

Curriculum

Theory

s.no.	Subject name	L	P	M
01	Chemistry	4	0	100
02	Engineering mechanics	4	0	100
03	Language elective	4	0	100
04	Mathematics	4	0	100
05	Physics	4	0	100
06	Electrical Engineering	4	0	100
07	Electronic devices and circuits	4	0	100
08	Strength of Materials	4	0	100

Practical

S.No	Subject name	L	P	M
09	Computer practice	0	3	100
10	Workshop Practice	0	3	100
11	Physical Science Laboratory	0	3	100
12	Engineering Graphics	0	3	100

FIRST YEAR

SYLLABUS CHEMISTRY

4 0 100

UNIT-I ELECTROCHEMISTRY

(19)

Types of electrodes and cells- Reversible and Irreversible Cells- Nernst Equation - EMF Measurements and its application- - Electromotive Series-electro winning-metallurgy-applications-sensors-electrochemical machining-metal processing-principles of chemical and electrochemical corrosion-corrosion control (sacrificial anode and impressed current methods).

UNIT-II WATER TREATMENT

(12)

Water quality parameters-definition and expression-estimation of hardness (EDTA-method)- alkalinity (titrimetry) - water softening (zeolite) – demineralization (ion-exchangers) and desalination (RO) – domestic water treatment.

UNIT-III POLYMERS

(19)

Monomer – functionality – degree of polymerization – classification based on source and applications – addition, condensation and co polymerization – mechanism of free-radical polymerization-thermoplastics and thermosetting plastics-processing of plastics-injection molding, blow molding and extrusion process-Commodity and engineering plastics-polymer blends and alloys- molding compounds-powder, DMC, SMC, liquid resin-composites-fibers ceramics-glass.

UNIT-IV CHEMICAL THERMODYNAMICS

(10)

Definition of enthalpy, entropy, free energy and spontaneity-Maxwell relations- Gibb's-Helmholtz Equation –Van't hoff equation-stoichiometry and energy balances in chemical reactions

DYNAMICS OF CHEMICAL PROCESS

(10)

Basic concepts-composite reactions (opposing, parallel and consecutive reactions)-collision theory-thermodynamic formulation of reaction rates-unimolecular reactions-chain reaction (stationary and non-stationary)-enzyme kinetics-michaelis-menten equation

UNIT-V

ORGANIC REACTIONS AND THERMOCHEMISTRY

(10)

Organic reactions and mechanisms-law of mass action- industrial enthalpy balances-free energies of metallic compounds-Ellingham diagram- metallurgical and multicomponent equilibria-phase rule of metallurgical reactions-refractory materials.

EXTRACTIVE METALLURGY AND ALLOYS

(10)

Ores-ore dressing-extraction processes-alloys-phase diagrams-iron-carbon systems-heat treatment-non ferrous and special alloys-Powder metallurgy-Principles-compacting and sintering methods-applications

TOTAL HOURS:90

TEXT BOOKS:

1. Atkins P W, "Physical Chemistry", EIBS, IV Edition, 1998 London.
2. Dara S.S,"A Text Book Engineering Chemistry", S.Chand & Company Ltd., New Delhi 1996.

References:

1. Balsubramanian M.R., Krishnamoorthy S., and Murugesan V., " Engineering Chemistry", Allied Publisher Limited, Chennai, 1993.
2. Karunaidhi M., Ayyaswamy N., Ramachandran T and Venkatraman H., "Applied Chemistry", Auradha Agencies, Kumbakonam, 1994.
3. Jain P.C. And Monica J., "Engineering Chemistry",Dhanbat Raj Publications Co.,(P).
4. Kannan P., and Ravikrishnan A., "Engineering Chemistry- II",Srikrishna Publications, Chennai,2003.
5. Christopher, Brett M.A. "Electrochemistry, Principles, Methods And Applications", Oxford University Press, 1993.

FIRST YEAR

MATHEMATICS

4 0 100

UNIT – I: MATRIX

(18)

Characteristic equation – Eigen values and eigenvectors of a real matrix – Properties of eigen values – Cayley-Hamilton theorem – Orthogonal reduction of a symmetric matrix to diagonal form – Orthogonal matrices - Reduction of quadratic form to canonical form by orthogonal transformation.

THREE DIMENSIONAL ANALYTICAL GEOMETRY:

Direction cosines and ratios – Angle between two lines – Equation of a plane – Equation of a straight line – Co-planer lines – Shortest distance between skew lines – Sphere – Tangent plane – Plane section of a sphere – orthogonal spheres.

UNIT-II: GEOMETRICAL APPLICATIONS OF DIFFERENTIAL CALCULUS

(18)

Curvature – cartesian and polar coordinates – Circle of curvature – Involutives and Evolutes – Envelopes – properties of envelopes – Evolute as envelope of normals.

FUNCTIONS OF SEVERAL VARIABLES

Functions of two variables – Partial derivatives – Total differential - Differentiation of implicit functions – Taylor's expansion – Maxima and Minima – Constrained Maxima and Minima by Lagrangean Multiplier method – Jacobians – differentiation under integral sign.

UNIT-III: ORDINARY DIFFERENTIAL EQUATIONS

(18)

Simultaneous first order linear equations with constant coefficients – Linear equations of second order with constant and variable coefficients – Homogeneous equation of Euler type – equations reducible to homogeneous form – Method of reduction of order - Method of variation of parameters.

MULTIPLE INTEGRALS

Double integration in Cartesian and polar coordinates – Change of order of integration – Area as a double integral – Triple integration in Cartesian coordinates – Change of variables – Gamma and Beta functions.

UNIT-IV : ANALYTIC FUNCTIONS

(18)

Cauchy Riemann equations – Properties of analytic functions – Determination of harmonic conjugate – Milne-Thomson's method – Conformal mappings : Mappings $w = z + a$, az , $1/z$, z^2 and bilinear transformation.

COMPLEX INTEGRATION

Cauchy's theorem – Statement and application of Cauchy's integral formulae – Taylor's and Laurent's expansions – Singularities – Classification – Residues – Cauchy's residue theorem – Contour integration – Circular and semi Circular contours (excluding poles on real axis).

UNIT-V:VECTOR CALCULUS

Curvilinear coordinates - Gradient, Divergence, Curl – Line, surface & volume integrals – Statements of Green's, Gauss divergence and Stokes' theorems – Verification and applications.

STATISTICS

Moments - Coefficient of correlation – Lines of regression – Tests based on Normal and T distributions, for means and difference of means – χ^2 test for goodness of fit.

TOTAL HOURS = 90 HRS

TEXT BOOKS

1. Kreyszig, E., "Advanced Engineering Mathematics" (8th Edition), John Wiley and Sons (Asia) Pte Ltd., Singapore, 2001
2. Veerarajan, T., "Engineering Mathematics", Tata McGraw Hill Publishing Co., NewDelhi, 1999.
3. Kreyszig, E., "Advanced Engineering Mathematics" (8th Edition), John Wiley and Sons, (Asia) Pte Ltd.,Singapore, 2000.
4. Grewal, B.S., "Higher Engineering Mathematics" (36th Edition), Khanna Publishers, Delhi 2001

REFERENCES

1. Grewal, B.S., "Higher Engineering Mathematics" (35th Edition), Khanna Publishers, Delhi, 2000.
2. Kandasamy, P., Thilagavathy, K., and Gunavathy, K., "Engineering Mathematics", Volume I (4th Revised Edition), S. Chand & Co., New Delhi, 2000.
3. Narayanan, S., Manicavachagom Pillay, T.K., Ramanaiah, G., "Advanced Mathematics for Engineering Students", VolumeI (2nd Edition), S. Viswanathan (Printers & Publishers), 1992.
4. Venkataraman, M.K. "Engineering Mathematics - First year " National Publishing Company, Chennai (2nd Edition), 2000.
5. Kandasamy, P., Thilagavathy, K., and Gunavathy, K., "Engineering Mathematics", Volumes I & II (4th Revised Edition), S. Chand & Co., New Delhi, 2001.
6. Narayanan, S., Manicavachagom Pillay, T.K., Ramanaiah, G., "Advanced Mathematics for Engineering Students", Volumes I & II (2nd Edition), S.Viswanathan (Printers & Publishers, Pvt, Ltd.), 1992.

FIRST YEAR

PHYSICS

4 0 100

UNIT-I PROPERTIES OF MATTER & ACOUSTICS (18)

Elasticity-stress-strain diagram-factors affecting elasticity - twisting couple on a wire-shafts- Torsion pendulum- Depression of a cantilever- Young's modulus by cantilever- Uniform and non Uniform bending-I shape girders- Production and measurement of high vacuum-rotary pump-Diffusion pump-Pirani Gauge-Penning gauge-Viscosity- Oswald Viscometer- Comparison of viscosities.

Acoustics of buildings-Absorption coefficient-Intensity-Loudness-Reverberation time-Sabine's formula-Noise pollution-Noise control in a machine-Ultrasonics-production-Magnetostriction and Piezoelectric methods- Applications of ultrasonics in Engineering and Medicine.

UNIT -II HEAT AND THERMODYNAMICS & OPTICS

(18)

Thermal conductivity-Forbe's and Lee's Disc methods-radial flow of heat-Thermal conductivity of rubber and glass- Thermal insulation in buildings-Laws of thermodynamics-Carnot's cycle as heat engine and refrigerator-Carnot's theorem-Ideal Otto and Diesel engines- Concept of entropy-Entropy Temperature diagram of Carnot's cycle.

Photometry- Lummer- Brodhun photometer-Flicker Photometer-Antireflection coating-Airwedge-Testing of flat surfaces-Michelson's Interferometer and its applications- Photoelasticity and its applications.

UNIT – III LASER , FIBRE OPTICS & ENGINEERING MATERIALS (18)

Principle of lasers-laser characteristics-Ruby-Nd-YAG, He-Ne, CO₂ and semiconductor lasers-propagation of light through optical fibers-types of optical fibers-Applications of optical fibers as optical waveguides and sensors.

Materials – Structure property relationship – Selection of materials for engineering – Advance modern materials – Crystal structure – Miller indices – density – Packing factor – Space lattices – X-ray diffraction .

UNIT –IV MECHANICAL PROPERTIES, CERAMICS & COMPOSITES

(18)

Tensile – Compression – Hardness – Impact – fatigue – Creep and stress rupture – Comparative study of metals, ceramic, plastic and composite materials – Alloy – solid solution – Ferrous and Nonferrous system, phase changes Time – Temp. Transformation. Modern ceramic materials – cermets – cutting tools – glass ceramics – fibres – Composites – FRP – CRFP materials – Engineering application.

UNIT-V ELECTRONIC MATERIALS & NON-DESTRUCTIVE TESTING

(18)

Conduction materials – semiconducting – elemental – Compound semiconductor – Properties – Effect of temperature – Band gap energy – Hall effect – Different type of magnetic materials and their properties – Ferrites and insulators – Classification and their application – Optical materials LED\ LCD, Photo conducting materials – Optical properties and principles of testing.

Liquid penetrant – Magnetic particle and Eddy current method – X-ray radiography – Fluoroscopy – Gamma ray – radiography – Ultrasonic Scanning method – flaw detector – Thermography.

TOTAL HOURS: 90 Hrs

Text Book :

1. Arumugam.M. Engineering Physics, Anuradha Agencies, 3rd Edition, Kumbakonam,2002.
2. Arumugam M. Materials Science, Anuradha Agencies, 3rd Edition, Kumbakonam,2002.

Reference :

1. Resnik.R. and Halliday.D., Physics, Wiley Eastern, 1986.
2. Nelkon.M., and Parker.P., Advanced Level Physics, Arnold-Heinemann, 1986.
3. Vasudeva A.S., Modern Engineering Physics, S. Chand and Co., 1998..
4. Gaur.R.K., and Gupta S.L. Engineering Physics, Dhanpat Raj and Sons, Sixth edition, 1988.
5. Mathur, D.S, Elements of properties of Matter, S.Chand & Co., 1989.
6. Van Vlack L.H., Materials Science for engineers, Addison Wesley, 1985.
7. Raghavan V., Materials Science and Engineering , Prentice Hall of India, New Delhi, 1993.
8. Pillai S.O., Solid State physics, New Age Inc., 1998.

FIRST YEAR

Electrical Engineering

4 0 100

1. ELECTRICAL CIRCUITS

(9)

Ohms Law - Kirchoff's Laws - steady state solution of DC circuits - Introduction to AC circuits - Waveforms and RMS value - power and power factor, single phase and 3 phase balanced circuits.

2. ELECTRICAL MACHINES

(9)

Principles of operation and characteristics of DC machines, Transformers (single phase and three phase) - Synchronous Machines - 3 Phase and single phase Induction motors - (op. principles).

3. ELECTRICAL MEASUREMENTS

(9)

Moving coil and moving iron instruments (Ammeter and Voltmeter) Dynamometer type watt meters and energy meters (op. principles).

4. PRACTICAL

(18)

TOTAL HOURS:45

Text Books:

1. Mittle, V.N., " Basic Electrical Engineering ", TMH Edition, New Delhi, 1990.
2. Del Toro, " Electrical Engineering Fundamentals ", Prentice Hall of India Pvt.Ltd., New Delhi, Second Edition.

References:

1. Jimmie J.Cathey and Nasar, S.A., " Basic Electrical Engineering ", Schaurn outline series in Engineering, McGraw Hill Book Co.1987.
2. Deshpande, N.V., " Electrical Machines " A.A.Wheeler and Co. Ltd., New Delhi,1994.

FIRST YEAR

Electronic Devices and Circuits

4 0 100

1. BASIC PRINCIPLES (9)

Principles of current conduction in solid-conductor, insulator and semiconductor. Intrinsic semiconductor-Ptype, n-type, P-n junction - diode equation, characteristics and applications. Transistor current components-drift and diffusion current, transistor characteristics.

2. SMALL SIGNAL AMPLIFIERS (9)

Transistor biasing, D.C. load line, CE-CB amplifiers, small signal analysis h-h parameter model, frequency response, cascaded stages.

3. FEED-BACK AMPLIFIERS AND OSCILLATORS (9)

Feed back amplifiers-topologies, analysis and effects on gain, bandwidth, noise. Oscillators-principles, classification and basic oscillator circuits.

4. OPERATIONAL AMPLIFIERS AND APPLICATIONS (9)

Operational amplifiers-characteristics, CMRR, block diagram only. Application of opamps-current voltage conversion, arithmetic circuits, differentiation and Integrator, simulation of differential equations, instrumentation amplifiers and elementary filters.

5. MULTIVIBRATORS AND TIMERS (9)

Collector coupled and complementary collector coupled astable and multivibrators. Triggering delay and switching time calculations, Schmidt trigger. 555 timer, different modes of operations.

TOTAL HOURS: 45

Text book:

1. Malvino, Principles of Electronics, PHI, 1985.
2. Gayakward, OP-AMP and linear integrated circuits, Wiley Eastern Publications, 1990.

References:

1. Millman and Halkias, Integrated Electronics, McGraw Hill Publishers, 1985.

FIRST YEAR

Strength of Materials

4 0 100

1. STRESS, STRAIN AND DEFORMATION OF SOLIDS (6)

Rigid bodies and deformable solids - Stability, Strength and Stiffness - Tension, Compression and Shear Stresses - Deformation of simple and compound bars - Thermal Stresses - Elastic Constants.

2. TRANSVERSE LOADING ON BEAMS (6)

Beams - Types and transverse loading on beams - Shear force and bending moment in beams - Cantilevers - Simply supported beams and over-hanging beams.

3. STRESSES IN BEAMS (6)

Theory of simple bending - Analysis of stress - Local carrying capacity - Proportioning sections - leaf springs - Flitched beams - Shear Stress distribution - Shear flow.

4. TORSION (6)

Stresses and deformation in circular and hollow shafts - Stepped shafts - Shafts fixed at both the ends - Stresses in helical springs - Deflection of springs - Design of buffer springs.

5. ANALYSIS OF STATES OF STRESS (TWO DIMENSIONAL) (8)

Biaxial state of stress - Thin cylinders and shells - Deformation of thin cylinders and shells - Stresses at a point - Stress as tension - Stresses on inclined planes - Principal stresses and principal planes - Mohr's circle of stress.

6. DEFLECTION OF BEAMS (7)

Double integration method - Macaulay's method - Area moment theorems for computation of slopes and deflections in beams - Conjugate beam method.

7. ENERGY PRINCIPLES (6)

Strain energy and strain energy density - Strain energy in traction, shear flexure and torsion - Castigliano's and Engesser's energy theorems. Principle of virtual work - Application of energy theorems for computing deflection in beams - Maxwell's reciprocal theorem.

TOTAL HOURS: 45

Text Books:

1. Egor P. Popov, " Engineering Mechanics of Solids ", Prentice hall of India, New Delhi, 1997.
2. Srinath L.N., " Advanced Mechanics of Solids ", Tata McGraw Hill Publishing Company Ltd., New Delhi.

References:

1. Junarkar S.B., " Mechanics of Structures ", Vol. 1, 21st Edition, Charotar Publishing House, Anand, India, 1995.
2. Kazimi S.M.A., " Solid Mechanics ", Tata McGraw Hill Publishing Company, New Delhi, 1981.
3. Laudner T.J. and Archer R.R., " Mechanics of Solids in Introduction ", McGraw Hill International Editions, 1994.
4. William A.Nash, " Theory and Problems of Strength of Materials ", Schaum's Outline Series, McGraw Hill International Editions, Third Edition, 1994.
5. Elangovan A., " Thinmavisaiyiya ", Mechanics of Solids in Tamil, Anna Unviersity, Chennai, 1995.

**FIRST YEAR
COMPUTER PRACTICE**

0 3 100

**1. MULTIUSER OPERATING SYSTEM & FUNDAMENTALS OF
COMPUTERS AND OPERATING SYSTEMS**

20

Unix: Introduction – basic commands – vi editor – filters – input/output redirection – piping – transfer of data between devices – shell scripts. Evolution of Computers - Organization of Modern Digital Computers-Single user Operating System- Multitasking OS-GUI

2. FUNDAMENTALS OF NETWORKING & OFFICE AUTOMATION

20

Working on a network environment – accessing different machines from one node – concept of E-mail – uses of internet.

- a) Word Processing
- b) Data Base Management System
- c) Spread Sheet Package
- d) Presentation Software

3. HIGH LEVEL LANGUAGE PROGRAMMING

20

C language: Introduction – operator – expressions – variables – input / output statements – control statements – functions – arrays – pointers – structures – unions – file handling – case studies.

TOTAL HOURS: 60

TEXT BOOKS:

1. Stephen J. Kochen and Patrick h. Wood. ‘Exploring the Unix System’, Techmedia, 1999.
2. Maurice J. Bach, ‘The design on Unix Operating Systems’, Prentice Hall of India, 1999.
3. Ramos, ‘Computer Networking Concepts’, Prentice Hall International, 1999.
4. Balagurusamy, ‘Programming in ANSI C’, Tata McGraw Hill, 1999.
5. Kernighan and Ritchie, ‘The C Programming Language’, Prentice Hall of India, 1999.

6. Gottfried, 'Programming with C', Tata McGraw Hill, 1999.
7. Kutti, 'C and Unix Programming: A Conceptual Perspectives', Tata McGraw Hill, 1999. Eric Nagler Learning C++ M/s. Jaico Publishing Co. 1998 – 99.
8. Ghosh Dastidar, Chattopadhyay and Sarkar, " Computers and Computation – A Beginner's Guide ", Prentice Hall of India, 1999.
9. Nelson, Microsoft Office 97, Tata McGraw Hill, 1999.
10. Taxali, " PC Software for Windows Made Simple ", Tata McGraw Hill, 1999

**FIRST YEAR
Workshop Practice**

0 3 100

1. SHEET METAL (10)

Tools and Equipments - Fabrication of tray, cone, etc., with sheet metal

2. WELDING (10)

Tools and Equipments - Arc Welding of butt joint, Tap Joint, Tee fillet etc., Demonstration of gas welding.

3. FITTING (10)

Tools and Equipments- Practice in Chipping, Filing, Drilling - making Vee joints, square and dove tail joints.

4. CARPENTRY (10)

Tools and Equipments-Planning Practice-making halving joint and dove tail joint models.

5. FOUNDRY (10)

Tools and Equipments Preparation of moulds of simple objects like flange, gear V- grooved pulley etc.

6. SMITHY (10)

Tools and Equipments - Demonstration for making simple parts like keys, bolts etc.

TOTAL HOURS: 60

References:

1. Venkatachalapathy V.S., " First Year Engineering Workshop Practice ", Raamalinga Publications, Madurai, 1999.

2. Kanaiah P. and Narayana K.C., " Manual on Workshop Practice Scitech Publications ", Chennai, 1999.

PHYSICAL SCIENCE LABORATORY

A) Physics Laboratory

List of Experiments:

1. Young's modulus by non-uniform bending
2. Rigidity modulus and moment of inertia using Torsion Pendulum
3. Viscosity of a liquid by Poiseuille's method
4. Wavelength determination using grating by Spectrometer
5. Particle size determination by Laser
6. Thermal conductivity by Lee's disc.
7. Thickness of wire by Air wedge
8. Thermo e.m.f. measurement by potentiometer

TOTAL HOURS : 45 Hrs.

B) Chemistry Lab

WEIGHING AND PREPARATION OF STANDARD SOLUTIONS

Preparation of the normal and molar solutions of the following substances Oxalic acid, Sodiumcarbonate, Sodiumhydroxide, Hydrochloric acid Preparation of buffer solution: Borate buffer, Phosphate buffer using Henderson equation.

WATER ANALYSIS

Determination of total, permanent and temporary hardness of water by EDTA method
Determination of alkalinity in water sample
Determination of dissolved oxygen content by Winkler's method
Determination of chloride content of water sample by Argentometric method
 P^H To find out the strength of given hydrochloric acid by Sodiumhydroxide

CONDUCTOMETRIC

Conductometric titration of mixture of acids
Conductometric precipitation titration using Bariumchloride Vs Sodiumsulphate

POTENTIOMETRY

Redox titration- Iron Vs Dichromate

SPECTROPHOTOMETRY

To determine the iron content of an unknown solution (1,10 Phenanthroline/ thiocyanate method)

FLAME PHOTOMETRY

To determine sodium and potassium in water

VISCOMETERY

Determination of molecular weight of a polymer

CORROSION EXPERIMENTS

Corrosion rate measurements

Inhibition efficiency

ELECTROCHEMISTRY EXPERIMENTS

Determination of emf

Single electrode potential

(TOTAL HOURS: 45)

TEXT BOOK:

Engineering chemistry practicals by Dr. C. Daniel Yesudian, 2004, Hitech Publications.

FIRST YEAR

Engineering Graphics

0 3 100

1.PRINCIPLES OF GRAPHICS

15

Two dimensional geometrical construction - Conic sections, involutes and cycloids - Representation of threedimensional objects - Principles of projections - standard codes of principles.

2.ORTHOGRAPHIC PROJECTIONS

15

Projections of points, straight line and planes - ' Auxiliary projections ' - Projection and sectioning of solids -Intersection of surfaces - Development of surfaces.

3.PICTORIAL PROJECTIONS

15

Isometric projections - ' Perspectives ' - Free hand sketching.

4.COMPUTER GRAPHICS

15

Hardware - Display technology - Software - Introduction to drafting software.

TOTAL HOURS: 60

Text Books:

1. Narayanan, K.L., and Kannaiah, P., " Engineering Graphics ", Tata McGraw-Hill Publishers Co., Ltd., 1992.

References:

1. William M. Neumann and Robert F.Sproul, " Principles of Computer Graphics ", McGraw Hill, 1989.
2. Warren J. Luzzadder and John M. Duff, " Fundamentals of Engineering Drawing ", Prentice-Hall of India Private Ltd., Eastern Economy Edition, 1995.
3. Natarajan K.V., " A Text Book of Engineering Drawing ", Private Publication, Madras, 1990.
4. Mathur, M.L. and Vaishwanar, R.S., " Engineering Drawing and Graphics ", Jain Brothers, New Delhi, 1993.