RAJASTHAN TECHNICAL UNIVERSITY, KOTA

SCHEME OF TEACHING & EXAMINATION
AND
SYLLABUS

Ist B. Tech. (I & II Semester)

Effective from session: 2007 - 2008

Scheme of Teaching & Examination for I & II Semesters B. Tech. (I B.Tech)

Effective from the Session: 2007 – 2008
(Common to all branches of engineering)

I Semester

Sub Code	Subject	Number of Teaching Hours Per Week (55 Minutes each)			Duration of Theory Paper (Hours)	Marks Allocation				
		L	T	P		Theory	Term Test	Sessional	Prac. Exam.	Total
101	English	3	-	-	3	80	20			100
102	Engineering Mathematics – I	3	1	-	3	80	20			100
*103/203 1003/2003	Physics / Engg. Chemistry	3	1	-	3	80	20			100
104	Computer Systems & Prog.	3	-	-	3	80	20			100
105	Electrical & Electronics Engineering	3	-	-	3	80	20			100
	Total	**15**	**02**	**-**	**-**	**400**	**100**			**500**
*106/208 1006/2008	Physics / Engg. Chem. Lab	-	-	4		-		60	40	100
107	Computer Programming Lab	-	-	2		-		60	40	100
108	Practical Geometry	-	-	3				60	40	100
109	Workshop Practice	-	-	2				45	30	75
110	Electrical & Electronics Lab	-	-	2				45	30	75
111	Discipline & Extracurricular Activities	-	-	-				50	-	50
	Grand Total	**15**	**02**	**13**	**-**	**400**	**100**	**320**	**180**	**1000**

(Total 30 periods per week)

II Semester

S. No.	Subject	Number of Teaching Hours Per Week (55 Minutes each)			Duration of Theory Paper (Hours)	Marks Allocation				
		L	T	P		Theory	Term Test	Sessional	Prac. Exam	Total
201	Communication Techniques	3	-	-	3	80	20			100
202	Engineering Mathematics – II	3	1	-	3	80	20			100
*203/103 2003/1003	Physics / Engg. Chemistry*	3	1	-	3	80	20			100
204	Engineering Mechanics	3	1	-	3	80	20			100
205	Elective – I	3		-	3	80	20			100
206	Elective – II	3	-	-	3	80	20			100
	Total	**18**	**03**	**-**	**-**	**480**	**120**			**600**
207	Language Lab	-	-	2		-		45	30	75
*208/106 2008/1006	Physics / Chemistry Lab*	-	-	4		-		60	40	100
209	Environmental Engg. Lab	-	-	2		-		45	30	75
210	Machine Drawing	-	-	3		-		60	40	100
211	Discipline & Extra Curricular Activities	-	-	-	-	-		50	-	50
	Grand Total	**18**	**03**	**11**	**-**	**480**	**120**	**260**	**140**	**1000**

(Total 32 periods per week)

L = Lecture, **T** = Tutorial, **P** = Practical

Half of the intake of the students in a college / institute shall study Physics and rest of the students shall study Engineering Chemistry in 1st semester. In 2nd semester, the students shall interchange the subjects and vice-versa.

Students shall have to choose any two elective subjects one each from the following groups, other than their branch.

Group B (Elective II) 206

(a) Civil Engineering
(b Mechanical Engineering
(c)Instrumentation
(d) Information Technology
(e) Environmental Engineering

Minimum two electives from group B shall have to be offered for the intake of 240 and three electives (if possible) for the higher number of students.

DETAILED SYLLABI OF FIRST SEMESTER B.TECH

ENGLISH **[101]**

Class B. Tech. 1st 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	**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 (Cartesian Coordinates Only) • Curvature • 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 **[103 / 203]**

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	**Interference of Light** Preliminary: [Interference as superposition of waves in space. Intensity variation. Bright and dark fringes. Fringe width. Conditions for observing interference of Light.] • Newton's Rings: Theory and experiment for determining wavelength of light and refractive index of liquid • Michelson's Interferometer: Production of circular & straight line fringes, Determination of wavelength of light, Determination of wavelength separation of two nearby wavelengths • Interference in Optical Technology: elementary idea of anti reflection coating and interference filters **Polarization of Light** • Plane, circular and elliptically polarized light on the basis of electric (light) vector, Malus Law • Double Refraction: Qualitative description of 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 devices
II	**Diffraction of Light and Holography:** Preliminary: [Diffraction as a consequence of limiting wavefront. Fresnel's and Fraunhofer's diffraction. Interference and Diffraction. Diffraction at single slit qualitative description.] • Single Slit Diffraction: Quantitative description of single slit, Positions of maxima / minima and width of central maximum, Intensity variation • Diffraction Grating: Construction and theory, Formation of spectrum by plane transmission grating, Missing and overlapping of spectra, Determination of wavelength of light using plane transmission grating • Resolving Power: Geometrical & Spectral, Reyleigh criterion, Resolving power of diffraction grating, Electron microscope and its resolving power **Holography** • Holography versus photography, Basic theory of holography, Basic requirement of a holographic laboratory • Application of holography in microscopy and interferrometry
III	**Coherence** • Spatial and temporal coherence, Coherence length, Coherent time and 'Q' factor for light • Visibility as a measure of coherence • Spatial coherence and size of the source • Temporal coherence and spectral purity **Lasers** • Theory of Laser Action: Einstein's coefficients components of a laser, Threshold condition for laser action • Theory, design and application of He-Ne and Semiconductor lasers • Elementary ideas of Q-switching and mode locking **Optical Fibers** • Optical fiber as optical wave guide

	• Numerical aperture and maximum angle of acceptance
IV	**Quantum Mechanics:** Preliminary: [Origin of quantum nature of light: Black body radiation and photoelectric effect. Unability of wave theory of light to explain photoelectric effect. Einstein Photoelectric Equation. De-Broglie Matter waves. Uncertainity principle] • Compton effect and quantum nature of light • Schrödinger's Wave Equation: Time dependent and time independent cases • Physical interpretation of wave function and its properties, boundary conditions **Applications of Schrödinger's Equation** • Particle in one and three dimensional boxes • Degeneracy barrier penetration and tunnel effect • Tunneling probability, α – decay **Sommerfield's Free Electron Gas Model** • Postulates, Density of energy status, Fermi energy level
V	**Special Theory of Relativity and Nuclear Detectors** Preliminary: [Classical theory of relativity and Galalian Transformations. Michelson Morley Experiment. Explanation of negative result.] • Postulates of special theory of relativity, Lorentz transformations relativity of length, mass and time • Relativistic velocity addition, Mass – Energy relation • Relativistic energy • Velocity of light in moving media, Sagnac's formula and its application in optical gyroscopes **Nuclear Radiation Detectors** • Characteristics of gas filled detectors: general considerations • Construction, working and properties of : Ionization chamber, Proportional Counter, G.M. Counter and Scintillation counter

ENGINEERING CHEMISTRY **[1003 / 2003]**

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	**Water** • Common Impurities, Hardness • Determination of hardness by Clark's test and complexometric (EDTA) method, Degree of hardness **Municipal Water Supply** • Requisites of drinking water, Purification of water, Sedimentation, Filtration, Sterilization, Break point chlorination **Water for Steam Making** • Boiler troubles carry over, Corrosion, Sludge and scale formation and caustic embrittlement **Methods of Boiler Water Treatment** • Preliminary treatments, Preheating, Lime-Soda process, Permutit (Zeolite) process, Deionizer or Demineralizer, Feed water conditioning, Internal treatment, Blow down • Numerical problems based on water treatment (Lime-Soda process)
II	**Fuels** • Chemical Fuels: Origin and classification of fuels **Solid Fuels** • Coal, Proximate and ultimate analysis of coal, Significance of the constituents • Gross and net calorific value, Determination of calorific value by Bomb calorimeter • Coke – Metallurgical, Coke-carbonization process • Manufacture of coke-beehive Coke oven and byproduct coke ovens **Liquid Fuels** • Advantages, Petroleum and refining of petroleum, Synthetic petrol, Refining and reforming of gasoline • Knocking, Octane number, Knocking – Anti knocking agents, Cracking **Gaseous Fuels** • Advantages, Manufacture, Composition and calorific value of coal gas and oil gas • Determination of calorific value by Junker's calorimeter, Flue gas analysis by Orsat apparatus
III	**Phase Rule** • Statement, Definition and meaning of the terms involved • Application to one component system (Water and Sulphur systems) • Study of two component system (Ag-Pb system) **Polymers** • Plastics: Classifications and constituents of plastics and their uses, Preparation, properties and uses of polyethylene, Bakelite, Teryline and Nylon • Rubber: natural rubber, Vulcanization, Synthetic rubber viz. Buna-S, Buna-N, Butyl and Neoprene rubbers **Lubricants** • Classification, Types of lubrication, properties and uses • Viscosity & Viscosity index, flash & fire point, Cloud and pour point, Emulsification
IV	**Corrosion** • Definition and its significance, Theories of corrosion, Galvanic cell and concentration cell, Pitting and Stress corrosion, Protection against corrosion, Protective metallic coating **New Engineering Materials** • Brief idea of following: Superconductors, organic electronic materials, Fullerenes and Optical fibers
V	**Cement** • Manufacturing of Portland cement, Vertical shaft kiln technology • Chemistry of setting and hardening **Refractories** • Definition, properties, classification, properties of silica and fireclay refractories **Glass** • Preparation, varieties and uses

COMPUTER SYSTEMS AND PROGRAMMING **[104]**

Class B. Tech. 1st 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	**Introduction** • Types of computers and generations • Basic architecture of computers and its building blocks • Input-Output devices, Memories
II	**Number Systems** • Binary, octal, decimal and hexadecimal representation of numbers • Integers and floating point numbers • Representation of characters, ASCII and EBCDIC codes • Binary Arithmetic: addition, subtraction, complements
III	**Classification of Computer Languages** • Machine, assembly and high level languages • Brief idea of operating system • Assembler, compiler and interpreter **Programming in 'C'** • Need of programming languages, Defining problems • Flowcharts and algorithm development
IV	• Data types, constants, variables, operators and expressions • Input and output statements, Conditional and control statements, Arrays
V	• Structures and unions • Pointers • File handling

ELECTRICAL AND ELECTRONICS ENGINEERING **[105]**

Class B. Tech. 1st 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.

PHYSICS LAB **[106 / 208]**

Class B. Tech. 1st Semester	Evaluation
Schedule per week Practical : 4	Maximum Marks = 100 [Sessional (60) & Practical (40)]

S. No.	List of Experiments
OPTICS	
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 rings.
3.	To determine the specific rotation of Glucose (Sugar) solution using a Polarimeter.
4.	To determine the wave length of Sodium light by Michelson's Interferometer.
5.	To determine the wavelength of prominent lines of mercury by plane diffraction grating with the help of a spectrometer.
6.	To determine the dispersive power of material of prism for violet and yellow colors of mercury light with the help of a spectrometer.
7.	To determine the height of water tank with the help of a sextant.
8.	To measure the numerical aperture of an optical fiber.
9.	To determine the coherent length and coherent time of laser using He-Ne Laser.
10.	To determine the profile of He-Ne Laser beam.
ELECTRONICS / ELECTRICAL	
11.	To convert a galvanometer into an Ammeter of range 1.5 Amps and calibrate it.
12.	To convert a galvanometer into an Voltmeter of range 1.5 Volts and calibrate it.
13.	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.
14.	To determine the specific resistance of the material of a wire by Carey-Foster's bridge.
15.	To determine the ferromagnetic constants, retaintivity, permeability and susceptibility by tracing I-H curve using CRO.
16.	To study the variation of thermo emf of Iron-Copper thermo couple with temperature.
17.	To study the charge & discharge of a condenser and hence determine time constant. (Both current and voltage graphs are to be plotted)
18.	To determine the high resistance by the method of leakage, using a Ballistic Galvanometer.
19.	To determine dielectric constant of a liquid using moving coil Ballistic Galvanometer with standard parallel plate condenser.
20.	Study G. M. counting system and hence study absorption coefficient of Lead using lead sheets.

Note: Any 15 experiments from above list are to be performed.

ENGINEERING CHEMISTRY LAB **[1006 / 2008]**

Class B. Tech. 1st Semester	Evaluation
Schedule per week Practical : 4	Maximum Marks = 100 [Sessional (60) & Practical (40)]

S. No.	List of Experiments
(i) VOLUMETRIC ANALYSIS	
1.	Determination of Hardness of Water by different methods.
2.	Determination of available chlorine in water.
3.	Determination of Copper Sulphate Iodometrically.
4.	Determination of Ferrous Ammonium Sulphate.
5.	Determination of Sodium Hydroxide and Sodium Carbonate in a alkali mixture.
(ii) GRAVIMETRIC ANALYSIS	
6.	Determination of Barium as Barium Sulphate.
7.	Determination of Silver as Silver Chloride.
(iii) PHYSCICO CHEMICAL ANALYSIS	
8.	Determination of Viscosity of lubricating oil by Redwood Viscometer.
9.	Determination of Flash & Fire Point of lubricating oil by Pensky – Martin apparatus.
10.	Determination of Cloud and Pour Point of lubricating oil.
11.	Determination of Calorific Value of a solid fuel by Bomb Calorimeter.
12.	Determination of proximate analysis of Coal.
(iv) PHYSCICO CHEMICAL INSTRUMENTAL ANALYSIS / CHARACTERIZATION	
13.	Spectrophotometer (UV – Vis) analysis / characterization.
14.	Determination of pH by pH meter.
15.	Determination of Conductivity of aqueous solutions of salts.
16.	Determination of Sodium and Potassium by flame photometer.

Note: Experiments (i) and (ii) are compulsory; rest may be included on the availability of apparatus in the laboratory.

COMPUTER PROGRAMMING LAB **[107]**

Class B. Tech. 1st Semester	Evaluation
Schedule per week Practical : 2	Maximum Marks = 100 [Sessional (60) & Practical (40)]

S. No.	List of Experiments
1.	Simple input output program integer, real character and string. (Formatted & Unformatted)
2.	Conditional statement programs (if, if-else-if, switch-case)
3.	Looping Program. (for, while, do-while)
4.	Program based on array (one, two and three dimensions)
5.	Program using Structure and Union.
6.	Program using Function (with and without recursion)
7.	Simple programs using pointers.
8.	File handling.

PRACTICAL GEOMETRY **[108]**

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 [109]

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

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

ELECTRICAL AND ELECTRONICS LAB [110]

Class B. Tech. 1st 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.

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**

Note: Paper No. 203 and 2003 shall be same as 103 and 1003 in previous semester.

ENGINEERING MECHANICS **[204]**

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	• 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 fraction, 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

BASICS OF CIVIL ENGINEERING

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	**Civil Engineering Materials** • Stone, bricks, cement, lime, timber-types, properties, tests & uses • Mortars-cement, lime & mud, mortars, concrete proportioning, mixing, curing, properties, tests and uses • RCC, RBC, PSC, FRC, cellular concrete, ferro-cement- properties and uses • Steel, aluminum, copper, glass, plastics, bitumen, asbestos, paints, distempers, varnishes, solid and hollow concrete blocks, pre-cast stone masonry blocks, roofing and flooring tiles
II	**Building Construction** • Elements of building construction, planning with respect to orientation, utility of space, energy efficiency etc. • Foundations, conventional spread footing, raft, RCC footing, grillage and arch foundations, pipe foundations etc. • Super structure-stone and brick masonry walls, partition walls, bounds, plastering and pointing, floors, roofs • Doors, windows, lintels, staircases- types and their suitability • Dampness and its protection • Cost effective construction techniques in mass housing schemes
III	**Surveying and Positioning** • Introduction to surveying: Instruments – levels, theodolites, plane tables and related devices, electronic surveying instruments etc. • Measurement of distances – conventional and EDM methods, • Measurement of directions by different methods, measurement of elevations by different methods
IV	**Mapping and Sensing** • Mapping details and contouring, measurement of area, volumes • Applications of measurements in quantity computations • Survey stations, introduction to remote sensing and its applications
V	**Fluid Mechanics** • Pressure at a point, pressure variation in static fluid, absolute and gauge pressure, manometers • Forces on plane and curved surfaces, buoyant force, stability of floating and submerged bodies • Euler's equation and Bernoulli's equation, applications of Bernoulli's equation • Continuity equation, linear momentum equation for steady flow, velocity measurement and flow measurement.

MECHANICAL ENGINEERING **[206 (b)]**

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	**Basic Concepts** • Thermodynamic systems, properties, work and heat **Working Fluids** • Calculation of properties of air as ideal gas for various thermodynamic processes **First and Second Laws of Thermodynamics** • First Law of thermodynamics : Non-flow and flow energy equations • Second law statements, Carnot cycle
II	**Internal Combustion Engines** • Otto and Diesel cycle, thermal efficiency calculations • Classification, two and four stroke engines, construction and working of petrol and diesel engines **Gas Turbine Plants** • Ideal Bryton cycle, thermal efficiency calculations • Applications of gas turbine plants
III	**Steam Power Plant** • classification of steam generators • Construction and working of simple vertical, Babcock & Wilcox and La Mont boiler • Layout and working of steam power plant **Refrigeration and Air-conditioning** • Elementary concepts of refrigeration and air-conditioning • Vapour compression cycle, working principle and schematic diagrams of refrigerators, air coolers, air conditioners and ice plants
IV	**Manufacturing Processes** • Classification, principle of working, specification, applications of various machine tools, lathe, drilling, shaper and milling machines • Basic descriptions and applications of hot and cold working processes, forging, bending, shearing, drawing and extrusion
V	**Foundry** • Types of Pattern and allowances, Moulding Materials and Properties of Moulding Sand, Foundry Tools and equipments, Process of Green Sand Moulding. **Welding** • Gas welding : Principle and working of Oxy-acetylene Welding, Gas welding flames • Arc welding : Principle and working, TIG, MIG, Submerged arc and Plasma arc • Soldering and brazing

INSTRUMENTATION **[206 (c)]**

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	**Theory of Errors** • Accuracy and precision, repeatability, limits of errors • Systematic & random errors. modeling of errors, probable errors & standard deviation • Gaussian error analysis, combination of errors
II	**Electronic Instruments for Measuring Basic Parameters** • Electronic voltmeter, electronic multi-meters, digital voltmeters, vector impedance meter • RF power & voltage measurement, introduction to shielding and grounding
III	**Oscilloscopes** • CRT construction, basic CRO circuits, CRO probes • Oscilloscope techniques for measurement of frequency, phase angle and time delay
IV	**Signal Generation** • Introduction to oscillators, sine wave generators • Frequency synthesized signal generator, sweep frequency generators
V	**Transducers** • Classification, selection criteria, characteristic, construction, working principle, application of following transducers – RTD, thermocouples, thermistors, LVDT, strain gauges, bourdon tubes, tachogenerators, load cell, piezoelectric transducers

INFORMATION TECHNOLOGY **[206 (d)]**

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	**Introduction to Information Technology** • An overview of information technology, difference between data and information, quality of information, Information system • Important data types: text, image, graphics & animation, audio, video • Data compression and its techniques
II	**Internet** • Introduction to internet: www, web browser, search engine, email • Introduction to e-commerce and its advantage, security threats to e-commerce, Electronic payment system, • E-governance, EDI and its benefits • Introduction to cryptography, digital signature and smart card technology
III	**Data Communication** • Introduction to LAN, WAN, MAN: Transmission media • Data transmission type: Introduction to OSI reference model • Analog and digital signals, modulation • Network topologies, client-server architecture, ISDN
IV	**Introduction to Operating Systems** • Overview, definition and function of operating system, need of operating system • Batch processing, spooling, multi-programming, multi-processing • Time sharing, online processing, real time system
V	**Application Software** • Application software and their categories, system software • User interface GUI, spread sheet • Data base software, its features and benefits

BASIC ENVIRONMENTAL ENGINEERING

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	Introduction • General introduction to environment, biotic and abiotic environment • Environmental pollution, Adverse effect of pollution n environment, control strategies • Various acts and regulations for environmental protection
II	Water Pollution • Surface and underground sources of water • Water quality standards, impurities in water and their removal • River water pollution, eutrophication of lakes • Domestic waste water management
III	Air Pollution • Sources of air pollution, adverse effects on human health • Air quality standards, measures to check air pollution • Green house effect, global warming, acid rain, ozone depletion
IV	Solid Waste Management • Characteristics of solid waste, collection conveyance and disposal of solid waste • Recovery of resources sanitary land filling, wormy composting • Hazardous waste management
V	Ecology • Basics of species, biodiversity, population dynamics • Energy flow, ecosystems, environmental impact assessment • Renewable sources of energy, Sustainable development

II	• Flow chart of various stages of spinning of fiber to yarn • Flow chart of conversion of yarn to fabric
III	• Introduction to woven structure and fabric designs • Classification of fabrics • Introduction to non-woven, knitted and terry towels
IV	• Brief description of various chemical processing and mechanical finishing of the fabric
V	• Other textile products used as ropes, carpets, agriculture, sports, medicals, geo-textiles

LANGUAGE LAB **[207]**

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

S. No.	**Contents of the Subject**
1.	Phonetic symbols and transcription
2.	One word for many
3.	Synonyms and antonyms
4.	Word forms
5.	Words commonly mis-spelt and mis-pronounced
6.	Affixes
7.	Seminar Presentations
8.	Group Discussions

Note: The contents of syllabus for subjects 208 and 2008 are same as that of 106 and 1006. (I Semester)

ENVIRONMENTAL ENGINEERING LAB **[209]**

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

S. No.	**List of Experiments**
1.	Measurement of pH of water
2.	Measurement of hardness of water
3.	Measurement of residual chlorine in water
4.	Measurement of conductivity of water
5.	Measurement of chlorides in water
6.	Measurement of nitrate in water
7.	Measurement of fluoride in water
8.	Measurement of dissolves oxygen in water
9.	Measurement of total solids in sewage
10.	Measurement of dissolved solids in sewage
11.	Measurement of settelable solids in sewage

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**
1.	• Introduction to machine drawing • Dimensioning, locations and placing, • Orthographic projections: First & third angle methods
2.	Sheet 1: Orthographic Projections (3 Problems)
3.	Sheet 2: Sectional Views (3 Problems)
4.	Sheet 3: Riveted joints, lap joints, butt joints, chain riveting, zig-zag riveting
5.	Sheet 4: Screw fasteners, different threads, Nuts & bolts locking devices, set screws, foundation
6.	Sheet 5: Bearing, Plumber block
7.	Lectures on free hand sketches
8.	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

GUIDELINES FOR THE B.E. 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.

   It is proposed that syllabus should be carefully framed. Contents of the syllabus should be reasonable & should be covered in 12 weeks with ease and more focus should be given on the fundamentals. The entire syllabus/Course contents of a paper may be divided into 5 units with lecture plan specified.

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 2nd Semester to 8th Semester) whereas 2nd semester there will be two elective papers However in 1st Semester (IBE) there will be 5 theory papers of 100 Marks.

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. Total marks in practical and sessional in each semester should be 350 except in 8th semester, which will have 550 marks. However in the Ist Semester of first year BE total marks in practical and sessional will be 450.

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

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

7. 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.

8. 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.

9. 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)

10. 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.

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

12. There will be one elective subject in each semester starting form 2nd semester, except in second semester two elective are to be floated from the discipline outside the branch/ department one from each group.

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

14. 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.

15. The syllabi of the various subjects/discipline of Engineering are to be prepared by the respective BOS as per the prescribed format and specified nomenclature of subject codes thereof.

16. While preparing the teaching schemes, it may be kept in mind that the AICTE has recommended the following breakup of formal contact hours (Table I, Given below).

Table-I

i)	Languages, Social Sciences, Humanities & Introduction to Management	5 to 10%
ii)	Basis Science (General)	15 to 25%
iii)	Engineering Science and Technical Arts	15 to 25%
iv)	Professional (specific discipline based) subject	45 to 65%
v)	Elective belonging to (iv) above	About 10%

17. The course for study for III Semester onwards shall be separate for various disciplines of Engineering.