

Course structure
B. Tech. First year (common to all B. Tech. Courses)
Year I, Semester I

S. No.	Course Code	NAME OF THE SUBJECT	PERIODS			Evaluation Scheme			Subject Total	Credit	
						SESSIONAL EXAM.		ESE			
			L	T	P	CT	TA	Total			
THEORY											
1	AME 101/ PEC 101	Engineering Mechanics/Basic Electronics Engg.	3	1	0	30	20	50	100	150	4
2	PAS 101/PAS 102	Engg. Chemistry / Professional Communication	3	1	2	30	20	50	100	150	4
3	AEE102/ PCS 101	Basic Electrical Engg./ Fundamentals of Computer Programming	3	1	0	30	20	50	100	150	4
4	NAS101	Engg. Mathematics-I	3	1	0	30	20	50	100	150	4
5	NAS102	Engg. Physics-I	2	1	0	15	10	25	50	75	3
6	ACE 102/ ACE 101	Environment & Ecology/ Basic Manufacturing processes	2	0	0	15	10	25	50	75	2
PRACTICAL/TRAINING/PROJECT											
7	NAS 151/NAS 152	Engg. Chemistry Lab/Engg. Physics Lab	0	0	2	10	10	20	30	50	1
8	AEE 151/ PCS 151	Electrical Engineering Lab /Computer Programming Lab	0	0	2	10	10	20	30	50	1
9	AME 153 /AME151	Engineering Mechanics Lab/ Workshop practice	1	0	3	10	10	20	30	50	2
10	AME152/ PAS 152	Computer Aided Engineering Graphics/ Professional Communication Lab	0	0	2	10	10	20	30	50	1
11	GP 101	General Proficiency						50		50	0
		Total	17	5	9						26

NAS-101
MATHEMATICS I

L T P
3 1 0

Unit –I (8hrs)

Differential Calculus-I

Successive Differentiation, Leibnitz theorem, Partial differentiation, Euler's theorem for homogeneous function, Total Derivatives, Curve tracing, Change of variables, Curve Tracing and Polar coordinates

Unit – II (8hrs)

Differential Calculus-II

Taylor's and Maclaurian's theorem, Expansion of Functions of Several Variables, Jacobian, approximation of errors, Extrema of functions of several variables, Lagrange's method of multipliers (Simple applications).

Unit – III (10hrs)

Matrices

Elementary row and column transformation, Rank of matrix, Linear dependence, Consistency of linear system of equations and their solution, Characteristic equation, Cayley-Hamilton theorem, Eigen values and eigen vectors, Diagonalisation, Complex and unitary matrices, Application of matrices to engineering problems.

Unit – IV (8hrs)

Multiple Integrals

Double and triple integral, Change of order of integration, Change of variables, Beta and Gamma functions, Application to area, volume, Dirichlet's integral and applications.

Unit – V (10hrs)

Vector Calculus

Point function, Gradient, divergence and curl of a vector and their physical interpretations, Line, surface and volume integrals, Statement and problems of Green's, Stoke's and Gauss divergence theorems (without proof), orthogonal curvilinear coordinate system- cylindrical, spherical.

Test Books:-

1. B.V.Ramana, Higher Engineering Mathematics, Tata McGraw-Hill Publishing Company Ltd., 2008.
2. R.K.Jain & S.R.K.Iyenger, Advance Engineering Mathematics, Narosa Publishing House, 2002.

Reference Books:-

1. B.S.Grewal, Engineering Mathematics, Khanna Publishers, 2004.
2. B.S.Grewal, Higher Engineering Mathematics, Khanna Publishers, 2005.
3. E.Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons, 2005.
4. C.Ray Wylie & Louis C. Barrett, Advanced Engineering Mathematics, Tata McGraw-Hill Publishing Company Ltd. 2003
5. Peter V. O'Neil, Advanced Engineering Mathematics, Thomson (Cengage) Learning, 2007.

ENGINEERING PHYSICS I

L T P
3 1 0**Unit – I (10hrs)****Optics**

Interference: Interference of light, Biprism experiment, displacement of fringes, Interference in thin films- wedge shaped film, Newton's rings,

Diffraction - Single, Double & N- Slit, Diffraction grating, Grating spectra, Rayleigh's criterion and resolving power of grating.

Polarization- Phenomena of double refraction, Nicol prism, Production and analysis of plane, circular and elliptical polarized light, Fresnel's theory of optical activity, Polarimeters .

Unit - II (12hrs)**Wave Mechanics and X-ray Diffraction**

Wave- particle duality, de-Broglie matter waves, Phase and Group velocities, Davisson-Germer experiment, Heisenberg uncertainty principle and its applications, Wave function and its significance, Schrödinger's wave equation – particle in one dimensional box.

Diffraction of X-rays by crystal planes, Bragg's spectrometer, Compton's effect.

Unit - III (12hrs)**Dielectric and Magnetic Properties of Materials:**

Dielectric constant and Polarization of dielectric materials, Types of Polarization (Polarizability), Equation of internal fields in liquid and solid (One- Dimensional), ClausiusMossoti- Equation, Ferro and Piezo electricity (Qualitative), Frequency dependence of dielectric constant, Dielectric Losses, Important applications of dielectric material, Langevin's theory for dia and paramagnetic material, Phenomena of hysteresis and its applications.

Ultrasonic: Generation, detection and application of ultrasonics

Unit – IV (10hrs)**Electromagnetics**

Displacement Current, Maxwell's Equations (Integral and Differential Forms). Equation of continuity, EM- Wave equation and its propagation characteristics in free space and in conducting media, Poynting theorem and Poynting vectors.

Reference Books:

- (i) Concepts of Modern Physics - ArthurBeiser (Mc-Graw Hill)
- (ii) Introduction to Special theory of Relativity - Robert Resnick - Wiley
- (iii) Optics - AjoyGhatak (TMH)
- (iv) Optics- Brijlal& Subramanian (S. Chand)
- (v) Optical Fibre& Laser - Anuradha De. (New Age)
- (vi) Fundamental of Physics - Resnick, Halliday & Walker (Wiely)
- (vii) Principles of Physics - R.A. Serway& J.W. Jewett (Thomson Asia Pvt. Ltd.)

PCS 101
FUNDAMENTALS OF COMPUTER PROGRAMMING

L T P
3 1 0

UNIT 1

Introduction to any Operating System [Unix, Linux, Windows], Programming Environment, Write and Execute the first program, Introduction to the Digital Computer; Concept of an algorithm; termination and correctness. Algorithms to programs: specification, top-down development and stepwise refinement. Introduction to Programming, Use of high level programming language for the systematic development of programs. Introduction to the design and implementation of correct, efficient and maintainable programs, Structured Programming, Trace an algorithm to depict the logic, Number Systems and conversion methods

Standard I/O in “C”, **Fundamental Data Types and Storage Classes:** Character types, Integer, short, long, unsigned, single and double-precision floating point, storage classes, automatic, register, static and external, **Operators and Expressions:** Using numeric and relational operators, mixed operands and type conversion, Logical operators, Bit operations, Operator precedence and associativity,

UNIT 2

Conditional Program Execution: Applying if and switch statements, nesting if and else, restrictions on switch values, use of break and default with switch, **Program Loops and Iteration:** Uses of while, do and for loops, multiple loop variables, assignment operators, using break and continue, **Modular Programming:** Passing arguments by value, scope rules and global variables, separate compilation, and linkage, building your own modules.

UNIT 3

Arrays: Array notation and representation, manipulating array elements, using multidimensional arrays, arrays of unknown or varying size, **Structures:** Purpose and usage of structures, declaring structures, assigning of structures, **Pointers to Objects:** Pointer and address arithmetic, pointer operations and declarations, using pointers as function arguments, Dynamic memory allocation, defining and using stacks and linked lists.

UNIT 4

The Standard C Preprocessor: Defining and calling macros, utilizing conditional compilation, passing values to the compiler, **The Standard C Library:** Input/Output : fopen, fread, etc, string handling functions, Math functions : log, sin, alike Other Standard C functions.

UNIT 5

Sequential search, Sorting arrays, Strings, Text files

Lecture-wise Break-UP

Week	Lecture 1	Lecture 2	Lecture 3	Lab Meeting
Week-1	Introduction to any OS, Programming Environment	A Simple C program	Need of Datastructures & Algorithms	Get familiar with OS and Environment.
Week-2	An Example, Termination, Correctness	Different Types of Programming Languages	Number Systems	Get familiar with C compiler Implement and Test Small Routine in C
Week-3	Number Systems	Standard I/O in C	Data Types and Variables	Implement and Test Small Routine in C
Week-4	Data Types and Variable	Data Types and Variable	Operators & Expression	Evaluation of Expression

Week-5	Operators & Expression	Operators & Expression	Operators & Expression	Evaluation of Expression
Week-6	IF, SWITCH Statements	IF, SWITCH Statements	Nested If Statement	Iteration
Week-7	Repetition structure in C	Repetition structure in C	Modular Programming	Iteration, Function
Week-8	Modular Programming	Modular Programming	Arrays	Recursion, Function
Week-9	Arrays	Structures	Structures	Arrays, Structures
Week-10	Pointers	Pointers	Pointers	Linked Lists
Week-11	Searching	Selection	Sorting	Searching, Selection
Week-12	Sorting	Strings	Strings	Sorting, Strings
Week-13	Files	Files	Std C Preprocessor	Files
Week-14	Std C Library	Std C Library	Std C Library	Use of Std. C Library

Text Books :

1. Problem Solving and Program Design in C, by Jeri R. Hanly, Elliot B. Koffman, Pearson Addison-Wesley, 2006.
2. Computer Science- A Structured Programming Approach Using C, by Behrouz A. Forouzan, Richard F. Gilberg, Thomson, Third Edition [India Edition], 2007.

PEC 101
BASIC ELECTRONICS ENGINEERING

L T P
3 1 0

Unit – I

Semiconductor Diodes, Transistors and Applications: (10 hrs)

Semiconductor diodes- construction, operation and application, types of diodes (Zener, Varactor, Schottky, photodiode, photodetector), diode circuit, bipolar junction transistor (BJT),- construction, operation and application, types and characteristics of BJT as amplifier, different configuration and biasing of BJT.

Unit – II

Field effect transistor: (08 hrs)

Field effect transistor- construction, operation and application, types and characteristics of FET, configurations and biasing of FET, advantages over BJT, basic ideas of MESFET, MOSFET.

Unit – III

Operational amplifier: (10 hrs)

Operational amplifier (opamp)- construction, operation and application, configuration and application of op amps, opamp IC 741- adder & difference amplifier, integrator, differentiator, half wave rectifier, level detector, Schmitt trigger

Unit – IV

Switching Theory and Logic Design (STLD): (07 hrs)

Number system, addition and subtraction, Boolean algebra, Logic gates, K-map, Register and counters.

Number system, conversion of bases (decimal, binary, octal and hexadecimal numbers)

Addition and subtraction, fractional numbers, BCD numbers

Boolean algebra, logic gates, concept of universal gates

Canonical forms, minimization using K-map (don't care conditions also)

Unit – V Electronics Instruments: (05 hrs)

Instruments- (block diagram, operation and application) Digital multimeter, power supplies, oscilloscopes and function generator, transducer- megger meter, flow meter, Q-meter.

Working principle of digital voltmeter, digital multimeter (block diagram approach)

CRO (its working with block diagram)

Measurement of voltage, current, phase and frequency using CRO

Books and references:

1. Robert L. Boylestad/ Louis Nashelsky “Electronic Devices and Circuit Theory”, 9th Edition, Pearson Education 2007
2. Devid A. Bell “Electronic Devices and Circuits”, 5th Edition, OXFORD University Press 2008
3. Jacob Millman/ Christos C. Halkias/ SatyabrataJit “Electronics Devices and Circuits”, 3rd Edition, TMH 2008
4. Morris Mano “Digital Computer Design”, PHI 2003
5. H.S. Kalsi “Electronic Instrumentation”, 2nd Edition, TMH 2007

PAS 102
PROFESSIONAL COMMUNICATION

L T P
3 1 2

Unit-1 Fundamentals of Communication

Technical Communication: features: Distinction between General and Technical communication; Language as a tool of communication; Levels of communication: Interpersonal, Intrapersonal, Mass Communications, Group; The flow of Communication: Downward, Upward, Lateral of Horizontal (Peer group): Importance of technical communication, Barriers to Communication.

Unit-II Remedial English Grammar and Use of English

Words and Phrases: Word formation. Synonyms and Antonyms; Homophones; Select vocabulary of about 500-1000 New words; **Correct Usage:** all Parts of Speech; Modals; Concord; Articles; Infinitives; Requisites of Sentence Construction

Unit-III Business Correspondence

General Principles, Features of an effective business Letter, Job application and Resumes. Reports, Project, Thesis, Dissertation with special Reference to Report Writing. Technical Proposal; Parts; Types; Writing of Proposal; Significance.

Unit-IV: Presentation Strategies and Listening Skills.

Theme Presentation, Seminar Presentation, Power point Presentation, Role Play; Linguistic Levels: Phoneme, Syllable, Stress, Intonation, Rhythm, IPA; Listening Skills: Active Listening, Passive Listening; Methods for improving Listening Skills.

Unit-V Writing Skills

Paragraph Development: Techniques and Methods- Inductive, Deductive, Spatial, Linear, Chronological etc; The Art of Condensation-various steps. Paragraph Writing, Essay Writing, Article Writing, Précis writing, Paraphrasing and Editing

Text Book

1. Worksheet on Professional Communication by Dr. R.B.Singh/Sonal Srivastava, Book Shelf (KEM), 2008 Delhi.
2. Functional Skills in Language and Literature by Dr. R.P. Singh, Oxford University Press, 2006 Delhi.

Reference Books

1. Word Power Made Easy by Norman Lewis, W.R.Goyal Pub. & Distributors, 2009 Delhi.
2. Manual of Practical Communication by L.U.B.Pandey: A.I.T.B.S. Publications India Ltd.; Krishan Nagar, 2013, Delhi.

ACE 101
BASIC MANUFACTURING PROCESSES

Unit-I
Basic Metals & Alloys : Properties and Applications

- Properties of Materials:** Strength, elasticity, stiffness, malleability, ductility, brittleness, toughness and hardness. Elementary ideas of fracture, fatigue & creep. 2
- Testing of metals:** Destructive testing and Non destructive testing, Tensile testing, Compression test, Hardness test, Impact test etc. 2
- Ferrous Materials:** Carbon steels, its classification based on % carbon as low, mild, medium & high carbon steel, its properties & applications. Wrought iron. Cast iron. Alloy steels: stainless steel, tool steel. 2
- Heat Treatment:** Elementary introduction to Heat- treatment of carbon steels: annealing, normalizing, quenching & tempering and case- hardening. 2
- Non-Ferrous metals & alloys:** Common uses of various non-ferrous metals & alloys and its composition such as Cu-alloys: Brass, Bronze, Al-alloy such as Duralumin. 2

Unit-II
Introduction to Metal Forming & Casting Process and its applications

- Metal Forming:** Basic metal forming operations & uses of such as: Forging, Rolling, Wire & Tube drawing/making and Extrusion, and its products/applications. Press-work, die & punch assembly, cutting and forming, its applications. Hot-working versus cold-working. 4
- Casting:** Pattern & allowances. Molding sands and its desirable properties. Mould making with the use of a core. Gating system. Casting defects & remedies. Cupola Furnace. Die-casting and its uses. 3

Unit-III
Introduction to machining & welding and its applications

- Machining:** Basic principles of Lathe-machine and operations performed on it. Basic description of machines and operations of Shaper-Planer, Drilling, Milling & Grinding. 4
- Welding:** Importance & basic concepts of welding, classification of welding processes. Gas-welding, types of flames. Electric-Arc welding. Resistance welding. Soldering & Brazing and its uses. 3

Unit-IV
Misc. Topics

- Manufacturing:** Importance of Materials & Manufacturing towards Technological & Socio- Economic developments. Plant location. Plant layout – its types. Types of Production. Production versus Productivity. 3
- Non-Metallic Materials:** Common types & uses of Wood, Cement-concrete, Ceramics, Rubber, Plastics and Composite-materials. 2
- Misc. Processes:** Powder-metallurgy process & its applications, Plastic-products manufacturing, Galvanizing and Electroplating. 2
- Quality:** Brief introduction about product quality. 2

Reference books:-

1. "Process and Materials of manufacture", lindberg, PHI.
2. "Manufacturing Process", J.P.Kaushish, PHI.
3. "Manufacturing Engineering and Technology", Kalpakjian and schmid, Pearson.
4. "Manufacturing Process", Kalpakjian and schmid, Pearson.
5. "Manufacturing Process", H.N.Gupta, R.C.Gupta, New age.

Module -1

Atomic and Molecular Structure

Molecular orbital's of diatomic molecules. Band theory of solids. Liquid crystal and its applications. Point defects in solids. Structure and applications of graphite and fullerenes. Concept of Nanomaterials and its application.

Module 2

Spectroscopic techniques and applications:

Elementary idea and Simple applications of Rotational, Vibrational, Ultraviolet & Visible and Raman Spectroscopy.

Module 3

Electrochemistry

Nernst equation and Application, relation of EMF with thermodynamic functions (ΔH , ΔF and ΔS). Lead storage battery.

Corrosion; causes effects and its prevention.

Phase Rule and its application to water system.

Module 4

Water Analysis; Hardness of water, Techniques of water Softening (lime-soda, Zeolite, Ion Exchange resin and Reverse Osmosis method).

Fuels; Classification of Fuels, Analysis of coal, Determination of calorific Value (Bomb calorimeter and Dulong's method).

Module 5

Polymer; Basic concept of polymer-Blend and composites, Conducting and biodegradable Polymers. Preparation and its application of some industrially important polymers (Buna-s, Buna-N, Neoprene, Nylon-6, nylon-6,6 and Terylene). General methods of synthesis of organometallic compounds (Grignard reagent) and their applications.

ENGINEERING CHEMISTRY (OLD)

L T P
3 1 0

UNIT-I

CHEMICAL BONDING AND STATES OF MATTER

M.O. theory and its applications in diatomic molecules. Hydrogen bond, metallic bond and their applications. Various states of matter including liquid crystallite state, classification and applications of liquid crystals. Types of unit cell, space lattice (only cubes, Bragg's Law. Calculation and density of the unit cell, one and two dimensional solids such as graphite and its conduction properties. Fullerenes and their applications.

UNIT-II

REACTION KINETICS, PHASE RULE AND ELECTROCHEMISTRY

Order and molecularity of reactions, Zero order, first order and second order reactions. Integrated rate equations. Theories of reaction rates. Phase rule and its applications to one component system (water). Equilibrium potential, electrochemical cells, galvanic and concentration cells, electrochemical theory of corrosion and protection of corrosion. Fuel cells.

UNIT-III

STRUCTURAL AND MECHANISTIC CONCEPTS OF ORGANICS

Inductive, electromeric mesomeric and hyperconjugative effects. Stability of reaction intermediates e.g. carbocation and free radicals. Mechanism of nucleophilic substitutions. Mechanism of the following reactions:

- (i) Aldol condensation (ii) Cannizzaro reaction (iii) Beckman rearrangement
(iv) Hoffmann rearrangement and (v) Diels-Alder reaction.

E-Z nomenclature, R.S. configuration, optical isomerism, chirality and its implications, conformations of butene.

UNIT-IV

POLYMERS AND ORGANOMETALLICS

Polymerization and its classification. Thermoplastic and Thermosetting resins. Elastomers and synthetic fibres. Ion exchange resins. Organic conducting and biodegradable polymers. Classification and general methods of synthesis of organics and their applications in polymerizations and catalysis.

UNIT-V

ANALYTICAL METHODS AND FUELS

Titrimetric analysis with reference to acid-base, redox, precipitations and complexometric titrations. Elementary ideas and simple applications of u.v., visible, infra-red and HNMR spectral techniques. Water treatment methods for boiler feed water by calgon process, zeolites and ion-exchange resins. Classification of fuels. Analysis of coal, determination of colorific values. Biomass and biogas.

Text Books

1. Advanced Inorganic Chemistry, by Cotton, F.A., Wilkinson G., Murrillo, C.A. and Bochmann, Wiley, chichester, 1999.
2. March's Advanced Organic Chemistry : Reactions, Mechanisms and Structure Smith, Michael B./March, Jerry, John Willey & sons, 6th Edition, 2007.
3. Elements of Physical Chemistry, Glasstone, Samuel B. ELBS, 2005.
4. Organic Chemistry, Finar, I.L. : Addison – Wesley Longman, Limited, 2004.

Reference Books

1. Text Book of Polymer Science by F.W. Billmeyer, John Wiley & sons, 1994.
2. Liquid Crystals and Plastic Crystals, vol.-I, edited by G.W. Gray and P.A. Winsor, Ellis Harwood Series in Physical Chemistry, New York.
3. Corrosion Engineering by M.G. Fontana McGraw Hill Publications.

AME 101 ENGINEERING MECHANICS

L T P
3 1 0

UNIT I (8 hrs)

Two Dimensional Force Systems: Basic concepts, Laws of motion, Principle of Transmissibility of forces, Transfer of a force to parallel position, Resultant of a force system, Simplest Resultant of Two dimensional concurrent and Non-concurrent Force systems, Distributed force system, Free body diagrams, Equilibrium and Equations of Equilibrium, Applications.

Friction: Introduction, Laws of Coulomb Friction, Equilibrium of Bodies involving Dry-friction, Belt friction, Application.

UNIT II (8 hrs)

Beam: Introduction, Shear force and Bending Moment, Differential Equations for Equilibrium, Shear force and Bending Moment Diagrams for Statically Determinate Beams.

Trusses: Introduction, Simple Truss and Solution of Simple truss, Method of Joints and Method of Sections.

UNIT III (6 hrs)

Centroid and Moment of Inertia: Centroid of plane, curve, area, volume and composite bodies, Moment of inertia of plane area, Parallel Axes Theorem, Perpendicular axes theorems, Principal Moment Inertia, Mass Moment of Inertia of Circular Ring, Disc, Cylinder, Sphere and Cone about their Axis of Symmetry.

UNIT IV (8 hrs)

Kinematics of Rigid Body: Introduction, Plane Motion of Rigid Body, Velocity and Acceleration under Translation and Rotational Motion, Relative Velocity.

Kinetics of Rigid Body: Introduction, Force, Mass and Acceleration, Work and Energy, Impulse and Momentum, D'Alembert's Principles and Dynamic Equilibrium.

UNIT V (9 hrs)

Simple Stress and Strain: Introduction, Normal and Shear stresses, Stress- Strain Diagrams for ductile and brittle material, Elastic Constants, One Dimensional Loading of members of varying cross-sections, Strain energy.

Pure Bending of Beams: Introduction, Simple Bending Theory, Stress in beams of different cross sections.

Torsion: Introduction, Torsion of shafts of circular section, torque and twist, shear stress due to torque.

Text books:

1. Engineering Mechanics by Irving H. Shames, Prentice-Hall
2. Mechanics of Solids by Abdul Mubeen, Pearson Education Asia.
3. Mechanics of Materials by E.P.Popov, Prentice Hall of India Private Limited.

AEE 102
BASIC ELECTRICAL ENGINEERING

L T P
3 1 0

Unit-I (9 hrs)

1. D C Circuit Analysis and Network Theorems:

Circuit Concepts: Concepts of network, Active and passive elements, voltage and current sources, concept of linearity and linear network, unilateral and bilateral elements, R, L and C as linear elements, source transformation.

Kirchhoff's laws; loop and nodal methods of analysis; star-delta transformation; Network Theorems: Superposition Theorem, Thevenin's Theorem, Norton's Theorem, Maximum Power Transfer Theorem (simple numerical problems).

Unit-II(8 hrs)

2. Steady- State Analysis of Single Phase AC Circuits:

AC Fundamentals: Sinusoidal, square and triangular waveforms – average and effective values, form and peak factors, concept of phasors, phasor representation of sinusoidally varying voltage and current. Analysis of series, parallel and series-parallel RLC Circuits: apparent, active & reactive powers, power factor, causes and problems of low powerfactor, powerfactor improvement; resonance in series and parallel circuits, bandwidth and quality factor (simple numerical problems).

Unit-III (7 hrs)

3. Three Phase AC Circuits:

Three phase system-its necessity and advantages, meaning of phase sequence, star and delta connections, balanced supply and balanced load, line and phase voltage/current relations, three-phase power and its measurement (simple numerical problems).

4. Measuring Instruments:

Types of instruments, construction and working principles of PMMC and moving iron type voltmeters & ammeters, single phase dynamometer wattmeter and induction type energy meter, use of shunts and multipliers (simple numerical problems on energy meter, shunts and multipliers).

Unit-IV (8 hrs)

5. Introduction to Power System:

General layout of electrical power system and functions of its elements, standard transmission and distribution voltages, concept of grid (elementary treatment only).

6. Magnetic Circuit:

Magnetic circuit concepts, analogy between electric & magnetic circuits, magnetic circuits with DC and AC excitations, magnetic leakage, B-H curve, hysteresis and eddy current losses, magnetic circuit calculations, mutual coupling.

7. Single Phase Transformer:

Principle of operation, construction, e .m. f. equation, equivalent circuit, power losses, efficiency (simple numerical problems), introduction to auto transformer.

Unit-V (8 hrs)

8. Electrical Machines:

Principles of electro mechanical energy conversion,

DC machines: types, e. m. f. equation of generator and torque equation of motor, characteristics and applications of dc motors (simple numerical problems).

Three Phase Induction Motor: types, Principle of operation, slip-torque characteristics, applications (numerical problems related to slip only).

Single Phase Induction motor: Principle of operation and introduction to methods of starting, applications.

Three Phase Synchronous Machines: Principle of operation of alternator and synchronous motor and their applications.

Text Books:

1. V. Del Toro, “ Principles of Electrical Engineering” Prentice Hall International
2. I.J. Nagarath, “ Basic Electrical Engineering” Tata McGraw Hill
3. D.E. Fitzgerald & A. Grabel Higginbotham, “ Basic Electrical Engineering Mc-Graw Hill

Reference Books:

1. Edward Hughes, “ Electrical Technology” Longman
2. T.K. Nagsarkar & M.S. Sukhija, “ Basic Electrical Engineering” Oxford University Press.
3. H. Cotton, “ Advanced Electrical Technology” Wheeler Publishing
4. W.H. Hayt & J.E. Kennely, “ Engineering Circuit Analysis” Mc Graw Hill.

ACE 102
ENVIRONMENT & ECOLOGY

L T P
20 0

UNIT-I (6 hrs)

Definition, Scope & Importance, Need For Public Awareness- Environment definition, Eco system – Balanced ecosystem, Human activities – Food, Shelter, Economic and social Security. Effects of human activities on environment-Agriculture, Housing, Industry, Mining and Transportation activities, Basics of Environmental Impact Assessment. Sustainable Development.

Ecology:- Ecological succession, energy Flow, Productivity

UNIT-II (8 hrs)

Natural Resources- Water Resources- Availability and Quality aspects. Biodiversity, Water borne diseases, Water induced diseases, Fluoride problem in drinking water. Mineral Resources, Forest Wealth, Material cycles- Carbon, Nitrogen and Sulphur Cycles.

Energy – Different types of energy, Electro-magnetic radiation. Conventional and Non-Conventional sources – Hydro Electric, Fossil Fuel based, Nuclear, Solar, Biomass and Bio-gas. Hydrogen as an alternative future source of Energy. Ocean Thermal Energy(OTEC)

UNIT-III (9 hrs)

Environmental Pollution and their effects. Water pollution, Land pollution. Noise pollution, Public Health aspects, Air Pollution, Solid waste management.

Current Environmental Issues of Importance : Population Growth, Climate Change and Global warming- Effects, Urbanization, Automobile pollution. Natural Disaster & its management

Acid Rain, Ozone Layer depletion, Animal Husbandry. Rain water harvesting

UNIT-IV (3 hrs)

Environmental Protection- Role of Government, Legal aspects, Initiatives by Non-governmental Organizations (NGO), Environmental Education, Women Education.

Role of IT in Environment & Human health

Text Books

1. Environmental Studies – Benny Joseph – Tata McgrawHill-2005
2. Environmental Studies – Dr. D.L. Manjunath, Pearson Education-2006.
3. Environmental studies – R. Rajagopalan – Oxford Publication - 2005.
4. Text book of Environmental Science & Technology – M. Anji Reddy – BS Publication..

Reference Books

1. Principles of Environmental Science and Engineering – P. Venugoplan Rao, Prentice Hall of India.
2. Environmental Science and Engineering – Meenakshi, Prentice Hall India.

