First Year of Bachelor of Technology

Subject Code	Subject Title	Periods per week		Evaluation weightages (%)			Course Credits
		L	T / P	TWA	MST	ESE	
Semester One (Common to All Branches)							
CH-101	Engineering Chemistry – I	2	1	10	15	75	5
PH-101	Engineering Physics – I	2	1	10	15	75	5
MA-101	Engineering Mathematics – I	3	1	10	15	75	7
SE-101	Engineering Mechanics – I	2	2	20	20	60	6
ME-101	Engineering Graphics – I	1	3	20	20	60	5
EE-101	Basic Electrical Engineering	3	2	20	20	60	8
CT-101	Computer Programming	2	2	20	20	60	6
ME-102	Workshop Practice – I	-	3	100	-	-	3
	Total Contact Hours: 30 (L:15, T/P: 15)			Total Credits: 45			
Semester Two (Common to All Branches)							
CH-201	Engineering Chemistry – II	2	1	10	15	75	5
PH-201	Engineering Physics – II	2	1	10	15	75	5
MA-201	Engineering Mathematics – II	3	1	10	15	75	7
SE-201	Engineering Mechanics – II	2	2	20	20	60	6
ME-201	Engineering Graphics – II	1	2	20	20	60	4
EE-201	Elements of Engineering	2	2	20	20	60	6
CT-201	Object Oriented Programming	3	2	20	20	60	8
ME-202	Workshop Practice – II	-	2	100	-	-	2
HM-201	Communication Skills	1	1	10	15	75	3
	Total Contact Hours: 30 (L:16, T/P: 14)			Total Credits: 46			

L: Lecture, T: Tutorial, P: Practical,
TWA: Term Work Assessment, MST: Mid-semester Tests, ESE: End Semester Examination

First year of bachelor of technology	Semester One
All Branches	CH-101:Engineering Chemistry 1
Periods per week:	Evaluation System
Lectures:2	Term Assessment : 10%
Practicals/tutorials: 1	Mid Semester Test: 15%
Credits : 5	End Semester Examination:75%

1	Water Treatment
	Hard and soft water, Hardness- types, units, estimation by EDTA. Numerical to calculate hardness from analytical data and EDTA estimation. Softening of water, boiling feed waters, Boiler troubles.
2	Polymers, Resins, Plastics and Elastomers
	Introduction and definition of Polymers and Elastomers , Classification of polymers, Functionality, Structure of polymers, Crystallinity of polymers, Properties of polymers, Effect of heat, Effect of heat on polymers, Modifying the properties of polymers, Applications of polymers, Miscellaneous polymers- Sponge, Rubber, Laminate,(Plywood, Plastics, Laminate Glass, Thermocole), Resins and Plastics, Classification, Compounding of Plastics, Commodity Plastics-Polyolefins, PVC, Polystyrene,Polyamide, Polyester, Bakelite, Rubber,- Cis and Transisomer, Properties and Drawbacks, Vulcanization, Synthetic Rubber- Manufacture, Properties and uses of Polyurethen, Silicone rubber.
3	Lubricants
	Definition of lubricants, Lubrication, Purpose of lubrication, Mechanisms of lubrication – Fluid, Boundary, and extreme pressure lubrication, Classification of lubricants, - solids, semi-solids, liquids, liquids emulsions, Properties of ideal lubricants – Viscosity, viscosity index, flash and fire point, cloud, and pour point, Saponification value, acid value(definition and significance), Numerical problems based on sap value and acid value, Industrial oils – machine and engine oils, Spindle oils, Refrigeration oils, Circulating oils ,Gear oils, Steam cylinder oils.
4	Biotechnology
	Introduction, Scope and importance of biotechnology [Medicine, Industry, Agriculture, Industrial applications – Microbial enhanced oil recovery] – Microbes in mining – plastics.
5	Manufacture – Biodegredable plastics
	Biomass for energy production – fuel alcohol production.
6	Composite materials
	Introduction, Constitution, Types of composite – particulate, layered, fibre, reinforced, Hybrid composites, Structural composites – laminar composites sandwich panels.
	Practicals:
1	Determination of Total Hardness of water
2	Determination of Chloride in water
3	Determination of Sponification value of an oil
4	Determination of Viscosity by Red Wood Viscometer
5	Determination of flash point by Abel's apparatus
6	Determination of flash point by Pensky – Martins apparatus
	Reference Books:
1	Engineering Chemistry, Jain and Jain.
2	Text Book of Engineering , M.M.Uppal
3	Engineering Chemistry , S.S.Dara

First year of bachelor of technology	Semester one
All branches	**PH 101: Engineering Physics 1**
Periods per week:	Evaluation system
Lectures: 2	Term Asessment: 10%
Practicals/tutorials: 1	Mid semester test: 15%
Credits : 5	End Semester examination: 75%

1	Crystal Structure	
		Fundamentals of crystal structures, monoatomic and diatomic cubic crystals, $CaCl_2$„ NaCl, Diamond, Barium Titanate, Miller Indices, Miller Planes and directions, Ligancy and critical radius ratios in ionic crystals.
2	Semiconductors	
		Formation of energy bands and classification of solids, physics of semiconductor junction (bipolar), characteristics of transistor, concept of Fermi level, energy gap, temperature dependence.
3	Acoustics and Ultrasonics	
		Elementary acoustics, Sabine's formula with derivation, piezo – electric and magnetostriction effects, production of ultrasonic waves and its applications, - echo sounding, thickness measurement, cavitation and non –destructive testing
4	Electricity and Magnetism	
		Motion of charges, charged particles in electric and magnetic fields, magnetic and electrostatic focusing systems and its use in CRO Construction and working of CRO, uses of CRO.
	Practicals:	
	1	Study of crystal structure – 1
	2	Study of crystal structure – 2 (Miller Indices)
	3	Characteristics of PN Junction Diode
	4	Ultrasonic Interferometer
	5	Ultrasonic processor and cleaner
	6	Cathode Ray Oscilloscope
	References Books:	
	1	Engineering Physics , R.K.Gaur and S.L.Gupta
	2	Material Science and Engineering , V. Raghavan
	3	A Text Book of Engineering Physics, M.N.Avadhanalu, P.G.Khirsagar
	4	Solid State Physics , Kittle

First year of bachelor of technology	Semester one
All branches	MA101: Engineering Mathematics 1
Periods per week:	Evaluation system
Lectures: 3	Term Asessment: 10%
Practicals/tutorials: 1	Mid semester test: 15%
Credits : 7	End Semester examination: 75%

1	Complex Numbers	
		Argand diagram, Cartesian, polar and exponential form of complex number, De'Movire's theorem, Power and roots of exponential and trignomerric functions, Hyperbolic nad logarithmic functions, inverse trigonometric functions.
2	Vector Algebra and Vector Calculus	
		Vector triple product and product of 4 vectors, Differentiation of a vector function of a single scalar variable. Theorems on derivatives of sum and product, Curves in space,Serret Frenet formulae curvature, torsion, osculating plane, normal plane and rectifying plane, Mean value theorems, Rolles theorem, Lagrange's and Cauchy's mean value theorem, Idea of convergence and divergence series, Taylor's and Maclaurin's series.
3	Differential Calculus	
		Successive differentiation of nth derivatives of function such as $(ax + b)^m$, $(ax + b)^{-1}$ e^{ax}. Sin $(ax + b)$, cos $(ax + b)$, log $(ax + b)$, e^{ax} sin $(bx + c)$, e^{ax} cos $(bx + c)$, Leibnitz's theorem inderterminate forms and L'Hospital rule.
4	Partial Differentiation	
		Partial derivatives of first and higher order, total differentials, composite functions and implicit functions, Euler's theorem on homogeneous functions with two and three independent variables, Errors and approximations, Maxima and minima of a function of two variables.
	Assignments:	
		Assignments based on syllabus
	Reference Books:	
	1	Higher Engineering Mathematics, Dr.B.S.Grewal-Khanna Publications
	2	A Text Book of Applied mathematics, P.N & J.N.Wartikar - Pune Vidyarthi Griha
	3	Advanced Engineering Mathematics, Erurin Kreyszing – Wiley Eastern Limited
	4	Engineering Mathematics 1, G.V.Kumbhojkar-C.Jamnadas & Co.
	5	Applied Mathematics 1, Mrs.N.M.Kumthekar – Nandu Publications

First Year of Bachelor of Technology	Semester One
All Branches	**SE-101: Engineering Mechanics 1**
Periods per week:	Evaluation System:
Lectures: 2	Term Assessment: 20%
Practicals \ Tutorials: 2	Mid Semester Test: 20%
Credits: 6	End Semester Examination: 60%

1	System of Coplanar Forces	
		Resultant of Concurrent force system, moment of force about any point, Couple, Varignon's theorem, distributed forces in planes in planes. Resultant of Parallel force system General force system
2	Equilibrium of System of Co-planar Force	
		Condition of equilibrium for 1.Concurrent force system. 2. Parallel force system. 3. General force system, Type of supports, Determination of reaction at supports for various types of determinate structure, (without internal hinge), centroid of plane area, center of gravity of wires bent in different shapes, Area Moment of Inertia and mass Moment of Inertia, Analysis of pin jointed plane frame/ truss by method of joint and method of section, introduction to Graphic static's.
3	Friction :	
		Law of friction, equilibrium of bodies on inclined plane. Application to problems involving wedge and ladders, screws and belt friction – only simple problems involving tension on both sides of pulley to be covered.
4	Principle of Virtual Work and Forces in Spaces	
		Principle of Virtual Work – application to link system with single degree of freedom only, Forces in Space – 1. Resultant and equilibrium of concurrent force system. 2. Moment of force about a point and about a axis.
	Assignments:	
	1	Simple Beams
	2	Bell Crank Lever
	3	Principle of Virtual Work
	4	Chain Link
	5	Simple Jib Crane
	6	Simple Roof Truss
	7	Simple Screw Jack. (Friction)
	8	Centroid of Plane Area
	Reference Books:	
	1.	Mechanics for Engineering, Beer and Johnson. McGraw - Hill
	2	Engineering Mechanic, Schaum Out line Series – Mclean and Nelson
	3	Engineering Mechanics, R.C.Hibbeler – Pearson Education Asia
	4	Engineering Mechanics , A.K. Tayal – Umesh Publication
	5	Engineering Mechanics , Timoshenko and Young - McGraw Hill
	6	Engineering Mechanics, Singer – McGraw - Hill

First Year of Bachelor of Technology	Semester One
All Branches	ME-101: Engineering Graphics-1
Periods per week:	Evaluation System:
Lectures: 1	Term Assessment: 20%
Practicals \ Tutorials: 3	Mid Semester Test: 20%
Credits: 5	End Semester Examination: 60%

1	Introduction
	Drawing instruments, symbolic lines, lettering, dimensioning system as per I.S.conventions, geometrical constructions and tangential arcs (01)
2	Engineering Curves
	Ellipse, parabola and hyperbola, by Focus directrix Method & Rectangle Method, Cycloid, Involute by various methods including their tangents and normals (02/20)
3	Projections
	Projections of points and lines to both the reference planes including HT and VT (excluding application problems), Projection of planes inclined to both the reference planes(excluding H.T and V.T)
4	Projections of Right Regular Solids
	Cube, prism, pyramid, tetrahedron, cylinder & cone with inclined to both H.P and V.P.(excluding spheres, hollow and composite solids)
5	Orthographic Projections
	Multi-view orthographic projections of simple machine parts by first angle method of projection(02/20)
6	Sectional View
	Sectional view of simple machine parts (full section, half section, offset section, partial section, removed and revolve sections) (01/10)
	Term Work Assignments :
1	Term work shall consist of the following :-
2	(all drawings to be prepared during practical class, hours on half imperial drawing
3	sheets wit at least three problems on each sheet)
4	Two drawing sheets on engineering curves
5	Two drawing sheets on projections of point and lines
	Two drawing sheets on projections of planes
	Two drawing sheets on projections of solids
	Two drawing sheets on orthographic projections and sectional views.
	Each student should appear for one written test conducted during the term.
1	The distribution of term marks shall be as follows:-
2	Written Test :- 10 Marks
3	Term Work :- 10 Marks
	Extra work/ Perception/Distinctiveness/Creativity/ Initiative :- 05 Marks
	Reference Books:
1	Graphic Science , Thomas.E.French ET&AT – McGraw Hill
2	Engineering Graphics, Glesecke ET&AT – Macmillan Co
3	Engineering Drawing , S.Bogolyubov – Mir Publishers

First Year of Bachelor of Technology	Semester One
All Branches	**EE-101 : Basic Electrical Engineering -1**
Periods per week:	Evaluation System:
Lectures: 3	Term Assessment: 20%
Practicals \ Tutorials: 2	Mid Semester Test: 20%
Credits: 8	End Semester Examination: 60%

1	Introduction	
		Effect of temperature on resistance, Resistance temperature coeff, Work, Power energy and relationship between Thermal, mechanical and electrical units.(problems based on above topics)
2	D.C.Networks	
		Star-delta transformation, series-parallel combination of network, Kirchoff's law, Loop and nodal analysis, Superposition Theorem, Thevenin's & Nortons theorem, aximum power transfer theorem.
3	Magnetic Circuits	
		BH Curve, expression for eddy current loss, hysteria loss, series-parallel magnetic circuits, Inductance, self inductance, mutual inductance and emf induced due to self and mutual inductance, coeff of coupling energy stores.
4	A.C.Circuits	
		Sinusoidal voltage and current wave forms , RMS and average value, R-L,R-C,RLC series parallel circuits, phaser diagram, power factor, series and parallel resonance
5	Three Phase Balanced System	
		Three phase voltage generators and waveform, star and delta balanced systems. Relationship between phase and line quantities, phase diagram power in a three phase circuit
6	Generation of Electricity	
		Basic concepts about thermal, hydro & nuclear power stations
	Assignment:	
	1	Verification of Kirchoff's Current and Voltage Law
	2	Verification of Superposition theorem
	3	Verification of Thevenin's Theorem and Norton's Theorem
	4	Study of Single Phase series and parallel circuits
	5	Verification of voltage and current relationship of Balanced Star and Delta networks
	6	Study of series Resonance
		Six Assignments based on the syllabus
	Reference Books:	
	1	Principle of Electrical Engineering , A.Vincent Deltoro PHI
	2	Principles in Electrical Engineering, S.Parker Smith. Oxford university

First Year of Bachelor of Technology	Semester One
All Branches	CT-101 : Computer Programming-1
Periods per week:	Evaluation System:
Lectures: 2	Term Work Assessment: 20%
Practicals \ Tutorials: 2	Mid Semester Test: 20%
Credits: 6	End Semester Examination: 60%

1	Preliminaries
	Role of programming languages, Programming paradigm, Algorithm, Programming constraints: Selection, Looping, Sequence. Language evaluation criteria, Practices and attributes of good programming languages
2	Data Types
	Character set, variable names, data types, constants and declaration.
3	Operators
	Operators & expressions, precedence of operators.
4	Basic input and output
	Basics input and output, formatted input and output
5	Control Structure:
	Concept of a block statement, if, if –else, switch, looping structures – For, Do, While
6	Functions
	Parameter passing, Use of pointers, Recursion
7	Arrays
	One dimensional, Two dimensional and multi dimensional arrays, their limitations, their initialization & manipulation
8	Strings
	String processing
9	Structure and Unions
	Basic of structures, initialization
10	File Management
	Low level file access error handling
	Assignments :
1 2 3 4 5	Each candidate shall submit a journal in which the candidate has recorded at least 15 programs based on the topics given below. The programs can be implemented in Turbo C/Microsoft ANSI C. Algebraic problem – Newton Raphson, quadratic roots etc. Array based searching sorting – binary search, bubble sort. Matrix manipulations using real and complex elements. Banking applications – fixed deposit interest calculations, loans repayments. Text processing – extracting of words, searching sorting of algorithm. Study of internal and external Dos commands.
	Reference Books:
1 2 3 4 5	Programming Language, B.W.Kernighan, D.M.Ritchie - PHI Computer Programming UNIX &C , M.P.Bhave, S.A.Patekar, Nandu Programming With C , Schaum's - TMH Fundamentals of Programming Language, V.Rajaram, PHI C The Complete Reference, Herbert Schildt - TMH

First Year of Bachelor of Technology	Semester One
All Branches	**ME-102: Workshop Practice - I**
Periods per week:	Evaluation System:
Lectures: 0	Term Assessment: 100%
Practicals \ Tutorials: 3	Mid Semester Test: -
Credits: 3	End Semester Examination: -

1	Fitting	
		Use and setting of fitting tools for marking, center punching, chiping, cutting, filing, drilling, taping
	Carpentry	
		Use and setting of hand tools like hack saws, hack planes, chisels and gauges for construction for various joins, Demonstration for wood training and Report writing
3	Electrical board wiring	
		House wiring, stair case wiring, godown wiring, 3 Phase wiring.
4	Plumbing	
		Use of plumbing tools, spanners, pipe wrenches, threading dies, demonstration of preparation of domestic plumbing lines involving fixing of a water tap and use of coupling, elbow, tee and union etc
	Assignment :	
		Batch size: 12 Students. Turns: 2 students per trade of 3 hrs each.
	1	Term works to include one simple job involving fitting operations.
	2	Term works to include one simple job involving a joint.

First Year of Bachelor of Technology	Semester Two
All Branches	**CH-201: Engineering Chemistry - II**
Periods per week:	Evaluation System:
Lectures: 2	Term Assessment: 10%
Practicals \ Tutorials: 1	Mid Semester Test: 15%
Credits: 5	End Semester Examination: 75%

1	Corrosion and its Control	
	1.1	Introduction: corrosion in dry and moist atmosphere, electrochemical theory of corrosion (mechanism), galvanic as well as concentration cell theory, factors influencing rate of corrosion
	1.2	Types of corrosion: (water line, differential aeration, pitting, soil)
	1.3	Effect of atmospheric pollution on corrosion (moisture, corrosive gases, dust particles)
	1.4	Corrosion control: by proper selection of material and design, by cathodic protection (impressed current-sacrificial anode), by anodic protection, by protective coating (metallic coatings: galvanizing, tinning, paints coatings)
2	Fuels	
	2.1	Introduction: classification of fuels (based on physical state, origin in brief), characteristics of good fuel, calorific value (high and low, units, Dulong's formula with numerical problems)
	2.2	Solid fuels, composition of coal: types of coal, selection of coal, commercial types of coal (steam coals, gas coals, house coals), analysis of coal (proximate and ultimate with significance)
	2.3	Liquid fuels: Petroleum (composition, classification, mining and refining), Cracking (thermal, catalytic; principle with reactions), Knocking (Octane number, Cetane number, anti-knocking agents
	2.4	Gaseous fuels: composition and properties of natural gas, LPG and coal gas
	2.5	Other sources of energy: wind power, water power, geothermal power, tidal power
3	Commonly used metals and alloys	
	3.1	Cast iron, wrought iron, steel, alloy steels
	3.2	Copper, brasses and bronzes
	3.3	Aluminum, duralumin and magnalumin
	3.4	Nickel alloys and solder alloys (with respect to composition, properties and applications)
4	Pollution and its control	
	4.1	Definition of pollution and pollutants
	4.2	Introduction to air pollution, acid rains, green house effect, Ozone layer, smog methods of reducing atmospheric pollution in brief
	4.3	Introduction of water pollution, treatment of waste water, solid waste materials and their treatment, noise pollution
5	Cements and adhesives	
	5.1	Introduction to cements: chemical composition of cements, setting and hardening of Portland cement, types of cements (white, waterproof, Portland, pozzolanic, high alumina)
	5.2	Introduction to adhesives, classification of adhesives, bonding processes by adhesives
	Practicals:	
	1	Estimation of iron in plain carbon steel
	2	Determination of zinc in brass
	3	Nickel in steel alloy
	4	Determination of lime in cement
	5	Nitrogen in fuel
	6	Transport fuel adulteration
	Recommended books:	
	1	Engineering Chemistry, Jain and Jain
	2	Text book of Engineering Chemistry, M M uppal
	3	Engineering Chemistry, S S Dara

First Year of Bachelor of Technology		**Semester Two**
All Branches		**PH-201: Engineering Physics - II**
Periods per week:		Evaluation System:
Lectures: 2		Term Work Assessment: 10%
Practicals \ Tutorials: 1		Mid Semester Test: 15%
Credits: 5		End Semester Examination: 75%

1	Optics	
	1.1	Interference: fundamentals of interference, interference in thin films, colors of thin films, Newton's rings, wedge shaped films, testing optical flatness of surface, antireflection coating
	1.2	Diffraction: fundamentals of diffraction, Fraunhoffer diffraction at a single slit, double slit and diffraction at N parallel slits, grating
	1.3	Optical fibre: principle, working and types
2	X-rays	
		Production, origin and properties of x-rays, Moseley's law, x-ray diffraction, Bragg's law, spectrometer and determination of crystal structure
3	Laser	
		Fundamentals of laser, types of laser, applications
4	Nuclear physics	
		Properties of nucleus, natural and artificial radioactivity, transmutation equation and Q-value of nuclear reactions, fission, fusion
	Practicals:	
	1	Newton's rings
	2	Wedge shape method
	3	G M Counter – I (inverse square law)
	4	G M Counter – II (optical activity)
	5	LASER diffraction
	6	Study of fibre optics
	7	Fibre optics educator
	Recommended books:	
	1	A text book of optics, N Subramanyam and Brij Lal
	2	A textbook of engineering, M N Avadhanulu and P G Kshirsagar
	3	Fundamental of optics, Jenkins and White
	4	Nuclear Physics, Kaplan

First Year of Bachelor of Technology	Semester Two
All Branches	**MA-201: Engineering Mathematics – II**
Periods per week:	Evaluation System:
Lectures: 3	Term Work Assessment: 10%
Practicals \ Tutorials: 1	Mid Semester Test: 15%
Credits: 7	End Semester Examination: 75%

1	Improper integrals	
		Beta and gamma functions
		Error functions
		Differential under integral sign
2	Integral calculus	
		Curve tracing
		Rectification of plane curves
		Double and triple integration
		Idea of Jacobian for evaluating integrals with transformation
		Evaluation of double integration by changing order of integration, changing the polar form
		Applications of double and triple integration to area, mass and volume computations
3	Differential equations	
		Differential equations of first order and first degree, exact differential equation and those that can be reduced to exact by use of integrating factors.
		Linear differential equation, Bernoulli's equation and equations reducible to liner equations, linear differential equations of higher order with constant coefficients, complimentary functions, particular integrals
		Generalized rule and P.I. for equation of type $f(D)y = x$ where $x = e^{ax,}$ $\sin(ax+b)$, $\cos(ax+b)$, x^m, $e^{axV,}$ xV where V is a function of x only.
		Cauchy's linear homogeneous equation and Legendre's different equation. Method of undetermined coefficients and variation of parameter method.
	Recommended Books:	
	1	Higher Engineering Mathematics, B S Grewal
	2	A Text book of Applied Mathematics, P N Wartikar and J N Wartikar
	3	Engineering Mathematics, G V kumbhojkar
	4	Applied Mathematics, Dr U B Jangam, K P Patil and N M Kumthekar

First Year of Bachelor of Technology	Semester Two
All Branches	**SE-201: Engineering Mechanics – II**
Periods per week:	Evaluation System:
Lectures: 2	Term Work Assessment: 20%
Practicals \ Tutorials: 2	Mid Semester Test: 20%
Credits: 6	End Semester Examination: 60%

1		Kinematics of particle
	1	Rectilinear motion, uniform acceleration, non-uniform acceleration, displacement time, acceleration time and velocity time curves and their application
	2	Velocity and acceleration, rectangular co-ordinate system, motion along plane curved path, tangential and normal components of acceleration
	3	Projectile motion
	4	Simple harmonic motion
	5	Relative velocity
2		Kinematics of rigid bodies
	1	Translation, pure rotation and plane motion of rigid bodies
	2	Instantaneous center of rotation for bodies in plane motion
3		Kinetics of particles and rigid bodies
	1	D'Alembert principle, equation of dynamic equilibrium in linear and curvilinear motion
	2	Linear momentum, impulse momentum, principle of conservation of momentum
	3	Impact of solid bodies, elastic impact, semi-elastic impact, plastic impact
	4	Work done by force, potential and kinetic energy and work-power energy equation, principle of conservation of energy
		Practicals:
	1	'g' by falling weight method
	2	Plane motion of bodies
	3	M.I. of fly wheel
	4	Compound pendulum
	5	Torsional pendulum
	6	Principle of conservation of energy (connected bodies with flywheel)
	7	Stiffness of spring
		Reference books:
	1	Mechanics for Engineers, Beer and Johnston, McGraw Hill
	2	Engineering Mechanics, Mclean and Nelson, Schaum Outline Series
	3	Engineering Mechanics, R C Hibbeler, Pearson Education
	4	Engineering Mechanics, A K tayal, Umesh
	5	Engineering Mechanics, Timoshenko and Young, McGraw Hill
	6	Engineering Mechanics,, Singer, McGraw Hill

First Year of Bachelor of Technology	Semester Two
All Branches	**ME-201: Engineering Graphics – II**
Periods per week:	Evaluation System:
Lectures: 1	Term Work Assessment: 20%
Practicals \ Tutorials: 2	Mid Semester Test: 20%
Credits: 4	End Semester Examination: 60%

1		Sections of solids
		Sections of cube, prism, pyramid, tetrahedron, cylinder and cone cut by planes perpendicular to at least one reference plane
2		Development
		Development of lateral surface of cut solids (as above), cut by straight and curved cutting planes and solids containing holes
3		Free hand sketches
		Thread profiles: IS conventions of external and internal threads, cross sections of drilled and tapped holes
		Bolt heads: hexagonal, square, cylindrical
		Nuts: hexagonal, square wing and capstan
		Set screws: heads and ends
4		Isometric view
		Isometric view / projections of simple blocks (plain and cylindrical objects excluding spheres)
5		Reading of orthographic projections and sectional views
6		Introduction to computer 2-D drafting
		Term Work Assessment Assignments:
	1	One drawing sheet on sections of solids
	2	One drawing sheet on development
	3	One drawing sheet on free hand sketches
	4	One drawing sheet on isometric views
	5	Two drawing sheets on reading of orthographic projections and sectional views
	6	One print out of computer aided 2-D drafting for two problems on orthographic projections and sectional views
		Note: all the above drawings to be prepared using half imperial sheets with at least three problems on each sheet.
		Recommended Text Books:
	1	Machine drawing, N D Bhat
	2	Engineering Drawing –II, M B Shah and B C Rana
	3	Engineering Drawing – II, N H Dubey
		Reference Books:
	1	Graphic Science, T E French and Others, McGraw Hill
	2	Engineering Graphics, Glesecke and Others, Macmillan
	3	Graphics for Engineers AutoCAD R13, J H Earle

First Year of Bachelor of Technology	Semester Two
All Branches	**EE-201: Elements of Engineering**
Periods per week:	Evaluation System:
Lectures: 2	Term Work Assessment: 20%
Practicals \ Tutorials: 2	Mid Semester Test: 20%
Credits: 6	End Semester Examination: 60%

1		D C Motors
		Construction and principle of operation, emf and torque equation, types of motors, torque – speed characteristics, different speed control methods (numerical problems based on above)
2		Single phase transformers
		Construction, principle of operation, emf equation, transformer losses, transformer on no load and on load, equivalent circuit and phasor diagram, open circuit and short circuit test, regulation and efficiency, all day efficiency (numerical problems based on above)
3		Measuring instruments
		Production of deflecting torque, control torque and methods of damping
		PMMC: construction, principle of operation, deflecting torque equation,, scale use as ammeter and voltmeter, extension of range
		Electro-dynamometer: construction, principle of operation, torque equation, use as ammeter, voltmeter and wattmeter (numerical problems based on above)
4		Transducers
		Study and application of following transducers: strain gauge, LVDT, thermo-couple, thermistors, piezo electric transducer
	Practicals:	
	1	Magnetization characteristics of a d.c. machine
	2	Speed control of d.c. shunt motor
	3	Open circuit and short circuit test on transformer to calculate efficiency, regulation, equivalent circuit and parameters
	4	Efficiency and regulation of a transformer by direct load test
	5	Extension of range of a PMMC meter
	6	Measurement and verification of power in single phase a.c. circuit
	7	Study of LVDT
	Recommended Books:	
	1	Electrical machinery, P S Bimhra, Khanna publishers
	2	A course in electrical and electronics measurements and instrumentation, A K Sawheny, Dhanpat Rai & Co
	3	Instrumentation devices and system, C S Rangan, G R Sharma, and V S V Mani, Tata McGraw Hill

First Year of Bachelor of Technology	Semester Two
All Branches	**CT-201: Object Oriented Programming**
Periods per week:	Evaluation System:
Lectures: 3	Term Work Assessment: 20%
Practicals \ Tutorials: 2	Mid Semester Test: 20%
Credits: 8	End Semester Examination: 60%

1	C++ fundamentals (moving from C to C++)
	Data types, preprocessor directives, input and output, manipulators (endl, setw(), setprecision), control structures, functions, arrays, difference between C and C++
2	Objects and classes
	Data hiding and encapsulation, private and public members, member functions, accssing class members, object as function parameters, static data and member functions, friend functions and friend classes
3	Object installation and cleanup
	Constructors, parameterized constructors, destructors, constructor overloading, constructors with default arguments, default constructors and copy constructors
4	Function and operator overloading
	Function overloading, functions with default arguments, inline functions, unary operator overloading, operator returning value, binary operator overloading such as arithmetic, relational and assignment operators, overloading of insertion and extraction operators.
5	Inheritance
	Derived and base class, protected members, overriding functions, private, protected and public inheritance, derived class constructors, types of heritance, virtual base class and inheritance relationship
6	Pointers
	Pointer concepts, pointer variable, address operator, referencing and de-referencing, void pointers, pointer to functions and objects, THIS pointer, pointers and memory management, New and Delete operators, dynamic memory allocation, linked lists, (single block and many small blocks of memory)
7	Virtual functions and polymorphism
	Polymorphism and its types, need for virtual functions, pointer to derived class object, pure virtual functions, abstract classes, dynamic or late binding
8	Graphics
	Text mode graphics, graphic mode graphics, colors and pallets, use of setting, drawing, filling and text functions, drawing various shapes, animation using Getimage and Putimage functions, storing image on the disk
9	File handling
	Files and streams, opening and closing a file, text and binary files
10	Object oriented system development
	Programming language before object orientation and advantages of object oriented analysis, design and implementation, case study
	Practicals:
	1	Simple programs to implement object passing and returning object
	2	Class for complex variables
	3	Data manipulation classes
	4	Matrix manipulation class with operator overloading
	5	String class
	6	Programs on inheritance and its types
	7	Programs on graphics and animated graphics
	Text Book:
	Object Oriented Programming with C++, M P Bhave and S A Patekar, Pearson Education
	Reference Books:
	1	The annotated C++: reference manual, ANSI base document, M A Ellis and B Stroustrap, Pearson Education
	2	Programming with C++, J R Hubbard, Schaum's outline series, McGraw Hill
	3	Object oriented programming with C++, E Bslguruswamy, Tata McGraw Hill
	4	The complete reference: C++, H Scildt, Tata McGraw Hill

First Year of Bachelor of Technology	Semester Two
All Branches	**ME-202: Workshop Practice - II**
Periods per week:	Evaluation System:
Lectures: 0	Term Assessment: 100%
Practicals \ Tutorials: 2	Mid Semester Test: -
Credits: 2	End Semester Examination: -

1	Fitting	
		Use and setting of fitting tools for marking, center punching, chipping, cutting, filing, drilling, tapping
		Term work to include one simple job involving above mentioned operations
2	Carpentary	
		Use and setting of hand tools like hack saw, jack plane, chisels and gauges for construction of various joints
		Term work to include one simple job involving a joint
		Demonstration for wood turning and report writing
3	Forging (smithy)	
		At least one job for change of cross sectional area like round into rectangular or making a ring from a round bar
4	Welding	
		Edge preparation
		Term work to include one simple job having lap or butt welding of plates or fillet welding
5	Plain turning	
		Operations: simple turning, step turning, taper turning
		Term work to include one simple job involving above mentioned operations
6	Electrical board wiring	
		House wiring, staircase wiring, go-down wiring, three-phase wiring
7	Printed circuit boards	
		Layout drawing, +ve and -ve film making, PCB etching and drilling, tinning and soldering techniques
8	Sheet metal and brazing	
		Use of sheet metal working hand tools, cutting, bending and spot welding
9	Plumbing	
		Use of plumbing tools, spanners, wrenches, threading dies, demonstration of preparation of a domestic plumbing line involving fixing of a water tap and use of coupling, elbow, tee, tee and union etc.
10	Masonry	
		Use of mason's tools like trowel, hammers, spirit level, square, plumb, line and pins etc.
		Demonstration of mortar making, single and one and half brick masonry, english and flemish bonds, block masonry, pointing and plastering

First Year of Bachelor of Technology	Semester Two
All Branches	**HM-201: Communication Skills**
Periods per week:	Evaluation System:
Lectures: 1	Term Assessment: 10%
Practicals \ Tutorials: 1	Mid Semester Test: 15%
Credits: 3	End Semester Examination: 75%

1		Communication
		Definition; processes and components, barriers to communication, technology enabled communication – drafting, word processing, creating e-mail messages
2		Communication skills
	1	Verbal:
		Oral - speaking with confidence, voice modulation, word stress, tone, pitch, pronunciation
		Written – 7C's of style, mechanics of writing: writing effective sentence patterns, paragraphs – topic sentence cohesiveness, summarization, comprehension – passages from science and technology with objective type question, vocabulary – synonym – antonym, grammar
	2	Non-verbal communication: body language, as aid in speaking
3		Communication forms
	1	Oral: giving short speeches, group discussion techniques
	2	Written: business correspondence – layout principles, letters of enquiry, claims and adjustments, critical evaluation of a piece of writing
		Term Work assignments:
	1	Written
		Case study on communication practice
		Sentence pattern and paragraph writing
		Summarization
		Comprehension of technical material
		Basic principles of letter writing
		Letter of enquiry / claims / adjustment
	2	Oral
		One presentation of speech / participation in group discussion
		Reference Books:
	1	Technical Communication: Principles and Practice, Meenakshi Raman, Sangeeta Sharma, Oxford
	2	Business Communication Today, Sushil Bahl, response Books