging:**
  Forging-introduction, upsetting & drawing out, drop forging, press forging & m/c forging

- Carpentry shop

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

PROGRAMMING IN C LAB

Course Code: **BCS 125** **P:02,C:01**

Software Required: Turbo C

Course Contents:

- C program involving problems like finding the nth value of cosine series, Fibonacci series. Etc.

- C programs including user defined function calls

- C programs involving pointers, and solving various problems with the help of those.

- File handling

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

Course Code: **BEE 126**   **P:02, C:01**

List of Experiments:

1. To verify KVL & KCL in the given network.

2. To verify Superposition Theorem.

3. To verify Maximum Power Transfer Theorem.

4. To verify Reciprocity Theorem.

5. To determine and verify RTh, VTh, RN, IN in a given network.

6. To perform open circuit & short circuit test on a single-phase transformer.

7. To study transient response of a given RLC Circuit.

8. To perform regulation, ratio & polarity test on a single-phase transformer.

9. To measure power & power factor in a three phase circuit by two wattmeter method.

10. To measure power & power factor in a three phase load using three ammeter & three voltmeter method.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

ENGLISH

Course Code: BCS 101   C:01

Course Objective:
The course is intended to give a foundation of English Language. The literary texts are indented to help students to inculcate creative & aesthetic sensitivity and critical faculty through comprehension, appreciation and analysis of the prescribed literary texts. It will also help them to respond form different perspectives.

Course Contents:

Module I: Vocabulary

Use of Dictionary
Use of Words: Diminutives, Homonyms & Homophones

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

Module III: Essentials of Grammar - II

Sentence Structure
Subject -Verb
agreement
Punctuation

Module IV: Communication

The process and importance
Principles & benefits of Effective Communication

Module V: Spoken English Communication

Speech Drills
Pronunciation and
accent Stress and
Intonation

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

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

Module VIII: Written English communication

Progression of
Thought/ideas Structure
of Paragraph Structure
of Essays

Module IX: Short Stories

Of Studies, by Francis Bacon
Dream Children, by Charles

Lamb The Necklace, by Guy
de Maupassant A Shadow, by
R.K. Narayan
Glory at Twilight, Bhabani Bhattacharya

Module X: Poems

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

Examination Scheme:

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

Text & References:

- Madhulika Jha, Echoes, Orient Long Man
- Ramon & Prakash, Business Communication, Oxford.
- Sydney Greenbaum Oxford English Grammar, Oxford.
- Successful Communications, 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**   **C: 01**

Course Objective:
This course aims at imparting:

- Understanding self & process of self exploration
- Learning strategies for development of a healthy self esteem
- Importance of attitudes and its effective on personality
- Building Emotional Competence

Course Contents:

Module I: Self: Core Competency

Understanding of Self
Components of Self – Self
identity Self concept
Self
confidence
Self image

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

Module III: Self Esteem & Effectiveness

Meaning and
Importance
Components of self
esteem High and low
self esteem Measuring
your self esteem

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

Module V: Building Emotional Competence

Emotional Intelligence – Meaning, components, Importance and
Relevance Positive and Negative emotions
Healthy and Unhealthy expression of emotions

Module VI: End-of-Semester Appraisal

Viva based on personal journal
Assessment of Behavioural change as a result
of training Exit Level Rating by Self and
Observer

Examination Scheme:

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

Text & References:

- Organizational Behaviour, Davis, K.
- Hoover, Judhith D. Effective Small Group and Team Communication, 2002,Harcourt College Publishers
- Dick, Mc Cann & Margerison, Charles: Team Management, 1992 Edition, viva books
- Bates, A. P. and Julian, J.: Sociology - Understanding Social Behaviour
- Dressler, David and Cans, Donald: The Study of Human Interaction
- Lapiere, Richard. T – Social Change
- Lindzey, G. and Borgatta, E: Sociometric Measurement in the Handbook of Social Psychology, Addison – Welsley, US.
- Rose, G.: Oxford Textbook of Public Health, Vol.4, 1985.

- LaFasto and Larson: When Teams Work Best, 2001, Response Books (Sage), New Delhi
- J William Pfeiffer (ed.) Theories and Models in Applied Behavioural Science, Vol 2, Group (1996); Pfeiffer & Company
- Smither Robert D.; The Psychology of Work and Human Performance, 1994, Harper Collins College Publishers

FRENCH - I

Course Code: FLF 101   C: 02

Course Objective:
To familiarize the students with the French language
- with the phonetic system
- with the syntax
- with the manners
- with the cultural aspects

Course Contents:

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

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

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

Unité 2: Faire connaissance

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

Unité 3: Organiser son temps

1. dire la date et l'heure

Contenu grammatical:
1. organisation générale de la grammaire
2. article indéfini, défini, contracté
3. nom, adjectif, masculin, féminin, singulier et pluriel
4. négation avec « de », "moi aussi", "moi non plus"
5. interrogation : Inversion, est-ce que, qui, que, quoi, qu'est-ce que, où, quand, comment, quel(s), quelle(s)
   Interro-négatif : réponses : oui, si, non
6. pronom tonique/disjoint- pour insister après une préposition
7. futur proche

Examination Scheme:

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

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- le livre à suivre : Campus: Tome 1

GERMAN - I

Course Code: FLG 101   C: 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!, (estut 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** **C: 02**

Course Objective:
To enable students acquire the relevance of the Spanish language in today's global context, how to greet eachother. 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 intoday'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 numbersand 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

JAPANESE - I

Course Code: FLJ 101   C: 02

Course Objective:
To enable the students to learn the basic rules of grammar and Japanese language to be used in daily life thatwill later help them to strengthen their language.

Course Contents:

Module I: Salutations

Self introduction, Asking and answering to small general questions

Module II: Cardinal Numbers

Numerals, Expression of time and period, Days, months

Module III: Tenses

Present Tense, Future tense

Module IV: Prepositions

Particles, possession, Forming questions

Module V: Demonstratives

Interrogatives, pronoun and adjectives

Module VI: Description

Common phrases, Adjectives to describe a person

Module VII: Schedule

Time Table, everyday routine etc.

Module VIII: Outings

Going to see a movie, party, friend's house et*c.*

Learning Outcome
➢ Students can speak the basic language describing above mentioned topics

Methods of Private study /Self help
➢ Handouts, audio-aids, and self-do assignments and role-plays will support classroom teaching

Examination Scheme:

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

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

Text:
• Teach yourself Japanese

References:
• Shin Nihongo no kiso 1

CHINESE – I

Course Code: FLC 101   C: 02

Course Objective:

There are many dialects spoken in China, but the language which will help you through wherever you go is Mandarin, or Putonghua, as it is called in Chinese. The most widely spoken forms of Chinese are Mandarin, Cantonese, Gan, Hakka, Min, Wu and Xiang. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I

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

Module II

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

Module III

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

Module IV

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

Module V

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

Examination Scheme:

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

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

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

APPLIED MATHEMATICS – II

Course Code:　　　　**AM 201**　　　　　　　　**L:03 T:01 C: 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 Transformati on, Reduction of a Matrix to Row Echelon Form, Rank of a Matrix, Consistency of Linear Simultaneous Equations, Gauss Elimination Method, Gauss-Jordan Method, Eigen Values and Eigen Vectors of a Matrix, Caley- Hamilton Theorem, Diagonalization of a Matrix, Vector Space, Linear Independence and Dependence of Vectors, Linear Transformations.

Module II: Infinite Series

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

Module III: Complex Analysis
De Moivre's Theorem and Roots of Complex Numbers, Logarithmic Functions, Circular, Hyperbolic Functions and their Inverses.
Functions of a Complex Variables, Limits, Continuity and Derivatives, Analytic Function, Cauchy-Riemann Equations (without proof), Harmonic Function, Harmonic Conjugates, Conformal Mapping, Bilinear Transformations, Complex Line Integral, Cauchy Integral Theorem, Cauchy Integral Formula, Derivative of Analytic Function, Power Series, Taylor Series, Laurent Series, Zeroes and Singularities, Residues, Residue

Theorem, Evaluation of Real Integrals of the Form $\int_0^{2\pi} F(\cos\theta, \sin\theta)\, d\theta$ and $\int \frac{f(x)}{F(x)}\, dx$.

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

Evaluation:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text & References:

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

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

APPLIED PHYSICS - II - MODERN PHYSICS

Course Code: **AP 202**   **L:02 T:01 C: 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.

Evaluation:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text & References:

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

OBJECT ORIENTED PROGRAMMING USING C++

Course Code: **BCS 203**   **L:02 T:01 C: 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.

Evaluation:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text & References:

Text:

- A.R. Venugopal, Rajkumar, T. Ravishanker "Mastering C++", TMH, 1997
- R. Lafore, "Object Oriented Programming using C++", BPB Publications, 2004.
- "Object Oriented Programming with C++" By E. Balagurusamy.
- Schildt Herbert, "C++: The Complete Reference", Wiley DreamTech, 2005.

References:

- Parasons, "Object Oriented Programming with C++", BPB Publication, 1999.
- Steven C. Lawlor, "The Art of Programming Computer Science with C++", Vikas Publication, 2002.
- Yashwant Kanethkar, "Object Oriented Programming using C++", BPB, 2004

ENGINEERING MECHANICS

Course Code: **BME 204**   **L:02 T:01 C: 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, Ratio of tension, centrifugal tension, condition of maximum power transmission., Initial tension

Module III: Distributed Force

Determination of center of gravity, center of mass and centroid by direct integration and by the method of composite bodies, area moment of inertia by direct integration and composite bodies method, radius of gyration, parallel axis theorem, perpendicular axis theorem, polar moment of inertia**.**

Module IV: Stress Strain Analysis

Simple stress and strain: introduction, normal shear, and stresses-strain diagrams for ductile and brittle materials. Elastic constants, Strain Energy, Properties of material-strength, elasticity, stiffness, malleability, ductility, brittleness, hardness and plasticity etc; Concept of stress and strain.

Examination Scheme:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

MTE- Mid-term Examination

Text & References:

- D.S. Kumar (2009) Engineering Mechanics – S. K. Kataria & Sons
- Dr. R.K. Bansal (2008) Engineering Mechanics – Laxmi Publication
- J. L. Meriam, L. G. Kraige (2012) Engineering Mechanic-Don Fowley
- Timoshenko, Engineering Mechanics, McGraw Hill
- R. S. Khurmi, Engineering Mechanics, S. Chand Publication
- H. Shames & G. K. M. Rao, Engineering Mechanics, Pearson Education, 2006

ENGINEERING GRAPHICS

Course Code: **BME 205**   **L:01 C: 01**

Course Contents:

Module 1: Scales & Curves

Representative factor, Plain Scales, Diagonal Scales, Comperative Scales and Scale of chords. Construction of ellipse, Parabola, Hyperbola, Cycloid, Epicycloid, Hypocycloid, Involutes and Spirals by various methods.

Module 2: Projection of Points & Straight lines

Projection of points, Projection of straight lines. True inclinations and true length of straight lines.

Module 3: Projection of planes and solids

Projection of circle, triangle, polygons, polyhedrons, pyramids, cylinders and cones in different positions.

Module 1: Section of solids and Isometric projections

Section of right solids by normal and inclined planes, Orthographic projection, first angle & third angle projection. Isometric scale, Isometric axes, Isometric projection from orthographic drawing.

Examination Scheme:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

MTE- Mid-term Examination

Text & References:

- Engineering Graphics – Basant Agrawal and Dr. C. M. Agrawal, Tata McGraw-Hill Publishing Company Ltd.
- Engineering Drawing – by N. D. Bhatt
- Engineering Drawing and Graphics – by Veenugopal
- Engineering Drawing – by T. Jeyopoovan

APPLIED PHYSICS LAB - II

Course Code: **AP 222**   **P:02 C: 01**

List of Experiments:

1. To determine the wavelength of prominent lines of mercury spectrum using plane transmission grating.

2. To determine the thickness of a given wire by Wedge method.

3. To determine the wavelength of He-Ne laser light using single slit.

4. To determine the frequency of an electrically maintained tunning fork by Melde's method.

5. To study the variation of magnetic field along the axis of Helmholtz coil and to find out reduction factor.

6. To draw the V – I characteristics of a forward and reverse bias PN junction diode.

7. To determine the frequency of AC mains using sonometer.

8. To determine the energy band-gap of Germanium crystal using four probes method.

9. To draw V – I characteristics of a photocell and to verify the inverse square law of radiation.

10. To determine the acceleration due to gravity ('g') using Keter's reversible pendulum.

11. To study the characteristics of photo voltaic cell (solar cell).

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

OBJECT ORIENTED PROGRAMMING USING C++ LAB

Course Code:　　　　**BCS 223**　　　　　　　　　**P:02 C: 01**

Software Required: Turbo C++

Course Contents:

- Creation of objects in programs and solving problems through them.

- Different use of private, public member variables and functions and friend functions.

- Use of constructors and destructors.

- Operator overloading

- Use of inheritance in and accessing objects of different derived classes.

- Polymorphism and virtual functions (using pointers).

- File handling.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

ENGINEERING MECHANICS LAB

Course Code: BME 224   **P:02 C: 01**

Course Contents:

- To verify the law of Force Polygon.

- To verify the law of Moments using Parallel Force apparatus. (Simply supported type)

- To determine the co-efficient of friction between wood and various surface (like Leather, Wood, Aluminum) on an inclined plane.

- To find the forces in the members of Jib Crane.

- To determine the mechanical advantage, Velocity ratio and efficiency of a screw jack.

- To determine the mechanical advantage, Velocity ratio and Mechanical efficiency of the Wheel and Axle

- To determine the MA, VR, of Worm Wheel (2-start)

- Verification of force transmitted by members of given truss.

- To verify the law of moments using Bell crank lever

- To find CG and moment of Inertia of an irregular body using Computation method

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

ENGINEERING GRAPHICS LAB

Course Code: **BME 225**   **P:02 C: 01**

List of Experiments:

- Sketching and drawing of scale & Curve

- Sketching and drawing of Cycloidal Curve

- Sketching and drawing of Involute & Spirals

- Sketching and drawing of points & line

- Sketching and drawing of projection of planes

- Sketching and drawing of projection of solids

- Sketching and drawing of intersection of surfaces

- Sketching and drawing of development of surfaces

- Sketching and drawing of orthographic and isometric projection

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

Text & References:

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

ENGLISH

Course Code: BCS 201 C: 03

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
accentStress and
Intonation

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

Module VII: Communication Skills - II

Developing Reading
SkillsDeveloping
writing Skills

Module VIII: Written English communication

Progression of
Thought/ideasStructure
of Paragraph Structure
of Essays

Module IX: Short Stories

Of Studies, by Francis Bacon
DreamChildren, by Charles
Lamb The Necklace, by Guy
de Maupassant A Shadow, by
R.K. Narayan
Glory at Twilight, Bhabani Bhattacharya

Module X: Poems

All the Worlds a Stage	Shakespeare
To Autumn	Keats
O! Captain, My Captain.	Walt Whitman
Where the Mind is Without Fear	Rabindranath
TagorePsalm 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**   **C: 01**

Course Objective:
To enable the students:
- Understand the process of problem solving and creative thinking.
- Facilitation and enhancement of skills required for decision-making.

Course Contents:

Module I: Thinking as a tool for Problem Solving
What is thinking: The Mind/Brain/Behaviour
Critical Thinking and Learning:
Making Predictions and
ReasoningMemory and
Critical Thinking Emotions
and Critical Thinking
Thinking skills

Module II: Hindrances to Problem Solving Process

Percepti
on
Expressi
on
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:
Percepti
on
Expressi
on
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 trainingExit 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 C: 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: Object if 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 C: 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

- 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**   **C: 02**

Course Objective:
To enable students acquire more vocabulary, grammar, Verbal Phrases to understand simple texts and startdescribing any person or object in Simple Present Tense.

Course Contents:

Module I

Revision of earlier modules.

Module II

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

Module III

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

Module IV

Possessive pronouns

Module V

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

Examination Scheme:

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

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español, En Directo I A
- Español Sin Fronteras

CHINESE – II

Course Code: FLC 201   C: 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 much it
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

NUMERICAL ANALYSIS AND PROGRAMMING

Course Code: BME 301   L:03 C: 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.

Evaluation:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text & References:

Text:
- Rajaraman V, "Computer Oriented Numerical Methods", Pearson Education
- Gerald & Whealey, "Applied Numerical Analyses", AW
- Jain, Iyengar and Jain, "Numerical Methods for Scientific and Engineering Computations", New Age Int.
- Grewal B S, "Numerical methods in Engineering and Science", Khanna Publishers, Delhi

References:
- T Veerarajan, T Ramachandran, "Theory and Problems in Numerical Methods, TMH
- Pradip Niyogi, "Numerical Analysis and Algorithms", TMH
- Francis Scheld, " Numerical Analysis", TMH

- Sastry S. S, "Introductory Methods of Numerical Analysis", Pearson Education.
- Gupta C.B., Vijay Gupta, "Introduction to Statistical Methods", Vikas Publishing.
- Goyal, M, "Computer Based Numerical and Statistical Techniques", Firewall Media, New Delhi.

THERMODYNAMICS

Course Code: BME 302   **L:2,T:1, C:03**

Course Objective:
Objective of this course is to impart in depth understanding of the principles of thermodynamics and heat transfer. This course also helps students understand the application of basic fluid mechanics, thermodynamic, and heat transfer principles and techniques, including the use of empirical data, to the analysis of representative fluid and thermal energy components and systems encountered in the practice of electrical, electronic, industrial, and related disciplines of engineering.

Course Contents:
Module I: Basic concepts of thermodynamics

Thermodynamic system, intensive and extensive properties, cyclic process, Zeroth Law of Thermodynamics,Work and heat, Flow work,First law of thermodynamics, Mechanical equivalent of heat, internal energy,Analysis of non-flow system, flow process and control volume, steady flow, energy equation, flow processes **Module II: Second Law of Thermodynamics and Entropy**
Heat Engine, heat pump, Kelvin Planck and Clausius statement of Second Law of Thermodynamics, Perpetual motion machine, Reversible cycle- Carnot Cycle, Clausius inequality, entropy, Principle of entropy increase, concepts of availability, irreversibility,Carnot theorem, Max-well-relation,

Module III: Air-Standard Cycles

Carnot cycle, Otto cycle, Diesel cycle, Dual cycle, Stirling cycle, Erricsson cycle, Brayton cycle; Reversed Carnot cycle.

Module IV: Steam
Use of steam tables, wet steam, superheat steam, different processes of vapour, Mollier Diagram,steam Nozzle, calorimeter.

Module V : Compressors

Introduction,Types of compressors, Isothermal efficiency, adiabatic efficiency, clearance volume, volumetric efficiency, and multi-stage compression with intercooling.

Evaluation:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text & References:

Text:
- P.K. Nag, "Engineering Thermodynamics", Tata McGraw Hill
- Incropera, "Engineering Thermodynamics", John Willy

References:
- Engel, T. and Reid, P., Thermodynamics, Statistical Thermodynamics & Kinetics, Pearson Education, 2006
- Cengel & Boles, "Thermodynamics", Tata McGraw Hill.
- Sonntag/Vanhylene, Fundamentals of Thermodynamics, Wiley
- Rahul Gupta, Engineering Thermodynamics, Asian Books P. Ltd.
- Y.V.C. Rao, Engineering Thermodynamics, Khanna Publications
- Onkar Singh, Applied Thermodynamics, New Age Publications.
- Dhomkundwar Kothandaraman, "A Course in Thermal Engineering", Dhanpat Rai Publications

MECHANICS OF SOLIDS

Course Code: BME 303   L:02,T:01,C: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, strain energy, different theories of failure, stress in thin cylinder thick cylinder and spheres 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. Temperature stress and strain calculations due to applications of axial loads and variation of temperature in single and compound walls.

Module II: Compound stress and strains:

The two dimensional system; stress at a point on a plane, principal stresses and principal planes; Mohr's circle of stress. Graphical and Analytical methods for stresses on oblique section of body. Shear force and bending moment diagrams for cantilever, simply supported and overhanging beams.

Module III: Bending &Shear Stress:

Theory of bending stresses in beams due to bending, assumptions in the simple bending theory, derivation of formula: its application to beams of rectangular, circular and channel sections, composite beams, Shear stress in symmetric and Unsymmetric sections, bending and shear stresses in composite beams.

Module IV: Torsion& Spring:

Derivation of torsion equation and its assumptions. Applications of the equation of the hollow and solid circular shaft torsional rigidity, combined torsion and bending of circular shafts, principal stress and maximum shear stress under combined loading of bending and torsion, analysis of close-coiled-helical springs.

Module V: Thin cylinders and spheres:

Derivation of formulae and calculation of hoop stress, longitudinal stress in a cylinder and sphere subjected to internal pressure.

Module VI: Columns and struts:

Columns and failure of columns, Euler's formulas; Rankine-Gordon's formula, Johnson's empirical formula foraxially loaded columns and their applications.

Module VII: Slope and deflection:

Relationship between moment, slope and deflection, Mohr's theorem; Moment area method; method of integration; Macaulay's method,Calculate slope and deflection for the Cantilever beams, Simply supported beams with or without overhanging under concentrated loads, uniformly distributed loads or combination of concentrated and uniformly distributed loads by using these three methods.

Evaluation:

Components	Internal Assessment	Attendance	MTE	ESE

Weight age (%)	30	5	15	50

Text & References:

- Jindal U.C., "Strength of Materials", Galgotia Publication, New Delhi, 1998.
- Ryder G.H., "Strength of Materials", Macmillan, Delhi, 2003.
- R.K. Bansal, "Strength of Materials", Laxmi Publication, New Delhi, 2001.
- Sadhu Singh, "Strength of Materials", Khanna Publishers, New Delhi, 2000.
- Timoshenko S.P., "Elements of Strength of Materials", East-West affiliated, New Delhi, 2000.

- Hibbler R.C., "Mechanics of Materials", Prentice Hall, New Delhi, 1994.
- Popov Eger P., "Engg. Mechanics of solids", Prentice Hall, New Delhi, 1998.
- Fenner, Roger. T, "Mechanics of Solids", U.K. B.C. Publication, New Delhi, 1990.
- Srinath L.S. et.al., "Strength of Materials", McMillan, New Delhi,2001

MANUFACTURING PROCESS

Course Code: **BME 304**   **L:03**

C:03 Course Objective:

This is a new developmental graduate course for students interested in learning various types of manufacturing machines and various operations that can be possible on machine to make a desired shape to the components. It anticipated that this course would become part of the new manufacturing emphasis area in mechanical engineering.

Course Contents:

Module I: Introduction to Machine Tools

Classification of machine tools, kinds of motion in machine tool operations, definition of cutting speed, feed and depth of cut

Module II: Lathe

Classification and various parts of Lathe, specification, Description of important mechanism viz. apron, tail stock, head stock, work holding, devices and operations, e.g. taper, turning, eccentric turning and screw-cutting, Geometry of a single point cutting tool. Capstan and turret lathe, cutting speed, feed, depth of cut and calculation machining time in lathe machine

Module III: Drilling Machine

Geometry and nomenclature of a twist drill, specification and classification of drilling machines, tool holding devices, work holding devices, different types of operations performed on a drilling machine, cutting speed, feed, depth of cut and calculation machining time in drilling

Module IV: Milling Machine

Working principle, milling methods, classification of milling machines, different types of operations e.g. slab, face, Angular, form, straddle, gang, end, T-slot, saw milling operations, Dividing Head e.g. Plain, universal and optical, Indexing methods e.g. simple, compound and differential indexing

Module V: Shaper, Slotter & Planer

Principal part of a shaper, classification, Quick Return mechanism, table feed mechanism of a shaper, Operations, e.g. horizontal, vertical and inclined shaping, Principal part of a Planer, Types of planer, Planer Operations, Principal part of a Slotter, Types of slotter, Difference between a shaper, planer and slotter.

Module VI: Grinding Machines

Abrasive machining, surface finishing parameters, grinding wheels selection parameters, wheel turning and dressing, Types of grinding machines e.g. Rough grinders, Cylindrical grinders, Internal grinders, surface grinder, Tool and cutter grinder, special purpose grinding machines.

Module VII: Special Machines

Introduction of NC, DNC and CNC machines, Broaching machines, Gear hobbing machine, Lapping, honing and super finishing processes.

EXAMINATION SCHEME:

Components	Other Components	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

MTE: Mid-term Examination, **ESE**: End Semester Examination**; A:** Attendance

Text & References:

Text:

- P.N. Rao, "Manufacturing Technology: Metal Cutting & Machine Tools", Tata McGraw Hill, Delhi, 2004.
- B.S. Raghuwanshi, "Workshop Technology", Vol.2, Dhanpat Rai & Sons, 2003.
- Hazra Chandhari S.K., "Elements of Workshop Technology", Vol.2, Media Promoters, 2003.

References:

- P.C. Sharma, "A Text Book of Production. Engineering", S. Chand, New Delhi, 2004.

- Bawa H.S., "Workshop Technology", Vol.2, Tata McGraw Hill, 2004.
- Juneja & Shekhon, "Fundamental of Metal Cutting", New Age Publications
- S.F. Krar Stevan F. and Check A.F., "Technology of M/C Tools", McGraw Hill Book Co., 1986.
- Kibbe Richard et al, "M/c Tool practices", Prentice Hall India, 2003.
- Bangalore HMT, "Production Technology", Tata McGraw Hill, 1980.
- R.K. Jain, "Production Technology", Khanna Publishers

Gerling Heinrich, "All about Machine Tools", New Age Publication, 2003.

COMPUTER GRAPHICS

Course Code: **BME 305**   **L:02 C:02**

Course Objective:

The objective of the course is to provide the understanding of the fundamental graphical operations and the implementation on computer, the mathematics behind computer graphics, including the use of spline curves and surfaces. It gives the glimpse of recent advances in computer graphics, user interface issues that make the computer easy, for the novice to use.

Course Contents:

Module I: Introduction to Graphics and Graphics Hardware System

Video display devices, CRT, LCD Display devices Raster scan displays, Random scan displays, Raster scan systems, Random scan Systems.
Input devices, keyboard, mouse, Trackball and spaceball, Joystick, Data glove, Digitizers, Image scanners, Touch panels, Light pens, Voice systems.
Hardcopy devices, Printers, Plotters.

Module II: Output Primitives and Clipping operations

Algorithms for drawing 2D Primitives lines (DDA and Bresenham's line algorithm),circles (bresenham's and midpoint circle algorithm),ellipses(midpoint ellipse algorithm),other curves(conic sections, polynomials and spline curves).
Antialiasing and filtering techniques
Line clipping (cohen-sutherland algorithm), clip windows, circles, ellipses, polygon, clipping with Sutherland Hodgeman algorithm.

Module III: Geometric transformation

2D Transformation: Basic transformation, Translation, Rotation, scaling, Matrix Representations and Homogeneous coordinates, window to viewport transformation.
3D Concepts: Parallel projection and Perspective projection, 3D Transformation.

Module IV: 3D object Representation, Colour models and rendering

Polygon meshes in 3D, Spheres, Ellipsoid, Bezier curves and Bezier surfaces, Bspline curves and surfaces, solid modeling, sweep representation, constructive solid geometry methods. Achromatic and color models.
Shading ,rendering techniques and visible surface detection method: Basic illumination, diffuse reflection, specular reflection. Polygon rendering method, Gouraud & Phong shading. Depth-buffer method, A-buffer method, Depth-sorting method(painter's algorithm).

Module V: Introduction to multimedia

File formats for BMP, GIF, TIFF, IPEG, MPEG-II, Animation techniques and languages.

Evaluation:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text & References:

Text:

- Foley et. al., "Computer Graphics Principles & practice", 2nd ed. AWL., 2000.

- D. Hearn and P. Baker, "Computer Graphics", Prentice Hall, 1986.

- R. Plastock and G. Kalley, "Theory and Problems of Computer Graphics", Schaum's Series, McGraw Hill, 1986

References:

- R.H. Bartels, J.C. Beatty and B.A. Barsky, "An Introduction to Splines for use in

Computer Graphics and Geometric Modeling", Morgan Kaufmann Publishers Inc., 1987.

- C.E. Leiserson, T.H. Cormen and R.L. Rivest, "Introduction to Algorithms", McGraw-Hill Book Company, 1990.

- W. Newman and R. Sproul, "Principles of Interactive Computer Graphics, McGraw-Hill, 1973.

- F.P. Preparata and M.I. Shamos, "Computational Geometry: An Introduction", Springer-Verlag New York Inc., 1985.

- D. Rogers and J. Adams, "Mathematical Elements for Computer Graphics", McGraw-Hill International Edition, 1989

- David F. Rogers, "Procedural Elements for Computer Graphics", McGraw Hill Book Company, 1985.
- Alan Watt and Mark Watt, "Advanced Animation and Rendering Techniques", Addison-Wesley, 1992

THERMODYNAMICS LAB

Course Code: **BME 322**   **P:2, C:01**

     Course Contents:

- To study about the different Boilers.

- To study different types of Boilers mountings.

- To study different boilers accessories.

- To study two-stroke and four stroke petrol engine.

- To study two-stroke and four storke diesel engine.

- To study air reciprocation compressor unit.

- To determine the CV of fuel using bomb calorimeter.

mination Schedule:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

MECHANICS OF SOLIDS LAB

Course Code: **BME 323**   **P:02 C:01**

Course Contents:

Experimental work will be based on the paper of Mechanics of Solids.

List of Experiments:

MECHANICS OF SOLIDS LAB
1. Tensile Test (MS)

2. Double Shear Test (MS)

3. Compression Test (CI)

4. BrinellHardness No.

5. Izod Impact

6. Testing Machine

7. Rockwell Hardness Tester

8. Spring Stiffness (Spring Compression Testing machine)

9. Torsion testing machine

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

MANUFACTURING PROCESS LAB

Course Code: **BME 324**   **P:02 C:01**

Course Contents:

1. Operations on the Lathe Machine.

2. Operations on the Shaper Machine.

3. Operations on the Planner Machine.

4. Operations on the Drilling Machine.

5. Operations on the Grinding Machine.

6. Operations on the Milling Machine.

7. To make a Single point cutting tool

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

COMPUTER GRAPHICS LAB

Course Code: **BME 325**   **P:02 C:01**

Software Required: Turbo C/C++

Course Contents:

Assignments will be provided for the following:

1. Geometrical shapes based on graphics algorithms

2. 2D Geometric transformation translation, rotation, scaling, reflection.

3. Clipping

4. Animation

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

PROGRAMMING IN MAT LAB

Course Code: **BTM 326**   **C:01 P:02**

Course Objective:
It is matrix based simulation software which works on algorithms. It carries various tool boxes which is helpful for day -to-day accessibility to real world. It helps in designing graphic user interface, provides tools for neural network. Hardware which are not economical for general purpose, this software tool box helps to minimize the cost ability.

Course Contents:

Software Requirement: MAT LAB 6.5

Name of Experiments:

1   To draw the time response for first order transfer function
$$H(S) = \frac{6}{S+9}$$
second order transfer function
$$H(S) = \frac{45}{S^2 + 6S + 49}$$
third order transfer function
$$H(S) = \frac{8S}{S(S+2)(S+3)}$$

2   To realize the time response in simulink by importing the system parameters from the work window for given transfer function
$$H(S) = \frac{4S}{S(S+9)(S+5)}$$

3   To draw the bode plot for following function
$$H(S) = \frac{46S}{(S+2)(S+4)(S^2 + 2S + 4)}$$
and draw the bode plot using input arguments that represents the continuous state space system:
$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ -3 & -4 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u$$
$$y = \begin{bmatrix} 10 & 0 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \end{bmatrix} u$$

4   To draw the Nyquist plot for following function
$$H(S) = \frac{46S}{(S+2)(S+4)(S^2 + 2S + 4)}$$
and draw the Nyquist plot using input arguments that represents the continuous state space system:
$$\begin{bmatrix} \dot{x}_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ -3 & -4 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u$$
$$y = \begin{bmatrix} 10 & 0 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \end{bmatrix} u$$

5   To draw the root locus plot for following transfer function

$$H(S) = \frac{45}{S(S+2)(S+4)^2}$$

6 Write a program to determine the values of the DTFT of a real sequence described as a rational function in

e^{-j}

$$X\left(e^{-j}\right) = \frac{0.008 - 0.033e^{-j} + 0.05e^{-j2} - 0.033e^{-j3} + 0.033e^{-j4}}{1 + 2.37e^{-j} + 2.7e^{-j2} + 1.6e^{-j3} + 0.41e^{-j4}}$$

where K= 256

7 Write a program to determine the M-point DFT of the following N-points sequence

$u[n] = 1, 0 \quad n \quad N$

-1

0, Otherwise

here N=8 and M=16

8 Express the following Z- transform in factored form , plot its poles and zeros, and then determine its ROCs

$$G(Z) = \frac{2z^4 + 16z^3 + 44z^2 + 56z + 32}{3z^4 + 3z^3 - 15z^2 + 18z - 12}$$

9 Write a program to test the stability of the transfer function

$$H(Z) = \frac{1}{4z^4 + 3z^3 + 2z^2 + z + 1}$$

10 Design a DAS of given four signals with signal conditioning equipments in SIMULINK

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

<h1 style="text-align:center">COMMUNICATION SKILLS - I</h1>

Course Code: **BCS 301**   **P:02 C: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
Forma
ts

Module III

Memo
Agenda and
MinutesNotice
and Circulars

Module IV: Report Writing
Purpose andScope of a Report
Fundamental Principlesof 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 FileGD – 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**   **P:02 C: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
CommunicationTypes – Self and
Other Oriented
Rapport Building – NLP,
Communication ModeSteps 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
AnalysisGames
Analysis
Interactional and Transactional Styles

Module IV: Conflict Management
Meaning and nature of conflicts
Styles and techniques of conflict management
Conflict management and interpersonal communication

Module V: Negotiation Skills

Meaning and Negotiation approaches (Traditional and
Contemporary)Process and strategies of negotiations
Negotiation and interpersonal communication

Module VI: End-of-Semester Appraisal

Viva based on personal journal
Assessment of Behavioural change as a result
of trainingExit 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   L:02 C: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**   **L:02 C: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

- 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**   **L:02 C: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 vocabularyEn 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 L:02 C: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 versaHuman 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 classmatesUse 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

KINEMATICS AND DYNAMICS OF MACHINES

Course Code: **BME 401**   **L:03 C:03**

Course Objective:

The objective of this course is to identify the alternatives to satisfy the needs of the customer and to quantify and evaluate the alternatives. It includes an introduction to the study of motion of constrained mechanism in machine systems. The objective is to develop the students understanding of basic machine design. The overall objective of this course is to learn how to analyze the motions of mechanisms, design mechanisms to have given motions.

Course Contents:

Module I: Mechanisms and Machines:

Mechanism, machine, plane and space mechanisms, kinematic pairs, kinematic chains and their classification, degrees of freedom, Grubler's criterion, kinematic inversions of four bar mechanism and slider crank mechanism, equivalent linkages, pantograph, straight line motion mechanisms, Davis and Ackermann's steering mechanisms, Hooke's joint.

Module II: Kinematic analysis of plane mechanisms using graphical and Cartesian vector notations:

Planar kinematics of a rigid body, rigid body motion, translation, rotation about a fixed axis, absolute general plane motion. General case of plane motion, relative velocity method, velocity and acceleration analysis, instantaneous center and its application, Kennedy's theorem, relative motion, Coriolis component of acceleration.

Module III: Friction

Surface contacts, Types of friction, Friction in screws with square thread and V threads, Pivot and collar friction, Friction clutches-single, multi-plate, cone clutch, Film friction, greasy friction. Friction aspects in Brakes, Different types of brakes, rope belt and chain drive.

Module IV: Gyroscope

Angular velocity and acceleration, gyroscopic torque/couple; gyroscopic effect on naval ships; stability of two and four wheel vehicles. .

Module V: Cams and Followers

Classification of followers and cams, radial cam nomenclature, analysis of follower motion (uniform, modified uniform, simple harmonic, parabolic, cycloidal), pressure angle, radius of curvature, synthesis of cam profile by graphical approach, cams with specified contours.

Evaluation:

Components	Internal Assessment	Attendance	MTE	ESE
Weight age (%)	30	5	15	50

Text & References:

- Rattan SS; Theory of machines; TMH
- Ambekar AG; Mechanism and Machine Theory; PHI.
- Sharma CS; Purohit K; Theory of Mechanism and Machines; PHI.
- Thomas Bevan; Theory of Machines; Pearson/ CBS PUB Delhi.

- Rao JS and Dukkipati; Mechanism and Machine Theory; NewAge Delhi.
- Dr.Jagdish Lal; Theory of Machines; Metropolitan Book Co; Delhi –
- Ghosh,A,.Mallik,AK; Theory of Mechanisms & Machines, 2e,;East West Press, Delhi.
- Khurmi RS, Theory of Machines, S Chand.

FLUID MECHANICS

Course Code: BME 402   L:02,T:01,C: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 behaviour of fluids, dimension and model analysis, laminar and turbulent flow, flow through pipes and orifices,boundary layer theory.

Course Contents:

Module I: Fluid Properties and Fluid Statics

Newtonian and Non-Newtonian Fluids; Viscosity; Incompressible and compressible fluids, compressibility. Forces on plane surfaces, forces on curved surfaces, buoyant forces, and stability of floating bodies, metacentre and metacentre height.

Module II: Kinematics of Fluid Motion

Steady and unsteady flow; uniform and non-uniform flow; Laminar and turbulent flow; streamline, path line and streak line; continuity equation, irrotational and rotational flow, velocity potential and stream function, vortex flow, free and forced vortex, sink and source flow.

Module III: Dynamics of Fluid Flow

Euler's equation of motion and its integration to yield Bernoulli's equation, its practical applications – Pilot tube, Venturi meter; steady flow momentum equation, force exerted on a pipe bend. Measurement of flow using Venturi meter, orifice meter, Pitot tube, measurement of flow in open channels – rectangular, triangular

Module IV: Dimensional Analysis and Principles of Similarity

Buckingham -Theorem and its applications, Geometric, Kinematics and Dynamic similarity; Dimensionlessnumbers-Reynolds, Froude, Euler, Mach, Weber Number and their significance.

Module V: Laminar and Turbulent Flow

Reynold's experiment, critical velocity, steady laminar flow through a circular tube, flow between parallel plates. Transition from laminar to turbulent flow, courses of turbulence, velocity distribution law near a solid boundary, velocity distribution in rough pipes, Hazen – Williams's formula. Boundary layer theory.

Module VI: Analysis of Pipe Flow

Energy losses, minor losses in pipe lines, concept of equivalent length, flow between two reservoirs, and multiple pipe systems – in series and parallel, siphon.

Evaluation:

Components	Internal Assessment	Attendance	MTE	ESE
Weight age (%)	30	5	15	50

Text & References:

Text:

- R.K. Bansal, "Fluid Mechanics & Hydraulic Machines", Laxmi Publications (P) Ltd., 2002.
- Gupta, S. C., Fluid Mechanics and Hydraulic Machines, Pearson Education, 2007
- D.S. Kumar, "Fluid Mechanics and Fluid Power Engineering", S.K. Kataria & Sons, 2000.

References:

- F. M. White, Introduction to Fluid Mechanics, McGraw Hill
- I.H. Shames, "Mechanics of Fluids", Tata McGraw Hill
- Douglas, J. F., Gasiorek, J.M. and Swaffield, J., Fluid Mechanics, Pearson Education, 4/e, 2006
- V.L. Streeter and E.B. Wylie, "Fluid Mechanics", Tata McGraw Hill
- Massey B S, Mechanics of Fluids, Van Nostrand Reinhold Co

METROLOGY
Course Code: **BME 403** **L:02 C:02**

Course Objective:

The main objective of this course is to give the student: a basic understanding of the physical loss governing metrology and tolerance design. Gain and appreciation for the capabilities and applications of metrology through hands own experiences.

Course Contents:

Module I: Principles of measurement
Definition of Metrology, difference between precision and accuracy. Sources of errors: Controllable and Random Errors, Effects of Environment and Temperature, Effects of support, alignment errors.
Length Standards: Line standards, end standards and wavelength standards, transfer from line standards to end standards. Numerical based on line standards. Slip gauges – its use and care, methods of building different heights using different sets of slip gauges.
Limits, fits and tolerances: Various definitions, different types of fits and methods to provide these fits. Numerical to calculate the limits, fits and tolerances, ISO system of limits and fits; Gauges and its types, limit gauges – plug and ring gauges. Gauge Design – Taylor's Principle, wear allowance on gauges.

Module II: Comparators
Principles and working of Mechanical, Electrical, Optical and Pneumatic Comparators.
Angular Measurement: Sine Bar – different types of sine bars, use of sine bars in conjunction with slip gauges, Use of angle gauges, spirit level, errors in use of sine bars. Numericals.Principle and working of autocollimator.

Module III: Straightness and flatness
Definition of Straightness and Flatness error.Numericals based on determination of straightness error of straight edge with the help of spirit level and auto collimator
Screw Thread Measurement: Errors in threads, Measurement of elements of screw threads – major diameter, minor diameter, pitch, flank angle and effective diameter (Two and three wire methods). Effect of errors in pitch and flank angles
Gear Measurement: Measurement of tooth thickness – Gear tooth vernier caliper, Constant chord method, base tangent method and derivation of mathematical formulae for each method.Parkinson Gear Tester.

Module IV
Coordinate measuring machine (CMM)- Constructional features – types, applications – digital devices- computer aided inspection.
Surface texture: Introduction, types of irregularities, Elements of surface Texture, Measurement of surface finish, Examination of surface Roughness.

EXAMINATION SCHEME:

Components	Other Components	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

MTE: Mid-term Examination, **ESE**: End Semester Examination**; A:** Attendance

Text and Reference Books:
1. Engineering Metrology and Measurement, N V Raghavendra and Krishnamurthy, Oxford University Press,

2. Engineering Metrology and Measurements, Bentley, Pearson Education
3. Theory and Design for Mechanical Measurements, 3 rd Edition,Richard S Figliola, Donald E Beasley, Wiley India
4. Metrology and Measurement, AnandBewoor&VinayKulkarni McGraw-Hill
5. Doebelin's Measurement Systems Ernest Doebelin, DhaneshManik McGraw-Hill
6. A Text book of Engineering Metrology, I C Gupta, DhanpatRai Publications 8. A course in Mechanical Measurements and Instrumentation, A K Sawhney, DhanpatRai Publications
7. Mechanical Measurements and Instrumentations, Er. R K Rajput, Kataria Publication(KATSON)
8. Mechanical Measurement and Metrology by R K Jain, KhannaPublisherMechanical Measurement & Control by D.S. Kumar.
9. Industrial Instrumentation & Control by S K Singh, McGrawHill
10. Mechanical Measurements by Beckwith & Buck, Narosa publishing House

MEASUREMENTS AND CONTROLS

Course Code: **BME 404**   **L:02 C:02**

Course Objective:

Knowledge of Measurement & Control in any engineering branch is vital in designing and industrial production/application. The course covers the characteristics and classifications of measurement related to mechanical & automation as well as recent development in measurement & control engineering applications. Successful completion of this course will be very helpful for the students who wish to join challenging industry.

Course Contents:

Module I

Introduction to generalized measurement system and their functional elements. Basic characteristics of measuring devices, Standards & Calibration. Accuracy, Precision, Sensitivity, Resolution, Linearity & Errors in measurement.

Module II

Transducers, Stages & their classification, Resistive transducers, Strain gauges, Rosettes, Inductive transducers, Displacement measurement, LVDT.
Measurement of viscosity & flow, Transient Time & Doppler's flow meter, Measurement of liquid level, humidity, hair hygrometers.

Module III

Control engineering applications, Introduction to type of control Systems, Open loop & close loop Control Systems; Examples & their block diagrams. Transfer function.

Module IV: Modes of Control & Controller Mechanism

P, PI and PID Controller. Pneumatic & Hydraulic Controller, General Pr. of generating various Control Actions. Concept of Control Valves.

Examination Scheme:

Components	Internal Assessment	Attendance	MTE	ESE
Weight age (%)	30	5	15	50

Text & References:

Text:

- Sawhney A. K 2000, "A course in Electrical & Electronics Measurement & Instrumentation", Dhanpat Rai & Son's.
- B.C Nakra, K K Chaudhary. 2004,"Instrumentation, Measurement & Analysis". TMH.
- M Ogata, "Modern Control Engineering" PHI.

References:

- H.S Kalsi, 1999, Electronic Instrumentation", TMH.
- B. C Kuo, "Automatic Control System", Prentice Hall.

MATERIAL SCIENCE AND METALLURGY

Course Code: **BME 405**   **L:02 C:02**

Course Objective:

Metallurgy and Materials deal with the structure and properties of all materials, which have engineering applications. Metallurgists and Materials Engineers are responsible for designing, producing, examining and testing materials as diverse as metallic engineering alloys, semiconductors and superconductors, ceramics, plastics and composites. This course will help students understand the properties of different types of materials and their applications.

Course Contents:

Module I

Crystal Atoms of Solid: Structure of atom binding in solids metallic, Vander walls, ionic and covalent, Space lattice and crystal system arrangement of atoms in BCC, FCC and HCP crystal. Manufacture of Refractory and Ferrous Metals: Properties uses and selection of acid, basic and natural refractory, metallurgical coke, Properties, types, uses and brief description of the manufacturing processes for iron and steel making.

Module II

Plastic deformation of Metals: Point and line defects in crystals, their relation to mechanical properties, deformation of metal by slip and twinning stress strain curves of poly crystalline materials viz. mild steel cast iron and brass yield point phenomenon. Cold and hot working of metals and their effect on mechanical properties, annealing of cold worked metals, principles of re-crystallization and grain growth phenomenon, fracture in metal and alloys, ductile and brittle fracture, fatigue failure

Module III

Alloy Formation and Binary Diagram: Phase in metal system solution and inter-metallic compounds. Hume-Rottery's rules, solidification of pure metals and alloy equilibrium diagrams of isomorphous, eutectic peritectic and eutectoid system, non-equilibrium cooling and coring iron, iron carbon equilibrium diagram.

Module IV

Principles and applications of heat treatment processes viz. annealing, normalizing hardening, tempering; harden ability & its measurement, surface hardening processes. Defects in heat treatment and their remedies; effects produced by alloying elements on the structures and properties of steel. Distribution of alloying elements (Si, Mn. Ni. Cr. Mo. TL. Al) in steel.

EXAMINATION SCHEME:

Components	Other Components	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text & References:

Text:

- V. Raghavan, "Material Science & Engineering", Prentice Hall India Ltd., 2001.
- Shackelford, J.F. and Muralidhara, M.K., Introduction to Material Science for Engineers (6/e), Pearson Education, 2007
- S.K. Hazra Chaudhuri, "Material Science & Processes", Indian Book Publishers, Calcutta, 1983.

- R.B. Gupta, "Material Science Processes", Satya Prakashan, New Delhi, 2000.

References:

- Degarmo E. Paul et.al, "Materials & Processes in Manufacture", Prentice Hall India, New Delhi, 2001.
- Raymond A Higgim., "Engineering Metallurgy Part 1", Prentice Hall India, New Delhi, 1998.
- L. Krishna Reddi, "Principles of Engineering Metallurgy", New Age Publication, New Delhi, 2001.
- Buduisky et al, "Engineering Materials & Properties", Prentice Hall India, New Delhi, 2004.
- Peter Haasten, "Physical Metallurgy", Cambridge Univ. Press, 1996.

KINEMATICS AND DYNAMICS OF MACHINES LAB

Course Code: **BME 421**   **P:02 C:01**

Course Contents:
List of Experiments:

1. To study inversion of 3 R-IP Kinematics chain

2. To study inversions of 2R-2P Kinematics Chain

3. To carry out computer implementable kinematics analysis of 4 R mechanisms

4. To carry out computer implementable kinematics analysis of slider bar mechanism

5. To study gearbox, clutch and differential gear

6. To find the coefficient of friction for clutch plate

7. To determine gear ratio for an epicyclical gear train and verify it by analytical method

8. To study different types of Cam follower systems

9. To verify Gyroscopic Law

10. To determine and verify the whirling speed of a shaft-disc system

11. To determine the damping factor for a given horizontal vibration set up

12. To obtain dynamic balance for an unbalanced system with revolving masses

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

FLUID MECHANICS LAB

Course Code: **BME 422**   **P:02**
C:01 Course Contents:

FLUID MECHANICS LAB

1. Verification of Bernoulli's Theorem

2. Experiment using Venturimeter

3. Determination of coefficient of Discharge C_d, C_c, C_l Using

4. Circular/triangular/rectangular orifice

5. To find major head losses in a pipe line

6. To find minor head losses in a pipe line (sudden expansion/contraction/bend)

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

METROLOGY LAB

Course Code: **BME 423**   **P:02 C:01**

Name of Experiments:

1 Set up a dimension by slip gauges (example 36.936; 14.727…..) Measure this set up by micrometer (least count 0.01) several times and read dimensions. Find statistical mean and record the expected variation between the actual dimension and dimension measured by micrometer.

2 To check the roundness of a circular bar with the help of dial gauge.

3 To calibrate the micrometer using slip gauges.

4 Check the bore in a component by a bore-indicator. Set the bore indicator by micrometer and measure the deviation in the bore. Measure several times and obtain the mean value at three positions along the length of the bore.

5 Set – up a sine bar for measuring the angle of an inclined surface (of a bracket, milling cutter arbor with 7/24 taper, ….). Measure the angle several times and record the mean value. Use height gauge wherever necessary.

6 Performance on angular measurement using angular measuring instruments.

7 Measure the straightness of a surface (surface plate; guide way of machine tool) by using straight edge and dial gauge and dial gauge stand.

10 To machine a given surface and study its roughness characteristics

11 Measure the dimensions of a mechanical component using profile projector

12 Measure the dimensions of a mechanical component using tool maker's microscope.
13. Measurement of Temperature with different devices.

Open ended Problem:

Students will work on an industrial based problem on measurement.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

MEASUREMENT AND CONTROL LAB

Course Code: BME 424   **P:02 C:01**

Course Contents:

List of Experiments:

1. Measurement of resolution and sensitivity of thermocouple (study of various thermocouples J, K, T, etc.) (Calibration)

2. Measurement of resolution, sensitivity and non linearity of termistor. (termistor instability)

3. Measurement of thickness of LVDT.

4. Measurement of resolution of LVDT (and displacement measurement)

5. Study of proportional control and offset Problems.

6. Study of proportional integral control.

7. Study of proportional integral derivative (PID) control.

8. Vibration measurement by stroboscope (natural frequency of a cantilever)

9. Angular frequency (speed of rotating objects) measurement by stroboscope.

10. Pressure transducer study and calibration.

11. Proving ring (force measurement)

12. Torque cell.

13. Closed loop study of an electric circuit.

14. Young's modulus of a cantilever.

15. Young's modulus and poison's ratio of tensile test piece of M.S.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

COMPUTER AIDED DRAFTING AND DESIGN LAB

Course Code: **BME 425**   **P:02**

C:01 Course Contents:

1. Basics of Auto CAD

2. Modeling of machine Components such as Connecting Rod, Piston etc.

3. Introductory exercise for 3-D modeling.

4. Exercise for advanced 3-D modeling.

5. Exercise for 3-D editing options.

6. Exercise for Assembly modeling.

7. Exercise for surface modeling.

8. Using Any One (From CREO, Unigraphics, CATIA, Solid Edge, Inventor) Parametric Software.

   a. Prepare solid models of dismantled parts of an assembly.

   b. Assemble the parts.

   c. Get orthographic projection of solid models prepared at "a" above.

   d. Get orthographic projection of an assembly model prepared at "b" above.

   e. Prepare the bill of material (BOM).

   f. Prepare a power point presentation of the work.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

COMMUNICATION SKILLS - II

Course Code: **BCS 401** **L:01 C: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 FileGD – 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**   **L :01 C:01**

Course Objective:
To understand the basis of interpersonal
relationshipTo understand various
communication style
To learn the strategies for effective interpersonal relationship

Course Contents:

Module I: Understanding Relationships

Importance of
relationships Roleand
relationships Maintaining
healthy relationships

Module II: Bridging Individual Differences

Understanding individual differences
Bridging differences in Interpersonal Relationship –
TACommunication Styles

Module III: Interpersonal Relationship Development

Importance of Interpersonal
RelationshipsInterpersonal
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 trainingExit 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   L:02 C: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   L:02 C: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**   **L:02 C: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 eaSrlier semester modules
Introduction to Present Continuous Tense (Gerunds)

Module II

Translation with Present Continuous
Tense Introduction to Gustar, Parecer,
Apetecer, doler

Module III
Imperatives (positive and negative commands of regular verbs)

Module IV

Commercial/business vocabulary

Module V
Simple conversation with help of texts and
vocabulary En la recepcion del hotel
En el restaurante
En la agencia de viajes
En la tienda/supermercado

Examination Scheme:

Components	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**   **L:02 C: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

MACHINE DESIGN – I

Course Code: **BME 501** **L:03 C:03**

Course Objective:
The objective of this course is to help students apply concepts learned in the mechanics, structure, material and manufacturing courses. This course offers working knowledge in the use of proper failure theories under steady and variable loading, design of mechanical elements, such as shaft, coupling, power screws, and detachable, permanent and welded connections.

Course Contents:

Module I: Variable stresses in Machine Parts
Fatigue and Endurance Limit, Factor of Safety for Fatigue Loading, Stress concentration, Notch sensitivity, Gerber Method, Goodman Method and Soderberg Method for a combination of stresses.

Module II: Power Screws
Types of screw threads, Torque required to raise and lower the load, Efficiency of square threaded screw, overhauling and self locking screw, stresses in power screw, design of screw jacks.

Module III: Shaft, Keys and Couplings
Design of shaft, Types of Keys, Splines, Strength of Sunk Key, types of shaft coupling, Sleeve and muff coupling, Flange coupling, Flexible coupling, Oldham coupling, Universal coupling.

Module IV: Cotter and Knuckle Joints
Types of cotter joints, design of socket and spigot joint, design of sleeve and cotter joint, design of jib and cotter joint, Design procedure of Knuckle joint.

Module V: Drives
Types of Belt drives, Flat Belt drives, Velocity ratio, Sleep, Creep of Belt, Length of open Belt, length of cross belt, power transmission by belt, Maximum tension in the belt. Types of V belt and Pulleys, advantages and disadvantages of V belt over Flat Belt, Ratio of Driving tensions for V belt, Rope drives. Chain drives, advantages and disadvantages of Chain drives.

Module VI: Riveted and Welded Joint
Types of Riveted joint, Lap joint, Butt Joint, Caulking and Fullering, Failure of Riveted joint, Strength of Riveted joint, Efficiency of Riveted joint. Advantages and Disadvantages of welded joint over Riveted joint, Strength of Fillet joint, strength of Butt joints.

Examination Scheme:

Components	Internal Assessment	Attendance	MTE	ESE
Weight age (%)	30	5	15	50

Text & References:
- J.E. Shigley, Mechanical Engineering Design.
- Sadhu Singh, Machine Design
- R.S. Khurmi & J.K. Gupta, Machine design
- D.K. Aggarwal & P.C. Sharma, Machine Design

ADVANCED MANUFACTURING PROCESS

Course Code: **BME 502**   **L:03**

C:03 Course Objective:

Metal cutting involves removing metal through machining operations. Machining traditionally takes place on lathes, drill presses, and milling machines with the use of various cutting tools. Successful machining also requires knowledge about the material being cut. This course is designed in such way that it explains all aspects (process and tools) of metal cutting. The course also covers the common tooling setups and operations as well as specialized applications for the more experienced users.

Course Contents:

Module I: Introduction

Basic shape of cutting tools, Function of different angles of cutting tools, tool geometry and Nomenclatures- ASA, ORS systems, Conversion of angles, Tool Materials.

Module II: Mechanism of chip formation

Fracture & yielding mechanism, Types of chips, Factors involved in chip formation analysis, shear plane in flat chips, chip formation in drilling and milling.

Module III: Mechanism of metal cutting

Force system during turning, merchant circle diagram, velocity relationship, stress in conventional shear plane, Energy of cutting process, Ernst& merchant angle relationship, Lee-Shafer relationship, measurement of forces, Heat generation and temperature distribution in metal cutting.

Module IV: Theory of Tool wears

Criteria of wear, machinability and tool life, Flank wear, Crater wear, Taylor's tool life equation, causes and mechanism of tool failure, cutting fluid, Economics of metal machining.

Module V: Design for sheet metal works

Press working Terminology, press operation, types of dies, clearance, cutting forces, methods of reducing cutting forces, minimum diameter of piercing, center of pressure, Drawing dies-blank diameter, drawing force.

Module VI: Jigs and Fixture design

Important considerations in jig and fixture design, Locating and clamping, principles for location purposes, principles for clamping purposes, design principles for jigs and fixtures.

Evaluation:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text & References:

Text:

- A Bhattacharya , "Metal cutting theory& practice", C.B. Publication

References:

- Geoffrey Boothroyd, "Fundamentals of Metal Machining & Machine Tools", Tata McGraw Hill Kogakusha Ltd.

- P.N. Rao, "Manufacturing Technology", Tata McGraw Hill Publication Ltd.

- Dr. P.C. Pandey & C.K. Singh, "Production Engg. Sciences", Standard Publisher. Distributors.

- Dr. B.J. Ranganath, "Metal Cutting & Tool Design" Vikas Publishing House Pvt. Ltd.

HEAT AND MASS TRANSFER

Course Code: **BME 503**   **L:02,**

C:02Course Objective:

The main objective of the course to understand the behaviour of thermal systems. To illustrate the development of the governing differential, algebraic and finite difference equations associated with thermal systems. To introduce the possible methods of solution to the governing equation. To investigate the influences of boundary and initial conditions and system parameters on the resulting steady or transient response of the system. To provide the basic tools those are used in thermal system design. To expose students to heat transfer applicationsin industry.

Course Contents:

Module I Conduction

One-dimensional steady-state conduction through homogeneous and composite plane walls, cylinders and spheres, critical thickness of insulation; heat transfer from fins of uniform cross section.

Module II Free convection

Introduction, Laminar Boundary Layer Equations of Free convection on a vertical flat plate, Integral method for Free convection on a vertical flat plate, Empirical correlations for Natural convection, Free convection under uniform heat flux, free convection caused by centrifugal forces.

Module III Forced convection Introduction, Parllel flow over a flat plate, flow over Cylinders and Spheres, Fully developed Laminar flow in circular Tubes, Flow of Liquid Mettals, Combined free and forced convection

Module IV Radiation

Thermal radiation; Kirchoff's law; Planck's distribution law, Wien's displacement law; Stefan-Boltzmann's relation, Configuration factors; radiant interchange between black and grey surfaces; radiation shielding solar radiation.

e V Heat exchangers

Combined heat transfer analysis; overall heat transfer co-efficient; types of heat exchangers; LMTD methods of heat exchanger design; simple heat exchanger calculations.

Module VI Mass transfer

Steady state moleculer diffusion in fluids, Mass heat momentum transfer analysis, unsteady state diffusion, diffusion in solids,Ficks law of diffusion, interface mass transfer

Evaluation:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text & References:

- Incropera, F.P. and DeWitt, D.P. (2002). Fundamentals of Heat and Mass Transfer, John Willy & Sons, New York, NY.

- Nag, P.K. (2002). Heat and Mass Transfer, TMH.

- John R.Howell & Richrd O Buckius, Fundamentals of Engg. Thermodynamics, McGraw Hill International.

- Holman, J.P. (1997). Heat Transfer, 9th edition, McGraw-Hill.

- Mills, A.F. (1999). Basic Heat and Mass Transfer. Prentice-Hall.

- Thirumaleshwar, M. (2006). Fundamentals of Heat and Mass Transfer, Pearson education.

- Ghoshdastidar, P.S. (2004). Heat Transfer. Oxford University Press.

- Arora, Domkundwar, S. and Domkundwar, A. (1988). A Course in Heat & Mass Transfer, Dhanpat Rai & Co.

WEB DEVELOPMENT

Course Code: BCS 510 **Credit Units: 03**

Course Objective:

To design web base and context aware systems to acquire, organize process, share and use the knowledge of web sites. The field of web site is multidisciplinary as web sites are amazingly complex systems. The major objective of this course is to provide a sound foundation to the students on the concepts, percepts and practices in a field that is of immense concern to the industry and business.

Course Contents:

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.

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

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.

IV: Cascading style-sheet (CSS) in HTML

Introduction to Cascading Style Sheets (CSS), Types of Style Sheets (Inline, Internal and External), CSS forWebsite Layout and Print Layout.
Types of various CSS Selectors, CSS properties: Type Properties, Background Properties, Block Properties, BoxModel Properties, List Properties, Border Properties, Positioning Propeties.

V: Introduction to Java Script

Role of java script in a web page, Script writing basics, Adding interactivity to a web page, creating dynamic webpages,
Similarities to java, embedding JavaScript code, embedding java applets in a web page, Form validation using javascript

:

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.**

MACHINE DESIGN-I LAB

Course Code: BME 521   **P:02 C:01**

Course Contents:
Design of:
  (i)   Cotter Joint
  (ii)   Knuckle Joint
  (iii) Pipe Joint
  (iv)   Screw Jack
  (v)   Rigid and Flexible coupling

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

ADVANCED MANUFACTURING PROCESS LAB

Course Code: **BME 522**   **P:02**

C:01 Course Contents:

Name of Experiments:

1. Step and taper turning on lathe machine

2. To make a hexagonal headed bolt on a milling machine.

3. To make a job on a shaper.

4. To study the Kinematics design of workshop machines.

5. To make a job on drilling machine as per given specifications.

6. To measure cutting forces on a single point cutting tool

7. To measure cutting parameters for multipoint cutting tool.

8. Study of a punch and die set.

9. Study of a jig and fixture.

10. Fixture fabrication with case study.

11. Study of formation of chips during turning and shaping operations on samples of C.I., M.S., Brass, Cu & aluminum.

12. Determination of the life of the cutting tool used on lathe for various cutting speeds, feeds and different work piece materials.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

PRACTICAL TRAINING (EVALUATION)

Course Code: **BME 550**   **C:06**

Methodology
Practical training is based on the theoretical subjects studied by students. It can be arranged within the college or in any related industrial unit. The students are to learn various industrial, technical and administrative processes followed in the industry. In case of on-campus training the students will be given specific task of fabrication/assembly/testing/analysis. On completion of the practical training the students are to present a report covering various aspects learnt by them and give a presentation on same.

Examination Scheme:

Feedback from industry/work place	20
Training Report	40
Viva	15
Presentation	25
Total	**100**

WEB WEVELOPMENT LAB

Course Code: **BCS 530**   **Credit Units:**

01 Software Required: Java

List of Assignment:

1. Design a HTML page using all the basic tags.
2. Design a page containing your educational qualification in a table.
3. Design a page containing an ordered list/unordered list.
4. Design a HTML page for your resume.
5. Design a form in HTML to enter different attribute of student information.
6. Design a home page for ASE using Frame.
7. Design another page and connect these to the home page.
8. Write a function in Javascript for input validation.
9. Write a function in Javascript to calculate monthly installation of the loan.
10. Write an input form and save its data in a database using ASP.
11. Display the data stored in database in tabular form on the page.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note**:** IA – Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva**.**

COMMUNICATION SKILLS - III

Course Code: **BCS 501**   **L:01 C: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
Consona
nts
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** **L :01 C :01**

Course Objective:

To inculcate in the students an elementary level of understanding of group/team functionsTo 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 policiesetc.
Internal conditions affecting group functioning: Roles, Norms, Conformity, Status, Cohesiveness, Size, Intergroup conflict.
Group Cohesiveness and Group ConflictAdjustment in Groups

Module III: Teams

Meaning and nature of teams
External and internal factors effecting teamBuilding Effective Teams
Consensus
Building
Collaboration

Module IV: Leadership

Meaning, Nature and Functions
Self leadership
Leadership styles in organizationLeadership in Teams

Module V: Power to empower: Individual and Teams

Meaning and NatureTypes 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 trainingExit 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**   **L:02 C:02**

Course Objective:
To furnish some basic knowledge of French culture and civilization for understanding an authentic document andinformation relating to political and administrative life.

Course Contents:

Module D: pp. 131 – 156 Unités 10, 11

Contenu lexical: **Unité 10:** Prendre des décisions
1. Faire des comparaisons
2. décrire un lieu, le temps, les gens, l'ambiance
3. rédiger une carte postale

Unité 11: faire face aux problèmes

1. Exposer un problème.
2. parler de la santé, de la maladie
3. interdire/demander/donner une autorisation
4. connaître la vie politique française

Contenu grammatical:

1. comparatif - comparer des qualités/ quantités/actions
2. supposition : Si + présent, futur
3. adverbe - caractériser une action
4. pronom "Y"

Examination Scheme:

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

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- le livre à suivre : Campus: Tome 1

GERMAN - V

Course Code: **FLG 501**   **L:02 C: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	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 - V

Course Code: **FLS 501**   **L:02 C: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	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español Sin Fronteras, Greenfield

CHINESE – V

Course Code: **FLC 501**   **L :02**

C: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
ChinaShort 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 werethere? What did you think of others?
Talking about a day in your life using compliment of degree "de". When you get up? When do you go for class?Do you sleep early or late? How is Chinese? Do you enjoy your life in the hostel?
Making up a dialogue by asking question on the year, month, day and the days of the week and answer them.

Examination Scheme:

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

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- "Elementary Chinese Reader " Part-II Lesson 39-46

MACHINE DESIGN – II

Course Code: **BME 601** **L:3, C:3**

Course Objective:

The course aims at developing concepts as to how to analyze mechanical systems and select proper machine elements (bearing, gears, belts, chains). It prepares the students how to design machine element by specifying their type, geometry, material and how to integrate these elements to build a mechanical systems.

Course Contents:

Module I: Gears

Selection of transmission, spur, helical, bevel and worm gears,

Module II: Friction Clutches & Brakes

Materials for friction surface, uniform pressure and uniform wear theories, Design of friction clutches: Disk , plate clutches, cone & centrifugal clutches.

Design of brakes: Band & block brake, Internal expending brakes, Disk brakes.

Module III: Bearings and Lubrication

Types of lubrication, viscosity, hydrodynamic theory, design factors, temperature and viscosity considerations, Reynold's equation, stable and unstable operation, heat dissipation and thermal equilibrium, boundary lubrication, dimensionless numbers, Design of journal bearings, Rolling-element Bearings: Types of rolling contact bearing, bearing friction and power loss, bearing life; Radial, thrust & axial loads; Static & dynamic load capacities; Selection of ball and roller bearings; lubrication and sealing.

Module IV: Springs

Design of helical compression and tension springs, consideration of dimensional and functional constraints, leaf springs and torsion springs; fatigue loading of springs, surge in spring; special springs.

Module V: Design of I.C. Engine components

Selection of type, general design consideration, design of cylinder, cylinder liner, cylinder head, pistons, connecting rod, crank shaft, valves gears mechanism, flywheel.

Examination Scheme:

Components	Internal Assessment	Attendance	MTE	ESE
Weight age (%)	30	5	15	50

Text & References:

Text:

- Maleeve Hartman and O.P. Grover, "Machine Design", CBS Publication & Publishers.

- V.B Bhandari, "Machine Design", Tata McGraw Hill.

- P.C. Sharma and D.K Aggarwal., "Machine Design", S.K. Kataria & Sons.

References:

- Mahadevan, "Design Data Book", CBS Publication & Publisher

INDUSTRIAL ENGINEERING & OPERATIONS RESEARCH

Course Code: BME 602   **L:3 C:3**

Course Objective: In a rapidly changing environment an understanding is sought which will facilitate the choice and the implementation of more effective solutions, which, typically, may involve complex interactions among people, materials and money. Organizations may seek a very wide range of operational improvements - for example, greater efficiency, better customer service, higher quality or lower cost. Whatever the business, engineering aim, Operation Research can offer the flexibility and adaptability to provide objective help. This course introduces students to the principles of operational research.

Course Contents:

Module I: Introduction, Definition of operation Research, Characteristics and limitations of operation Research, Applications, advantages and disadvantages of operation Research, Linear Programming Formulation of problem. Graphical and Simplex method for maximization and minimization, Big M Method, Duality Theory and Sensitivity Analysis

Module II: Transportation Models, NWCR Method, Least Cost Method, Row Minima And Column Minima Method, Stepping Stone Algorithm, MODI Method And Vogel'S Approximation Method (VAM), Balanced, Unbalanced Transportation Problems and Problems of Degeneracy and Maximization.

Module III: Assignment Models, Hungarian Method, Assignment model for maximization and traveling salesman problems, Industrial Problems

Module IV: Queuing Theory Basic structured, Terminology, classification, (M/M/I) :(FCFS/∞/∞) Model, Birth and death process. Sequencing: Processing in jobs through machines with the same processing order. Processing of 2 jobs through machines with each having different processing order.

Module V: Network Models Introduction to PERT and CPM, Fundamental Concept of Network Models and Construction of Network Diagrams, PERT Activity, Time Estimates, Critical Path and Project Time Duration, Probability of Completing The Project On Or Before Specified Time, Float Of An Activity.

Module VI: Games Theory Zero Sum Two Person Competitive Games, Minimax And Maximini Principle Arithmetic, Algebraic, Matrix Algebra Method, Solution By Dominance, Sub Game, Graphical And Linear Programming Method.

EXAMINATION SCHEME:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text & References:

- HM Wagner, Principles of Operations Research, Prentice Hall

- Heizer, J. & Render B., Operations Management, Pearson Education (8/e), 2006

- PK Gupta and DS Hira, Operations Research, S. Chand & Co.

- Taha, Introduction to Operation Research, TMH

- F.S. Hiller and G.I. Libermann, Introduction to Operation Research, Holden Ray.

FLUID POWER SYSTEMS
Course Code: **BME 603**   **L:2,T:1, C:3**

Course Objective:
Fluid power systems cover generation, transmission, and control applications of power by using pressurized fluids. This course imparts the knowledge of different fluid power systems (pneumatic and hydraulic) which are used in industries and hydro power plants.

Course Contents:
Module I: Introduction
Euler's equations for turbo machines; impulse and reaction forces due to fluid systems on stationery and moving system of vanes; jet propulsion.

Module II: Water & Gas Turbines

Classification: Pelton, Francis, Propeller and Kaplan turbines; velocity triangles; efficiency; draft tubes, governing.
General aspect of gas turbine, Jules cycle, Brayton cycle, classification, merits of gas

turbine, open- cycle gas turbine, closed cycle gas turbine, Inter cooling, Reheating, Re-

generation in gas turbine.

Module III: Pumps

Centrifugal pumps, velocity triangles, efficiency, turbine pumps, axial and mixed flow pumps.
Module IV: Fluid Machines
Similarity laws applied to roto dynamic machines; specific speed, unit quantities; characteristic curves; use of models; cavitations and attendant problems in turbo machines; selection of turbines hydroelectric plants.
Module V: Hydraulic Power Transmission
Transmission of hydraulic power through pipe lines; water hammer; precautions against water hammer in turbine and pump installations.
Module VI: Fluid Systems
Hydraulic press, hydraulic accumulator, Hydraulic intensifier, Hydraulic ram, Hydraulic lift, Hydraulic crane, Positive pumps, gear, fluid coupling and torque converter,
Pneumatic Power: comparison of pneumatic and hydraulic Systems.

Evaluation:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text & References:
Text:
- Gupta, S. C., Fluid Mechanics and Hydraulic Machines, Pearson Education, 2007
- R.K. Bansal, "Fluid Mechanics & Hydraulic Machines", Laxmi Publications (P) Ltd., 2002.

References:
- Dr. D.S. Kumar, "Fluid Mechanics & Fluid Power Engineering", S.K. Kataria & Sons,2001
- D.R. Malhotra & N.K. Malhotra, "The Fluid Mech. & Hydraulics", Satya Prakashan, 2001
- V.P. Gupta, Alam Singh, Manish Gupta, "Fluid Mechanics, Fluid Mechanics & Hydraulics", CBS Publishers; 1999.

AUTOMOTIVE ENGINEERING

Course Code: BME 604   L:03 C:03

Course Objective:

This course emphasizes on constructional details of automotive vehicles which includes – Basic structure,engine, transmission systems, suspension systems, steering system, braking systems and wheels&tyres.

Course Contents:

Module I

Introduction, Components of an automobile, basic engine terminology, engine cycles, working of an IC engine. Basic engine design considerations, constructional details of C.I. and S.I. engines. crank shafts, connecting rod, piston, values, cams, manifolds, air cleaners, mufflers, radiators, and oil filters.

Module II: Transmission System

Description and working of manually operated gearboxes like sliding mesh, constant mesh, synchromesh and epicycle; hydraulic torque convertor and its construction working and performance, sem-automatic and fully automatic transmission, Hydramatic transmission, analysis of differentials, live axles, construction working and requirements of overdrive.

Module III:Steering System

Introduction, Front axle, wheel alignment, Steering geometry, steering mechanisms, Ackerman steering, center point steering, power steering.

Module IV: Suspension

Objective, requirement, function, types Shock absorbers, Independent suspension, Stabilizer, air suspension, Hydroelastic suspension, Hydragas interconnected suspension.

Module V

Principle, braking requirements, brake efficiency, fading of brakes, types of brakes, bleeding of brakes, brakefluid.

Examination:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text & References:

- Kirpal Singh, "Automobile Engg.", Vol. I & II, Standard Publishers, 2004

- N.K. Giri, "Automotive Mechanics", Khanna Publishers

- Narang G.B.S., "Automobile Engg.", Khanna Publishers

- Srinivasan, "Automotive Engines", Tata McGraw Hill

- K.K. Jain & R.B. Asthana, "Automobile Engineering", Tata McGraw Hill

- James D. Halderman and Chase D. Mitchell Jr., Automotive Engines- Theory and Servicing, Pearson Education, 2007

IC ENGINES

Course Code: **BME 605**   **L:03 C:03**

Course Objective:

This course provides an in-depth knowledge of the functioning of IC Engine & Gas Turbine, and also deals with the combustion techniques used for various fuels. This course finds immense application in automobile industry and gas-operated power plants.

Course Contents:

Module I: Fundamentals

Development of IC engine, Classification, Working Cycles, Indicator diagram, comparison of SI Engine and CI Engine, two stroke and four-stroke engine, Valve timing diagram of SI and CI engine.

Module II: Air Standard Cycle

Assumptions in air standard cycle & fuel-air cycle, fuel-air cycle calculations, factors influencing fuel-air cycle, effects of variable specific heats, dissociation.

Module III: Fuel and Combustion

Combustion of SI engine, ignition limits, normal combustion, abnormal combustion, effect of engine Variable in ignition lag, spark advance and factors affecting ignition timing, pre-ignition, theory, and factors affecting detonation, PN, HUCR. Combustion in CI engine, fundamentals of combustion process in Diesel engine, delay period, diesel knock, and cold starting of CI engine. IC engine Fuel, combustion equations, theoretical air and excess air, stoichiometric air fuel ratio, desirable Properties of good IC engine fuels knock rating of SI engine fuel.

Module IV: Performance & Testing

Testing and performance of IC engine, performance parameters, basic measurement, engine Performance curve, fuel consumption, load outputs, engine power, heat balance.

Evaluation:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text & References:

Text:

- Ganesan, V. Internal Combustion Engine, Tata McGraw-Hill.
- Mathur, M.L. and Sharma, R.P. Internal Combustion Engine. Dhanpat Rai Publication
- Vladimir Leonidas Maleev. Internal-combustion Engines, Theory and Design. McGraw-Hill.

References:

- Lester Clyde Lichty, Robert Leroy Streeter. Internal Combustion Engines, McGraw-Hill
- Wallace Ludwig Lind. Internal-combustion Engines: Their Principles and Applications to Automobile, Aircraft, Ginn.
- Edward Frederic Obert, Burgess Hill Jennings, Internal Combustion Engines: Analysis and Practice
- Joseph Albert Polson. Internal Combustion Engines, Chapman & Hall, limited
- Rolla Clinton Carpenter, Herman Diederichs. Internal Combustion Engines, Their Theory Construction and Operation. Van Nostrand companies
- John Benjamin Heywood. Internal Combustion Engine Fundamentals. McGraw-Hill

PROGRAMMING WITH PYTHON

Course Code: BCS 610   **Credit Units:**

03 Course Objective:

Objective: Python is next generation multi-purpose programming language that allows different users to create applications of various domains. Students will be able to learn primary fundamentals of python programming and potential of python is to achieve modern computing requirements

Course Outcomes: After completion of this course, student will be able to
- To learn basics of Python.
- To develop console application in python.
- To develop database application in python.
- To develop basic machine learning application.

Pre-requisite of course: Object oriented concepts, Programming fundamentals

Course Contents:

Module I: Basic of Python Programming

The concept of data types; variables, assignments; immutable variables; numerical types; arithmetic operators and expressions; comments in the program; understanding error messages.

Module II: Conditioning and looping in python

Conditions, Boolean logic, logical operators; ranges; Control statements: if-else, loops (for, while); lambda function in python.

Module III: String, List, Tuple, Set, Dictionary data structure

String manipulations: subscript operator, indexing, slicing a string; strings and number system: converting strings to numbers and vice versa. Lists, tuples, and dictionaries; basic list operators, replacing, inserting, removing an element; searching and sorting lists; dictionary literals, adding and removing keys, accessing and replacing values, traversing dictionaries.

Module IV: Function

Design with functions: hiding redundancy, complexity; arguments and return values; formal vs actual arguments, named arguments. Program structure and design. Recursive functions.

Module V: Basic Python Libraries

Pandas: creation of dataframe, Manipulation of dataframe, generation of series, iloc and loc function etc. NumPy: creation of arrays (1-D, 2-D and n-D array), random matrix, one's matrix, zero's matrix and all other operation over arrays, matplotlib: plotting of line graph, pi chart and box plot etc.

Creating a discussion form, creating an online store, creating a job site**.**

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	20	10	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att:Attendance

Text & References:

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.**

MACHINE DESIGN-II LAB

Course Code: **BME 621**   **P:2 C:1**

Course Contents:

Design and drawing based upon the course Machine Design II such as automotive transmission, brakes, clutches connecting rod, I.C. engine piston, connecting rod,

Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

INDUSTRIAL ENGINEERING & OPERATIONAL RESEARCH LAB

Course Code: BME 622   **C:01 P:02**

Course Contents:

1. Program on C or C++ for Linear Programming.

2. Program on C or C++ for Simplex Problem.

3. Program on C or C++ for Assignment Problem.

4. Program on C or C++ for Transportation Problem.

5. Program on C or C++ for PERT, CPM Problem.

6. Program on C or C++ for Sequencing Problem.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

FLUID POWER SYSTEMS LAB

Course Code: **BME 623**   **P:2, C:01**

Course Contents:

- To conduct a test on Centrifugal Pump and plot its characteristics

- To Plot the characteristics of Pelton turbine.

- To conducts an experiment on Francis turbine.

- To study the effect of a draft tube on reaction turbines.

- To find the friction factor for flow through pipes

- To study the hydraulic controls rig.

- To conduct an experiment for verifying model laws.

- To study the cavitations phenomenon in turbines.

- Study of hydraulic couplings and torque converters.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

AUTOMOTIVE ENGINEERING LAB

Course Code: **BME 624**   **P:02 C:01**

Course Contents:
List of Experiments:

1. Drawing Valve Timing Diagram

2. Determination of Firing Order of engine

3. Specification of engine

4. Study of different parts of engine

5. Study of Clutch

6. Study of Hydraulic Brake System

7. Study of Carburetor

8. Study of various parts of Auxiliary systems

9. Study of Wheel

10. Study of emission system

11. Study of steering system

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva

COMMUNICATION SKILLS - IV

Course Code: **BCS 601**   **L:01 C: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

PROGRAMMING WITH PYTHON LAB

Course Code: **BCS630**   **Credit Units:**

01Software 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 of 1/2, 1/3, 1/4, . . . , 1/10.
5. Write a Program to demonstrate list and tuple in python.
6. Write a program using for loop that loops over a sequence.
7. Write a program using a while loop that asks the user for a number, and print countdown from that number to zero
8. WAP to find the sum of the even-valued terms.
9. Write a program to count the numbers of characters in the string and store them in a dictionary data structure.
10. Write a program to use split and join methods in the string and trace a birthday of a person with a dictionary data structure.
11. Write a program to print each line of a file in reverse order.
12. Write a program to compute the number of characters, words and lines in a file.
13. Write a function nearly equal to test whether two strings are nearly equal. Two strings a and b are nearly equal when a can be generated by a single mutation.
14. Write function to compute gcd, lcm of two numbers. Each function shouldn'texceed one line

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	15	20	10	40	10

Note**:** IA – Internal Assessment, EE**-** External Exam, PR**-** Performance, LR – Lab Record, V – Viva**.**

BEHAVIOURAL SCIENCE - VI
(STRESS AND COPING STRATEGIES)

Course Code: **BSS 604** **L:01 C: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
Organizatio
nal
Environmen
tal

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

- Blonna, Richard; Coping with Stress in a Changing World: Second edition
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- Pestonjee, D.M.; Stress and Coping: The Indian Experience
- Clegg, Brian; Instant Stress Management – Bring calm to your life now

Course Code: **FLF 601** **L:02 C: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**   **L:02 C: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

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

SPANISH – VI

Course Code: **FLS 601**   **L:02 C: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   **L:02 C: 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

REFRIGERATION AND AIR CONDITIONING

Course Code: BME 701   L:02 C:02

Course Objective: The aim of this course is to provide the students with the understanding of the basic principles of Refrigeration and Air Conditioning such that they could build simple mathematical models representing the conditioned space and its components used to control environmental conditions. The application of thermodynamics, heat transfer, and fluid mechanics includes an understanding of refrigerants and refrigeration systems, psychometrics, human comfort and air quality, calculation of heating and cooling loads, and heat and mass transfer processes and associated R & AC components and systems.
 Course Contents:

Module I:Introduction

 Refrigeration, Second law of thermodynamics, Unit of Refrigeration, Reversed Carnot Cycle, Bell Coleman Cycle, Necessity of cooling an aircraft, types of air refrigeration systems, Basic Cycle, Boot Strap Cycle, Regenerative cycle of air refrigeration of aircraft,

Module II: Vapour compression Refrigeration system
Vapour Compression Refrigeration System, various compression refrigeration cycles, and basic components of the plant, factors affecting COP of VCRS, Multiple Compression and Evaporation System, Cascading of VCRS**Module III**: **Refrigerants**
Refrigerants, Classification of Refrigerants, Nomenclature of Refrigerants, Azeotropes, Secondary Refrigerants,Properties and choice of refrigerants, Eco-friendly Refrigerants

Module IV:Vapour Absorption Refrigeration system

 Vapour Absorption Cycle, Electrolux System, Steam Jet Refrigeration, Vortex Tube, Application of Refrigeration Systems Cascading, Introduction to Cryogenics

Module V:Psychrometrics
 Psychrometrics, Psychrometrics processes, Basic Components of Air conditioning system, comfort air- conditioning, ventilation requirements, cooling and dehumidification system, estimation of cooling and heating loads, air handling, air distribution, duct design, industrial air conditioning.

EXAMINATION SCHEME:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text & References:

- CP Arora, Refrigeration and Conditioning, Tata McGraw Hill

- Manohar Prasad, Refrigeration and Conditioning , Wiley Eastern Limited

- Jordan and Priester, Refrigeration and Conditioning, Prentice Hall of India

- WF Stoecker, Refrigeration and Conditioning, McGraw Hill.

- RS Rajput, Refrigeration and Air Conditioning, S K Kataria And Sons New Delhi

COMPUTER INTEGRATED MANUFACTURING

Course Code: BME 702   **L: 02, C: 02**

Course Objective:

The aim of the course is to impart the students the basic and essential concepts in using Computer Integrated Manufacturing (CIM) and to understand the application of computers in various aspects of Manufacturing viz., Design, Proper planning, Manufacturing cost, Layout & Material Handling system.

Course Contents:

Module I: Fundamental of CIM:

Brief introduction to CAD and CAM – Manufacturing Planning, Manufacturing control- Introduction to CAD/CAM – Concurrent Engineering-CIM concepts – Computerised elements of CIM system –Types of production – Manufacturing models and Metrics – Mathematical models of Production Performance – Simpleproblems – Manufacturing Control – Simple Problems – Basic Elements of an Automated system – Levels of Automation – Lean Production and Just-In-Time Production.

Module II: PRODUCTION PLANNING AND CONTROL:

Process planning – Computer Aided Process Planning (CAPP) – Logical steps in Computer Aided Process Planning – Aggregate Production Planning and the Master Production Schedule – Material Requirement planning – Capacity Planning- Control Systems-Shop Floor Control-Inventory Control – Brief on Manufacturing Resource Planning-II (MRP-II) & Enterprise Resource Planning (ERP) – Simple Problems.

Module III: CELLULAR MANUFACTURING

Group Technology(GT), Part Families – Parts Classification and coding – Simple Problems in Opitz Part Coding system – Production flow Analysis – Cellular Manufacturing – Composite part concept – Machine cell design and layout – Quantitative analysis in Cellular Manufacturing – Rank Order Clustering Method – Arranging Machines in a GT cell – Hollier Method – Simple Problems.

Module IV: FLEXIBLE MANUFACTURING SYSTEM (FMS) AND AUTOMATED GUIDED VEHICLE SYSTEM (AGVS)

Types of Flexibility - FMS – FMS Components – FMS Application & Benefits – FMS Planning and Control– Quantitative analysis in FMS – Simple Problems. Automated Guided Vehicle System (AGVS) – AGVS Application – Vehicle Guidance technology – Vehicle Management & Safety

Module V: INDUSTRIAL ROBOTICS

Robot Anatomy and Related Attributes – Classification of Robots- Robot Control systems – End Effectors – Sensors in Robotics – Robot Accuracy and Repeatability - Industrial Robot Applications – Robot Part Programming – Robot Accuracy and Repeatability – Simple Problems.

Evaluation:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text & References:

Text:

- Mikell P. Groover, "Automation, Production Systems and Computer-Integrated Manufacturing", 2nd Edition, Pentice Hall, 2001.
- Rao, Kundra&Tiwari, "Computer aided Manufacturing" Tata McGraw Hill, 2007.
- Numerical Control: by Koren, Khanna Publisher.

References:

- Mikell P. Groover, Emory W.Zimmers, "CAD/CAM", Pearson Education, 2006.

- P.N. Rao, "CAD/CAM Principles and Applications", Tata McGraw Hill, 2006.

ADVANCED PROGRAMMING WITH PYTHON

Course Code: BCS 710   Credit Units: 03

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.

:

Creating a discussion form, creating an online store, creating a job site**.**

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	20	10	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:
1. Michael Urban and Joel Murach, Python Programming, Shroff/Murach, 2016.
2. Haltermanpython.
3. Mark Lutz, Programming Python, O`Reilly, 4th Edition, 2010ONLINE

RESOURCES:
https://www.w3schools.com/python.
https://docs.python.org/3/tutorial/index.html.
https://www.python-course.eu/advanced_topics.ph

REFRIGERATION AND AIR-CONDITIONING LAB

Course Code: **BME 721**   **P:02, C:01**

Course Contents:

List of Experiments:

1. Study of refrigeration testing.

2. Study of Air-Conditioning testing.

3. To calculate the COP of Refrigerator.

4. Study of Ice Making Plant

5. Study of Water Cooler.

6. To calculate total Heat Load for Air-Conditioning unit.

7. To calculate the COP of Heat Pump

EXAMINATION SCHEME:

IA				EE	
A	**V**	**LR**	**TA**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

COMPUTER INTEGRATED MANUFACTURING LAB

Course Code: BME 722   **P: 02, C: 01**

Course Contents:

1. To conduct briefly study into various aspects of CNC machines.
2. To Study the preparatory and miscellaneous function of CNC codes.
3. Study exercise on Milling operations:

    - Circular Pocketing

    - Rectangular pocketing

    - Peck Drilling cycle

    - Boring operation

    - End drilling operation

4. Study exercise on Turning operations:

    - Simple facing

    - Simple turning operation

    - Step turning operation Circular Pocketing

    - Rectangular pocketing

    - Peek Drilling cycle

    - Boring operation

    - End drilling operation

5. Study the work holding and tool holding devices in the CNC lathe and machining centre and draw up their specifications and capacities.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	20	20	5	25	25

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

INDUSTRIAL TRAINING EVALUATION

Course Code: BME 750   **C:06**

Methodology:

Practical training is based on the theoretical subjects studied by students. It can be arranged within the college or in any related industrial unit. The students are to learn various industrial, technical and administrative processes followed in the industry. In case of on-campus training the students will be given specific task of fabrication/assembly/testing/analysis. On completion of the practical training the students are to present a report covering various aspects learnt by them and give a presentation on same.

Examination Scheme:

Feedback from industry/work place	20
Training Report	40
Viva	15
Presentation	25
Total	**100**

SEMINAR/MINOR PROJECT STAGE-I

Course Code: BME 760   **C:03**

Methodology:

Topics of project are to be based on the latest trends, verifying engineering concepts /principle and should involve elementary research work. For that, students need to select their project title and basic requirements to accomplish their project. The projects may involve design, fabrications, testing, computer modeling, and analysis of any engineering problem. At last, the students have to submit a report and give presentation the methodology used to accomplish their project.

Examination Scheme:

Synopsis Report	50
Viva	25
Synopsis Presentation	25
Total	**100**

ADVANCED PROGRAMMING WITH PYTHON LAB

Course Code: BCS730   **Credit Units: 01**

List of Assignment:
- Practice Assignment based on string data, Python functions, and Boolean expressions.
- Practical based on iteration, working with lists, tuples and dictionaries.
- Practical based on class, objects, constructor, method in side class.
- Practical questions based on Inheritance, Polymorphism, Type Identification, Custom Exception Classes.
- Handling Errors using Python.
- Practical Assignment based on Usage of Numpy for numerical Data,
- Practical Assignment based on Usage of Usage of Pandas for Data Analysis.
- Practical Assignment based on Usage of Matplotlib for Python plotting.
- Practical Assignment based on Usage of Seaborn for Statically plots.
- Practical Assignment based on Usage of Interactive Dynamic visualizations.
- Practical Assignment based on Usage of SciKit for Machine learning.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	15	20	10	40	10

Note**:** IA – Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva**.**

Automation in industries

Course Code: BME 703   **L: 03, C: 03**

Course Objective: The aim of the course is to impart the students the basic and essential concepts of Automation in industries. Applications of latest technology in improvement plant output. Optimization of various aspects of Manufacturing viz., Design, Proper planning, Manufacturing cost, Layout & Material Handling system.

Course Contents:

Module 01

Introduction to Automation: Definition and fundamentals of automation, reasons for Automating, basic elements of an automated system: Power, Program and control system

Advanced automation functions: safety, maintenance & repair diagnosis, error detection and recovery

Levels of automation Automation principles and strategies: USA principle, ten strategies of automation and production system, automation migration strategy

Module 02

Mechanization and Automation: Mechanization and automation, product cycle, hard Vs flexible automation, Capital- intensive Vs low cost automation

Types of systems-mechanical, electrical, hydraulic, pneumatic and hybrid systems

Automation using CAMS, Geneva mechanisms, gears etc.

Assembly line Automation: automated assembly systems, transfer systems, vibratory bowl feeders, non-vibratory feeders, part orienting, feed track, part placing & part escapement systems

Introduction to Material storage/ handling and transport systems, and its automation using AS/RS, AGVS and conveyors etc.

Module 03:

Pneumatics and hydraulics: Hydraulic and pneumatic devices-Different types of valves, Actuators and auxiliary elements in Pneumatics & hydraulics , their applications and use of their ISO symbols Synthesis and design of circuits (up to 3 cylinders)–pneumatic, electro pneumatics and hydraulics Design of Electro-Pneumatic Circuits using single solenoid and double solenoid valves; with and without grouping

Module 04:

Sensors & Actuators Sensors: Selection of sensors (Displacement, temperature, acceleration, force /pressure) based on static and dynamic characteristics

Interfacing: Concept of interfacing, bit accuracy and sampling speed, amplifying electronics, and microcontroller

Actuators: Principle and selection of mechano-electrical actuators (1) DC motors (2) Stepper Motors (3) Solenoid Actuators (4) Servo Motors (5) BLDC

Module 05:

Industrial control systems: Process industries versus discrete manufacturing industries, Continuous verses discrete control, Computer process control, Forms of computer process control. Discrete control using PLC- discrete process control, Programmable logic controller, its architecture, ladder digs, Ladder Logic

Programming for different types of logic gates, Latching, Timers, Counter, Practical Examples of Ladder Programming

Module 06:

Robots and their applications: Introduction to robots, Types, Classifications, Selection of robots, Robot Degrees of freedom, Robot configuration, Accuracy and repeatability, Specification of a robot, Robot feedback controls:

Point to point control and Continuous path control, Control system for robot joint, Adaptive control, Drives and transmission systems, End effectors, Industrial robot applications of robots

Evaluation:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text & References:
Text:

- Iqbal Hussein, Electric and Hybrid Vehicles: Design Fundamentals, CRC Press, 2003

References:

- James Larminie, John Lowry, Electric Vehicle Technology Explained, Wiley, 2003.
- Mehrdad Ehsani, YimiGao, Sebastian E. Gay, Ali Emadi, Modern Electric, Hybrid Electric and Fuel Cell Vehicles: Fundamentals, Theory and Design, CRC Press, 2004.

Electric and Hybrid Vehicles

Course Code: BME 707   **L: 03, C: 03**

Course Objective:

The aim of the course is to impart the students the basic and essential conceptsof Electric and Hybrid Electric Vehicles.

Course Outcome:

The students will be able to

1. Choose a suitable drive scheme for developing an electric hybrid vehicle depending on resources
2. Design and develop basic schemes of electric vehicles and hybrid electric vehicles.
3. Choose proper energy storage systems for vehicle applications
4. Identify various communication protocols and technologies used in vehicle networks.

Course Contents:

Module 1

Introduction to Hybrid Electric Vehicles: History of hybrid and electric vehicles, social and environmental importance of hybrid and electric vehicles, impact of modern drive-trains on energy supplies.

Conventional Vehicles: Basics of vehicle performance, vehicle power source characterization, transmission characteristics, mathematical models to describe vehicle performance.

Module 2

Hybrid Electric Drive-trains: Basic concept of hybrid traction, introduction to various hybrid drive-train topologies, power flow control in hybrid drive-train topologies, fuel efficiency analysis.

Electric Drive-trains: Basic concept of electric traction, introduction to various electric drive-train topologies, power flow control in electric drive-train topologies, fuel efficiency analysis.

Module 3:

Electric Propulsion unit: Introduction to electric components used in hybrid and electric vehicles, Configuration and control of DC Motor drives, Configuration and control of Induction Motor drives

Module 4:

Energy Storage: Introduction to Energy Storage Requirements in Hybrid and Electric Vehicles, Battery based energy storage and its analysis, Fuel Cell based energy storage and its analysis, Hybridization of different energy storage devices.

Module 5:

Sizing the drive system: Matching the electric machine and the internal combustion engine (ICE), Sizing the propulsion motor, sizing the power electronics, selecting the energy storage technology,

Module 06:

Communications, supporting subsystems: In vehicle networks- CAN, Energy Management Strategies: Introduction to energy management strategies used in hybrid and electric vehicles, classification of different energy management strategies, comparison of different energy management strategies

Evaluation:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

Text & References:
Text:

- Iqbal Hussein, Electric and Hybrid Vehicles: Design Fundamentals, CRC Press, 2003

References:

- James Larminie, John Lowry, Electric Vehicle Technology Explained, Wiley, 2003.
- Mehrdad Ehsani, YimiGao, Sebastian E. Gay, Ali Emadi, Modern Electric, Hybrid Electric and Fuel Cell Vehicles: Fundamentals, Theory and Design, CRC Press, 2004.

COMMUNICATION SKILLS - V

Course Code: **BCS 701** **L:01 C:01**

Course Objective:
To facilitate the learner with Academic Language Proficiency and make them effective users of functionallanguage to excel in their profession.

Course Contents:

Module I

Introduction to Public
SpeakingBusiness
Conversation Effective
Public Speaking
Art of Persuasion

Module II: Speaking for Employment
Types of
InterviewStyles
of Interview

Facing Interviews-Fundamentals and Practice
Session Conducting Interviews- Fundamentals and
Practice SessionQuestion 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
MeetingsKeynote
Speeches

Examination Scheme:

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

CAF – Communication
Assessment FileGD – 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** **L :01 C :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
Importanceand Recognition of Individual differences in
Personality Accepting andManaging Individual differences
(adjustment mechanisms) Intuition, Judgment, Perception &
Sensation (MBTI)
BIG5 Factors

Module II: Managing Diversity

Defining Diversity
Affirmation Action and Managing
DiversityIncreasing 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 workIntegrity 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 trainingExit 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**   **L:02 C: 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** **L:02 C:**

02Course 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**   **L:02 C: 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**   **L:02 C: 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

PLANT MAINTENANCE & SAFETY

Course Code: **BME 801** **L: 03,C: 03**

The present course intends to give the exposure of various methods of plant maintenance and safety engineering which is an important manufacturing route to fabricate bulk storage and processing equipment's in industries for production engineering students. The subject focuses on knowledge and understanding of various layout techniques the underlying principles, Group Technology, flow design, material handling, plant maintenance and industrial safety.

After learning the course the students should be able to:
- Indicate various plant engineering and safety aspects
- Identify and determine plant facility location
- Identify and determine various types of plant layout and flow patterns.

Unit-1: Fundamentals of maintenance engineering
Definition and aim of maintenance engineering.Primary and secondary functions and responsibility of maintenance department.Types of maintenance.Types and applications of tools used for maintenance.Maintenance cost & its relation with replacement economy.Service life of equipment.

Unit-2: PLANT FACILITY LOCATION

Nature of Location Decision, Need for facility location planning, General procedures and Factors influencing location decisions, Facility Location Models, economics and cost analysis, Rural and urban location pattern in India.

Unit-3: Periodic and preventive maintenance
Periodic inspection-concept and need.Degreasing, cleaning and repairing schemes.Overhauling of mechanical components.Overhauling of electrical motor.Common troubles and remedies of Electric motor.Repair complexities and its use.Definition, need, steps and advantages of preventive maintenance.Steps/procedure for periodic and preventive maintenance of:Machine tools,Pumps,Air compressors,Diesel generating (DG) sets.Program and schedule of preventive maintenance of mechanical and electrical equipments.Advantages of Preventive maintenance.Repair cycle-concept and importance.

Unit4: Industrial safety
Accident - causes, types, results and control.Mechanical and electrical hazards-types, causes and preventive steps/procedure.Describe salient points of Factories act 1948.for health and safety-, wash rooms, drinking water layouts, light, cleanliness, fire, guarding, pressure vessels, etc.Safety colour codes.Fire prevention and fire fighting, equipment and methods.

Unit-5: Recovery, reconditioning and retrofitting
Definition of recovery, reconditioning and retrofitting.Methods of recovery and their applications.Selection criteria of recovery methods.Reconditioning - process, features and advantages.Retrofitting - concept, need and applications.

Text Book and References:

1. Maintenance Engineering Handbook Higgins & Morrow DA Information Services

2. Maintenance Engineering H.P.Garg S. Chand and Company.

3. Maintenance of Machine Tools Gilbirg & Morrow
4. Pump-hydraulic Compressors Audels. McGrew Hill Publication.
5. Foundation Engineering Handbook Winterkorn, Hans. Chapman 3& Hall London

Evaluation:

Components	Internal Assessment	Attendance	MTE	ESE
Weightage (%)	30	5	15	50

PROJECT STAGE - II

Course Code: BME 860   C: 12

Methodology
Topics of project are to be based on the latest trends, verifying engineering concepts /principle and should involve elementary research work. The projects may involve design, fabrications, testing, computer modeling, and analysis of any engineering problem. On completion of the practical training the students are to present a report covering various aspects learnt by them and give a presentation on same.

Examination Scheme:

Literature study/ Fabrication/ Experimentation	40
Written Report	20
Viva	15
Presentation	25
Total	**100**