DETAILED SYLLABI OF FIRST SEMESTER B.TECH

ENGLISH **[101]**

Class B. Tech. 1st Semester	**Evaluation**
Schedule per week Lectures : 2	Examination Time = Three (3) Hours Maximum Marks = 100 [Mid-term (20) & End-term (80)]

Units	**Contents of the Subject**
I	**Short Stories** "The Gift of the Magi" by O. Henry "The Fortune-Teller" by Karl Capek "The Nightingale and the Rose" Oscar Wilde
II	**Short Stories** "Dr. Heidegger's Experiment" by Nathaniel Hawthorne "The Three Dancing Goats" by Anonymous "The Accompanist" by Anita Desai
III	**Poems** "Mending Wall" by Robert Frost "This is Going to Hurt Just a Little Bit" by Odgen Nash "Death and Leveler" by James Shirley "Last Lesson of the Afternoon" by D. H. Lawrence "Night of the Scorpion" by Nissim Ezekiel
IV	**Short Plays** "The Dear Departed" by Stanley Houghton "Refund" by Fritz Karinthy "Monkey's Paw" by W. W. Jacobs
V	**Essays** "Of Studies" by Francis Bacon "Third Thoughts" by E. V. Lucas "Toasted English" by R. K. Narayana

ENGINEERING MATHEMATICS – I **[102]**

Class B. Tech. 1st Semester	**Evaluation**
Schedule per week Lectures : 3 Tutorial : 1	Examination Time = Three (3) Hours Maximum Marks = 100 [Mid-term (20) & End-term (80)]

Units	**Contents of the Subject**
I	**Differential Calculus** Asymptotes and 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)
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
III	**Integral Calculus** Applications in Finding the Length of Simple Curves Surface and Volumes of Solids of Revolution Double Integral, Areas & Volumes by Double Integration Change of Order of Integration Beta Function and Gamma Function (Simple Properties)
IV	**Differential Equations** Differential Equations of First Order and First Degree – Variable Separable, Homogeneous Forms, Reducible to Homogeneous Form, Linear Form, Exact Form, Reducible to Exact Form Linear Differential Equations of Higher Order with Constant Coefficients Only
V	**Differential Equations** Second Order Ordinary Differential Equations with Variables Coefficients Homogeneous and Exact Forms Change of Dependent Variable Change of Independent Variable, Normal Forms Method of Variation of Parameter

PHYSICS-I **[103]**

Class B. Tech. 1st Semester	Evaluation
Schedule per week Lectures : 2 Tutorial : 1	Examination Time = Three (3) Hours Maximum Marks = 100 [Mid-term (20) & End-term (80)]

Units	Contents of the Subject
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. • Interference of Optical technology: elementary idea of anti-reflection coating and interference filters.
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 circular and elliptically polarized light. • Optical Activity: Optical activity and law of optical rotation, specific rotation and its measurement using the half-shade and bi-quartz device.
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,
IV	**Quantum Mechanics** • Compton effect & quantum nature of light. • Schrödinger's Wave Equation: Time dependent and time independent cases. • Physical interpretation of wave function and its properties, boundary conditions. • Particle in one-dimensional box.
V	**Special Theory of Relativity** • Postulates of special theory of relativity, Lorentz transformations, relativity of length, mass and time. • Relativistic velocity addition, mass-energy relation. • Relativistic Energy and momentum.

COMPUTER PROGRAMMING AND IT **[104]**

Class B. Tech. 1st Semester	**Evaluation**
Schedule per week Lectures : 3 Tutorial : -	Examination Time = Three (3) Hours Maximum Marks = 100 [Mid-term (20) & End-term (80)]

Units	**Contents of the Subject**
I	• Introduction: Stored Program Architecture of Computers, Evolution of Processors (In terms of word length & Speed only), Storage Device- Primary Memory and Secondary Storage, Working Principle of Primary Storage devices- RAM, ROM, PROM, EPROM, EEPROM, Random, Direct, Sequential access methods. • Language Translators – Concept of High-Level, Assembly and Low Level programming languages. Working of Assembler, Interpreter and compiler. Representing Algorithms through flow chart, pseudo code, step by step etc.
II	• 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 Integer in sign-magnitude, signed 1's and 2's complement. Floating point representation. Concept of bias and normalization. Representation of alphabets. • Binary Codes: Binary arithmetic, Addition and subtraction of Integers and floating point numbers. Multiplication of Integers. Gray code, BCD 8421 and 2421, Excess-3 and Excess-3 gray codes.
III	• 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, Expressions in C, Type Casting, Control Statements, printf( ), scanf ( ), reading single character. Command Line Arguments.
IV	Arrays in C, Pointers, Using pointers to represent arrays, Dynamic Memory allocation, Structures, using typedef, Arrays of Structures & pointers, File Handling (Opening in different modes & closing of file, fscanf & fprintf only).
V	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.

ENGINEERING MECHANICS **[105]**

Class B. Tech. 1st Semester	**Evaluation**
Schedule per week Lectures : 3 Tutorial : 1	Examination Time = Three (3) Hours Maximum Marks = 100 [Mid-term (20) & End-term (80)]

Units	**Contents of the Subject**
I	• System of forces, Fundamental laws of mechanics, Composition of forces • Free body diagram, Lami's theorem • Moments and couple, Varignon's theorem, condition of equilibrium • Types of support and loading, reaction, Analysis of simple trusses by methods of joints and method of sections
II	Laws of Coulomb friction, Ladder, Wedges Belt friction and rolling Principle of virtual work and its applications
III	• Location of centroid and center of gravity, area moment of inertia, mass moment of inertia • Law of machines, Variation of mechanical advantages, efficiency, reversibility of machine • Pulleys, wheel and axle, wheel and differential axle • Transmission of power through belt and rope
IV	**Kinematics of Particle** Rectilinear motion, plane curvilinear motion Projectile motion Constrained motion of connected particles **Dynamics of Particle and Rigid Body** • Newton's law of motion • D'Alembert's principle
V	**Work and Energy** Work, energy (Potential, Kinetic and Spring) Work – Energy relation Law of conservation of energy **Impulse and Momentum** • Impulse, momentum • Impulse – Momentum relation, Impact **Vibration** Un-damped Free vibrations

ENGINEERING CHEMISTRY-I **[106]**

Class B. Tech. 1st Semester	Evaluation
Schedule per week Lectures : 2 Tutorial : 1	Examination Time = Three (3) Hours Maximum Marks = 100 [Mid-term (20) & End-term (80)]

Units	Contents of the Subject
I	**Water** • Common Impurities of water • Hardness of water: Determination of hardness by Clark's test and complex metric (EDTA) method, Degree of hardness • Numerical based on hardness and EDTA method • Municipal Water Supply: Requisites of drinking water, Steps involved in purification of water, Sedimentation, coagulation, Filtration and Sterilization, Break point chlorination
II	**Water Treatment** • Softening of water**:** Lime-Soda Method, Permutit (Zeolite) Method and Deionization or Demineralization Method • 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
III	**Polymers** • Different methods of classification and constituents of polymers • Plastics: Themosets and Thermoplasts • Preparation, Properties and uses of polyethylene, Bakelite, Terylene and Nylon • Elastomers – Natural rubber, vulcanization, Synthetic Rubbers viz. Buna-S, Buna-N, Butyl and neoprene rubbers
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 • Types of silicate glasses and their commercial uses • Importance of annealing in glass making
V	**Refractories** • Definition, classification, properties, Requisites of good refractory and manufacturing of refractory • Detailed study of silica and fire clay refractory and 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

PHYSICS LAB-I **[107]**

Class B. Tech. 1st Semester	**Evaluation**
Schedule per week Practical : 2	Maximum Marks = 75 [Sessional (45) & Practical (30)]

S.No.	**List of Experiments**
	(Any 7 experiments are to be performed)
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 measure the Numerical Aperture of an Optical Fibre.
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 Volt of range 1.5 volt and calibrate it.
7.	To study the variation of semiconductor resistance with temperature and hence determine the Band Gap of 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 the wavelength of sodium light by Michelson Interferometer.
10.	To determine coherent length and coherent time of laser using He-Ne Laser

ENGINEERING CHEMISTRY LAB-I **[108]**

Class B. Tech. 1st Semester	**Evaluation**
Schedule per week Practical : 2	Maximum Marks = 50 [Sessional (30) & Practical (20)]

S.No.	**List of Experiments**
	(Any 7 experiments are to be performed)
1.	To determine the hardness of water by HCL method.
2.	To determine the hardness of water by EDTA method.
3.	Determination of CO_2 in a water sample.
4.	To determine free chlorine in a given water sample.
5.	To determine the viscosity of a given lubricating oil by Redwood viscometer.
6.	Measurement of residual chlorine in water.
7.	To determine the flash and fire point of a given lubricating oil.
8.	Measurement of dissolves oxygen in water.
9.	To determine cloud and pour point of a given oil.
10.	Measurement of nitrate in water

COMPUTER PROGRAMMING LAB **[109]**

The lab is to be conducted on Linux platform. vi editor is to be used.

Class B. Tech. 1st Semester	**Evaluation**
Schedule per week Practical : 2	Maximum Marks = 75 [Sessional (45) & Practical (30)]

S. No.	**List of Experiments**
	Simple OS Commands, vi editor, compiling program, compiler options, linking libraries.
	Simple input output program integer, real character and string. (Formatted & Unformatted)
	Conditional statement programs (if, if-else-if, switch-case)
	Looping Program. (for, while, do-while)
	Program based on array (one, two and three dimensions)
	Program using Structure and Union.
	Program using Function (with and without recursion)
	Simple programs using pointers.
	File handling.

PRACTICAL GEOMETRY **[110]**

Class B. Tech. 1st Semester	**Evaluation**
Schedule per week Practical : 3	Maximum Marks = 100 [Sessional (60) & Practical (40)]

S. No.	**List of Experiments**
1.	• Lines, Lettering and Dimensioning • Scales: Representative factor, plain scales, diagonal scales, scale of chords • Conic Sections: Construction of ellipse, parabola and hyperbola by different methods. Normal and Tangents • Special Curves: Cycloid, Epicycloids, Hypo-cycloid, Involutes, Archemedian and logarithmic spirals
2.	• Projections: Types of projection, Orthographic projection, First angle and third angle projection • Projection of points and lines, True inclinations and true length of straight lines, Traces of straight lines, Auxiliary planes
3.	• Projection of planes and solids: Projection of planes, Projection of polyhedra, Pyramids, Cylinder and Cone
4.	• Sections of Solids: Section of right solids by normal and inclined planes • Development of Surfaces: Parallel line and radial line method for right solids
5.	• Isometric Projections: Isometric Scale, Isometric axes, Isometric projections of planes and solids

WORKSHOP PRACTICE [111]

Class B. Tech. 1st Semester	Evaluation
Schedule per week Practical : 2	Maximum Marks = 50 [Sessional (30) & Practical (20)]

S. No.	List of Experiments
1.	**Carpentry Shop** • Timber, definition, engineering applications, seasoning and preservation • Plywood and ply boards
2.	**Foundry Shop** • Moulding Sands, constituents and characteristics • Pattern, definition, materials types, core prints • Role of gate, runner, riser, core and chaplets • Causes and remedies of some common casting defects like blow holes, cavities, inclusions
3.	**Welding Shop** • Definition of welding, brazing and soldering processes and their applications • Oxyacetylene gas welding process, equipment and techniques, types of flames and their applications • Manual metal arc welding technique and equipment, AC and DC welding • Electrodes: Constituents and functions of electrode coating, welding positions • Types of welded joints, common welding defects such as cracks, undercutting, slag inclusion and boring
4.	**Fitting Shop** • Files, materials and classification.
5.	**Smithy Shop** • Forging, forging principle, materials • Operations like drawing, upsetting, bending and forge welding • Use of forged parts

List of jobs to be made in the workshop practice

S. No.	List of Experiments
CARPENTRY SHOP	
1.	T – Lap joint
2.	Bridle joint
FOUNDRY SHOP	
3.	Mould of any pattern
4.	Casting of any simple pattern
WELDING SHOP	
5.	Gas welding practice by students on mild steel flat
6.	Lap joint by gas welding
7.	MMA welding practice by students
8.	Square butt joint by MMA welding
9.	Lap joint by MMA welding
10.	Demonstration of brazing
MACHINE SHOP PRACTICE	
11.	Job on lathe with one step turning and chamfering operations
12.	Job on shaper for finishing two sides of a job
13.	Drilling two holes of size 5 and 12 mm diameter on job used / to be used for shaping
14.	Grinding a corner of above job on bench grinder
FITTING AND SMITHY SHOP	
15.	Finishing of two sides of a square piece by filing
16.	Tin smithy for making mechanical joint and soldering of joint
17.	To cut a square notch using hacksaw and to drill three holes on PCD and tapping

SECOND SEMESTER

COMMUNICATION TECHNIQUES [201]

Class B. Tech. 2nd Semester	Evaluation
Schedule per week Lectures : 3	Examination Time = Three (3) Hours Maximum Marks = 100 [Mid-term (20) & End-term (80)]

Units	Contents of the Subject
I	**Grammar** Words and Sentences Verbs / Tenses Questions / Questions Tags Modal Verbs The Passive
II	**Grammar** • The Infinitive and The ING form • Nouns and Articles • Determiners • Reported Speech • Adjectives and Adverbs
III	**Grammar** • Prepositions • Verbs with Prepositions and Adverbs • Pronouns • Relative Clauses • Conditionals • Linking Words
IV	**Compositions** • Essay and Report Writing • Review Writing
V	**Compositions** • Applications, Letter and Précis Writing • Technical Proposal Writing

ENGINEERING MATHEMATICS – II **[202]**

Class B. Tech. 2nd Semester	**Evaluation**
Schedule per week Lectures : 3 Tutorial : 1	Examination Time = Three (3) Hours Maximum Marks = 100 [Mid-term (20) & End-term (80)]

Units	**Contents of the Subject**
I	**Coordinate Geometry of Three Dimensions** • Equation of a sphere • Intersection of a sphere and a plane, tangent plane, normal lines • Right circular cone • Right circular cylinder **7**
II	**Matrices** • Rank of a matrix, inverse of a matrix by elementary transformations • Solution of simultaneous linear equations • Eigen values and Eigen vectors, Cayley – Hamilton theorem (without proof) • Diagonalization of matrix **7**
III	**Vector Calculus** Scalar and vector field, differentiation & integration of vector functions Gradient, Divergence, Curl and Differential Operator Line, Surface and volume Integrals Green's Theorem in a Plane, Gauss' and Stoke's Theorem (without proof) and their Applications **9**
IV	**Dynamics** • Angular Motion, Radial and Transverse Velocities and Accelerations • Tangential and Normal Accelerations • Rectilinear Motion in Resisting Medium **8**
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 **8**

PHYSICS-II **[203]**

Class B. Tech. 2nd Semester	Evaluation
Schedule per week Lectures : 2 Tutorial : 1	Examination Time = Three (3) Hours Maximum Marks = 100 [Mid-term (20) & End-term (80)]

Units	Contents of the Subject
I	**Applications of Schrödinger's Equation** • Particle in three-dimensional boxes. Degeneracy • Barrier penetration and tunnel effect. • Tunneling probability, Alpha **Decay.** **Summerfield's Free electron gas model** • Postulates, Density of energy states, Fermi energy level. • Band Theory of solids
II	**Lasers** • 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. • Elementary ideas of Q-switching and mode locking. **Holography** • Holography versus photography, Basic theory of holography, Basic requirement of a holographic laboratory. • Applications of holography in microscopy and interferometry.
III	**Coherence** • Spatial and temporal coherence, Coherence lenght, 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 Fibers** • Optical fiber as optical wave-guide. • Numerical aperture and maximum angle of acceptance.
IV	**Nuclear Radiation Detectors and Dielectrics** • Characteristics of gas filled detectors: general considerations. • Constructions, Working and properties of: Ionization chamber, proportional Counter, G.M.Counter and Scintillation Counter. • Dielectrics: Electric break down and measurement of dielectric constant
V	**Electro Dynamics** • Scalar and Vector fields • Definitions of gradient Divergence and curl • Maxwell's Equations • Boundary Conditions • Wave equation and its solution for free space • Nature of E.M. Waves, Poynting vector

ENVIRONMENTAL ENGINEERING & DISASTER MANAGEMENT [204]

Class B. Tech. 2nd Semester	**Evaluation**
Schedule per week Lectures : 3	Examination Time = Three (3) Hours Maximum Marks = 100 [Mid-term (20) & End-term (80)]

Units	**Contents of the Subject**
I	Basics of Environment. Adverse effects of environmental pollution and control strategies. Environmental Acts and Regulations. Functional concepts of Ecology. Basics of species. Ecosystem. Hydrological and chemical cycles. Energy flow in ecosystems. Biodiversity, population dynamics. Renewable sources of energy. Potential & present status of renewable sources of energy in India .
II	Quality and quantity of potable water. Surface and ground water sources. Basics of water supply schemes. Treatment of water. Wastewater management, Treatment & disposal of wastewater. Anaerobic digestion, Septic tanks. Reuse and saving in use of water. Onsite sanitation. Environmental Impact Assessment (EIA). Necessity and methodology of EIA.
III	Air Pollution. Harmful effects of Air Pollution. Control of Air Pollution. Noise Pollution. Adverse effects and 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. Energy recovery. Sanitary landfill.
IV	Type of Disasters: Natural and Manmade (Earthquake, Tsunami, Cyclone, Flood, Drought, Landslides, Nuclear, Chemical, Fire and Environmental Hazards). Disaster Management Cycle and its components. Vulnerability of Indian Continent to different types of Disasters. Do's and Don'ts for safety during these disasters.
V	Introductory seismology, Occurrence of Earthquakes, Plate Tectonic Theory, types of earthquake Definitions; Earthquake Magnitude, Intensity and their scales, Focus, Focal Depth, Epicentre, Epicentral Distance, Earthquake Energy. Concept of Seismic Zoning. Basic Concepts of Earthquake Resistant Houses & Construction Practices.

ELECTRICAL AND ELECTRONICS ENGINEERING **[205]**

Class B. Tech. 2nd t Semester	**Evaluation**
Schedule per week Lectures : 3	Examination Time = Three (3) Hours Maximum Marks = 100 [Mid-term (20) & End-term (80)]

Units	**Contents of the Subject**
I	• **DC Networks:** Kirchoff's Laws, Node Voltage and Mesh Current Analysis; Delta-Star and Star-Delta Transformation, Source Conversion. Classification of Network Elements, Superposition Theorem, Thevenin's Theorem.
II	• **Single Phase AC Circuits:** Generation of Single Phase AC Voltage, EMF Equation, Average, RMS and Effective Values. RLC Series, Parallel and Series-Parallel Circuits, Complex Representation of Impedances. Phasor Diagram, Power and Power Factor. • **Three Phase A.C. Circuits:** Generation of Three-Phase AC Voltage, Delta and Star-Connection, Line & Phase Quantities, 3-Phase Balanced Circuits, Phasor Diagram, Measurement of Power in Three Phase Balanced Circuits.
III	• **Transformer:** Faraday's Law of Electromagnetic Induction, Construction and Operation of Single Phase Transformer, EMF Equation, Voltage & Current Relationship and Phasor Diagram of Ideal Transformer. • **Electrical DC Machine:** Principle of DC Machines, Types, Different Parts of DC Machines.
IV	• **Transistor:** Bipolar Junction Transistor, Transistor Current Components, Characteristics of CE, CB and CC Transistor Amplifiers. • **Thyristors:** The four layer diode, Bi-directional thyristors, the uni-junction transistor and its application in thyristor circuits.
V	• **Communication System:** Introduction to modulation (AM, FM & PM),demodulation, multiplexing. Superhetrodyne radio receiver, television.Elementary concepts of optical, satellite & mobile communication.

ENGINEERING CHEMISTRY-II **[206]**

Class B. Tech. 2nd Semester	Evaluation
Schedule per week Lectures : 2 Tutorial : 1	Examination Time = Three (3) Hours Maximum Marks = 100 [Mid-term (20) & End-term (80)]

Units	Contents of the Subject
I	**Fuels (General Aspects)** • Organic fuels: Origin, classification and general aspects of organic fuels • Solid fuels: Coal, carbonization of coal, manufacturing of coke by Beehive oven and By product oven method. • Liquid fuels: Advantages and refining of petroleum. Cracking, refining, reforming, polymerization and isomerization of refinery products • Synthetic petrol(Coal to Liquid, CTL, Technology): Berguis and Fischer Tropsch process • Knocking, octane number and anti-knocking agents • Gaseous fuels: Advantages, manufacturing, composition and calorific value of coal, gas and oil gas.
II	**Fuels (Analyses)** • Ultimate and proximate analysis of coal. • Determination of solid and gaseous fuels by bomb and Junker's Calorimeter respectively. • Calculations of calorific value based on Dulong's formula. • Combustion and requirement of oxygen/ air in combustion process. • Flue gas analysis by Orsat's apparatus and its significance.
III	**Phase Rule** • Statement, Definition and meaning of the terms involved • Application to one component system: Water and Sulphur systems • Reduced Phase Rule and study of two components Ag-Pb, Bi-Cd systems also its industrial application.
IV	**New Engineering Materials** • Fullerenes: Introduction, properties, preparation and uses. • Superconductors: Introduction, properties, preparation and uses • Organic Electronic Materials (including conducting polymers- poly(p-phenylene), polythiophenes, Polyphenylene vinylenes, polypyroles, polyaniline). • Optical fires: Introduction, properties, preparation, optical fiber grade glass and uses.
V	**Corrosion** • Definition and its significance • Mechanisms of corrosion: Chemical(Dry) corrosion and Electrochemical(Wet) corrosion • Protection from corrosion: Protective coatings, cathodic protection, sacrificial anode and modification in designs etc.

PHYSICS LAB-II **[207]**

Class B. Tech. 2nd Semester	**Evaluation**
Schedule per week Practical : 2	Maximum Marks = 75 [Sessional (45) & Practical (30)]

S.No.	**List of Experiments**
	(Any 7 experiments are to be performed)
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 determine the wave length of prominent lines of mercury by plane diffraction Grating with the help of spectrometer.
4.	To determine the ferromagnetic constants retentivity, permeability and susceptibility by tracing I-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 determine dielectric constant of a liquid using moving coil Ballistic Galvanometer.
8.	To study characteristics of G.M. Counting System.
9.	To determine the absorption coefficient of lead using using lead sheet by G.M. Counting System.
10.	To verify the expression for the resolving power of a Telescope.
11.	To determine the specific resistance of the material of a wire by Carey Fosters Bridge.

ENGINEERING CHEMISTRY LAB-II [208]

Class B. Tech. 2nd Semester	Evaluation
Schedule per week Practical : 2	Maximum Marks = 50 [Sessional (30) & Practical (20)]

S.No.	List of Experiments
	(Any 7 experiments are to be performed)
1.	Proximate analysis of solid fuel.
2.	Experiments based on Bomb Calorimeter.
3.	Measurement of pH of a given sample by pH-meter.
4.	Measurement of conductivity of a given sample by conductivity meter.
5.	Measurement of fluoride in water.
6.	To determine the strength of $CuSO_4$ solution with the help of hypo solution.
7.	To determine the strength of Ferrous Ammonium sulphate solution with the help of $K_2Cr_2O_7$ solution.
8.	Determination of Na/K/Ca by flame photometer in a given sample.
9.	To determine the strength of NaOH and Na_2CO_3 in a given alkali mixture.
10.	Determination of barium as barium sulphate gravimetrically.

Class B. Tech. 2nd Semester	**Evaluation**
Schedule per week Practical : 2	Maximum Marks = 75 [Sessional (45) & Practical (30)]

S. No.	**List of Experiments**
A. ELECTRICAL LAB	
1.	Single line diagram of a power system and a distribution sub-station and basic functional study of main components used in power systems.
2.	Make 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.
3.	Study the construction and basic working of ceiling fan, single phase induction motor and three phase squirrel cage induction motor. Connect ceiling fan along with regulator and single phase induction motor through auto-transformer to run and vary speed.
4.	(a) Basic functional study and connection of moving coil & moving iron ammeters and voltmeters, dynamometer, wattmeter and energy meter. (b) Run a 3-phase squirrel cage induction motor at no load and measure its voltage, current, power and power factor. Reverse the direction of rotation.
5.	Study the construction, circuit, working and application of the following lamps: (i) Fluorescent lamp, (ii) Sodium vapour lamp, (iii) Mercury vapour lamp, (iv) Halogen lamp and (v) Neon lamp
6.	(a) Study the construction and connection of single phase transformer and auto-transformer. Measure input and output voltage and fin turn ratio. (b) Study the construction of a core type three phase transformer. Perform star and delta connection on a 3-phase transformer and find relation between line and phase voltage.
ELECTRONICS LAB	
7.	Identification, testing and applications of resistors, inductors, capacitors, PN-diode, Zener diode, LED, LCD, BJT, FET, UJT, SCR, Photo diode and Photo transistor.
8.	(a) Functional study of CRO, analog & digital multi-meters and function / signal generator. (b) Study the single phase half wave and bridge rectifier and effects of filters on waveform.
9.	Study the BJT amplifier in common emitter configuration. Measure voltage gain, plot gain frequency response and calculate its bandwidth.
10.	(a) Study the construction and basic working of SCR. (b) Study the single phase half wave and bridge controlled rectifier and observe the effect of firing angle on waveform.

MACHINE DRAWING **[210]**

Class B. Tech. 2nd Semester	**Evaluation**
Schedule per week Practical : 3	Maximum Marks = 100 [Sessional (60) & End-term (40)]

S. No.	**List of Experiments**
	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
	Lectures 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

LANGUAGE LAB **[211]**

Class B. Tech. 2nd Semester	**Evaluation**
Schedule per week Practical : 2	Maximum Marks = 50 [Sessional (30) & End-term (20)]

S. No.	**Contents of the Subject**
	Phonetic symbols and transcription
	One word for many
	Synonyms and antonyms
	Word forms
	Words commonly mis-spelt and mis-pronounced
	Affixes
	Seminar Presentations
	Group Discussions

GUIDELINES FOR THE B.Tech TEACHING & EXAMINATION SCHEME AND SYLLABUS

1. Total teaching per week in a semester should be between 30 to 32 periods of 55 minute each. However, in the last semester, the teaching per week may be between 28 to 32 periods.

2. In each semester there should be 6 theory papers of 100 marks each except in 8th Semester, which should have 4 theory papers of 100 marks each. One paper should be elective in each Semester (From 3rd Semester to 8th Semester).

3. Each theory paper will have two term tests of 10 marks each. Thus the total marks of term test and theory paper will be 20 and 80 respectively for each theory paper.

4. In each semester, 50 marks will be assigned for discipline and extra curricular activities.

5. Total marks in each semester will be 1000 (inclusive of discipline and extra curricular activities)

6. Practical Training during summer at the end of 6thsemester will be held for 30 days. Industrial and Technical visits may be organized for 10 days after 5th Semester.

7. Students will have to give presentation on their Practical Training after coming back. One slot of 2 periods per week is to be provided in 7th Semester for presentation.

8. For Practical Training 100 marks are assigned in 7th Semester (inclusive of 20 marks for Industrial and Technical visit reports as the part of sessional component)

9. In 8th semester 25 working days are being provided exclusively for Project work at the end of academic teaching. During academic teaching 2/2 periods per week are assigned in 7th semester and two periods per week are being provided in 8th semester for project. Project allotment and working will start in 7th semester for which 50 marks are assigned. The same project may be continued/ extended in 8th semester for which 200 marks are assigned.

10. In 8th Semester one slot of 2 periods per week are to be provided for seminar. Marks to be assigned for seminar are 100.

11. Duration of the examination hours for theory paper will be 3 hours, in general.

12. Each theory paper needing sessional/practical should have it in the same semester, in general

    In each practical and sessional subject 60 marks are reserved for term work done during the term/semester 40% marks are assigned for end of terms/semester comprehensive examination.
    For assessment of work done during mid-term/mid semester the 60% component is to be distributed under the following heads for practicals and sessionals.

- Attendance (10%)
- Performance of practicals/drawing/design and submission of records (30%)
- Two mid term/ semester exams through Quiz/Practical/Drawing/design during the term/semester (20%)
- For 40% component (comprehensive examination) minimum two of the following three would be used to conduct the examination.
  (i) Quiz (ii) Viva, (iii) Practical/drawing/design.