

**SCHEME OF COURSES FOR B.TECH I YEAR
COMMON TO ALL BRANCHES**

**B.Tech I year, I Semester
(Common to all branches)**

Sl. No.	Course No.	Subject	Credits	Teaching Schedule Hrs. LTP	Total
1.	PH-101T	Engineering Physics-I (All Branches)	4	310	4
2.	CY-101T	Engineering Chemistry (EE, EC & EI)	4	310	4
3.	MA-101T	Engineering Mathematics-I (All Branches)	4	310	4
4.	HU-101T	Communicative English (EE, EC & EI)	3	210	3
5.	CS-101T	Computer Fundamentals & Programming (EE, EC & EI)	4	310	4
6.	ME-107 T	Engineering Graphics (CS, CH & ME)	2	120	3
7.	EE-101T	Basic Electrical Engineering (EE, EI & EC)	4	310	4
8.	EI-101T	Basic Electronics Engineering (ME, CS & CH)	4	310	4
9.	CY-103T	Environments Studies (CS, CH & ME)	2	300	3
10.	HU-103T	Fundamentals of Economics (ME, CS & CH)	2	300	3
11.	ME-101T	Manufacturing Techniques (EE, EC & EI)	2	200	2
12.	ME-105T	Basic Mechanical Engineering (CS, CH & ME)	4	310	4
		Total	22 (CS, CH, ME) /25 (EE, EI, EE)		25/25
Laboratory Courses					
13.	PH-101P	Engineering Physics Lab (CS, CH & ME)	2	003	3
14.	CY-101P	Engineering Chemistry Lab (EE, EI & EC)	2	003	3
15.	CS-101P	Computer Programming Lab (EE, EC & EI)	2	003	3
16.	EE-101P	Basic Electrical Engg. Lab (EE, EI & EC)	2	003	3
17.	EI-101P	Basic Electronics Engg. Lab (CS, CH & ME)	2	003	3
18.	ME-101P	Workshop Practice Lab (CS, CH & ME)	2	003	3
		Total	6/6		9/9
		G. Total	28/31		34/34

**SCHEME OF COURSES FOR B.TECH I YEAR
COMMON TO ALL BRANCHES**

**B.Tech I year, II Semester
(Common to all branches)**

SI. No.	Course No.	Subject	Credits	Teaching Schedule Hrs. LTP	Total
1.	PH-102T	Engineering Physics-II (All Branches)	4	310	4
2.	CY-101T	Engineering Chemistry (CH, CS & ME)	4	310	4
3.	MA-102T	Engineering Mathematics-II (All Branches)	4	310	4
4.	HU-101T	Communicative English (CS, CH & ME)	3	210	3
5.	CS-101T	Computer Fundamentals & Programming (CS, CH & ME)	4	310	4
6.	ME-107 T	Engineering Graphics (EE, EC & EI)	2	120	3
7.	EE-101T	Basic Electrical Engineering (CS, CH & ME)	4	310	4
8.	EI-101T	Basic Electronics Engineering (EE, EC & EI)	4	310	4
9.	CY-103T	Environments Studies (EE, EC & EI)	2	300	3
10.	HU-103T	Fundamentals of Economics (EE, EC & EI)	2	300	3
11.	ME-101T	Manufacturing Techniques (CS, CH & ME)	2	200	2
12.	ME-105T	Basic Mechanical Engineering (EE, EC & EI)	4	310	4
		Total	25 (CS, CH, ME)/ 22 (EE, EI, EE)		25/25
Laboratory Courses					
13.	PH-101P	Engineering Physics Lab (EE, EC & EI)	2	003	3
14.	CY-101P	Engineering Chemistry Lab (CS, CH & ME)	2	003	3
15.	CS-101P	Computer Programming Lab (CS, CH & ME)	2	003	3
16.	EE-101P	Basic Electrical Engg. Lab (CS, CH & ME)	2	003	3
17.	EI-101P	Basic Electronics Engg. Lab (EE, EC & EI)	2	003	3
18.	ME-101P	Workshop Practice Lab (EE, EC & EI)	2	003	3
		Total	31 (CS, CH, ME)/ 28 (EE, EI, EE)		34/34

B.Tech. FIRST YEAR (FIRST SEMESTER)

PAPER CODE:PH-101T Engineering Physics-I

Credits-4

LTP(310)

(All Branches)

UNIT-I

Interference: Coherent sources, Theory of interference, displacement of fringes, Fresnel's biprism experiment, Interference in thin film, wedge shaped film, Newton's rings.

UNIT-II

Diffraction: Basic idea of Fresnel & Fraunhofer diffraction, single, double and n slit diffraction, diffraction grating, Rayleigh's criterion of resolution, resolving power of telescope, microscope and grating.

UNIT-III

Polarization: Phenomenon of double refraction, Malus law, Nicol prism, quarter wave and half wave plates, production and analysis of plane, circularly and elliptically polarized light, optical activity, specific rotation, Lorentz half shade and biquartz polarimeters.

UNIT-IV

Wave Mechanics: Elementary idea of quantization, black body radiation, Frank-Hertz experiment, Photoelectric effect. Wave particle duality, De Broglie concept of matter waves, Heisenberg's uncertainty principle, Schrodinger's wave equation, physical significance of wave function, applications of Schrodinger's wave equation: (i) Particle in one dimensional box. (ii) Potential Step (iii) Potential barrier-quantum mechanical tunneling (Basic idea).

UNIT-V

Solid State Physics: Structure of crystalline solid: Lattice translational vectors, unit cell, Bravais lattice, Miller indices and simple crystal structures.

Free electron model: Free electron gas in one and three dimensions, Fermi energy, Density of states, Heat capacity of the electron gas, failure of free electron model.

Band theory: Kronig Penny model, motion of electrons in one dimension according to the band theory, effective mass of an electron, concept of hole, distinction between metals, insulators and intrinsic semi-conductors.

Reference Books:

- 1) Geometrical & Physical Optics: B.K.Mathur
- 2) Introduction of Solid State Physics: C. Kittel
- 3) Solid State Physics: A.J. Dekkar
- 4) Quantum Mechanics: Singh and Bagdel
- 5) Optics: Ajai Ghatak
- 6) Quantum Mechanics: B.K. Agarwal & Hari Prakash
- 7) Optics: A.H. Flower
- 8) Geometrical & Physical: Zenkin's & White
- 9) Quantum Mechanics: Eisberg

PAPER CODE:CY-101T

Credits:4

Engineering Chemistry

LTP(310)

I Sem (EE, EI & EC)

II Sem (CS, CH & ME)

UNIT-I

Schrödinger equation: origin of quantization; applications of particle in a box problem; hydrogen atom; properties of atomic orbitals; many electron atoms; molecular orbital theory; bonding and intermolecular forces.

UNIT-II

Thermodynamics: Fundamental definition and concepts of thermodynamics; Work, heat and energy; First law: C_p and C_v ; Second law: entropy; Helmholtz and Gibbs Energy; chemical potential; Third law; phase equilibria; chemical equilibrium.

UNIT-III

Chemical kinetics: Rate laws; elementary reaction and chain reaction.

UNIT-IV

Periodic table and periodic properties: basis of periodic table, trends in size, electron affinity, ionization potential and electro negativity, Use of Ellingham diagram and thermodynamics in the extraction of elements; Transition metal chemistry: inorganic complexes, isomerism, nomenclature; bonding in transition metal complexes; valence bond and crystal field theory, magnetism, bonding aspects, structural distortion; Bioinorganic chemistry: storage and transport proteins; Catalysis: hydrogenation, hydroformylation and olefin metathesis.

UNIT-V

Organic Chemistry: Hückel treatment of ethylene, butadiene and benzene, concept of aromaticity, configuration, molecular chirality and isomerism, conformation of alkanes and cycloalkanes, reactivity of carbonyl groups (additions, addition-eliminations, reactions due to acidic proton, reactivity of acid halide, ester and amide), functional group inter-conversions involving oxidation and reduction. Introduction to bio-organic chemistry: carbohydrates, amino acids proteins and nucleic acids. Polymer chemistry definition, classification of polymers, orientation of polymers, types of polymerization, Mechanism of addition and condensation polymerization, thermo plastic and thermo setting revius: Important thermosetting and thermoplastic polymers: eg. Bakelite, polyester, cellulose derivatives, PVC, Poly ethylene, Teflon, Polystyrene, Nylon Natural and synthetic rubbers.

Suggested Books

1. P.W. Atkins, **Physical Chemistry** (7th Edition), Oxford University Press, 2006.
2. I. A. Levine, **Physical Chemistry**, McGrawHill, 2009
3. D.A. McQuarrie and J.D. Simon, **Physical Chemistry -a Molecular Approach**, Viva Books Pvt. Ltd., 1998.
4. R.T. Morrison and R.N. Boyd, **Organic Chemistry**, Prentice Hall of India Pvt. Ltd., 5th Ed, 1990
5. G. Solomons and C. Fryhle, **Organic Chemistry**, John Wiley & Sons (Asia) Pte Ltd.
6. J.D. Lee, **Concise Inorganic Chemistry**, (5th Edition), ELBS, 1996.
7. D. F. Shriver and P. W. Atkins, **Inorganic Chemistry**, Oxford University Press, 2006
8. F.W. Bill mayer, **Polymer Science**, Tata McGraw Hill.

B.Tech. FIRST YEAR (FIRST SEMESTER)

PAPER CODE: MA-101T ENGINEERING MATHEMATICS-I
Credits: 4

LTP:310

(All Branches)

UNIT:I

Differential Calculus: Limit, continuity and differentiability of functions of single variable. Successive, Differentiations, Leibnitz Theorem, Expansion of functions by Maclaurin's and Taylor's theorems.

Functions of several variables: Partial derivatives, Euler's theorem, change of variables, total differential coefficients, maxima and minima, Lagrange's method of multiplier.

UNIT:II

Integral Calculus: Fundamental and mean value theorems of integral calculus. Reduction formulae, Walli's formula, Beta and Gamma functions, Double and Triple integrals, change of orders of integrations. Area enclosed by plane curves, surfaces and volumes of revolutions.

UNIT:III

Vectors and Matrices: Differentiations and integrations of vectors. Gradient, Divergence and Curl. Vector identities, Green's, Gauss's and stoke's theorems with applications.

Types and algebra of matrices, rank, solution of simultaneous linear equations, Eigen values and Eigen vectors, diagonalisation of matrices, Cayley-Hamilton Theorem.

References:

1. E.Kreyszig: Advance Engineering mathematics, John Wiley & Sons, 2005.
2. B.V.Ramana: Higher Engineering Mathematics, Tata McGraw Hill Co. Ltd., 2008
3. R.K.Jain & S.R.K. Iyenger: Advance Engineering Mathematics, Narosa Publishing House, 2002.
4. J.C. Sharma: Vector Algebra, Students & Friends Co. Ltd. Agra.
5. J.K.Goel & K.P.Gupta: Matrix algebra, Students & Friends Co. Ltd. Agra.
6. H.K.Dan: Advanced Engineering Mathematics.

PAPER CODE:HU 101T

COMMUNICATIVE ENGLISH

LTP:310

Credits:3

I Semester (EE, EC & EI)

II Semester (CS, CH & ME)

UNIT:I

(a)Pronunciation: basic sounds of English (vowels and consonants) and word-stress.

(b) Vocabulary: word-formation (prefixes and suffixes),synonyms and antonyms.

(c) Syntax: parts of speech, active and passive voice, direct and indirect speech, tenses, basic sentence patterns, etc. The literary aspect will be dealt with through suitable texts such as poems, short stories and plays (chosen by the instructors). The main topics for discussion will be:

(a) What is literature?

(b) The nature of literary language (mainly “figurative “language)

(c) The literary forms or genres

(d) Literature and socio-cultural context

UNIT:II

Pre-Requisites of Scientific Writing: Salient features: BOCUST formula. Grammatical pre-requisites: Usage, Sentence fragments, questions tag. Modifiers, connectives Split infinitives, Dangling participle Gereunds, ellipsis coherence & unity: Method.

UNIT I:

Introduction to Computers: Basic definition, Generation, Classification of computers, Introduction to Computer architecture. **Number Systems:** Introduction, Classification- Decimal, Binary, Octal, Hexa Decimal, and their convertibility, Data representation, ASCII, BCD, Gray Code. **Input/Output:** Input System, Input device- Keyboard, Mouse, Joystick, Lighten, MCR MICR, Touch Screen, Graphic Tablet, Voice Input System, Output System, Output Devices- VDU, Printers, Plotters.

UNIT II:

Planning The Computer Program: Purpose of program planning, Algorithms, Flowcharts, Decision Tablets, Pseudo code. **Memory:** Introduction, Characteristic, Main Memory, secondary memory, Back- Up Memory, Cache Memory, Primary Memory, Semiconductor Memory, Memory Management Unit.

UNIT III:

Basic Operating System Concept: MS-DOS, WINDOWS, Introduction to basic commands Of DOS, Evolution of Operating Systems, Batch Processing, Spooling, Multiprogramming, Multiprocessing, Time Sharing, On Line Processing, Real-Time Processing, Introduction to Internet, Basic Terms related with internet.

UNIT IV:

Computer Software: Introduction to Software, Relationship between Hardware and Software, Types of Software, Acquiring software, Firmware.

UNIT V:

Programming in C: History, Introduction to C Programming, Language, Structure of C Programs, Compilation and Execution of C Programs, Debugging Techniques, Data Type and sizes, Declaration of Variables, Modifiers, Identifiers and Keywords, Symbolic constants, Storage Classes(Global, Automatic, External, Register, And Static), Enumerations, Command line Parameters, Macros, The C Preprocessors.

UNIT 5:

Operators: Unary Operators, Arithmetic and Logical Operators, Bit wise Operators, Assignment Operators, Expressions, Conditional Expressions, Precedence and order of evaluation. **Control Statements:** if-else, switch, break, continue, the comma operator, Goto statement. **Loops:** for, while, do-while. **Functions:** Built-in and user-defined, Function declaration, Definition and Function call, parameter passing, call by value, Call by reference, Recursive Functions, Multifile programs. **Arrays:** Linear Arrays, Multidimensional Arrays, Passing array to functions, Arrays of strings.

UNIT 6:

Structure And Union: Definition and differences, Self-referential Structure. **Pointers:** Introduction, Accessing the address of a variable, Declaring & Initializing pointers, Accessing a variable through in pointer, Pointers and Arrays, Pointers and character strings, Pointers and functions.

References:

- 1) Computers Fundamental by Rajaraman
- 2) Computers Fundamental by B. Ram.
- 3) Computers Fundamental by P.K. Sinha.
- 4) 'Programming in C' by E. Balagurusamy, TMIL.
- 5) 'Let Us C' by Yashwant Kanetkar, Narosa.
- 6) Exploring 'C' by Yashwant Kanetkar

PAPER CODE:ME-101T MANUFACTURING TECHNIQUES

Credit:02

LTP:200

I Semester (EE, EC & EI)

II Semester (CS, CH & ME)

Unit:I

Carpentry:-Wood, timber-exogenous & endogenous, Cross section of an exogenous tree, Seasoning of wood, Seasoning methods, defects (Both natural and that occurs during conversion), Brief description of carpentry tools, various carpentry process. Carpentry joints.

Unit:II

Pattern & Pattern making:-Pattern, types of pattern (Single piece, split, Match plate, Sweep, Loose piece, Gated patterns), Pattern making allowances, Design considerations in pattern making, pattern making materials, Core prints.

Unit:III

Foundry:-Moulding materials, types of foundry sands; characteristics of foundry sands; Binders & additives; moulding procedures: Floor moulding, Bench moulding, Pit moulding, Machine moulding, Green sand moulding, Dry sand moulding, CO₂, Core making processes.

Unit:IV

Foundry' tools & equipments:- Tools used in foundry (hand tools); moulding machine- (Jolt machine, Squeezing machine, Sand Slinger, Push off machine), Furnaces (Pit furnace, cupola furnace).

Unit:V

Welding:-Welding: Pressure and non-pressure, arc welding (AC and DC arc welding, Introduction to Carbon arc welding, metal arc welding, TIG & MIG welding); Electric resistance welding (Spot, seam, projection, But, thermit welding), welding tools and equipments, Gas welding (oxyacetylene).

Unit:VI

Bench work & fitting:- Tools (holding tools, striking tools, cutting tools), various operations performed in fitting shop (in detail).

Unit:VII

Machine tools: Definition, type:Lathe specifications; Lathe operations in brief (facing, plain turning, step turning, taper turning, threading, drilling and boring). Milling machine (introduction & brief description of operations only).

Unit:VIII

Jigs & Fixture: Introduction, Location points, Basic Design of Jigs & Fixture, Types of Jigs & Fixture.

Text Book:

A text Book on workshop technology by B. S. Raghuvanshi

Reference Book:

Workshop technology by Hazara & Chaudhry,

Production technology by R.'K.Jain

PAPER CODE:ME-107T

ENGINEERING GRAPHICS

LTP:120

Credits: 02

I Semester (CS, CH & ME)

II Semester (EE, EC & EI)

UNIT:I

Importance of Engineering Drawing, Engineering Drawing Instruments and uses, Layout of Drawing sheet, Lettering and Dimensioning, Types of Lines. Scales: What is scale, Representative factor, Types of Scale: Plain, Diagonal and Vernier scales, Metric Measurements and conventions, Plain Scale, diagonal scale& vernier scale(forward & backward both).

UNIT:II

Conic Section, Definition, and different methods of construction of ellipse, hyperbola and parabola by Eccentricity method Construction of parabola and ellipse by Concentric circles method, Oblong method, Parallelogram method.

UNIT:III

Projections, Principle, types and conventions, Theory of Projections and orthographic projections:- Introduction, Types of projections, Orthographic projections, Planes of Projection, Four quadrants, Types of orthographic projections, (a) Projections of point and straight lines, (b) Projections of lines inclined to both the planes, Projection of planes, (a) Projection of solids (b) Projection of solids inclined to both H.P. & V.P. (of prisms pyramids etc).

UNIT:IV

Isometric Projections: Theory of isometric projection- Isometric lengths, Isometric scales:- Methods to draw Isometric view or projection, various positions of Isometric axes. Isometric projection with isometric lines, non-isometric lines and with curved & circular surfaces.

Recommended Text Book

- 1.A Text book of Engineering Drawing (Geometrical Drawing) by R.K. Dhawan
2. Engineering Drawing & Graphics, by K.Venugopal Rao
3. Engineering Drawing by P.S. Gil
4. Engineering Drawing by N. D. Bhatt

Credits: 4**LTP: 3 1 0****I Semester (ME, CH & CS)****II Semester (EE, EC & EI)****UNIT I:**

Introduction of Semiconductor Physics: Band Theory of solids, Insulator, Semiconductor & Metals, Mobility and Conductivity, Electrons and holes in an intrinsic semiconductor, Carrier concentration in an intrinsic semiconductor, n-type material, p-type material, Donor and Acceptor impurities, Charge densities in a semiconductor, Hall-effect, Diffusion, the continuity equation, Fermi level in a semiconductor having impurities.

UNIT II:

Junction Diode Characteristics: p-n junctions, Forward bias, Reverse bias junction, V-I characteristics, Effect of temperature on a p-n junction diode, Maximum temperature operation, Reverse breakdown voltage, Capacitive effects in a p-n junction diode, Space charge capacitance, Diffusion capacitance, Diode Resistance, Static and Dynamic Resistance, Comparison of practical with ideal diode, load line analysis of a diode circuit.

UNIT III:

Rectifying Circuits and DC Power supplies: p-n junctions as an rectifier, form factor, average voltage and current, half wave & full wave rectifier, voltage regulation, Ripple factor, Bridge rectifier, Comparison of rectifier circuits, Filter circuits for power supplies, inductor filter, capacitor filter, Effect of capacitor series resistance, Peak inverse voltage of a half wave rectifier, LC filter, Comparison of filter circuits.

UNIT 4:

Diode Applications: Clippers, Series and parallel, Clampers, Zener diodes, Zener diode specification, Voltage regulator circuits, Design of a voltage regulator circuits, Effect of supply voltage variations, Zener diode breakdown mechanism, Voltage multiplier circuits, voltage doublers, voltage Tripler, Quadripler.

UNIT 5:

Bipolar Junction Transistor: The junction transistor, Transistor current components, transistor as an amplifier, Common base configuration. Early effect, the input and output characteristics, Common emitter configuration I/O characteristics, Active, Saturation, Cut-off regions for both configurations, common collector configuration, common base current gain, common emitter current gain.

REFERENCES

1. Integrated Electronics: Analog and Digital Circuits and System by Millman, Halkias and Parikh, TMH, Second Edition.
2. Electronic Devices and Circuits, An introduction by Allen Mottershead, TMH.
3. Electronic Devices and Circuits theory by Robert L. Boylestad, Louis Nashelsky,

B.Tech. FIRST YEAR (SECOND SEMESTER)

PAPER CODE: MA-102T

ENGINEERING MATHEMATICS-II

Credits:4

LTP:310

(All Branches)

UNIT:I

Numerical Techniques: Numerical solution of algebraic and transcendental equations by Bisection method, Secant method, Regula-Falsi and Newton-Raphson methods. Numerical integration by Gauss quadrature formula, Trapezoidal rule, Simpson's rule and Weddle's rule. Numerical solution of ordinary differential equations by Euler's method, Milne's method and Runge-Kutta method.

UNIT:II

Probability and statistics: Definitions of probability and simple theorems, conditional probability, Baye's Theorem, random variables, discrete and continuous distributions, Binomial, Poisson and normal distributions, correlation and linear regression.

UNIT:III

Complex Analysis: Analytic functions, C-R equations in Cartesian and polar forms, Harmonic functions, Milne-Thomson method, complex integration, Cauchy's theorem, Cauchy's integral formula. Liouville's and Morera's Theorems, Taylor's and Laurent's theorems. Residues: Cauchy's residue theorem, evaluation of real integrals of the type $\int_0^{2\pi} f(\cos \theta, \sin \theta) d\theta$ and $\int_{-\infty}^{\infty} f(x) dx$.

References:

1. E.Balagurusamy: Numerical Methods, Tata McGraw Hill, 2008.
2. Devi Prasad: An introduction to Numerical analysis, Narosa Publishing House, 2006.
3. J.B.Conway: Functions of one complex variable, springer verlag, International Students Edition Narosa Publishing House, 1980.
4. A.M.Goon, M.K.Gupta & B.Das Gupta: Basic Statistics, The world Pren Pvt. Ltd., Calcutta, 1991.
5. L.V.Alhfors: Complex analysis, Tata McGraw Hill, 1979.

PAPER CODE:EE-101T

BASIC ELECTRICAL ENGINEERING

LTP:310

Credits: 4

I Semester (EE, EC & EI)

II Semester (CS, CH & ME)

UNIT I:

Basic Concept: Definitions & units, Introduction to Basic Laws, Circuit Elements, KVL, KCL, Ideal & Real Sources, Dependent & Independent Sources, Conversion of Voltage Source into Current Source & vice versa, Controlled and Uncontrolled Sources, Loop and Nodal Method of analysis, Star to Delta Transformation & vice-versa.

UNIT II:

Magnetic Circuit: MMF, Flux, Reluctance, Magnetic Effect of Electrical Current, Hysteresis & Eddy Current Losses.

UNIT III:

Network Theorems: Superposition, Thevenin, Norton, Maximum Power Transfer & Reciprocity Theorems.

UNIT IV:

Steady-State Response: Steady-State Response of Circuit to Sinusoidal functions, Phasor Representation of Sinusoids, Concept of Complex Impedance, Series & Parallel AC Circuits, Series & Parallel resonance

UNIT V:

Balanced Three-Phase Circuit: Generation of Three Phase Voltage, Star/Delta Connected Supply, Balanced Load Circuits, Line and Phase Voltage & current Relations. Concept of Three Phase Power.

UNIT VI:

Transient: Response of RC, RL & RLC Circuit to DC Excitation only (simple problem).

UNIT VII:

Instruments: Introduction to MI,MC Instruments, Extension of range, Dynamometer Type Wattmeter, Simple problems based on these instruments.

Books:

- 1) Basic Circuit Theory by L.P.Huelsman, PHI.
- 2) Hughes Electrical Technology by M.Smith, Addison-Wesley Pub
- 3) Electrical Technology by B.L.Theraja.
- 4) Electrical Engineering Fundamentals by V.Deltoro, PHI

B.Tech. FIRST YEAR (SECOND SEMESTER)

PAPER CODE:PH-102T

ENGINEERING PHYSICS-II

Credit:4

LTP:310

(All Branches)

UNIT:I

Dielectric Properties of Materials: Polarization of dielectrics, dielectric constant, electric susceptibility, non-uniform polarization, electric displacement vector, Lorentz local field, Polarizability, Clausius-Mosotti relation, frequency dependence of dielectric constant.

UNIT:II

Magnetic Properties of Materials : Magnetization, three magnetic vectors (B,M & H), susceptibility and permeability, Dia, Para, and ferromagnetism, Magnetic domains, hysteresis, Ferro electricity & Piezoelectricity.

UNIT:III

Maxwell's Equations: Displacement Current, Maxwell's equation in vacuum & medium (Integral and Differential forms), Poynting theorem, Poynting vector.

UNIT:IV

Electromagnetic Waves: Wave equation, plane waves, Propagation of electromagnetic waves through non-conducting medium, reflection and transmission.

UNIT:V

Superconductivity: Temperature dependence of resistivity in superconducting materials, Effect of magnetic field (Meissner effect), Type I and Type II superconductors, BCS theory (Qualitative), high temperature superconductors. Characteristics of superconductors in superconducting state, applications of superconductors.

UNIT:VI

Nuclear Physics: Basic properties and constituents of nucleus, mass defect, packing fraction and binding energy, semi empirical mass formula, elementary idea of nuclear forces and their characteristic properties, Nuclear fission, important components and working of nuclear fission reactor, Basic Concept of nuclear fusion reactors.

Books:

- 1) Electricity and Magnetism: Berkley Physics Course-II.
- 2) Electromagnetic waves & Radiating systems: Jordan and Keith.
- 3) Solid State Physics: C.Kittel
- 4) Nuclear Physics: I. Kaplan
- 5) Modern Physics: A.Beiser
- 6) Electrodynamics: d.Griffith.

PAPER CODE:CY-103T

ENVIRONMENTAL STUDIES

LTP:300

Credits:2

I Semester (CS, CH & ME)

II Semester (EE, EC & EI)

Multidisciplinary nature of environmental studies, Ecosystems, Biodiversity and its conservation, Indicators of environmental pollution, Environment and human health. Consumption of natural resources and environmental degradation of forests, water, coal, minerals, energy, and land. Sustainable development, Environmental policy and legislation, Environmental impact assessment. Pollution of lakes, rivers, ground water, coasts, and oceans, Science and technology for drinking water and wastewater treatment and issues in management of systems. Solid and hazardous waste management: causes, effects and control measures. Air and noise pollution, science and engineering of pollution control, Global Issues including climate change, global warming, acid rain, ozone layer depletion, nuclear hazards, Disaster management, industrial accidents, floods, earthquakes, cyclones and landslides, Green house effect etc.

Suggested Books

1. W.P. Cunningham and M.A. Cunningham, **Principles of Environmental Science**, Tata McGraw-Hill Publishing Company, New Delhi, 2002.
2. J.A. Nathanson, **Basic Environmental Technology**, Prentice Hall of India, New Delhi, 2002.
3. S.J. Arceivala, and S.R. Asolekar, **Wastewater Treatment for Pollution Control and Reuse** (3rd Edition), Tata McGraw Publishing Co. Ltd., New Delhi, 2006.
4. S.R. Asolekar, and R. Gopichandran, **Preventive Environmental Management: An Indian Perspective**, Foundation Books Pvt. Ltd., New Delhi, 2005. Some selected book-chapters, monographs and journal papers

PAPER CODE:HU-103T

FUNDAMENTALS OF ECONOMICS

LTP:300

Credits:2

I Semester (CS, CH & ME)

II Semester (EE, EC & EI)

UNIT:I

Microeconomics: What is Economics? basic economic problems and nature of economics; demand and supply; consumer choice; individual and market demand; production and cost of production; profit maximization and perfect competition; market structure-monopoly, monopsony, monopolistic competition, and oligopoly; externalities and public goods; factor markets-land, labour and capital market.

UNIT:II

Macroeconomics: National income accounting-income, expenditure and components of GDP; consumption and saving; investment spending and demand for money; financial systems-central bank, money, credit, financial markets and asset prices; income and spending; money, interest and income; fiscal and monetary policies; economic growth and accumulation; aggregate supply-wages, prices and unemployment; inflation.

Suggested Books:

1. R.S. Pindyck and D.L. Rubinfeld. **Microeconomics** (7th Edition), Pearson Prentice Hall, New Jersey, 2009.
2. R. Dornbusch, S. Fischer, and R. Startz. **Macroeconomics** (9th Edition), McGraw-Hill Inc. New York, 2004.

PAPER CODE:ME-105T

BASIC MECHANICAL ENGINEERING

LTP:310

Credits: 04

I Semester (CS, CH & ME)

II Semester (EE, EC & EI)

A. THERMODYNAMICS:

UNIT: I

Fundamental Concepts and definitions: Definition of thermodynamics, system, surrounding and universe, phase, concept of continuum, macroscopic & microscopic point of view. Density, specific volume, pressure, temperature. Thermodynamic equilibrium, property, state, path, process, cyclic process, Energy and its form, work and heat, Enthalpy.

UNIT: II

Zeroth Law: Concepts of temperature, zeroth law.

First Law: First law of thermodynamics. Concept of processes, flow processes and control volume, flow work, steady flow energy equation, Mechanical work in a steady flow of process.

Second Law: Essence of second law, Thermal reservoir, Heat engines. COP of heat pump and refrigerator, Statements of second law. Carnot cycle, Clausius inequality, Concept of Entropy.

UNIT: III

Properties of steam and thermodynamics cycles: Properties of steam, use of property diagram, Steam-Tables, processes involving steam in closed and open systems. Rankine cycle.

Introduction to I.C. Engines-two & four stroke S.I. and C.I. engines. Otto cycle, Diesel cycle.

B. MECHANICS

UNIT: IV

Force system and Analysis:

Basic Concept: Laws of motion. Transfer of force to parallel position. Resultant of planer force system. Free Body Diagrams, Equilibrium and its equation, Centre of gravity, Moment of Inertia.

Friction: Introduction, Laws of coulomb friction, Equilibrium of bodies involving dry friction-Belt Friction.

UNIT: V

Stress and Strain Analysis:

Simple stress and strain: Introduction, Normal shear stresses, stress-strain diagrams for ductile and brittle materials, elastic constants, one dimensional loading of members of varying cross sections, strain Energy.

UNIT: VI

Newton's Second Law: D' alemberts Principle-problems (for horizontal & inclined surface). Analysis of lift, motion problem. Motion of several connection bodies, Motion of two bodies connected by as tiring, when one body is lying on horizontal surface and other is hanging free, when one body is lying on inclined plane and other is hanging free case (i) Smooth inclined surface case (ii) Rough inclined surface of co-efficient of friction ' μ ' (only problems).

Work Power & Energy: work-Units of work-Problems (horizontal & inclined surface). Power Derivation of the expression for power required to drive a body, problems energy, Types of energy problems. Laws of conservation of energy. Newton's law of conservation of momentum. Plastic impact & Elastic impact. Driving a pile into ground-problems. Motion of connected bodies, work done by spring.

Books:

- 1) Thermodynamics by P.K. Nag.
- 2) Thermodynamic by P.L. Ballaney.
- 3) Engineering Mechanics & Strength of Materials by R.K.Bansal (Chapter 6, 7 & 9)
Lakshmi Publications, New Delhi.
- 4) Holman, J.P.: Thermodynamics, MC Graw Hill book Co. NY.
- 5) Yadav R.: Thermodynamics and Heat Engines. Vol I & II (SI Edition) Central
Publishing House Allahabad.
- 6) Yadav R.: Steam & Gas Turbines.
- 7) Engineering Mechanics by S.S. Bhavikatti & K.G. Rajashekarappa (Chapter 9 & 10)
New Age Publications, New Delhi
- 8) F.L. Singer: Strength of Materials.
- 9) Timoshenko: Strength of Materials.