CORE COURSES
BACHELOR OF TECHNOLOGY

(COMMON TO ALL BRANCHES)
FOR 2004 BATCH ONWARD

1ST SEMESTER

GROUP-A

Course No.	Subject	L	T	P	Marks		Total Marks	Duration of Exam Hrs.
					Int.	Ext.		
PH-101	Engg. Physics	3	1	-	40	60	100	3
AM-101	Engg. Mathematics-I	4	2	-	40	60	100	3
HU-101	Communication Skills	3	0	0	40	60	100	3
EE-101	Basic Electrical & Electronics Engg	4	1	-	40	60	100	3
PH-103	Engg. Physics Laboratory	-	-	2	30	20	50	-
EE-103	Basic Electrical & Electronics Engg Lab	-	-	2	30	20	50	-
ME-104	Manufacturing Practice	1	-	6	60	40	100	-
HU-103	Communication Skills Lab	0	0	2	30	20	50	
Total		15	04	12	310	340	650	

CONTACT HOURS: 31

GROUP-B

Course No.	Subject	L	T	P	Marks		Total Marks	Duration of Exam Hrs.
					Int.	Ext.		
CH-101	Engg. Chemistry	3	1	-	40	60	100	3
AM-101	Engg. Mathematics-I	4	2	-	40	60	100	3
ME-101	Elements of Mech. Engg.	4	1	-	40	60	100	3
ME-102	Engg. Drawing	1	-	6	40	60	100	3
CS-101	Fundamentals of Computer Programming & IT	3	-	-	40	60	100	3
CS-103	Fundamentals of CP & IT laboratory	-	-	4	30	20	50	-
CH-103	Engg. Chemistry Laboratory	-	-	2	30	20	50	-
ME-105	Computer Graphics Lab	-	-	2	30	20	50	-
Total		15	04	14	290	360	650	-

CONTACT HOURS 33

2nd Semester

GROUP-A

Course No.	Subject	L	T	P	Marks		Total Marks	Duration of Exam Hrs.
					Int.	Ext.		
CH-101	Engg. Chemistry	3	1	-	40	60	100	3
AM-102	Engg. Mathematics-II	4	2	-	40	60	100	3
ME-101	Elements of Mech. Engg.	4	1	-	40	60	100	3
ME-102	Engg. Drawing	1	-	6	40	60	100	3
CS-101	Fundamentals of Computer Programming & IT	3	-	-	40	60	100	3
CS-103	Fundamentals of CP & IT Practicals	-	-	4	30	20	50	-
CH-103	Engg. Chemistry Laboratory	-	-	2	30	20	50	-
ME-105	Computer Graphics Lab	-	-	2	30	20	50	-
	General Fitness						100	
Total		15	04	14	290	360	750	-

CONTACT HOURS 33

GROUP-B

Course No.	Subject	L	T	P	Marks		Total Marks	Duration of Exam Hrs.
					Int.	Ext.		
PH-101	Engg. Physics	3	1	-	40	60	100	3
AM-102	Engg. Mathematics-II	4	2	-	40	60	100	3
HU-101	Communication Skills	3	0	0	40	60	100	3
EE-101	Basic Electrical & Electronics Engg	4	1	-	40	60	100	3
PH-103	Engg. Physics Laboratory	-	-	2	30	20	50	-
EE-103	Basic Electrical & Electronics Engg Lab	-	-	2	30	20	50	-
ME-104	Manufacturing Practice	1	-	6	60	40	100	-
HU-103	Communication Skills Lab	0	0	2	30	20	50	
	General Fitness						100	
Total		15	04	12	310	340	750	

CONTACT HOURS: 31

PH – 101 ENGINEERING PHYSICS

Internal Marks: 40   **L T P**
External Marks: 60   **3 1 0**
Total Marks: 100

PART – A

1. **Electrostatics & Electrodynamics:** Charge Distribution, Integral/ Differential approach to. Gauss's Law, Faraday's Law, Amperes Circuital Law. Dielectric Polarization; Electric displacement, susceptibility and permittivity, Maxwell's equation and their importance.
2. **MAGNETIC MATERIALS**: Terminology and classification of magnetic materials. Types of magnetism (dia, Para, Ferro and ferry), magnetic anisotropy and magnetostriction, magnetic domains, hard and soft magnetic materials, ferrites and their applications.
3. **LASERS:** Spontaneous and stimulated emission; Einstein's coefficients, population inversion and optical pumping; three-level and four- level lasers; Ruby, He-Ne, Co2, semiconductor lasers; holography.
4. **FIBRE OPTICS:** Introduction, basic theory, Acceptance Angle, Numerical Aperture, Normalized Frequency, etc; modes of propagating; material dispersion and pulse dispersion in optical fibre; fibre Connectors, splicers and couplers; application of optical fibre.

PART-B

5. **THEORY OF RELATIVITY:** Concept of ether; Michelson Morley experiment; Einstein's postulates and Lorentz transformation equations ; length, time and Simultaneity in relativity; addition of velocity, variation of mass with velocity, Mass-energy relation, energy momentum relation.
6. **X-RAYS:** Continuous X-ray spectra ; production of characteristic X-Ray spectra; Moseley's law ; Bragg's law and its applications in crystallography; absorption of X-rays and Absorption Coefficient ; Non-destructive techniques (qualitative idea).
7. **QUANTUM THEORY:** Need of Quantum mechanics, The Compton effect; matter waves; group and phase velocities, Uncertainty Principle and its application; time independent and time dependent Schrodinger wave equation; Eigen values and Eigen functions; Born's interpretation and normalization of wave function, orthogonal wave functions; applications of Schrodinger wave equation (particle in a box and harmonic oscillator).
8. **SUPERCONDUCTIVITY:** Introduction & Magnetic properties of Super Conductors (Meissner Effect); Type I and Type II Super Conductors; thermodynamics of Super Conductors; field penetration and London equations; BCS theory of superconductivity.

Recommended Books:

1. Introduction to Electrodynamics, D.J.Griffiths, Prentice Hall.
2. Electrodynamics, S.L.Gupta & V.Kumar, Pragati Prakashan.
3. Lasers, K.Thyagarajan & A K Ghatak, Macmillan India Ltd. Banglore.
4. Optical Fibre Communication, Gerd Keiser, Mc Graw Hill.
5. Optical Fibre System, C.K.Kao, Mc Graw Hill.
6. Introduction to Atomic Spectra, H.E.White, Mc Graw Hill.
7. University Physics, FW Sears, M.W. Zemansky. H.D.Young, Narosa.
8. Quantum Mechnics, B.N. Srivastva, Pragati Prakashan.
9. Modern Phusics, H.C.Ohanian, Prentice Hall.
10. Solid State Physics, C.Kittle Wiley Eastern Ltd. New Delhi.
11. Studies of High Temperature Superconductors, A.V.Narlikar (Ed)
    Nova Science Publishers Inc. New York.

AM-101 ENGINEERING MATHEMATICS – I

Internal Marks: 40   **L T P**
External Marks: 60   **4 2 0**
Total Marks: 100

PART – A

1. **Differential Calculus:** Curve tracing, Curvature of Cartesian curves; Curvature of parametric and polar curves.
2. **Integral Calculus:** Rectification of standard curves; Areas bounded by standard curves; Volumes and surfaces of revolution of curves; Centre of gravity and Moment of inertia of simple bodies by integral calculus and of composite areas by the principle of moments; Applications of integral calculus to find centre of pressure, mean and root mean square values.
3. **Partial Derivatives:** Function of two or more variables; Partial differentiation; Homogeneous functions and Euler's theorem; Composite functions; Total derivative; Derivative of an implicit function; Change of variable; Jacobians.
4. **Applications of partial differentiation :** Tangent and normal to a surface; Taylor's and Maclaurin's series for a function of two variables; Errors and approximations; Maxima and minima of function of several variables; Lagrange's method of undetermined multipliers.

PART – B

5. **Solid Geometry:** Sphere, cylinder, cone, standard conicoids (Ellipsoid, Paraboloid and Hyperboloid).
6. **Multiple Integral:** **D**ouble and triple integration, change of order of integration, change of variable. Application of double integration to find areas. Application of double & triple integration to find volumes, Beta and gamma functions.
7. **Infinite Series :** Convergence and divergence of series, Test of convergence : Comparison test, Integral test, Ratio test, Rabee's test, Logarithmic test,Cauchy's root test. Convergence and absolute convergence of alternating series, Power series and Uniform convergence.
8. **Complex Numbers:** De-Moivre's theorem and applications, exponential & logarithmic complex functions, circular and hyperbolic functions of complex variables, real and imaginary parts of inverse functions. Summation of trigonometric series.

TEXT BOOKS
1. Jain, R.K. and lyengar, S.R.K., Advanced Engineering Mathematics, Narosa Publishing House, New Delhi.
2. Grewal, B.S., Higher Engineering Mathematics, Khanna Publishers, New Delhi.
3. Bali, N.P., A Text Book on Engineering Mathematics, Luxmi Publications, New Delhi.

REFERENCE BOOKS

1. Kreyszig, E., Advanced Engineering Mathematics, John Wiley.
2. Ray Wylie, C., Advanced Engineering Mathematics,6th ed., McGraw Hill.
3. Zill D.G., and Cullen, M.R., Advanced Engineering Mathematics, CBS Publishers.

HU – 101, COMMUNICATION SKILLS

Internal Marks: 40   **L T P**
External Marks: 60   **3 0 0**
Total Marks: 100

PART – A

1. **Communication, Its types & Significance :** Communication; process of communication; its kinds, channels and role in the society.
2. **Reading Skills :** Process of reading; reading purposes, models, strategies, methodologies; reading activities, structure of meaning techniques.
3. **Writing Skills:** Elements of effective writing; writing styles; scientific and technical writing.
4. **Grammar :** Transformation of sentences; words used as different parts of speech; one word substitution; abbreviations, technical terms etc.

PART – B

5. **Business Correspondence :** Business letters; elements of business writing; kinds of business letters – office order memorandum, report, purchase order, quotations and tenders, job application letters, personal resume and curriculum vitae etc.
6. **Listening Skills :** The process of listening; the barriers to listening; the effective listening skills; feedback skills.
7. **Speaking Skills :** Speech mechanism, organs of speech, production and classification of speech sounds, phonetic transcription; the skills of effective speaking, the components of an effective talk; oral presentation and the role of audio visual aids in it.
8. **Discussion, Mecting and Telephone Skills** : Group discussion; conducting a meeting; attending telephonic calls.

TEXT BOOKS

1. Bhattacharya, Indrajit, An Approach to Communication Skills, Dhanpat Rai Co.,(Pvt.) Ltd., New Delhi.
2. Wright, Chrissie, Handbook of Practical Communication Skills, Jaico Publishing House, Mumbai.
3. Gartside, L, Modern Business Correspondence, Pitman Publishing, London.
4. Day, Robert A., How to Write and Publish a Scientific Paper, Cambridge University Press, Cambridge.
5. Gimson, A.C., An Introduction to the Pronunciation of English, ELBS
6. Bansal, R.K. and Harrison, J.B. Spoken English Orient Longman, Hyderabad.

REFERENCE BOOKS

1. Roach, Peter, English Phonetics & Phonology, Cambridge University Press, Cambridge.
2. Rutherford, Andrea J. Basic Communication Skills for Technology, Addison Wesley Longman, New Delhi.
3. Scott, Bill, The Skills of communicating, Jaico Publishing House, Mumbai.
4. Janis, J. Harold, Writing and communicating in Business, The Macmillan Company, New Delhi.
5. Berry, Thomas Elliott, The Most Common Mistakes in English Usage, Tata McGraw Hill Publishing Company Limited, New Delhi.

EE- 101 BASIC ELECTRICAL & ELECTRONICS ENGINEERING

Internal Marks: 40   **L T P**
External Marks: 60   **4 1 0**
Total Marks: 100

Part – I : Electrical Engineering

1. DC Circuits

Circuits : Identifying the Elements and the Connected Terminology, Kirchhoff's Laws – Statement and Illustration ,Method of solving a Circuits by Kirchoff's Laws, Computation of Resistance at Constant temperature, Temperature Dependence of resistance, Computation of Resistance at different temperatures, Ohm ' s Law- Statement , Illustration and limitation, Units – Work, Power and energy (Electrical, Thermal and Mechanical)

2. AC Fundamentals

Generation of Alternating emf, Concept of 3-phase EMF Generation, Root Mean square or Effective Value, Average value of AC, Phasor Representation of Alternating quantities, Analysis of AC Circuit Representation of Alternating Quantities in Rectangular and polar forms, Introduction of Resistors, Conductors and Capacitors, R-L Series Circuits,R-C Series Circuits, R-L-C Series Circuits, Admittance and its components, Resonance in Series and Parallel, Analysis of simple 3 phase system,star-delta connections and conversion.

3. Magnetic Circuits and Machines

Comparison between Magnetic and Electric circuits,   Electromagnetic Induction, Magnetic Effects of Electric Current, Current carrying conductor in Magnetic field, Law of Electromagnetic Induction, Self Inductance, Mutual Inductance ,Coupling Coefficient between   two   magnetically   coupled   Circuits Transformer:principle,construction,working,efficiency,application.

D.C. Generator : principle, construction, working ,application, D.C. Motor: principle, construction, working, application. Three phase Induction Motor: principle, construction, working, application

4. Measuring Instruments

Classification of Instruments, Basic Principles of indicating instruments, Moving Iron Instruments – Attraction and Repulsion Type, Moving Coil Instruments – Permanent Magnet - Dynamometer Type,
Induction Type Energy Meter. Multimeters fundamentals of Analog and

Part – II: Electronics Engineering

5. Transducers:

Capacitive Transducer, Inductive Transducers, Linear Variable differential Transformer (LVDT), Potentiometric Transducer, Electrical Strain Gauges, Thermistor,   Thermocouple,   Hall   effect,   Piezoelectric   Transducer,Photoelectric Transducer

6. Semiconductor devices

Principle of operation; characteristic and application of PN Junction Diode, Zener Diode, Bipolar Junction, Field effect transistor, Thyristor, Opto-Electronics Devices, Rectifiers

7   Integrated Circuits

Introduction,Linear Ics,Digital ICs,Linear ICs: PIN diagram and its description for IC741, IC555, IC78XX series (Regulator ICs)
Digital ICs : 74XX series ICs.

8. Digital Electronics :

Binary number System, Octal and Hexadecimal ,logic Gallies.
Introduction and truth tables, Flip Flops and the truth tables ; R-S, J-K, D and T.

Books suggested:

- ➢ Basic electrical and electronics and computer engg.by R muthusubramanian, S Salivahanan,K A MURALEEDHARAN,Tata McgrawHill
- ➢ A Textbook of Electrical Tech.by B.L Theraja.& A.K Theraja,S Chand.
- ➢ Fundamentals of Electrical Engg.by Vincent DELTORO,Prentice Hall.
- ➢ A Course in electrical and electronic Measurements & Instumentation by A.K Sawhney, Dhanpat Rai & co.
- ➢ Electrical Technology, Edward Hughes.
- ➢ Basic Electrical Engineering by H.M Rai and S.Marwaha, Satya Prakashan, Delhi.

PH – 103 ENGINEERING PHYSICS LABORATORY

Internal Marks: 30   **L T P**
External Marks: 20   **0 0 2**
Total Marks: 50

Note : Each student is required to perform at least ten experiments.

1.   To study the magnetic field of a Circular Coil carrying current.
2.   To find out Polerizability of a dielectric substance.
3.   To study the characteristics of a rectangular wave guide.
4.   To study the laser beam characteristics like; wave length, aperture & divergence etc.
5.   To study laser interference using Michel son's Interferometer.
6.   Making up the hologram using advanced laser kit.
7.   Study of Diffraction using Laser beam and thus to determine the grating element.
8.   Determination of optical aperture of a optical fibre.
9.   To determine attenuation & propagation losses in optical fibres.
10.   To find out the frequency of AC mains using electric-vibrator.
11.   To find out the Susceptibility of $FeCl_3$ by Quinke's Method.

Recommended Books:

1.   Practical Physics, C.L. Arora, S. Chand & Co.
2.   Practical Physics, R.S. Sirohi, Wiley Eastern.

EE-103: BASIC ELECTRICAL & ELECTRONICS ENGINEERING LAB

Internal Marks: 30   **L T P**
External Marks: 20   **0 0 2**
Total Marks: 50

To find voltage , current relationship and power factor of a given R-L circuit.

To connect 3 identical single phase transformers for three phase power transformations through following connections (a)star-delta (b) star-star(c) delta-star(d) delta-delta and to find phase and line voltage ratio.

To connect ,start and reverse the direction of rotation of a 3- phase induction motor.

To find out the line voltage , phase voltage relationship , line current and phase current relationship in case of star and delta connected 3- phase balanced load.

To perform open- circuit and short circuit test on a transformer and determine the following (a) the transformation ratio (b) the transformer efficiency.

To perform the Block Rotor test of 3-phase induction motor test.

 To study the response of P N junction diode.

To study the transistor response

To analysis the truth tables of various basic digital gates.

To study the response of LVDT transducer.

To study various measuring instruments(Moving Iron Instruments – Attraction Type, Moving Iron Instruments – Repulsion Type, Moving Coil Instruments – Permanent Magnet Type, Moving Coil Instruments – Dynamometer Type)

To study the use of Multimeter.

To study the response of LVDT

To study the speed control of characteristic of D.C. Motor.

ME-104   MANUFACTURING PRACTICE

Internal Marks: 60   **L T P**
External Marks: 40   **1 0 6**
Total Marks: 100

PART-A

1. CARPENTRY AND PATTERN MAKING :   Various types of timber and practice boards, defects in timber, seasoning of wood; tools, wood operation and various joints; exercises involving use of important carpentry tools to practice various operations and making joints.
2. FOUNDRY SHOP   Introduction to moulding materials; moulds; use of cores; melting furnaces; tools and equipment used in foundry shops; firing of a cupola furnace; exercises involving preparation of small sand moulds and castings.
3. FORGING PRACTICE:Introduction to forging tools; equipments and operations; forgability of metals; exercises on simple smithy; forging exercises.
4. MACHINE SHOP   machines, grinders etc; cutting tools and operations; exercises involving awareness.

PART-B

5. WELDING SHOP: Introduction to different welding methods; welding equipment; electrodes; welding joints; welding defects; exercises involving use of gas/electric arc welding.
6. ELECTRICAL & ELECTRONICS SHOP   Introduction to electrical wiring; preparation of PCBs involving soldering applied to electrical and electronic applications; exercises preparation of PCBs involving soldering applied to electrical and electronic applications.
7. SHEET METAL: Shop development of surfaces of various objects; sheet metal forming and joining operations, joints, soldering and brazing; exercises involving use of sheet metal forming operations for small joints.
8. FITTING SHOP   Introduction of fitting practice and tools used in fitting shop; exercise involving marking, cutting, fitting practice (Right Angles), male- Female mating parts practice, trapping practice.

TEXT BOOKS
1. Raghuwanshi, B.S. ; A course in Workshop technology, Vol 1 & II, Dhanpat Rai & Sons , New Delhi.
2. Jain, R.K. ; Production Technology, Khanna Publishers, New Delhi.
3. Singh, S, ; Manufacturing Practice, S.K. Kataria & Sons, New Delhi

HU-103 COMMUNICATION SKILL LAB

Internal Marks: 30   **L T P**
External Marks: 20   **0 0 2**
Total Marks: 50

Detailed Contents

(A)Recognizing and articulating speech sounds, mock dialogue/conversation, making an oral presentation, class seminars, paper reading, participating in a group discussion, listening to a recorded talk and reviewing/discussing its contents and style, holding a mock meeting, participating in a mock interview for a job etc., learning the skills of a compeer, watching a video recording and participating in a discussion on its style, presentation and composition, reading books and making reports on their contents.

(B) MINOR PROJECT: Individual or group (Comprising not more than four students per team) projects of minor nature on any general topic preferably survey based; submission of duly typed project report followed by presentation, discussion and viva.

CH – 101, ENGINEERING CHEMISTRY

Internal Marks: 40   **L T P**
External Marks: 60   **3 1 0**
Total Marks: 100

SECTION-A

1. **WATER AND ITS TREATMENT**: Specifications of water for different uses, water for domestic uses, different method of water softening , boiler feed water, desalination of water.
2. **CORROSION AND ITS PREVENTIONS**: Corrosion, different types corrosion like wet corrosion, dry corrosion, atmospheric corrosion, soil corrosion, protective measure against corrosion, other forms of corrosion.
3. **CHROMATOGRAPHYY**: Introduction to chromatography, classification of chromatographic separation methods, liquid chromatography, flow diagram of LC instrument, instrumentation, types of liquid chromatography, general and fundamental concepts of chromatography, chromatographic development. Applications
4. **ELECTROCHEMISTRY**: Electrochemical series, Nernst's equation for electrode potential and cell EMFF, varieties of cell-concentration and chemical cells, liquid junction potential, thermodynamic functions from cell EMF measurements, acid-base titrations, redox titrations, redox indicators, over voltage.

SECTION-B

5. **PHTOCHEMISTRY**: Laws of photochemistry, quantum yield, primary and secondary photochemical processes, Kinetics of photochemical reactions, photosensitized reactions, fluorescence and phosphorescence, masers and lasers, photosynthesis, oxygen liberation and carbon dioxide consumption in photosynthesis, various theories of mechanism of photosynthesis.
6. **MOLECULAR SPECTROSCOPY**: Experimental techniques for analysis, intensities and line widths, Infrared Spectroscopy, Ultra-violet and Visible spectroscopy, Franck – Condon principle.
7. **MAGNETIC RESONANCE SPECTROSCOPY**: Principles of magnetic resonance, information in NMR, spin-spin relaxation, spin-lattice relaxation, number of signals, chemical shift, spin-spin coupling, NMR spectrum at more than one radio-frequency, double resonance, deuterium exchange reactions nuclear overhauser effect, MRI and other applications of NMR, preliminary introduction to ^{13}C NMR. Introduction to ESR spectroscopy, number of signals, hyperfine structures, applications.
8. **PHASE EQUILBRIA** : Phase boundaries, phase diagrams of one component system- Water, carbon, helium and carbon dioxide, two component systems-lead-silver. Potassium iodide-water, phenol-water, triethylamine-water and nicotine-water, mixture of volatile liquids. Thermodynamic description of mixture colligative properties.

TEXT BOOKS
1. Atkins P.W., The Elements of Physical Chemistry, Oxford University Press
2. Sud, Dhiraj, Comprehensive Engineering Chemistry, Kataria Publishers
3. Sharma,Y.R., Elementary Organic Spectroscopy.
4. Jain & Jain, Engineering Chemistry, Dhanpat Rai Publishing Company.
5. Sharma, B.K, Engineering chemistry

REFERENCE BOOK
1. Atkins, P.W. Physical Chemistry, Oxford ELBS
2. Rao, C.N.R, Chemical Application of Infra-red Spectroscopy, Academic Press, New York.
3. Bellamy, L.J, The Infra-red spectra of complex molecules,Wiley
4. Rao, C.N.R, Ultra violet and visible spectroscopy-Chemical Applications, Plenum Press.
5. Rohatgi, Fundamentals of Photo Chemistry.
6. Glasstone, An Introduction to Electrochemistry
7. Banwet,C.N, Fundamentals of Molecular Spectroscopy.
8. Kuericase, J.C & Rajaram J, Chemistry in Engineering & Technology, Vol.I & II, Tata McGraw Hill

1.	
2	Kuriacose J.C. & Rajaram J., Chemistry in engineering & Technology, Vol . I & II Tata McGraw – Hill
3	Gurdeep Chatwal., photpchemistry
4	Banwell, C.N., Molecular Spectroscopy., Mc Graw-Hill
5	Morrison & Boyd, Organic Chemistry., Prentice Hall

ME - 101 ELEMENTS OF MECHANICAL ENGINEERING

Internal Marks: 40   **L T P**

External Marks: 60   **4 1 0**

Total Marks: 100

PART-A

1. BASIC CONCEPT OF THERMODYNAMICS : Thermodynamic system, boundary and surroundings, Open, Closed and isolated systems, State, property, process and cycle, Reversible, Quasi-static and irreversible processes and conditions for reversibility. Energy and its forms : energy transfer across system boundaries, heat and work, property and energy as point and path functions. Ideal gas and characteristic gas equation. Zeroth law of thermodynamics, concept of thermal equilibrium and principle of thermometry.

2. FIRST LAW OF THERMODYNAMICS : Essence and corollaries of the first law, analytical expressions applicable to a process ad cycle : internal energy, enthalpy and specific heats : first law analysis of steady flow, applications of steady flow energy equation to various engineering devices.

3. APPLICATIONS OF FIRST LAW OF THERMODYANICS : Closed and open systems, analysis of non-flow and flow processes for an ideal gas under constant volume (Isochoric), constant pressure (Iso baric), constant temperature (Isothermal), adiabatic and polytropic conditions. Analysis of free expansion and throttling processes. Representation of these processes o P-V chars and analysis of property changes and energy exchange (work and heat) during these processes.

4. SECOND LAW OF THERMODYNAMICS : Limitations of first law, various statements of second law and their equivalence, applications of statements of second law to heat engine, heat pump and refrigerator. Philosophy of Carnot cycle and its consequences. Carnot theorem for Heat engines and heat pump. Claussius inequality, concept and ;philosophy of entropy and entropy changes during various processes. Temperature entropy chart and representation opf various processes on it. Third law of Thermodynamics.

PART-B

5. GAS POWER CYLES : Concept and philosophy of Air Standard Cycle and Air standard Efficiency. Some basic definitions of Piston-Cylinder arrangement. Otto cycle, Diesel cycle, Dual cycle and Brayton cycle their representation on P-V and T-S Charts. Comparison of Otto cycle. Diesel cycle, Dual cycles, Mean Effective Pressure. Introduction to constructional features and working of two stroke and four stroke petrol and diesel engines and their comparison.

6. MECHANISM AND SIMPLE MACHINES : Philosophy of introducing Mechanisms and their concept , Definition of element, link, kinematic chain, mechanism, machine, Examples of mechanisms and their applications (Beam Engine, Slider Crank, Oldham Coupling, Elliptical Trammel, Socth-yoke.Pantograph), Concept of Basic machines, Reversibility of lifting Machine, Law of Lifting

Machine, Different systems of pulleys, Differential Pulley block, Simple and Differential Wheel and Axle arrangement, Worm and Worm Wheel.

7.   MECHANICS OF SOLIDS : Concept of mechanical behavior of Engineering materials; Tension, Compression, Torsion, Bending, Hardness, Fatigue, Creep, Impact, Concept and philosophy of stress and strain, Normal, Shear and Temperature stresses congitudinal and lateral strain, Poisson's ration, Concept of stress strain curve , yield point, elastic limit, ductility, elongation, true stress and true strain, stain energy and resilience , Sudden and impact load, Stresses in composite bar due to application of load and temperature, Elastic constants and their significance , relations between Elastic constants; Young modulus of Elasticity, Poisson's ratio, Modulus of rigidity,and Bulk modulus.

Books

1.   Nag P.K. Engineering Thermodynamics , Mc. Graw Hill.
2.   Yadav R., Thermodynamics and Heat Engines, Central Publishing House, Allahabad
3.   Singh V.P., Theory of Machines, Dhanpat Rai and Company , New Delhi.
4.   Jindal U.C., Engineering Mechanics , Part-I, Galgotia Publications Pvt.Ltd. , New Delhi.

Reference Books

1.   Moran M.J and Shapiro H.N., Fundamentals of Engineering Thermodynamics, John Wiley, New York.
2.   Van Wylen G.J., Fundamental of Classic Thermodynamics John Wiley New York.
3.   Spalding D.B. and Cole E.H., Engineering Thermodynamics, ELBS , New Delhi.
4.   Hibbeler R.C., Engineering Mechanics-Statics, Addison Wesley Longman, New Delhi.

ME-102   ENGINEERING DRAWING

Internal Marks: 40   **L T P**
External Marks: 60   **1 0 6**
Total Marks: 100
PART-A

1.   Drawing Techniques: Various types of lines, principles of dimensioning, size and location dimensions, symbols, conventions, scales (plane and diagonal) and lettering as per IS code of practice (SP-46) for general Engg. Drawing. Practice of drawing various types of lines and dimensioning exercises. Drawing exercises pertaining to Symbols, Conventions and exercises on lettering techniques free hand ;printing of letters and numerals in 3,5,8 and 12mm sizes, vertical and inclined at 75° Instrumental lettering in single stroke.

2.   Projection of Points, Lines and Planes:- Concept of horizontal and vertical planes. First and third angle pr9ojections; projection of points and lines, true lengths of lines and their horizontal and vertical traces, projection of planes and their traces. Auxiliary planes.

3.   Projection of Solids:-   Right and oblique solids; solids of revolution and polyhedrons etc. and their auxiliary views.

4.   Sectioning of Solids:-   Principles of sectioning, types of sectioning, and their practice on projection of solids, sectioning by auxiliary planes.

PART-B

5.   Isometric projections:- Concept of isometric views; isometric scale and exercises on isometric views.

6.   practice in (i)   Free hand sketching of different types of objects and
                       (ii) Drawing missing view in orthographic projections

7.   Development of Surfaces:-   Development of surfaces of cylinders, cones pyramids, prisms etc. Exercises involving development of unique surfaces like Y-piece, hopper, tray, truncated pieces etc.

8.   Intersection of Surfaces:-   Intersection of cylinders, cones and prisms with their axes being vertical, horizontal or inclined. Exercises on intersection of solids cylinder and cylinder, cylinder and cone , prism and prism, prism and cone, sphere with cylinder.

Note:- the students shall practice using Auto-CAD or similar graphic packages for preparing simple drawings of objects like prisms, Pyramids and Solids of Revolution in various positions.

TEXT BOOKS
    1.   Gill, P.S. Engineering Drawing, S.K. Kataria and sons, Ludhiana.
    2.   Bhatt, N.D. Engineering Drawing, Charotar Book Stall, Tulsi sadan, Anand.
REFERENCE BOOKS.
    1. French, t.e. and Vierck, C.J.; Graphic Science, McGraw-Hill, New York
    2. Zozzora, F, ; Engineering Drawing, McGraw Hill, New York

CS-101   FUNDAMENTS OF COMPUTER PROGRAMMING AND INFORMATION TECHNOLOGY

Internal Marks: 40   **L T P**
External Marks: 60   **3 0 0**
Total Marks: 100

1.   Computer Basics: Basic structure of computer and its working, Block diagram of computer associated peripherals, memories, RAM, ROM, secondary storage devices.
2.   Introduction to Windows: Introduction to windows and its features.
4.   Introduction to MS WORD: Introduction to MS Word, document creation, editing, printing and saving, spell check and mail merge. Process text by using text processor package such as MS Word. Use of computer using windows operating system.

PART-B

5.   C++ Introduction :   Introduction to C++ Language, structure of C++ Programme. Creating source file and compiling and linking, tokens, keywords Identifiers and data structures, symbolic constants, variable operators, control structures.
6.   Functions, Arrays and Operator Overloading :   Functions and their types. Introduction to one- dimensional, two- dimensional and multidimensional arrays. Concepts of Object Oriented programming, structures, classes and objects. Operator overloading concepts and type conversions. Inheritance. Pointers virtual functions and polymorphism.
7.   File Handling :   Input and output operations. Files, file pointers and their manipulations. Sequential input/ output operations, random access, error handling during compilation.
8.   Introduction to Information Technology: Programme development tools and implementing simple programmes. Introduction to Information Technology and its applications.
9.   Introduction of internet and its applications.

TEXT BOOKS

1. Fundamentals of computer Programming and Information Technology- V.K. Jain
2. Object Oriented programming with C++ by E. Balaguruswamy.
3. C++ Robert Lafore.

REFERENCE BOOKS

1.   Mastering work 6 for windows Ran Manfield
2.   Object oriented Programming with C++ by L. Naljyoti Barkali
Turbo C++ by Greg Perry and Marcus Jhonson

CS-103 FUNDAMENTALS OF COMPUTER PROGRAMMING & IT LABORATORY

Internal Marks: 30   **L T P**
External Marks: 20   **0 0 4**
Total Marks: 50

1. Familiarization of the computer system and on hand practice on power on and power off.
2. Loading window, closing, maximizing, icon shifting & ordering.
3. Changing drives and searching files and understanding file extensions.
4. Saving files, protecting and unprotecting.
5. Formatting floppies and practice on virus recognisation and protection.
6. Practice with control panel and file manager.
7. Practice with MS Word, Operating and closing document, Preparation of document, setting of document, familiarization with various tools, mail- merge practice.
8. Practice with C++ with the help of simple exercises giving on hand practice and understanding of various features.
9. Implementation of simple programmes.
10. Internet Browsing.

CH – 103 ENGINEERING CHEMISTRY LABORATORY

Internal Marks: 30   **L T P**
External Marks: 20   **0 0 2**
Total Marks: 50

**Note:- Each student is required to perform two experiments from each group
        depending on his/her Branch and Aptitude.**

1. ANALYSIS OF EFFLUENTS
1.   Determination of Hardness EDTA method.
2.   Determination of D.O. & O.D. by dissolved oxygen analyzer.
3.   Determination of COD
4.   Determination of BOD.
5.   Determination of turbidity by turbiditymeter
6.   Determination of Residual Chlorine.

2. ANALYSIS OF FUELS & LUBRICANTS
1.   Determination of Moisture, Volatile and ash content
      by proximate analysis.
2.   Determination of Flash & Fire point.
3.   Determination of Aniline Point
4.   Determination of the viscosity by Redwood Viscometer.
5.   Determination of Iodine Value
6.   Determination of Acid Value

3. INSTRUMENTAL ANALYSIS
1.   Determination λ-max by spectrophotometer.
2.   Determination of the surface tension by stalagmometer.
3.   Determination of the concentration of ions spectrophotometerically.
4.   Determination of the concentration of a solution conductometerically.
5.   Determination of the strength of a solution pH meterically.

4.CHOROMATOGRAPHY
1.   Determination of Rf value of amino acid by TLC and identification of the amino
      acid present.
2.   Separation of metallic ions by paper chromatography.
3.   Separation of Ions by using complexing agents
4.   Separation of plant pigments, ChlorophyII and carotenoids by column
      chromatography.
5.   Determination of the ion exchange capacity of the given ion exchanger.
6.   Separation of ions by ion-exchange method.

5.SYNTHESIS & MISCELLANEOUS EXPERIMENTS
1.   Preparation of a polymer phenol/urea formaldehyde resin or
      hexamethylenediamine adipic acid polymer.
2.   Preparation of aspirin.
3.   Preparation of a dye(methyl orange/methyl red)
4.   Kinetics of first/second order reactions.
5.   Synthesis of copper-ammonia/cobalt-ammonia complex.

TEXT BOOKS
1.   Rani, Sudha, Laboratory Manual on Engineering Chemistry, Dhanpat Rai Publishing Co.,
     Delhi.
2.   Das,R.C. & Behera B., Experimental Physical Chemistry, Tata McGraw – Hill Co. Ltd.
3.   Rajbhoj S.W., Systematic, Anjali Publication
4.   Chondhekar T.K., Experimental Physical Chemistry, Wiley Eastern
5.   Khosla, B.D., Senior Practical Chemistry
6.   Sharma B.K., Instrumental Methods of Chemical Analysis

REFERENCE BOOKS

1.   Vogel A-I, Quantitative Inorganic Analysis, Oxford ELBS
2.   Vogel A-I, Quantitative Organic Analysis, Oxford ELBS

ME-105 COMPUTER GRAPHICS LAB

Internal Marks: 30   **L T P**
External Marks: 20   **0 0 2**
Total Marks: 50

List of practical

1. Introduction of the CAD software and its utilities in the engineering software.
2. Study of the various toolbar options and exercises to familiarize all the drawing tools.
3. Study the basic initial setting and viewing of the drafting software interfaces.
4. Use of basic entities in 2D.
5. Use of various modify commands of the drafting software.
6. Dimensioning in 2D and 3D entries.
7. Study and implementing of coordinate systems & UCS.
8. Draw the different type of 3D modelling entries using viewing commands to view them (Isometric projection).
9. Sanctioning of solid primitives and rendering in 3D.
10. Intersection of solid primitives.
11. Draw different surface models with different editing commands.

AM – 102, ENGINEERING   MATHEMATICS – II

Internal Marks: 40   **L T P**
External Marks: 60   **4 2 0**
Total Marks: 100

PART – A

1. **Matrices:** Linear dependence of vectors and rank of matrices. Elementary transformation, Gauss- Jordan method to find inverse of a matrix, reduction to normal form, Consistency and solution of algebraic equations, Linear transformations, Orthogonal transformations, Eigen values, Eigen Vectors, Cayley Hamilton Theorem, Reduction to diagonal form, bilinear and quadratic form, Orthogonal, unitary, Hermitian and similar matrices.
2. **Ordinary Differential Equations:** Exact Differential equations, equations reducible to exact form by integrating factors; Equations of the first order and higher degree. Clairaut's equation.
3. **Linear Differential Equations :** Leibniz's linear and Bernoulli's equation, methods of finding complementary functions and particular integrals. Special methods for finding particular integrals: (i) method of variation of parameters (ii) method of underdetermined coefficients.   Cauchy's homogeneous and Legendre's linear equation. Simultaneous linear equations with constant coefficients.
4. **Applications of Differential Equations:** Applications to electric/electronic L-R-C circuits. Deflection of beams, Simple harmonic motion, Oscillation of a spring.

PART-B

5. **Vector Calculus:** Scalar and vector fields, differentiation of vectors, velocity and acceleration. Vector differential operators Del, Gradient, Divergence and curl, their physical interpretation. Formulae involving Del applied to point functions and their products. Line, surface and volume integrals.
6. **Application of Vector Calculus:** Flux, solenoidal and irrotational vectors. Gauss Divergence theorem. Green's theorem in plane. Stoke's theorem. Applications to electro magnetics and fluid mechanics.
7. **Statistics:** Recapitulation of statistics and probability. Discrete and continuous probability distributions.   Binomial, Poisson and Normal distribution, applications. Curve fitting.
8. **Sampling and Testing of Hypothesis:** Sampling methods. Student's t-test, Chi-square test, F-test and Fisher's z-test.

TEXT BOOKS
1. Jain, R.K. and lyengar, S.R.K., Advanced Engineering Mathematics, Narosa Publishing House, New Delhi.
2. Grewal, B.S., Higher Engineering Mathematics, Khanna Publishers, Delhi
3. Kreyszig, E., Advanced Engineering Mathematics, John Wiley.
4. Sastry, S.S., Engineering Mathematics, Vol. I & II, Prentice Hall of India, New Delhi.

REFERENCE BOOKS
1. Zill, D.G. and Cullen, M.R., Advanced Engineering Mathematics, CBS Publishers
2. O'Nell, P.V., Advanced Engineering Mathematics, Brooks / Cole Publishing.
3. Pipes, L.A. and Harvill, L.R., Applied Mathematics for Engineers and Physicists, McGraw Hill.