



**OPJS UNIVERSITY, CHURU, RAJASTHAN
BACHELOR OF TECHNOLOGY FIRST YEAR SYLLABUS
(COMMON TO ALL BRANCHES)**

B. Tech I Semester Syllabus Scheme

Name of subjects	Subject Code
COMMUNICATIVE ENGLISH	BT 101
ENGINEERING MATHEMATICS-I	BT 102
ENGINEERING PHYSICS-I	BT 103
ENGINEERING CHEMISTRY	BT 104
BASIC ELECTRICAL & ELECTRONICS ENGINEERING	BT 105
ENGINEERING PHYSICS LAB-I	BT 106
ENGINEERING CHEMISTRY LABCODE	BT 107
ELECTRICAL AND ELECTRONICS LAB	BT 108
PRACTICAL GEOMETRY	BT 109
WORKSHOP PRACTICE	BT 110

B. Tech II Semester Syllabus Scheme

Name of Subject	Subject Code
COMMUNICATION TECHNIQUES	BT 201
ENGINEERING MATHEMATICS-II	BT 202
ENGINEERING PHYSICS-II	BT 203
CHEMISTRY & ENVIRONMENTAL ENGINEERING	BT 204
ENGINEERING MECHANICS	BT 205
FUNDAMENTAL OF COMPUTER PROGRAMMING	BT 206
ENGINEERING PHYSICS LAB-II	BT 207
CHEMISTRY & ENVIRONMENTAL ENGINEERING LAB	BT 208
COMPUTER PROGRAMMING LAB	BT 209
MACHINE DRAWING	BT 210
COMMUNICATION TECHNIQUES LAB	BT 211

B.Tech Ist Semester Syllabus



COMMUNICATIVE ENGLISH CODE BT 101

Unit I

Grammar: Tenses, Passive Voice, Indirect Speech, Conditional Sentences, Modal Verbs

Unit II

Composition: Dialogue Writing, Paragraph and Precis Writing, Report, its importance and Report Writing

Unit III

Short Stories: The Luncheon: W.S. Maugham, How Much Land Does a Man Need?: Leo Tolstoy, The Last Leaf: O. Henry

Unit IV

Essays: On the Rule of the Road: A. G. Gardiner, The Gandhian Outlook: S. Radhakrishnan, Our Own Civilisation: C.E.M. Joad

Unit V

Poems: The Unknown Citizen: W. H. Auden, The Character of A Happy Life: Sir Henry Wotton, No Men are Foreign: James Kirkup, If : Rudyard Kipling

Reference Books:

- | | |
|---|--|
| 1. Communication skills for Engineers and Scientists, | Sangeeta Sharma & Binod Mishra, |
| 2. English for Engineers: Made Easy, | Aeda Abidi & Ritu Chaudhary |
| 3. A Practical Course for Developing Writing Skills in English, | J.K. Gangal, |
| 4. Intermediate Grammar, Usage and Composition, | Tickoo, A. E. Subramaniam & P. R. Subramaniam, |
| 5. The Written Word , | Vandana R. Singh, |
| 6. The Great Short Stories edited by | D.C. Datta |
| 7. Professional Communication, | Kavita Tyagi & Padma Misra, |
| 8. "Learn Correct English: Grammar, Usage and Composition" | Shiv K. Kumar & Hemalatha Nagarajan |
| 9. "Current English Grammar and Usage with Composition" | R.P. Sinha, |
| 10. "Grammar of the Modern English Language", | Sukhdev Singh & Balbir Singh, |

ENGINEERING MATHEMATICS-I CODE BT 102



Unit I

Differential Calculus: Asymptotes (Cartesian Coordinates Only), Curvature (Cartesian Coordinates Only), Concavity, Convexity and Point of Inflexion (Cartesian Coordinates Only), Curve Tracing (Cartesian and Standard Polar Curves-Cardioids, Lemniscates of Bernoulli, Limacon, Equiangular Spiral).

Unit II

Differential Calculus: Partial Differentiation, Euler's Theorem on Homogeneous Functions, Approximate Calculations, Maxima & Minima of Two and More Independent Variables, Lagrange's Method of Multipliers.

Unit III

Integral Calculus: Surface and Volumes of Solids of Revolution, Double Integral, Double Integral by changing into polar form, Areas & Volumes by Double Integration, Change of Order of Integration, Beta Function and Gamma Function (Simple Properties).

Unit IV

Differential Equations: Differential Equations of First Order and First Degree - Linear Form, Reducible to Linear form, Exact Form, Reducible to Exact Form, Linear Differential Equations of Higher Order with Constant Coefficients Only.

Unit V

Differential Equations: Second Order Ordinary Differential Equations with Variable Coefficients, Homogeneous and Exact Forms, Change of Dependent Variable, Change of Independent Variable, Method of Variation of Parameters.

Reference Books:

1. Advanced Engineering Mathematics,
2. Calculus and Analytical Geometry,
3. A Text Book of Differential Equations,
4. Higher Engineering Mathematics,
5. Thomas Calculus,

Erwin Kreyszig,
Thomas and Finney,
M.Ray and Chaturvedi,
B.V.Ramana,
Maurice D. Weir, Joel Hass

ENGINEERING PHYSICS-I
BT CODE BT 103



Unit I

Interference of light Michelson's Interferometer: Production of circular & straight line fringes, Determination of wavelength of light, Determination of wavelength separation of two nearby wavelengths. Newton's rings and measurement of wavelength of light.

Optical technology: Elementary idea of anti-reflection coating and interference filters.

Unit II

Polarization of light Plane circular and elliptically polarized light on the basis of electric (light) vector, Malus law, Double Refraction: Qualitative description of double refraction phase retardation plates, quarter and half wave plates, construction, working and use of these in production and detection of circularly and elliptically polarized light.

Optical Activity: Optical activity and laws of optical rotation, Specific rotation and its measurement using half-shade and bi-quartz devices.

Unit III

Diffraction of light Single slit diffraction: Quantitative description of single slit, position of maxima / minima and width of central maximum, intensity variation.

Diffraction Grating: Construction and theory, Formation of spectrum by plane transmission grating, Determination of wavelength of light using plane transmission grating.

Resolving power: Geometrical & Spectral, Raleigh criterion, Resolving power of diffraction grating and telescope.

Unit IV

Elements of Material Science Bonding in Solids: Covalent bonding and Metallic bonding, Classification of Solids as Insulators, Semiconductors and Conductors.

Semiconductors: Conductivity in Semiconductors, Determination of Energy gap of Semiconductor, X-Ray diffraction and Bragg's Law, Hall Effect: Theory, Hall Coefficient and applications.

Unit V

Relativity: Special Theory of Relativity Postulates of special theory of relativity, Lorentz transformations, relativity of length, mass and time, Relativistic velocity addition and mass-energy relation, Relativistic Energy and momentum.

Reference Books:

1. Fundamental of Optics,
2. Optics,
3. Concept of Modern Physics,
4. Modern Physics,

Jenkins and White
Ajoy Ghatak,
A. Baiser,
J. Morrison,



ENGINEERING CHEMISTRY CODE BT 104

Unit I

General Aspects of Fuel: Organic fuels, Origin, classification and general aspects of fossil fuels, Solid fuels, Coal, carbonization of coal, manufacturing of coke by Beehive oven and by product oven method, Liquid fuels, Composition of petroleum, advantages and refining of petroleum, Cracking, reforming, polymerization and isomerization of refinery products. Synthetic petrol, Bergius and Fischer Tropsch process, Knocking, octane number and anti-knocking agents, Gaseous fuels, Advantages, manufacturing, composition and calorific value of coal, gas and oil

Unit II

Fuels Analyses: Ultimate and proximate analysis of coal, Determination of calorific value of solid and gaseous fuels by bomb and Junker's Calorimeter respectively, Calculations of calorific value based on Dulong's formula, Combustion, requirement of oxygen/ air in combustion process, Flue gas analysis by Orsat's apparatus and its significance.

Unit III

Polymers: Different methods of classification, basic ideas of polymerization mechanisms.

Elastomers: Natural rubber, vulcanization, Synthetic Rubbers viz. Buna-S, Buna-N, Butyl and neoprene rubbers, New Engineering Materials: Fullerenes: Introduction, properties, preparation and uses, Organic Electronic Materials (including conducting polymers- poly (p-phenylene), polythiophenes, Polyphenylene, vinylenes, polypyroles, polyaniline).

Unit IV

Cement: Definition, Composition, basic constituents and their significance, Manufacturing of Portland cement by Rotary Kiln Technology, Chemistry of setting and hardening of cement and role of gypsum.

Glass: Definition, Properties, Manufacturing of glass and importance of annealing in glass making, Types of silicate glasses and their commercial uses, Optical fiber grade glass.

Unit V

Refractory: Definition, classification, properties, Requisites of good refractory and manufacturing of refractory, Preparation of Silica and fire clay refractory with their uses, Seger's (Pyrometric) Cone Test and RUL Test



Lubricants: Introduction, classification and uses of lubricants, Types of lubrication, Viscosity & viscosity index, flash and fire point, cloud and pour point, steam emulsification number, precipitation number and neutralization number.

Reference Books:

- | | |
|--|-------------------------------------|
| 1. The Chemistry and Technology of Coal, | J G Speigh, CRC Press |
| 2. The Chemistry and Technology of Petroleum, by | J G Speigh, CRC Press |
| 3. Polymer Chemistry: An Introduction, | Malcolm P. Stevens |
| 4. Solid State Chemistry and Its Applications, | Anthony R West, John |
| 5. Lubricants and Lubrications, | Theo Mang, Wilfeied, |
| 6. Hand Book of Conjugated Polymers, | Tejre A Skotheim and J. R. Reynolds |

**BASIC ELECTRICAL & ELECTRONICS ENGINEERING
CODE BT 105**

Unit I

Basic Concepts of Electrical Engineering: Electric Current, Electromotive force, Electric Power, Ohm's Law, Basic Circuit Components, Faraday's Law of Electromagnetic Induction, Lenz's Law, Kirchoff's laws, Network Sources, Resistive Networks, Series-Parallel Circuits, Node Voltage Method, Mesh Current Method, Superposition, Thevenin's, Norton's and Maximum Power Transfer Theorems.

Unit II

Alternating Quantities: Introduction, Generation of AC Voltages, Root Mean Square and Average Value of Alternating Currents and Voltages, Form Factor and Peak Factor, Phasor Representation of Alternating Quantities, Single Phase RLC Circuits, Introduction to 3-Phase AC System

Unit III

Rotating Electrical Machines DC Machines: Principle of Operation of DC Machine as Motor and Generator, EMF Equation, Applications of DC Machines

AC Machines: Principle of Operation of 3-Phase Induction Motor, 3-Phase Synchronous Motor and 3-Phase Synchronous Generator (Alternator), Applications of AC Machines

Unit IV

Basic Electronics: Conduction in Semiconductors, Conduction Properties of Semiconductor Diodes, Behaviour of the PN Junction, PN Junction Diode, Zener Diode, Photovoltaic Cell,



Rectifiers, L, C, & L-C filters, Bipolar Junction Transistor, Field Effect Transistor, Transistor as an Amplifier.

Digital Electronics: Boolean algebra, Binary System, Logic Gates and Their Truth Tables.

Unit V

Communication Systems: Introduction, IEEE Spectrum for Communication Systems, Types of Communication, Amplitude and frequency Modulation.

Instrumentation : Introduction to Transducers, Thermocouple, RTD, Strain Gauges, Load Cell and Bimetallic Strip, Introduction and classification of ICs.

Reference Books:

- | | |
|---|-------------------------------|
| 1. Electrical and Electronic Technology | Edward Hughes et al, |
| 2. Basic Electrical & Electronics Engineering | V. Jagathesan, K. Vinod Kumar |
| 3. Basic Electrical & Electronics Engineering | Van Valkenburge, |
| 4. Basic Electrical and Electronics Engineering | Muthusubramian, |
| 5. Fundamentals of Electrical Engineering | Leonard S. Bobrow, |
| 6. Fundamentals of Electrical and Electronics Engineering | Ghosh, Smarajit, |
| 7. Basic Electrical & Electronics Engineering | Ravish Singh, TMH |
| 8. Basic Electronics Engineering | Vijay Baru et al, |

ENGINEERING PHYSICS LAB-I CODE BT 106

1. To determine the wave length of monochromatic light with the help of Fresnel's biprism.
2. To determine the wave length of sodium light by Newton's Ring.
3. To determine the specific rotation of Glucose (Sugar) solution using a polarimeter.
4. To determine the wave length of prominent lines of mercury by plane diffraction grating with the help of spectrometer.
5. To convert a Galvanometer in to an ammeter of range 1.5 amp. and calibrate it.
6. To convert a Galvanometer in to a voltmeter of range 1.5 volt and calibrate it.
7. To study the variation of a semiconductor resistance with temperature and hence determine the Band Gap of the semiconductor in the form of reverse biased P-N junction diode.
8. To study the variation of thermo e.m.f. of iron copper thermo couple with temperature.
9. To determine coherent length and coherent time of laser using He-Ne Laser.

ENGINEERING CHEMISTRY LAB CODE BT 107

1. Proximate analysis of solid fuel.
2. Experiments based on Bomb Calorimeter.
3. To determine the strength of Ferrous Ammonium sulphate solution with the help of $K_2Cr_2O_7$ solution.



4. To determine the strength of CuSO_4 solution with the help of hypo solution.
5. To determine the strength of NaOH and Na_2CO_3 in a given alkali mixture.
6. Determination of Na/K/Ca by flame photometer in a given sample.
7. Determination of turbidity in a given sample.
8. To determine the flash and fire point of a given lubricating oil.
9. To determine the viscosity of a given lubricating oil by Redwood viscometer.
10. To determine cloud and pour point of a given oil.

ELECTRICAL AND ELECTRONICS LAB CODE BT 108

Electrical lab

1. Assemble house wiring including earthing for 1-phase energy meter, MCB, ceiling fan, tube light, three pin socket and a lamp operated from two different positions. Basic functional study of components used in house wiring.
2. Prepare the connection of ceiling fan along with the regulator and vary the speed.
3. Prepare the connection of single phase induction motor through 1-Phase Auto-transformer and vary the speed.
4. Prepare the connection of three phase squirrel cage induction motor through 3-Phase Autotransformer and vary the speed.
5. Prepare the connection of Fluorescent Lamp, Sodium Vapour and Halogen Lamp and measure voltage, current and power in the circuit.

Electronics lab

1. Identification, testing and application of Resistors, Inductors, Capacitors, PN-Diode. Zener Diode, LED, LCD, BJT, Photo Diode, Photo Transistor, Analog/Digital Multi- Metres and Function/Signal Generator.
2. Measure the frequency, voltage, current with the help of CRO.
3. Assemble the single phase half wave and full wave bridge rectifier & the analyse effect of L,C and L-C filters in rectifiers.
4. Study the BJT amplifier in common emitter configuration. Measure voltage gain plot gain frequency response and calculate its bandwidth.
5. Verify the truth table of AND, OR, NOT, NOR and NAND gates.

PRACTICAL GEOMETRY CODE BT 109

1. (a) Lines, Lettering & Dimension (Sketch Book)
(b) Scale-representative Fraction, Plan scale, Diagonal Scale, Vernier scales (In sheet) comparative Scale, & scale of chords (Sketch Book)



2. (a) Conic Section:-

Construction of Ellipse, Parabola & Hyperbola by different methods (In sheet)

(b) Engineering curves:-

Construction of cycloid, Epicycloids, Hypocycloid and Involutives (In sheet) Archimedean and Logarithmic spiral, (Sketch book)

3. (a) Type of Projection, Orthographic Projection: First Angle and third Angle Projection (Sketch Book)

(b) Projection of Points (Sketch Book)

(c) Projection of Straight lines, different position of Straight lines, methods for determining True length, true inclinations and Traces of straight lines (Four problems in sheet and three problems in (Sketch Book)

(d) Projection of Planes: Different positions of Plane lamina like:- Regular polygon, circle three of planes (Four problems in Drawing sheet and three problems in Sketch Book.)

4. (a) Projection of Solids:- Projection of right and regular Polyhedron, Prisms, Pyramids and cone (Four Problem in Drawing sheet and there in Sketch Book.)

(b) Section of Solids:- Projection of Frustum of a cone and pyramid, Projection of Truncated Solids (like Prism, Pyramid, Cylinder and Cone) in different positions.

5. (a) Development of Surfaces:- Parallel line and Radial line method for right, regular solids

(b) Isometric Projections:- Isometric Scales, Isometric Axes, Isometric Projection of Solids.

Reference Books:

1. Engineering Drawing Geometrical Drawing -
2. Engineering Drawing,
3. Engineering Drawing,
4. Engineering Drawing,

P.S.Gill, S.K.Katara & Sons.
Dhanarajay A Jolhe
Basant Agarwal & CM Agarwal ,
N.D.Bhatt.,

**WORKSHOP PRACTICE
CODE BT 110**

Carpentry Shop

1. T – Lap joint
2. Bridle joint

Foundry Shop

1. Mould of any pattern
2. Casting of any simple pattern

Welding Shop

1. Gas welding practice by students on mild steel flat
2. Lap joint by gas welding
3. MMA welding practice by students
4. Square butt joint by MMA welding



5. Lap joint by MMA welding
6. Demonstration of brazing

Machine Shop Practice

1. Job on lathe with one step turning and chamfering operations
2. Job on shaper for finishing two sides of a job
3. Drilling two holes of size 5 and 12 mm diameter on job used / to be used for shaping
4. Grinding a corner of above job on bench grinder

Fitting and Smithy Shop

1. Finishing of two sides of a square piece by filing
2. Tin smithy for making mechanical joint and soldering of joint
3. To cut a square notch using hacksaw and to drill three holes on PCD and tapping

Reference Books:

1. Mechanical Workshop Practice,
2. Elements of Workshop Technology
3. Workshop Technology ,

K.C. John,
Hajra & Choudhary,
W.A.J.Chapman,

B. Tech Second Semester Syllabus

COMMUNICATION TECHNIQUES CODE BT 201

Course contents

Unit I

Elements of Communication: Communication: Meaning, Importance and Process, Objectives of Communication, Media and Types of Communication

Unit II

Basics of Communication: Verbal and Non-Verbal Communication, Formal and Informal Channels of Communication, Qualities of Good Communication

Unit III

Skills of Communication: Barriers to Communication, Professional Communication, Interpersonal Communication and methods to improve it



Unit IV

Grammar: Subject-Verb Agreement (Concord), Linking Words (Conjunctions), Relative Clauses, Common Errors

Unit V

Composition: Resume Writing, Business Letter Writing: Sales, Credit, Enquiry, Order, Claim, Complaint, Job Applications, etc., E-mail messages, Telephone Etiquettes

Reference Books:

- | | |
|---|------------------------------------|
| 1. Communication Skills for Engineers and Scientists, | Sangeeta Sharma and Bino Mishra, |
| 2. English Grammar and Composition, | Gurudas Mukherjee, |
| 3. Current English Grammar and Usage with Composition, | R.P. Sinha, |
| 4. Effective Technical Communication, | M Ashraf Rizvi, |
| 5. Business Communication, | Meenakshi Raman, Prakash Singh, |
| 6. Professional Communication, | Aruna Koneru, |
| 7. A Practical Course for Developing Writing Skills in English, | J.K. Gangal, |
| 8. "Communicative English for Engineers and Professionals", | Nitin Bhatnagar & Mamta Bhatnagar, |
| 9. "The Ace of Soft Skills", Gopalswamy | Ramesh & Mahadevan Ramesh, |

202 ENGINEERING MATHEMATICS-II CODE BT 202

Unit I

Coordinate Geometry of Three Dimensions: Equation of a sphere, Intersection of a sphere and a plane, tangent plane, Intersection of two spheres, orthogonality of two spheres, Right circular cone. Right circular cylinder

Unit II

Matrices: Rank of a matrix, Rank of matrix by reducing to normal forms, Consistency of systems of linear simultaneous equations and its solution, Eigen values and Eigen vectors, Cayley-Hamilton theorem (without proof), Diagonalization of matrix.

Unit III

Vector Calculus: Scalar and vector field, differentiation & integration of vector functions, Gradient, Divergence, Curl and Differential Operator, Line, Surface and volume Integrals

Unit IV



Application of Vector Calculus: Green's Theorem in a Plane, Gauss's and Stoke's Theorem (without proof) and their Applications.

Fourier Series: Expansion of simple functions in Fourier Series, half range Fourier sine and cosine series, change of interval. Harmonic Analysis

Unit V

Differential Equations: Series Solutions of Second Order Linear Differential Equations with Variable Coefficients (Complementary Functions only), Partial Differential Equations of First Order : Lagrange's Form, Standard Forms, Charpit's Method .

Reference Books:

1. Advanced Engineering Mathematics,
2. Calculus and Analytical Geometry,

Erwin Kreyszig,
Thomas and Finney.

3. A Text Book of Differential Equations,
4. Higher Engineering Mathematics,
5. Mathematics for Engineers,
6. Advanced Mathematics for Engineers,

M.Ray and Chaturvedi,
B.V.Ramana,
Chandrika Prasad.
Chandrika Prasad,

ENGINEERING PHYSICS-II CODE BT 203

Unit I

Quantum Mechanics: Compton effect & quantum nature of light, Derivation of time dependent and time independent Schrödinger's Wave Equation, Physical interpretation of wave function and its properties, boundary conditions, Particle in one-dimensional box.

Unit II

Applications of Schrödinger's Equation, Particle in three-dimensional box and Degeneracy, Barrier penetration and tunnel effect, Tunneling probability, Alpha Decay, Summerfield's Free electron gas model Postulates, Density of energy states, Fermi energy level.

Unit III

Coherence and Optical Fibres, Spatial and temporal coherence, Coherence length, Coherence time and 'Q' factor for light, Visibility as a measure of coherence, Spatial Coherence and size of the source, Temporal coherence and spectral purity, Optical fiber as optical wave-guide, Numerical aperture , maximum angle of acceptance and applications of Optical Fiber.

Unit IV



Lasers and Holography: Theory of laser action, Einstein's coefficients, Components of a laser, Threshold conditions for laser action; Theory, Design and applications of He-Ne and semiconductor lasers; Holography versus photography, Basic theory of holography, Basic requirement of a holographic laboratory; Applications of holography in microscopy and interferometry.

Unit V

Nuclear Radiation Detectors, Characteristics of gas filled detectors: general considerations, Constructions, Working and properties of: Ionization chamber, proportional counter, G. M. Counter and Scintillation Counter.

Reference Books:

1. Fundamental of Optics,
2. Optics,
3. Quantum Mechanics,
4. Quantum Mechanics,
5. Nuclear Physics: Principles and Applications,

Jenkins and White
Ajoy Ghatak
Schiff
Merzbacher,
John Lilley

CHEMISTRY & ENVIRONMENTAL ENGINEERING CODE BT 204

Unit I

Water: Common Impurities of water Hardness of water, Determination of hardness by Clark's test and complexometric (EDTA) method, Numerical based on hardness and EDTA method, Municipal Water Supply: Requisites of potable water, Steps involved in purification of water, Sedimentation, coagulation, Filtration and Sterilization, Break point chlorination.

Unit II

Water Treatment: Softening of water, Lime-Soda, Permutit (Zeolite) and Deionization (Demineralization) methods, Boiler troubles their causes, disadvantages and prevention, Formation of solids (Scale and Sludge), Carry over (Priming and Foaming), Corrosion and Caustic, Embrittlement. Numerical problems based on Lime-Soda and Zeolite softening methods

Unit III

Basics of Environment: Environmental Pollution, Environmental Acts and Regulations, Environmental Impact Assessment (EIA), Necessity and methodology of EIA. Renewable sources of energy, Potential & present status of renewable sources of energy in India, Functional concepts of Ecology, Basics of species, Ecosystem, Hydrological and chemical cycles, Energy flow in ecosystems. Biodiversity, population dynamics



Unit IV

Air Pollution, Noise Pollution and Solid Waste Management: Air Pollution, Harmful effects of Air Pollution, Control of Air Pollution. Noise Pollution, Harmful effects of noise pollution, control of noise pollution, Global warming, Acid rain, Ozone depletion, Solid Waste Management, Classification of solid waste, Collection, transportation, treatment, and disposal of solid waste, Economic recovery of solid waste. Sanitary landfill, on site sanitation

Unit V

Water Pollution: Water pollution, Harmful effects of water pollution, control of water pollution. Waste water management, Treatment & disposal of wastewater. Reuse and saving in use of water, rain water harvesting. Corrosion: Definition and its significance. Mechanisms of Chemical (Dry) and Electrochemical (Wet) corrosion, Protection from corrosion, Protective coatings, cathodic protection, sacrificial anode and modification in designs

Reference Books:

1. Chemistry of water treatment, Samuel Faust & Osman M Aly,
2. Boilers water treatment. Principles and Practice, Colin Frayne,
3. Corrosion Understanding the Basic, Joseph R Davis,
4. Atmospheric pollution, W Buch ,
5. Introduction to Environmental Science, G Tyler Miller and Scott Spoolman,
6. Introduction to Environmental Engineering, Mackenzie L Davis and David A Cornwell,

ENGINEERING MECHANICS CODE BT 205

Unit I

Statics Of Particles and Rigid Bodies: Fundamental laws of mechanics, Principle of transmissibility, System of forces, Resultant force, Resolution of force, Moment and Couples, Varignon's Theorem, Resolution of a force into a force and a couple, Free body diagram, Equilibrium, Conditions for equilibrium, Lami's theorem. Virtual work: Principle of Virtual Work, Active forces and active force diagram.

Unit II

Centroid & Moment of Inertia: Location of centroid and center of gravity, Moment of inertia, Parallel axis and perpendicular axis theorem, Radius of gyration, M.I of composite section, Polar moment of inertia, M.I of solid bodies.

Lifting Machines: Mechanical advantage, Velocity Ratio, Efficiency of machine, Ideal machine, Ideal effort and ideal load, Reversibility of machine, Law of machine, Lifting machines; System of Pulleys, Simple wheel and axle, Wheel and differential axle, Weston's differential pulley block, Worm and worm wheel, Single purchase winch crab.



Unit III

Friction: Types of Friction, Laws of friction, Angle of friction, Angle of repose, Ladder, Wedge, Belt Friction.

Belt Drive: Types of belts, Types of belt drives, Velocity ratio, Effect of slip on Velocity ratio, Length of belt, Ratio of tensions and power transmission by flat belt drives, Management, Classification of solid waste, Collection, transportation, treatment, and disposal of solid waste, Economic recovery of solid waste, Sanitary landfill, on site sanitation

Unit IV

Kinematics of Particles and Rigid Bodies: Velocity, Acceleration, Types of Motion, Equations of Motion, Rectangular components of velocity and acceleration, Angular velocity acceleration, Radial and transverse velocities and accelerations, Projectiles motion on plane and Inclined Plane, Relative Motion.

Kinetics of Particles and Rigid Bodies: Newton's laws, Equation of motion in rectangular coordinate, radial and transverse components, Equation of motion in plane for a rigid body, D' Alembert principle

Unit V

Work, Energy and Power: Work of a force, weight, spring force and couple, Power, Efficiency, Energy, Kinetic energy of rigid body, Principle of work and energy, Conservative and Nonconservative Force, Conservation of energy.

Impulse and Momentum: Linear and angular momentum, Linear and angular impulse, Principle of momentum for a particle and rigid body, Principle of linear impulse and momentum for a particle and rigid body, Principle of angular momentum and Impulse, Conservation of angular momentum, Angular momentum of rigid body.

Reference Books:

- | | |
|------------------------------------|-------------------------|
| 1. Vector Mechanics for Engineers, | Beer and Johnston, |
| 2. Engineering Mechanics, | Hibbeler, . |
| 3. Engineering Mechanics, | Meriam and Kraige, |
| 4. Engineering Mechanics, | Timoshenko and Young, |
| 5. Engineering Mechanics, | Shames. |
| 6. Engineering Mechanics, | Boresi and Schmidt. |
| 7. Engineering Mechanics, | Andrew Pytel & Kiusalas |

FUNDAMENTAL OF COMPUTER PROGRAMMING CODE BT 206

Unit I

Programming in C: Structure of C Program, Concept of Preprocessor, Macro Substitution, Intermediate code, Object Code, Executable Code. Compilation Process, Basic Data types,



Importance of braces ({ }) in C Program, enumerated data type, Identifiers, Scope of Variable, Storage Class, Constants, Operators & Expressions in C, Type Casting, printf () and scanf () with format specifiers, reading single character

Unit II

Control Statements, Command Line Arguments, Arrays in C, Pointers, Using pointers to represent arrays, Pointer & address arithmetic, Structures, using type def

Unit III

Arrays of Structures & pointers, File Handling (f scan f, f print f, f e of, f open, f close, f read, f write only), Dynamic memory Allocation

Unit IV

Functions in C, Passing Parameters (By value & Reference), using returned data, Passing arrays, structures, array of structures, pointer to structures etc., passing characters and strings, The void pointer.

Unit V

Stored Program Architecture of Computers, Storage Device- Primary Memory and Secondary Storage, Random, Direct, Sequential access methods, Concept of High-Level, Assembly and Low Level programming languages, Representing Algorithms through flow chart, pseudo code, step by step.

Number System: Data Representation, Concept of radix and representation of numbers in radix r with special cases of r=2, 8, 10 and 16 with conversion from radix r1 to radix r2. r's and (r-1)'s complement, Representation of alphabets.

Reference Books:

- | | |
|-------------------------|---|
| 1. Ritchie & Kernighan, | The C Programming language, 2nd Ed., PHI. |
| 2. Dey & Ghosh, | Computer Fundamentals and programming in C, Oxford. |
| 3. Kamthane, | Programming in C, 2nd Ed., Pearson. |
| 4. Schildt, | The Complete Reference, 4th Ed., TMH. |
| 5. Balaguruswamy, | Programming in ANSI C, 5th Ed., TMH. |
| 6. V. Rajaraman, | Fundamentals of Computers, 5th Ed. PHI, 2011. |
| 7. Forouzan et.al, | Computer Science, 3rd Ed. Cengage Learning. |

ENGINEERING PHYSICS LAB-II CODE BT 207

1. To determine the height of water tank with the help of a Sextant.
2. To determine the dispersive power of material of a Prism for Violet Red and yellow Colours of Mercury light with the help of a spectrometer.



3. To measure the Numerical Aperture of an Optical Fibre.
4. To determine the ferromagnetic constants retentivity, permeability and susceptibility by tracing B-H curve using C.R.O.
5. To study the Charge & Discharge of a condenser and hence determine time constant (Both current and voltage graphs are to be plotted).
6. To determine the high resistance by method of leakage, using a Ballistic galvanometer.
7. To verify the expression for the resolving power of a Telescope.
8. To determine the specific resistance of the material of a wire by Carey Fosters bridge.
9. To determine the specific resistance of the material of a wire by Carey Fosters bridge.

CHEMISTRY & ENVIRONMENTAL ENGINEERING LAB CODE BT 208

1. To determine the hardness of water by HCL method.
2. To determine the hardness of water by EDTA method.
3. Determination of CO₂ in a water sample.
4. Measurement of pH of a given sample by pH-meter.
5. To determine free and residual chlorine in a given water sample.
6. Measurement of dissolves oxygen in water.
7. Measurement of conductivity of a given sample by conductivity meter.
8. Measurement of fluoride in water.
9. Measurement of nitrate in water.
10. Determination of sulphate in water.
11. Evaluation of Reverse Osmosis (RO) Process by TDS measurement.

COMPUTER PRAGRAMMING LAB CODE BT 209

S.No. Concept to be covered in the exercise

1. Simple OS Commands, vi editor, compiling program, compiler options, linking libraries.
2. Simple input output program, integer, real, character and string. (Formatted & Unformatted), Using Command Line Arguments.
3. Conditional statement (if, if-else-if, switch-case)
4. Looping & iterations (for, while, do-while, continue, break)
5. Using Arrays (one, two and three dimensional)
6. Using Structures and Union.
7. Program using Function (with and without recursion), passing parameters by value & reference.
8. Using pointers.
9. File handling.

MACHINE DRAWING



CODE BT 210

Introduction to machine drawing

Dimensioning, locations and placing.

Orthographic projections: First & third angle methods

Sheet 1: Orthographic Projections (3 Problems)

Sheet 2: Sectional Views (3 Problems)

Sheet 3: Riveted joints, lap joints, butt joints, chain riveting, zig-zag riveting

Sheet 4: Screw fasteners, different threads, Nuts & bolts locking devices, set screws, foundation

Sheet 5: Bearing, Plumber block Instructions on free hand sketches

List of free hand sketches

- Different type of lines
- Conventional representation of materials
- Screw fasteners
- Bearing: Ball, roller, needle, foot step bearing
- Coupling: Protected type, flange, and pin type flexible coupling
- Welded joints
- Belts and pulleys
- Pipes and pipe joints
- Valves

1. Machine Drawing,
2. Machine Drawing,

Reference Books:

Lakshminarayan, Jain Brothers.

N.D.Bhatt, Charotar Publishing House Pvt. Ltd.

COMMUNICATION TECHNIQUES LAB CODE BT 211

1. Phonetic Symbols and Transcriptions
2. Word Formation
3. Affixes
4. Listening and speaking Skills.
5. Words often Mis-spelt and Mis- Pronounced
6. One Word for Many.
7. Synonyms and Antonyms.
8. Seminar Presentation.
9. Group Discussion.
10. Job Interview

REFERENCE BOOKS

1. Advanced Manual for Communication Laboratories and Technical Report Writing,
2. A Course in Phonetics and Spoken English,
3. English Language Laboratories: A Comprehensive Manual,

D. Sudha Rani,
J. Sethi & P.V. Dhamija,
Nira Konar,