

SCHEME AND DETAILED SYLLABUS

of

SE (Mechanical Engineering)

(w. e. f. academic year 2017-18)

FOUR YEAR DEGREE COURSE IN SCIENCE & TECHNOLOGY



**Dr. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY,
AURANGABAD**

SE Mechanical Engineering

Semester -I

Sub Code	Semester-I	Contact Hrs/Week				Examination Scheme						Duration of Theory Examination
	Subject	L	T	P	Total	CT	TH	TW	PR	Total	credits	
BSH201	Engineering Mathematics –III	4	--	--	4	20	80	--	--	100	4	3 Hrs
MED202	Thermodynamics-I	4	--	--	4	20	80	--	--	100	4	3 Hrs
MED203	Machine Drawing	4	--	--	4	20	80	--	--	100	4	4 Hrs
MED204	Strength of Materials	4	--	--	4	20	80	--	--	100	4	3 Hrs
MED205	Production Processes	4	--	--	4	20	80	--	--	100	4	3 Hrs
MED221	Lab 1: Thermodynamics-I	--	--	2	2	--	--	25	25	50	1	
MED222	Lab 2: Machine Drawing	--	--	2	2	--	--	25	25	50	1	
MED223	Lab 3: Strength of Materials	--	--	2	2	--	--	25	--	25	1	
MED224	Lab 4: Workshop Practice-III	--	--	2	2	--	--	25	50	75	1	
MED225	Lab 5: Computer Aided Drafting	--	--	4	4	--	--	25	25	50	2	
	Total	20	0	12	32	100	400	125	125	750	26	

L: Lecture hours per week

T: Tutorial hours per week

CT: Class Test

TW: Term Work

TH: University Theory Examination

P: Practical hours per week

PR: Practical/Oral Examination

SE Mechanical Engineering

Semester-II

Sub Code	Semester-II	Contact Hrs/Week				Examination Scheme						Duration of Theory Examination
	Subject	L	T	P	Total	CT	TH	TW	PR	Total	credits	
BSH251	Engineering Mathematics-IV	4	--	--	4	20	80	--	--	100	4	3 Hrs
MED252	Thermodynamics-II	4	--	--	4	20	80	--	--	100	4	3 Hrs
MED253	Theory of Machines-I	4	--	--	4	20	80	--	--	100	4	4 Hrs
MED254	Electrical Machines	4	--	--	4	20	80	--	--	100	4	3 Hrs
MED255	Machine Tools	4	--	--	4	20	80	--	--	100	4	3 Hrs
MED271	Lab 6: Thermodynamics-II	--	--	2	2	--	--	25	25	50	1	
MED272	Lab 7: Theory of Machines-I	--	--	2	2	--	--	25	25	50	1	
MED273	Lab 8: Electrical Machines	--	--	2	2	--	--	50	--	50	1	
MED274	Lab 9: Workshop Practice-IV	--	--	2	2	--	--	25	25	50	1	
MED275	Lab 10: Communication Skills- I	--	--	4	4	--	--	50	--	50	2	
	Total	20	0	12	32	100	400	175	75	750	26	

L: Lecture hours per week

T: Tutorial hours per week

CT: Class Test

TW: Term Work

TH: University Theory Examination

P: Practical hours per week

PR: Practical/Oral Examination

BSH-201: Engineering Mathematics-III

Teaching Scheme

Lectures 4 Hrs/week

Credits: 04

Examination Scheme

Theory 80 Marks

Class Test 20 Marks

Duration of Theory paper 3Hrs

Unit 1: Linear Differential Equations

(8 Hrs)

Linear Differential Equations with constant coefficients General method, shortcut methods to find particular integral, Homogenous Linear differential equations (Cauchy's & Legendre's form), method of variation of parameters.

Unit 2: Application of Linear Differential Equations

(6 Hrs)

To Electrical circuits & to Mechanical system (Analogous study of two systems), To Civil Engineering, Free oscillations/vibrations, forced oscillation /vibrations, Damped Free oscillations / vibrations, Damped Forced oscillations / vibrations.

Unit 3: Fourier Transform

(6 Hrs)

Fourier Transform, Fourier sine and cosine transform, Fourier integral, Fourier sine and cosine integral.

Unit 4: Statistics & Probability

(8 Hrs)

Measures of central Tendency and Measures of Dispersion (for grouped data only), Karl Pearson's coefficient of skewness, Probability distribution for random variables, Binomial and Normal distributions Regression and Correlation.

Unit 5: Vector Differentiation

(6 Hrs)

Differentiation of vectors, Gradient of scalar point function, Directional derivative, Divergence of vector point function, Curl of a vector point function. Irrotational and solenoidal vector field.

Unit 6: Vector Calculus (Integral calculus)

(6 Hrs)

The line integral, Surface integral, volume integral, Gauss Divergence theorem, Stoke's theorem, Green's theorem (All theorem without proof).

Reference Books:

1. B. S. Grewal, "Higher Engineering Mathematics," Khanna Publications, New Delhi.
2. H.K. Das, "Advanced Engineering Mathematics," S. Chand & Company.
3. B.V. Ramana, "Higher Engineering Mathematics," (Tata McGraw- Hill).
4. Erwin Kreyszig, "Advanced Engineering Mathematics," Wiley Eastern Ltd.
5. Ravish R Singh, Mukul Bhat, "Engineering Mathematics," A Tutorial Approach, Mc Graw Hill
6. S.C Gupta and V.K Kapoor, "Fundamentals of Mathematical Statistics, S. Chand and Sons
7. P. N. Wartikar and J. N. Wartikar, "A Text Book of Engineering Mathematics (Volume-I, II,III)," Pune Vidyarthi Griha Prakashan, Pune.

Note: 1

Section A: Unit 1, 2, 3

Section B: Unit 4, 5, 6

Note: 2

Pattern of Question Paper:

The units in the syllabus shall be divided in two equal sections. Question paper shall be set having two sections A and B. Section A questions shall be set on first three units (1,2,3) and Section B questions on remaining three units. (4,5,6) Question paper should cover the entire syllabus.

MED202-THERMODYNAMICS-I

Teaching Scheme

Theory: 4 hours/week

Credits: 04

Examination Scheme

Class Test: 20 Marks

Theory: 80 Marks

Duration of theory examination: 3 Hrs

Unit 1: FIRST LAW OR THERMODYNAMICS APPLIED TO FLOW PROCESS (7 Hrs)

Concept of Flow work, control volume and steady flow process, assumptions, Steady flow energy equation on time and mass basis, difference between steady flow and non- flow process, study and applications of SFEE to some steady flow devices viz nozzles, diffusers, throttling valve, turbine, compressors, I.C. Engine, Heat Exchangers etc. Limitations of First law of Thermodynamics, Concept of PMM-I (Descriptive and Numerical Treatment)

Unit 2: SECOND LAW OF THERMODYNAMICS (7 Hrs)

Various statements, Heat engine, Refrigerator and Heat pump. COP of Heat pump and Refrigerator, Reversed heat engine, Equivalence of Kelvin-Planck and Clausius statements, PMM-II, Carnot theorem, Thermodynamic temperature scale. (Descriptive and Numerical Treatment)

Unit 3: ENTROPY (6 Hrs)

Entropy: Introduction, Clausius theorem, T-s plot, Clausius inequality, Entropy and Irreversibility, Entropy principle and its application, Entropy and direction, Entropy and disorder.

Availability: Available energy pertaining a cycle, Quality of energy, law of degradation of energy, maximum work in a reversible process, Dead state, Availability in steady flow and non-flow processes, second law efficiency. (Descriptive Treatment)

Unit 4: POWER CYCLE (7 Hrs)

Concept of air standard cycle, assumptions, Carnot, Otto, Diesel and dual air standard cycles with representation on P-V & T-S planes, mathematical analysis for efficiency, mean effective pressure and power output, comparison. Brayton cycles, Atkinson cycle, Ericsson Cycle. (Descriptive and Numerical Treatment)

Unit 5: PROPERTIES OF STEAM OR PURE SUBSTANCE (7 Hrs)

Pure substance, phase, phase transformation of water at constant pressure, p-v, T-s and h-s diagrams, critical point, Triple point, Different stages, Entropy of steam, steam tables, representation of processes of steam on p-v, T-s, and h-s diagrams, dryness fraction and its measurement. (Descriptive and Numerical Treatment)

Unit 6: FUELS AND COMBUSTION: (6 Hrs)

Definition of a fuel, types of fuels calorific values and its determination, combustion equation for hydrocarbon fuel on mass and volume basis, determination of minimum air required for combustion and excess air supplied, conversion of volumetric analysis to mass analysis and vice versa, fuel gas analysis, analysis of product of combustion, determination of actual and excess air quantity from combustion analysis and stoichiometric and actual air to fuel ratios. Orsat apparatus and flue gas analysis. (Descriptive and Numerical Treatment)

RECOMMENDED BOOKS

1. Nag P. K., “Engineering Thermodynamics”, TMH Publishing Co. New Delhi
2. Rajput R. K., “A Text Book of Engineering Thermodynamics”, Laxmi Publication, New Delhi
3. Ballaney P. L., “Thermal Engineering”,
4. Domkundwar & Domkundwar, “Introduction to Thermal Power Engineering”, Dhanpatrai And Sons, New Delhi
5. Rao, “Engineering Thermodynamics”,
6. Radhakrishnan, “Fundamentals of Engineering Thermodynamics”, PHI

Note: 1

Section A: Unit 1, 2, 3

Section B: Unit 4, 5, 6

Note: 2

Pattern of Question Paper:

The units in the syllabus shall be divided in two equal sections. Question paper shall be set having two sections A and B. Section A questions shall be set on first three units (1,2,3) and Section B questions on remaining three units (4,5,6). Question paper should cover the entire syllabus.

MED203-MACHINE DRAWING

Teaching Scheme

Lectures: 4 Hrs/week

Practicals: 2 Hrs/week

Examination Scheme

Theory: 80 Marks

Class Test: 20 Marks

Duration of Theory Examination: 4 Hrs.

COURSE CONTENT: (First Angle projection to be adopted)

Unit 1: Development of surfaces: (06Hrs)

Methods of Development, Parallel line development for Right and oblique prisms and Cylinders, Radial line development for Right pyramids, Development of oblique pyramid by Triangulation, Development of Right cones, Oblique cones and Development of Elbows.

Unit 2: Auxiliary Views: (06 Hrs)

Study of auxiliary planes, projection of objects on auxiliary planes, completing the regular views with the help of given auxiliary views.

Unit 3: Intersection of Solids: (08 Hrs)

Intersection of solids, prism to prism, cylinder to cylinder, cylinder to cylinder, cone to cylinder, cone to prism, curves on forged parts.

Unit 4: Drawing standards: (08 Hrs)

Conventional Representation -: Conventions used to represent materials in section and machine elements in machine drawings.

Screwed fastening: Thread profiles, Locking arrangement of nuts, Foundation bolts.

Pipe Joints: Flanged, socket and spigot joints, hydraulic, Union joints, expansion joints

Riveted Joints: Single and Double Riveted Butt and Lap Joints

Welding joints: Weld joints and symbols, Conventional signs, position and dimensioning of weld symbol in drawing.

Machining Symbols: surface roughness, indication of surface roughness on production drawing, indication of machining allowances.

Unit 5: Assembly Drawing: (06 Hrs)

Drawings assembled views for the part drawings of following assemblies. Importance of BOM, Preparation of BOM

a) Engine parts – stuffing box, cross heads, Eccentrics, Petrol Engine connecting rod, piston assembly.

b) Machine parts - Screws jacks, Machine Vices, Plummer block, Tool Post, Tailstock.

Unit 6: Detailed Part Drawings: (06Hrs)

Drawing of parts details given assembled views - - connecting rod ends– Jigs and fixtures, press tools, gauges, Valves: Steam stop valve, spring loaded safety valve, feed check valve and air cock.

TEXT BOOKS:

1. Elementary Engineering Drawing N D Bhatt Charotar Publication House
2. Machine Drawing-By N.D. Bhatt.
3. Machine Drawing by Sidheswar, N., Kanniah, P. and Sastry, V.V.S., Tata McGraw Hill.
4. Machine Drawing by K.I. Narayana, P. Kannaiah, K.Venkata Reddy, New Edge publications
5. Machine Drawing by Ajeet Singh (Tata McGraw Hill)
6. Machine Drawing by Sonaversity publications.
7. Machine Drawing – P.S.Gill.
8. Machine Drawing – Luzzader

Note: 1**Section A: Unit 1, 2, 3****Section B: Unit 4, 5, 6****Note: 2****Pattern of Question Paper:**

The units in the syllabus shall be divided in two equal sections. Question paper shall be set having two sections A and B. Section A questions shall be set on first three units (1,2,3) and Section B questions on remaining three units (4,5,6). Question paper should cover the entire syllabus.

MED204-STRENGTH OF MATERIALS

Teaching Scheme

Lectures: 4 Hrs/Week

Examination Scheme

Theory Exam: 80 Marks

Class Test: 20 Marks

Duration of Theory Exam: 3 Hrs

SECTION – A

Unit 1: Simple Stresses and Strains

(9 Hrs)

Stress and strain, (tensile, compressive & shear), Hooke's Law, Modulus of elasticity, Modulus of rigidity, Stress-strain diagram for ductile and brittle material, Working stress, Factor of safety, Principle of superposition, Stresses in composite bars. Thermal stresses and strains in simple and composite members. Linear and Lateral strains, Poisson's ratio, Volumetric strain, Bulk modulus, Interrelationship between elastic constants.

Unit 2: Shear Force and Bending Moment Diagrams for Beams

(4 Hrs)

Shear force and bending moment in determinate beams due to concentrated loads, U.D.L., U.V.L. and couples, Relation between S.F. and B.M., Determination of position of point of contra flexure and maximum bending moment.

Unit 3: Bending Stresses in Beams

(7 Hrs)

Theory of simple bending, Assumptions, Flexural formula, Moment of resistance and Section modulus. Determination of bending stresses and bending stress distribution diagram for the beams with commonly used sections like rectangular, square, circular, symmetrical and unsymmetrical I, T-sections etc.

Shear Stresses in Beams: Shear stress in beams subjected to bending, Shear stress distribution formula, Maximum and average shear stress, Determination of shear stresses and shear stress distribution diagram for beams with commonly used sections like circular & symmetrical sections etc.

Unit 4: Direct and Bending Stresses in Columns

(7 Hrs)

Bending stresses in column due to eccentric loading, (eccentricity about one axis and two axis), Condition for no tension, Core or Kernel of sections.

Torsion of Circular Shafts: Theory of torsion of circular shafts, Assumptions, Torsion formula, Determination of torsional shear stress and angular twist for solid, hollow and composite circular shafts, shafts in series and parallel.

Unit 5: Principal Stresses and Strains

(9 Hrs)

Principal planes and principal stresses, Maximum shear stress, Determination of positions of principal planes, planes of maximum shear (2 D cases only), Graphical method: Mohr's circle of stresses.

Thin Cylinders and Spheres: Circumferential (Hoop) stress and longitudinal stress, Change in dimensions of thin cylinders and spheres due to internal fluid pressure.

Strain Energy: Strain energy, Proof resilience, Modulus of resilience, Strain energy in a uniform bar due to gradual load, suddenly applied load and impact load. Strain energy due to shear stress.

Unit 6: Slope and deflection of beams**(4 Hrs)**

Relation between bending moment and slope, determination of slope and deflection of statically determinate beams (simply supported, cantilever and overhanging beams) subjected to point loads, uniformly distributed loads, moments by double integration method, McCauley's method.

Text Books:

1. Ramamrutham S., Strength of materials, Dhanpat Rai & Co. (P) Ltd., Delhi
2. Basu A. R., Strength of materials, Dhanpat Rai & Co. (P) Ltd., Delhi
3. Khurmi R. S. & Gupta J. K., Strength of materials, S. Chand & Co. Ltd. New Delhi
4. Rajput R. K., Strength of materials, S. Chand & Co. Ltd., New Delhi
5. Bansal R. K. Strength of materials, Laxmi publications (P) Ltd., New Delhi

Reference Books:

1. Timoshenko & Young, Strength of materials, CSB Publishers
2. Gere & Timoshenko, Mechanics of materials, CSB Publishers
3. Singer & Pytel, Strength of materials, Harper & Row publications
4. E.P. Popov - Introduction to Mechanics of Solids, Prentice Hall Publication.
5. Beer and Johnston - Strength of materials, CBS Publication.
6. S.S. Rattan Strength of material – Tata McGraw Hill Publication Co. Ltd.

Note: 1**Section A: Unit 1, 2, 3****Section B: Unit 4, 5, 6****Note: 2****Pattern of Question Paper:**

The units in the syllabus shall be divided in two equal sections. Question paper shall be set having two sections A and B. Section A questions shall be set on first three units (1,2,3) and Section B questions on remaining three units. (4,5,6) Question paper should cover the entire syllabus.

MED205-PRODUCTION PROCESSES

Teaching Scheme

Lectures: 4 Hrs

Examination Scheme

Theory: 80 Marks

Class Test: 20 Marks

Duration of Theory paper: 3Hrs.

Unit 1: FOUNDRY: (8 Hrs)

Pattern making: patterns and core boxes, Pattern materials, Types of patterns, core boxes, pattern allowances. Moulding sand: Constituents, types of moulding sands, properties, conditioning, testing of moulding sand. Sand mould: Moulding boxes, sand mould, gating system, types of gate, Risers, Metal flow. Classification of sand moulds, steps involved in making a general sand mould., core making. Melting Furnaces: Types of Melting furnaces: pit furnace, open hearth furnace, gas fired furnace, cupola, electric furnaces – Direct Arc, Indirect Arc and coreless induction furnace. Molten metal handling. Casting methods: sand mould and permanent mould casting, slush casting, shell molding, Investment or lost wax casting, Die casting methods, equipments and pressure and vacuum casting methods. Centrifugal casting, continuous casting, Cleaning and inspection of castings. Defects in castings. Inspection methods.

Unit 2: MECHANICAL WORKING OF METALS: (6 Hrs)

Classification of cold and hot working methods. Advantages and effects of these processes. Different types of hot working processes, Rolling, types of rolling mills, spinning, forging, extrusion, piercing, manufacture of seamless pipe and tubing. Machine forging: Types of power hammers and forging machines and presses. Closed and open die forging. Inspection methods and Defects. Cold working processes: cold rolling, roll forming, pipe and tube production, spinning, embossing, wire and tube drawing, extrusion, coining, cold forging, rotary swaging.

Unit 3: SHEET METAL WORKING: (5 Hrs)

Sheet metals used in manufacturing. Operations: shearing, slitting, nibbling, blanking, punching, piercing, hand forming, bending, flanging, ribbing, hemming, lancing, curling, edge formation, Types of sheet metal joints. Press working, types of presses and machines used in sheet metal. Manual, mechanical, hydraulic power presses. Press brake, roll bending (Block diagram, working principles and applications). Introduction to Press tools and die.

Unit 4: PROCESSING OF PLASTICS: (5 Hrs)

Types of plastics, polymers, additives. Classifications of plastics forming and fabrication processes. Study of casting, Compression moulding, transfer moulding, Injection moulding, Extrusion moulding, calendaring, Rotational moulding, blow moulding, laminating plastics (high and low pressure). Plastic moulding dies.

Unit 5: JOINING PROCESSES: (10 Hrs)

Classification of joining processes. Concept of welding. Weldability. Gas welding methods, gas cutting, equipment, working principle, and its application. Arc welding: Electric arc Welding equipment, AC and DC power sources, wire feed mechanism and its control systems, filler metals, fluxes, safety equipment. Classification of arc welding, study of shielded metal arc, submerged arc,

MIG, TIG, carbon arc, electro slag, electro gas and plasma arc welding. (working principle advantages, disadvantages, specific equipment and its application) Resistance welding: - Types, spot, seam, projection etc., process applications and limitations. Special welding processes: Friction Welding, thermit Welding. Ultrasonic, Electron Beam, Laser welding, under water welding (Introductory treatment is expected for the special welding processes)
Welding defects, Testing and Inspection of welds: Various welding defects, weld testing methods.

Unit 6: SURFACE TREATMENT:

(5 Hrs)

Purpose of surface treatment. Cleaning methods: mechanical and chemical cleaning, finishing methods and surface coatings, types of coatings, powder coating. Metallic coating: electroplating, galvanizing, metal spraying, anodizing, polishing.

BOOKS RECOMMENDED:

TEXT BOOKS:

1. Workshop Technology vol -1, B S Raghuwanshi, Dhanpat Rai and Sons 2001
2. Workshop Technology Vol-I, Hajra Chaudhary, Dhanpat Rai and Sons 2001
3. Manufacturing Process II H.S. Bawa, Tata Mc Graw hill Publishing Co. Ltd. 2004
4. Production Technology, Jain R.K., Khanna Publications.
5. Introduction to basic manufacturing processes and workshop Technology, by Rajender Singh, New Age International ltd, publication. 2010

REFERENCES BOOKS:

1. Processes and Materials of Manufacture by R. A. LindBerg PH Pub 2001
2. Workshop Technology, O.P. Khanna Dhanpat Rai and Sons 2001

Note: 1

Section A: Unit 1, 2, 3

Section B: Unit 4, 5, 6

Note: 2

Pattern of Question Paper:

The units in the syllabus shall be divided in two equal sections. Question paper shall be set having two sections A and B. Section A questions shall be set on first three units (1,2,3) and Section B questions on remaining three units (4,5,6) Question paper should cover the entire syllabus.

MED221 LAB-I THERMODYNAMICS-I

Teaching Scheme

Practical: 2Hrs/Week

Credit: 01

Examination Scheme

Term work: 25Marks

Practical: 25 Marks

All the experiments from the following list should be conducted /studied during the course and record for the same should be submitted:

1. Study of determination of calorific value of solid / liquid fuels by using calorimeter.
2. Study of determination of calorific value of gaseous fuels by using calorimeter
3. Study of determination of dryness fraction of steam.
4. Study of flue gas analysis by using Orsat apparatus
5. Assignment 1: Unit 1
6. Assignment 2: Unit 2
7. Assignment 3: Unit 3
8. Assignment 4: Unit 4
9. Assignment 5: Unit 5
10. Assignment 6: Unit 6

Term work

The term work will consist of submitting a file for all the experiments with neatly written records of the study and diagrams. The term work will be assessed by the subject teacher.

Practical Examination

The Practical Examination will comprise of viva voce on the syllabus (units 1 to 6). The practical examination will be assessed by two examiners, one will be the subject teacher and other examiner appointed by Dr. B.A.M.U. Aurangabad.

MED222-LAB-II MACHINE DRAWING

Teaching Scheme

Practical: 2 Hrs/Week

Credit: 01

Examination Scheme

Term work: 25 Marks

Practical: 25 Marks

TERM-WORK: (First Angle projection to be adopted)

A. SKETCHBOOK SHOULD CONTAINED

- 1) Engineering Curves
- 2) Drawing standards

B. TOTAL 6 NUMBERS OF DRAWING SHEETS

1. One drawing sheet on Locus of simple Mechanisms and Applications (Minimum Two problems)
2. One drawing sheet on Development of surfaces (Minimum Two problems)
3. One drawing sheet on Intersection of Solids (Minimum Two problems)
4. Two drawing sheet on details to assembly drawing (Based on unit 5 of MD theory syllabus)
5. One drawing sheets on assembly to details (Based on unit 6 of MD theory syllabus)

Term work

The term work shall consist of Performing / Studying above mentioned experiments. The candidate shall submit the report of each experiment and the assignments.

Practical Examination

The Practical Examination will comprise of performing the experiments and viva voce on the Syllabus. The practical will be assessed by two examiners, one will be the subject teacher and other will be examiner appointed by Dr. B.A.M.U. Aurangabad.

MED223-LAB-III STRENGTH OF MATERIALS

Teaching Scheme

Practical: 2 Hrs/Week

Credit: 01

Examination Scheme

Term work: 25 Marks

List of the Experiments (Any Eight)

1. Tension test on metals.
2. Compression test on materials.
3. Shear test on metals.
4. Modulus of rupture test.
5. Impact test on metals.
6. Hardness test on metals.
7. Torsion test on metals.
8. Deflection of beams.
9. Buckling of columns.
10. Deflection of springs.

Term work

The term work will consist of submitting a file for all the experiments with neatly written records of the study and diagrams. The term work will be assessed by the subject teacher.

MED224-LAB-4 WORKSHOP PRACTICE-III

Teaching Scheme

Practical: 2 Hrs/Week

Credit: 01

Examination Scheme

Term work: 25 Marks

Practical: 50 Marks

TURNING SHOP:

Study of different simple operations to be carried on the lathe machine. plane turning, facing, step turning, taper turning, knurling, external threading, safety precautions.

JOB: Preparing a job on lathe machine performing the above operations.

PATTERN MAKING:

Study of patterns-material, type of patterns and cores, allowances, pattern making tools, method.

JOB: At least one pattern in Wood, involving details like allowances, core prints (if required) parting line of multi piece pattern etc. in the cope, drag.

FORGING & BLACK SMITHY:

Study of forging parameters, forging tools, different operations like sizing, bending, upsetting, taper, Elongation, hand forging, power forging, Heating devices, forging temperature, different forging tools etc.

JOB: Prepare one job involving the above hand forging operations.

FOUNDRY SHOP:

Sand moulding, types of sands, preparing sand for moulding, equipments, sand moulds (cope, drag, check etc.)

JOB: Preparing sand moulds for single, multi-piece patterns in at least two or multi-piece moulding boxes and details like runners, risers, gates etc mould cavity finishing, obtain wax casting. Demonstration of at least one casting using ferrous or non-ferrous metal for every batch.

TERM WORK:

Term work shall consist of submission of the above jobs, a File containing the write-up (principle, tools, operations and application) of the above sections and a Workshop Diary in regular format which should have the record of job drawing, tools used, operations to be performed on the job, dates etc., certified by each Section Instructor and the Workshop Superintendent.

Assessment of the term work shall be done by the Workshop Superintendent and a teachers appointed by the Head of the Institute.

PRACTICAL EXAMINATION:

The Practical Examination will comprise of two jobs. One Job in Turning Shop is compulsory and another in any one of the remaining shops. The job of foundry will be a wax casting obtained from the mould. The jobs should involve all the operations studied during the semester. Duration will be Four hours for each job. Question paper will be set by University.

The jobs will be assessed by two examiners, one will be the Internal and other will be External examiner appointed by University.

MED225-LAB-5 COMPUTER AIDED DRAFTING

Teaching Scheme

Practical: 4Hrs/Week

Credit: 02

Examination Scheme

Term Work:-25 Marks

Practical Exam-25 Marks

Performing following experiments and preparing record of the experiments.

1. Study of capabilities of software for Drafting and Modeling – An overview of modeling software's.
2. Introduction to Graphical user interface (GUI) of any commercially used solid modeling software, Coordinate systems (absolute, relative, polar, etc.) – Creation of simple figures like polygon and general multi-line figures.
3. Creating a 2-D model with geometrical and dimensional constraints on any drafting package and get its hardcopy output. (min. 5 sketches)
4. Creating of 3D Solid models of any four components and obtaining 2D multi view drawings from 3D model using any appropriate high end CAD software and get its hardcopy output.
5. Building two composite assemblies consisting of at least five components using proper mating conditions and generation of exploded view using any appropriate high end CAD software and get its hardcopy output.

Term work

The term work shall consist of Performing / Studying above mentioned experiments. The candidate shall submit the report of each experiment and the assignments.

Practical Examination

The Practical Examination will comprise of performing the experiments and viva voce on the Syllabus. The practical will be assessed by two examiners, one will be the subject teacher and other will be examiner appointed by Dr. B.A.M.U. Aurangabad.

BSH-251: Engineering Mathematics-IV

Teaching Scheme

Lectures: 4 Hrs/week

Credit: 04

Examination Scheme

Theory 80 Marks

Class Test 20 Marks

Duration of Theory paper: 3Hrs

Unit 1: Laplace transform: (6 Hrs)

Definition, transforms of elementary functions, Properties & theorems of Laplace transforms (Without proof), transforms of periodic function, Heaviside unit step function, displaced unit step function, Dirac delta function, error function, Bessel' function of zero order.

Unit 2: Inverse Laplace transform and its applications (6 Hrs)

Inverse Laplace transforms by using (i) properties, ii) partial fractions, iii) Convolution theorem, Applications to solve linear differential equations with constant coefficients (Initial value problems), Simultaneous Linear differential equations.

Unit 3: Partial Differential Equations and its Applications (8 Hrs)

Formation of partial differential equation by eliminating arbitrary constant and function, equation solvable by direct integration, linear equations of first order (Lagranges' linear equation), non-linear equation of first order: (i) form $f(p,q)=0$, (ii) $f(z,p,q)=0$, Charpits Methods, method of separation of variable, solution of one dimensional heat flow equation, two dimensional heat equation, wave equation.

Unit 4: Numerical Methods and Curve Fitting (8 Hrs)

Solution of transcendental equations by Newton Raphson method, Gauss Seidel method to solve simultaneous linear equations, Lagranges interpolation formula for unequal intervals, numerical differentiation: Newton's forward and Newton's Backward difference formulae, Solution of ordinary differential equation by Euler Modified method and Runge- Kutta IVth order method, Curve fitting: Principle of least squares, Fitting of linear curve, parabola, exponential curve

Unit-5: Function of complex variable (Differential calculus): (6 Hrs)

Introduction, Analytic function Cauchy Riemann equations in Cartesian and Polar form, Harmonic function, Laurent's series (without proof), Conformal mapping: Translation, Magnification, Rotation and inversion, bilinear transformation.

Unit 6: Function of complex variable: (Integral calculus): (6 Hrs)

Line integral, contour integral: Cauchy's integral theorem, Cauchy's integral formula, Residues, Cauchy's residue theorem (All Theorems without proof).

Reference Books:

1. P. N. Wartikar and J. N. Wartikar, A Text Book of Engineering Mathematics (Volume-I, II, III) Pune Vidyarthi Griha Prakashan, Pune.
2. B. S. Grewal, "Higher Engineering Mathematics," Khanna Publications, New Delhi
3. H.K. Das, "Advanced Engineering Mathematics," S. Chand & Company.

4. B.V. Ramana, "Higher Engineering Mathematics" (Tata McGraw-Hill).
5. Erwin Kreyszig, "Advanced Engineering Mathematics," Wiley Eastern Ltd.
6. Ravish R Singh, Mukul Bhat, "Engineering Mathematics A Tutorial Approach," by,Mc Graw Hill

Note: 1

Section A: Unit 1, 2, 3

Section B: Unit 4, 5, 6

Note: 2

Pattern of Question Paper:

The units in the syllabus shall be divided in two equal sections. Question paper shall be set having two sections A and B. Section A questions shall be set on first three units (1,2,3) and Section B questions on remaining three units. (4,5,6) Question paper should cover the entire syllabus.

MED252-THERMODYNAMICS-II

Teaching Scheme

Theory: 4 hours/week

Credit: 04

Examination Scheme

Class Test: 20 Marks

Theory: 80 Marks

Duration of theory exam: 3 Hrs

Unit 1: STEAM GENERATORS AND PERFORMANCE OF BOILERS (7 Hrs)

Classification, constructional details of process and power boilers, equivalent evaporation, boiler efficiency, energy balance, steam generation controls, introduction to IBR laws, principle and working of high pressure boilers. (Descriptive and Numerical Treatment)

Unit2: BOILER DRAUGHT (6 Hrs)

Introduction, classification, determination of height and diameter of chimney, efficiency of chimney, condition for maximum discharge, artificial, forced and induced draught, Advantages. (Descriptive and Numerical Treatment)

Unit3: STEAM NOZZLES (7 Hrs.)

Types of nozzles, equation of continuity of nozzle, isentropic flow through nozzle, use of Mollier chart, velocity of steam leaving a nozzle, effect of friction, mass of steam discharged, nozzle efficiency, critical pressure ratio and maximum discharge, supersaturated flow through the nozzle, effect of back pressure on nozzle characteristics. (Descriptive and Numerical Treatment)

Unit4: STEAM CONDENSERS (6 Hrs.)

Classifications, Jet, Surface and evaporative condensers, comparison, vacuum efficiency, vacuum measurement, mass of circulating water required in a condenser, air removal, capacity of air extraction pumps, introduction to cooling towers. (Descriptive)

Unit5: VAPOUR POWER CYCLES (7 Hrs)

Carnot cycle, ideal Rankine cycle, modified Rankine cycle, Reheat and Regenerative cycles with bleeding of steam, thermal efficiency, specific steam consumption, work ratio, power output, effect of superheat, inlet pressure and back pressure on performance of Rankine cycle. (Descriptive and Numerical Treatment)

Unit6: AIR COMPRESSORS: (7 hrs)

(a) Classifications and working principles, reciprocating compressors. Terminologies used effect of clearance volume, actual indicated diagram, and multistage compression, intercoolers. (Descriptive and Numerical Treatment)

(b) Rotary compressors, working principles Centrifugal compressor, and axial flow compressor. Comparison between reciprocating and rotary compressors. Vacuum pumps, air motor. (Descriptive Treatment)

RECOMMENDED BOOKS

1. Nag P. K. "Engineering Thermodynamics", TMH Publishing Co. New Delhi
2. Rajput R. K. "A Text Book of Engineering Thermodynamics", Laxmi Publication, New Delhi

3. Ballaney P. L. "Thermal Engineering",
4. Domkundwar & Domkundwar, "Introduction to Thermal Power Engineering", Dhanpatrai and Sons, New Delhi
5. Rao, "Engineering Thermodynamics",
6. Radhakrishnan, "Fundamentals of Engineering Thermodynamics", PHI

Note: 1

Section A: Unit 1, 2, 3

Section B: Unit 4, 5, 6

Note: 2

Pattern of Question Paper:

The units in the syllabus shall be divided in two equal sections. Question paper shall be set having two sections A and B. Section A questions shall be set on first three units (1,2,3) and Section B questions on remaining three units. (4,5,6) Question paper should cover the entire syllabus.

MED253-THEORY OF MACHINES-I

Teaching Scheme

Theory: 4 hrs/week
Credit: 04

Examination Scheme

Class Test: 20 Marks
Theory: 80 Marks
Duration of theory exam: 4 Hrs.

Unit 1: Introduction and Definitions: Introduction and Definitions: (4 Hrs)

Scope of the subject, kinematics and dynamics. Statics and kinetics. Definitions: Kinematic link or element; Kinematic pair; Classification of Kinematic Pairs and their types; Kinematic chain; degree of freedom, relation between no. of links & joints. Basic Kinematic chains: single slider crank chain, Double slider crank chain and four bar chains of class I & class II type. Mechanisms, Inversions of Basic Kinematic chains, & their applications, variants, structures, machines.

Unit 2: Velocity Analysis: (7 Hrs)

Velocity analysis of mechanisms (having maximum six links) using Relative velocity method, Instantaneous center method and relative center method (using Kennedy's theorem), Determination of linear and angular velocities and their directions.

Unit 3: Acceleration Analysis: (8 Hrs)

Acceleration analysis of mechanisms (having maximum six links) using relative acceleration method. Problems involving Coriolis component of acceleration. Determination of linear and angular acceleration for mechanisms having maximum four links. Ritterhaus construction method and Klein's construction method for simple engine mechanisms and offset engine mechanisms. Modified Klein's construction method for four bar mechanisms. Analytical method for acceleration analysis for engine mechanisms

Unit 4: Brakes and Dynamometers: (8 Hrs)

Introduction, Materials for Brake Lining, Types of Brakes, Short shoe brakes, Band brakes and Band & block brakes, braking of a Vehicle, Dynamometer, Types of Dynamometers, Classification of Absorption, Dynamometers, Prony Brake Dynamometer, Rope Brake Dynamometers, Classification of Transmission Dynamometers.

Cams

Introduction, Classification of Followers, Classification of Cams, Terms used in Radial cams, Motion of the Follower, Displacement, Velocity and Acceleration Diagrams when the Follower Moves with Uniform Velocity, Simple Harmonic Motion, Uniform Acceleration and Cycloidal Motion, Construction of Cam Profiles,

Unit 5: Balancing of Rotating Masses: (8 Hrs)

Introduction, Balancing of Rotating Masses, Balancing of a Single Rotating Mass By a Single Mass Rotating in the Same Plane, Balancing of a Single Rotating Mass By Two Masses Rotating in Different Planes, Balancing of Several Masses Rotating in the Same Plane, Balancing of Several Masses Rotating in Different Planes,

Unit 6: Balancing of Reciprocating Masses: (8 Hrs)

Introduction, Primary and Secondary Unbalanced Forces of Reciprocating Masses, Partial Balancing of Unbalanced Primary Force in a Reciprocating Engine, Partial Balancing of Locomotives, Effect of Partial Balancing of Reciprocating Parts of Two Cylinder Locomotives, Variation of Tractive Force, Swaying Couple, Hammer Blow, Balancing of Primary Forces of Multi-cylinder In-line Engines, Balancing of Secondary Forces of Multi-cylinder Inline Engines.

Suggested Text Books and References:

- | | | | |
|----|-----------------------------------|------------|--|
| 1. | Theory of Machines | T. Beven | Pearson education India-IIIrd edition |
| 2. | Theory of Machines | S.S. Ratan | Tata McGraw Hill Education |
| 3. | Theory of Machines | Shigley | McGraw hill companies |
| 4. | Theory of Machines | Balaney | Khanna publications |
| 5. | A text book of Theory of Machines | R.K.Bansal | Lxmi publications |

Note: 1

Section A: Unit 1, 2, 3

Section B: Unit 4, 5, 6

Note: 2

Pattern of Question Paper:

The units in the syllabus shall be divided in two equal sections. Question paper shall be set having two sections A and B. Section A questions shall be set on first three units (1,2,3) and Section B questions on remaining three units (4,5,6) Question paper should cover the entire syllabus.

MED254-ELECRICAL MACHINES

Teaching Scheme

Theory: 4 hrs/week

Credit: 04

Examination Scheme

Class Test: 20 Marks

Theory: 80 Marks

Duration of theory exam: 3 Hrs.

UNIT 01: DC MACHINES

(10 Hrs)

1. D.C MACHINE CONSTRUCTION

Construction, main parts, magnetic circuit, typical flux path, armature winding, simple lap & wave winding, commutator & brush assembly.

2. DC GENERATOR AND DC MOTOR ACTION

Generator and Motor action, emf equation, types, characteristics, applications, torque equation of motor, significance of back emf, working at no load and on load. Power flow diagram, losses and efficiency. (Descriptive as wells as Numericals)

UNIT 02: Starting, Control & Testing of DC Motor.

(6 Hrs)

Starting of DC motors, starters for series & shunt motor, solid state starters speed control, tests, applications.

UNIT 03 Special purpose DC Machine

(4 Hrs)

Construction & operating principles of Brush less DC motor (BLDC), Stepper motor, DC Servo motor, PMDC Motor.

UNIT 04: Induction Motor.

(10 Hrs)

Three Phase Induction Motor:

Construction, Principle of operation, torque rate equation and torque ratios, speed equation, speed torque characteristics, effect of increase in rotor resistance, phasor diagram, equivalent circuit, no load test, blocked rotor test, efficiency and losses calculations.

Single Phase Induction Motor:

Double revolving field theory, starting methods, no load and block rotor test, equivalent circuit, types of single phase motor (Descriptive as wells as Numericals)

UNIT 05: SYNCHRONOUS MACHINES

(6 Hrs)

a) SYNCHRONOUS GENERATOR

Construction, Principle of operation, EMF equation, damper winding, Numericals on EMF Equation

b) SYNCHRONOUS MOTOR

Method of starting, phasor diagram, hunting and damping

UNIT 06: Special Purpose AC Machine.**(4 Hrs)**

Construction & operating principles of AC servomotor, Repulsion motor, FHP Synchronous motor and Hysteresis motor.

RECOMMENDED BOOKS

1. Electric motor Drives- Modeling, analysis and control by R.Krishnan, Low price Edition Pearson.
2. Utilization of Electric Energy: H.Pratab
3. Electrical Technology (AC and DC drives) by B.L.Thereja vpl-II and vo-III
4. Electrical machines by I. J Ngrath and D.P.Kothari (second edition) TMH.

Note: 1

Section A: Unit 1, 2, 3

Section B: Unit 4, 5, 6

Note: 2**Pattern of Question Paper:**

The units in the syllabus shall be divided in two equal sections. Question paper shall be set having two sections A and B. Section A questions shall be set on first three units (1,2,3) and Section B questions on remaining three units (4,5,6) Question paper should cover the entire syllabus.

MED255-MACHINE TOOLS

Teaching Scheme

Theory: 4 hours/week

Credit: 04

Examination Scheme

Class Test: 20 Marks

Theory: 80 Marks

Duration of theory exam: 3 Hrs

Unit 1: INTRODUCTION, METAL CUTTING & CUTTING TOOLS. ADVANCES (5 Hrs)

Introduction to machine tools, their classification. Types of cutting tools used in machine tools (single point, multiple point etc), orthogonal and oblique cutting, types of chips, single point cutting tool nomenclature, cutting speed, feed and depth of cut and its effect on tool life., chip breakers, machinability, cutting tool materials, heat generated in machining, cutting fluids, economics of machining. Mechanization, automation and computer application in machine tools. CIM, CNC machines. (Introduction, concept and applications)

Unit 2: LATHE: (6 Hrs)

Types, construction of centre lathe, operations, tool holding and workpiece holding devices. Procedure and calculation of taper turning, thread cutting. Attachments and lathe accessories.

Unit 3: (10 Hrs)

1.MILLING MACHINE:

Types, Construction of universal milling machine, milling tools (cutters), tool and workpiece holding devices, universal dividing head (working and applications). Operations on milling, calculations and procedure of gear cutting, helical cutting. Hobbing, gear hobbing.

2. SHAPER SLOTTER AND PLANER:

Types, construction. Operations carried.

Unit 4: DRILLING, BORING & GRINDING MACHINES (9 Hrs)

Drilling, twist drill nomenclature, types of drilling machines, work holding devices, tool holding devices, Boring – Introduction, classification of boring machines, Jig boring, boring bars, boring heads, boring defects, Introduction, grinding wheels, manufacturing of artificial abrasives, bonds and bonding processes, grit, grade and structure of grinding wheels, types of wheels, method of specifying grinding wheel, selection of grinding wheels, dressing and truing of grinding wheels, types of grinding machines. Broaching- Introduction, principle parts of broach, broaching machines, application of broach, advantages of broaches, limitations of broaches and broaching tools.

Unit 5: NON TRADITIONAL MACHINING (6 Hrs)

Introduction, classification of machining processes, Study of principle of working, equipment and applications of abrasive jet machining (AJM), ultrasonic machining (USM), Chemical machining (CHM), electro-chemical machining (ECM), Electrochemical grinding (ECG), electro discharge machining (EDM), electron beam machining (EBM), laser beam machining (LBM), plasma arc machining (PAM), ion beam machining.

Unit 6: MACHINE TOOL MAINTENANCE

(4 Hrs)

1. General Lubrication practice: Lubrication sources and composition – selecting the lubricant for various conditions of machine tools.
2. Introduction to various maintenance practices such as preventive maintenance, predictive maintenance, breakdown maintenance & reconditioning. Maintenance of various machine tool elements.

REFERENCE

1. Gerling, “All about Machine Tools”
2. Krar S.F., “Technology of Machine Tools”
3. Boothroyd, “Fundamentals of Metal Machining and Machine Tools”
4. Raghuvanshi B.S., “Workshop Technology”, Vol I
5. Hazra Choudhary, “Elements of Workshop Technology”, Vol I
6. Jain R.K. “Production Technology”
7. Bawa H.S. “Workshop Technology” Vol I

Note: 1

Section A: Unit 1, 2, 3

Section B: Unit 4, 5, 6

Note: 2

Pattern of Question Paper:

The units in the syllabus shall be divided in two equal sections. Question paper shall be set having two sections A and B. Section A questions shall be set on first three units (1,2,3) and Section B questions on remaining three units (4,5,6) Question paper should cover the entire syllabus.

MED271-Lab-VI THERMODYNAMICS-II

Teaching Scheme

Practical: 2 hours/week

Credit: 01

Examination Scheme

Term work: 25 Marks

Practical: 25 Marks

The list of experiments

- [1] Study of any two boilers
- [2] Study of boiler mounting and accessories
- [3] Study of condensers
- [4] Study of cooling towers
- [5] Trial on single/multistage reciprocating air compressor
- [6] Technical visit to steam power plant.
- [7] Two Assignments based on descriptive as well as at least five numerical from 1, 2, 3, 5 and 6 units.

Term work

The term work shall consist of Performing / Studying above mentioned experiments. The candidate shall submit the report of each experiment and the assignments.

Practical Examination

The Practical Examination will comprise of performing the experiments and viva voce on the Syllabus. The practical will be assessed by two examiners, one will be the subject teacher and other will be examiner appointed by Dr. B.A.M.U. Aurangabad.

MED272-Lab-VII THEORY OF MACHINES-I

Teaching Scheme

Practical: 2 hours/week

Credit: 01

Examination Scheme

Term work: 25 Marks

Practical: 25 Marks

Term-work

1. Study of Kinematics and Definition
2. Solution of minimum two problems each on velocity determination by Relative Velocity Method and Instantaneous Centre Method
3. Solution of minimum two problems each on relative acceleration Method, involving Coriolis Acceleration and one each on short cut Methods, (Klien's construction, Ritterhaus's Construction, Modified Klien's construction)
4. Solution of minimum three (including Graphical and Analytical) problem on topic 4
5. Solution of three problems on topic 5
6. Study of Brakes
7. Study of dynamometers

Term work

The term work shall consist of Performing / Studying above mentioned experiments. The candidate shall submit the report of each experiment and the assignments.

Practical Examination

The Practical Examination will comprise of performing the experiments and viva voce on the Syllabus. The practical will be assessed by two examiners, one will be the subject teacher and other will be examiner appointed by Dr. B.A.M.U. Aurangabad.

MED273-LAB-VIII ELECTRICAL MACHINES

Teaching Scheme

Practical: 02 hrs /week

Credit : 1

Examination Scheme

Term Work: 50 Marks

EXPERIMENTS LIST (any eight)

- 1) Load characteristics of DC compound generator
- 2) Speed control of DC shunt motor above and below rated speed
- 3) Load test on DC shunt motor
- 4) Load test on three phase induction motor
- 5) Speed control of three phase induction motor
- 6) No load and blocked rotor test on three phase induction motor
- 7) Characteristics of V- and inverted V curves of synchronous motor
- 8) Determination of voltage regulation of alternator by using synchronous impedance method
- 9) Determination of voltage regulation of alternator by using direct loading
- 10) Determination of voltage regulation of alternator by using ZPF method
- 11) Study of ac machines

Term work

The term work shall consist of Performing / Studying above mentioned experiments. The candidate shall submit the report of each experiment and the assignments.

MED-274 WORKSHOP PRACTICE-IV

Teaching Scheme

Practical: 2 hours/week

Credit: 01

Examination Scheme

Term work: 25 Marks

Practical: 25 Marks

TURNING SHOP:

Study of different operations on the lathe machine, like taper turning by different methods thread cutting along with calculations, drilling, boring, internal threading, internal taper turning, facing, use of at least one attachment (like grinding attachment, taper turning attachment, milling attachment etc.).

JOB: Preparing at least one job on lathe machine to perform the above operations.

MACHINE SHOP:

Study of different operations to be carried on the milling machine, the use of indexing, gear cutting.

JOB: Preparing a job individually or in a group of students involving indexing operation, Spur gear cutting, hole to be drilled and bored to the final size on drilling machine, Key way to be cut, surface grinding.

WELDING:

Different welding machines and equipments, types of welding and welded joints used in fabrication, Study of different arc welding processes. Preparation for weld joints, joint finishing, safety precautions, different tools, types of electrodes, angle cutters, portable grinder, drills etc

Job: Preparing a job individually or in a group of students of any useful item of daily use, using welding operations.

TERM WORK

Term work shall consist of submission of the above jobs, a File containing the write-up (principle, tools, operations and application) of the three sections and a Workshop Diary in regular format which should have the record of job drawing, tools used, operations to be performed on the job, dates etc., certified by each Section Instructor and the Workshop Superintendent.

Assessment of the term work shall be done by the Workshop Superintendent and a teachers appointed by the Head of the Institute.

PRACTICAL EXAMINATION

The Practical Examination will comprise of two jobs. One Job in Turning Shop is compulsory and another in any one of the remaining shops. For gear cutting on spur gear minimum three teeth to be cut. The jobs should involve all the operations studied during the semester. Duration will be Four hours for each job. Question paper will be set by University.

The jobs will be assessed by two examiners, one will be the Internal and other will be External examiner appointed by University.

MED275-LAB-X COMMUNICATION SKILLS-I

Teaching scheme

Practical : 04 hours/week

Credit : 2

Examination scheme

Term work: 50 Marks

The teacher shall explain in detail, the gist and techniques involved in the following work units to the students. The teacher shall subsequently formulate the exercises to adjudge the skill sets acquired by the students.

Unit 1 Time Management (4 Hrs)

Value of time, Diagnosing Time Management, Weekly Planner to do list and Prioritizing work.

Unit 2: Grammar and Usage (8 Hrs)

Overview of basic Mid-level English Grammar, Parts of speech, Preparations and Conditions, Tense and Concept of time, Sentence Construction (Concord), Vocabulary: Words, Idioms, Phrases, Antonyms and Synonyms

Unit 3: Speaking Skills (8 Hrs)

Training in Sound Recognition, the speech process, message, audience, speech style, feedback, conversation and oral skills, fluency and self-expression body language phonetics and spoken English, speaking techniques, word stress, correct stress patterns, voice quality, correct tone, types of tones, Presentation skills-planning, preparation, organization, Stress and Intonation pattern in spoken communication, Sound Recording Exercise (Language Lab Exercise), Communication Errors in English

Unit 4: Listening and Reading Skills (8 Hrs)

Active and Passive Listening, the reading process, purpose, different kinds of texts, reference material, scientific and technical texts, active and passive reading, strategies-vocabulary skills, eye reading and visual perception, Skimming and scanning reading, drawing inferences and conclusions, comprehension of technical material- scientific and technical texts, instructions and technical manuals, graphic information. Note making- tool for study skills.

Unit 5: Writing Skills (6 Hrs)

Identification of different writing styles (Four Writing Style), Types of reports, information and analytical reports, oral and written reports, formal and non-formal reports, printed forms, letter and memo format, manuscript format, proposals, technical articles, journal articles and conference papers, Drafting: Memo, Circulars, Notices, agendas etc. E-mails, Business Memos / Letters, Employment Communication- resume design, resume style.

Unit 6: Developing Skills and Presentations**(6 Hrs)**

Developing key traits 1: creativity, critical thinking and problem solving. Effective Presentations- Gathering Information and Building Presentation. Presentation by Students in team.

Text Books:

1. 'Effective Technical Communication' by M Ashraf Rizvi, Tata McGraw Hill Publishing Company Ltd.
2. 'Basic Managerial Skills for all' E. H. McGrath, Eastern Economy Edition, Prentice hall India.
3. 'Developing Communication Skills' Krishna Mohan, Meera Banerji, McMillan India Ltd.
4. Skills' Krishna Mohan, Meera Banerji, McMillan India Ltd.

Term Work:

Term work marks should be given on the basis of online test conducted internally at college level.