

Semester 1st

Course Code	Course Title	Type of Course	L-P	Credit
PHY-111T	Physics I	C	4-0	4
CHM-111T	Chemistry I	C	4-0	4
MTH-111T	Mathematics I	C	4-0	4
ELE-101T	Basic Electrical Engineering	CF	3-0	3
BIO-101T	Environmental Science	CF	4-0	4
CIV-101T/P	Engineering Drawing	CF	2-3	4
MEC-101P	Engineering Workshop	CF	0-3	2
PHY-112P	Physics I Lab	C	0-2	1
CHM-112P	Chemistry I Lab	C	0-2	1
Total Credits	21-10	27		

Physics-I PHY-111T

**L – P
4 – 0**

Unit-I

Vector Analysis, Rotation of coordinate axis and Transformation of vectors, Gradient of Scalar field, divergence and curl of vector field in Cartesian, Spherical Polar and Cylindrical Coordinate systems, line, surface & volume integrals, Gauss's divergence theorem, Stokes's Theorem.

Unit-II

Collision of particles, Conservative and non-conservative forces, elastics and inelastic Scattering, frames of references, laboratory and center of mass system, kinematics of Elastics scattering in laboratory system, application of conservation theorem in solving Collision and scattering problems, Rutherford's scattering.

Unit-III

Vibration and Acoustics, Differential equation of simple harmonic motion, Energy of simple Harmonic oscillator, Damped harmonic motion, Energy dissipation, Forced oscillations, Amplitude and velocity resonance, sharpness of resonance, Energy consideration in forced Oscillations.

Unit-IV

Electromagnetic Theory: Coulombs law and Gauss's theorem, Calculation of electric field and potential, Charged Lines and Cylinders, Charged Plates, Charged Spheres, Biot-Savart's law, Ampere's law, Applications of the Magnetic Force, Helical and Circular Motion of charged particle in Uniform B Cycloidal Motion of a charged particle in Crossed E and B fields, Modified Amperes Law, Displacement current, Faraday's.

Unit-V

Maxwell's Equations, Electromagnetic wave equation in free space, its solution in one dimension, Pointing Vector and Discussion of Energy intensity, pressure and Momentum in Electromagnetic wave. Introduction to plasma: Debye shielding, plasma parameter, plasma frequency, Tutorial problems.

Books Recommended:

1. Introduction to classical Mechanics by R.G. Takwale and P.S Puranik by TMH Publishing.
2. Classical Mechanics by N.C. Rana and P.S. Jog, Tata McGraw Hills.

Reference Books

1. Introduction to Electrodynamics by David Griffiths, Pearson Education.
2. Introduction to Plasma theory by Dwight R. Nicholson, John Wiley.
3. Vibrations and Waves by A.P French.
4. Electromagnetism by Gerald L. Pollack and Daniel R. Stump, Pearson Education Asia limited and Higher Education press.

Chemistry-I

CHM-111T

L - P
4 - 0

Unit-I

Chemical thermodynamics: Introduction and Importance, First Law of Thermodynamics, Work done in Isothermal and Adiabatic Conditions, Heat capacities, Relation between u_1 and u_2 relations, Second Law of Thermodynamics, Concept of Entropy, Carnot engine, Gibbs free energy, Free Energy Changes as Criteria of Reversible and Irreversible process, Gibbs-Helmholtz's equation, Clausius - Clapeyron equation.

Unit-II

Electro-chemistry: Introduction, Conductivity of Electrolytes, Kohlrausch's Law of Independent Migration of Ions and its Application, Debye Huckel Theory of Strong Electrolytes, Electrochemical cells, Electrode-Potential, Standard Electrode Potential, Types of Electrodes (Metal-Metal Ion electrode, Gas Electrodes, Metal Insoluble Metal Salt Electrode), Fuel Cells, pH Measurement and Control.

Unit-III

Introduction to Environmental Chemistry, Concept and Scope of Environmental Chemistry, Chemistry of the Atmosphere, Global Warming, Greenhouse effect, Acid Rain: Mechanism of Formation and Effects and Depletion of Ozone Layer, Chemistry of Water and Waste Water, Measurement of acidity, Alkalinity, Hardness, BOD, COD, and Treatment of Water for Domestic and Industrial Purpose, Toxic Chemicals in the Environment, Biochemical Effects of Arsenic, Lead, Mercury and, Pesticides.

Unit-IV

Introduction to Alloys, Advantages of Alloys over other Metallic Materials, Manufacturing of Alloys (Fusion Method, Powder Metallurgy, Electro-deposition and Reduction method), Classification of Alloys (Ferrous and non-Ferrous metal Alloys), Carbon steels (Carbon Steels Classification, Composition and Uses), Alloy Steels (Low, Medium and High alloys steels), Effect of Different Alloying Elements on Properties of Alloy steels, Engineering Application of Copper, Nickel and Aluminium Alloys.

Unit V

Instrumental Techniques-I: Introduction, Advantages and Disadvantages of Instrumental and Non-Instrumental Methods, Electromagnetic Radiation, Electromagnetic Spectrum, Light Absorption (Beers-Lambert Law) UV-Vis spectroscopy (Types of Transition, Chromophors, Auxo-chromes and Applications) Infrared Spectroscopy (Modes of vibration, IR bands Corresponding to different functional groups and Applications).

Books Recommended:

1. Chemistry in Engineering and Technology Volumes I & II by J.C. Kuriacose and J. Rejaraman, Tata McGraw Hill publishing company Limited, New Delhi
2. Engineering Chemistry by P.C. Jain, Dhanpat Rai & Sons, New Delhi)
3. Physical Chemistry by Puri Sharma and Patharua
4. Inorganic Chemistry by J.D. Lee
5. Physical Chemistry by Peter Atkins, Juliodepaula
6. Electrochemistry and Corrosion Science by N. Perez
7. A Textbook of Organic Chemistry by V. K. Ahluwalia and Madhuri Goyal
8. Organic Chemistry: Stereochemistry by I. L. Finar, Pearson Education
9. Environmental chemistry by A. K. De, New Age International

Reference Books:

1. Chemistry of Engineering Materials by C.V. Agarwal Tata publishing Works, Varanasi
2. Chemistry in Engineering by L.A. Munro Prentice Hall, New York
3. Chemistry of Engineering Materials by C.P. Murthy, C.V. Agarwal and A. Naidu BS

4. Applied Chemistry Theory and Practice by O.P. Vermani and A.K. Narula, Wiley Eastern Limited, New Delhi
5. Applied Chemistry for Engineers R. M. E. Diamond, (Pitman)
6. Laboratory Manual on Engineering Chemistry by S.K. Bhasin and Sudha Rani, Dhanpat Rai Publishing Company, New Delhi

Mathematics-I

MTH-111T

L - P
4 - 0

UNIT-I

Introduction to differential calculus, Leibnitz's Theorem for n^{th} derivative, Taylor's theorem, Tangent and Normal, Partial Differentiation, Euler's theorem, Double points, asymptotes,

Curvature and tracing of curves.

UNIT-II

Limit, continuity and differentiability of functions of several variables, Chain rule, Jacobi Theorem, Taylor's theorem of one and two variables, extrema of functions, two or more Variables using method of Lagrange's multipliers.

UNIT-III

Ordinary differential equations: Exact ordinary differential Equations and Ordinary differential equations reducible to exact differential equations, Linear differential equations and equations reducible to linear form, Linear Differential equations of second and higher order with constant and variable coefficients, Applications of Ordinary Differential Equations.

UNIT-IV

Series solutions of Ordinary Differential Equations.

UNIT-V

Algebraic Equation, Elements of the theory of polynomial equations, Fundamental theorem of Algebra, Relation between the roots and the coefficients of an equation, Solution of cubic & bi-quadratic equations.

Books Recommended

1. Differential calculus, Shanti Narayan, S.Chand
2. A text Book on Engineering Mathematics by Bali, N.P, Luxmi Publications
3. Ordinary and Partial Differential equation, M.D. Raisinghania, S. Chand and Co

Reference Books

1. Advanced Engineering Mathematics by Jain, R.K. and Iyengar SRK, Narosa,
2. Advanced Engineering Mathematics, Kreyszig, J.Wiley
3. Linear Algebra, Hoffmann & Kunze, Prentice-Hall
4. Differential equations and its applications, H.T. Piaggio, Prentice-Hall
5. Engineering mathematics, Vol I-II, Sastry, Prentice Hall of India

Basic Electrical Engineering

ELE-101T

L – P
3 – 0

UNIT I

Introduction to DC circuits, Active and passive two terminal elements, Types of Voltage and Current Sources, Ohms law, Voltage-Current relations for resistor, inductor & capacitor, Kirchhoff's laws, Mesh analysis, Nodal analysis, current division, voltage division, Conventions for describing networks, Reference directions for currents and voltages.

UNIT II

Superposition Theorem, Thevenin's Theorem, Norton's Theorem, Maximum Power Transfer Theorem, Application of network theorems in solving various circuits, Star-Delta Transformation.

UNIT III

Sinusoids, Generation of AC, Average and RMS values, Form and peak factors, concept of phasor representation, J operator, Analysis of R-L, R-C & R-L-C Circuits, Introduction to three phase systems - types of connections, relationship between line and phase values.

UNIT IV

Working principle, construction and applications of DC machines and AC machines (1 - phase transformers, single phase induction motors), introduction to alternator: Principle of operation and working.

UNIT V

Safety measures in electrical system- types of wiring- wiring accessories staircase, fluorescent lamps & corridor wiring- Basic principles of earthing –Types of earthing.

Books Recommended

1. Engineering Circuit Analysis by William H Hayt, J E Kemmerly and Steven M Durbin, McGraw Hill.
2. Electrical Engineering fundamentals by Deltoro, Prentice Hall India (PHI).
3. Basic Electrical Engineering by D.P. Kothari. and I. J. Nagrath Tata McGraw - Hill.
4. Basic Electrical and Electronics Engineering by S.K. Bhattacharya Pearson Education.
5. Circuit Theory (Analysis & Synthesis) by A. Chakrabarti, DhanpatRai & Co.

Environmental Science

BIO - 101T

L - P
4 - 0

Unit I

Multidisciplinary nature of environmental studies: Definition, scope and importance, Need for public awareness.

Unit II

Natural Resources: Renewable and non-renewable resources: Natural resources and associated problems.

a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people.

b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.

c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.

e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Case studies.

f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.

Unit III

Ecosystems

- Concept of an ecosystem.
- Structure and function of an ecosystem.
- Producers, consumers and decomposers.
- Energy flow in the ecosystem.
- Ecological succession.
- Food chains, food webs and ecological pyramids.

Introduction, types, characteristic features, structure and function of the following ecosystem:-

a) Forest ecosystem

b) Grassland ecosystem

c) Desert ecosystem

d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Unit IV

Biodiversity and its conservation

- Introduction – Definition: genetic, species and ecosystem diversity.
- Bio-geographical classification of India
- Value of biodiversity : consumptive use, productive use, social,ethical, aesthetic and option values
- Biodiversity at global, National and local levels.
- India as a mega-diversity nation
- Hot-spots of biodiversity.
- Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts.
- Endangered and endemic species of India
- Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

Unit V

Environmental Pollution: Definition, Causes, effects and control measures of:-

- a) Air pollution
- b) Water pollution
- c) Soil pollution
- d) Marine pollution
- e) Noise pollution
- f) Thermal pollution
- g) Nuclear hazards

· Solid waste Management: Causes, effects and control measures of urban and industrial wastes.

· Role of an individual in prevention of pollution.

· Pollution case studies.

· Disaster management: floods, earthquake, cyclone and landslides.

Unit VI

Social Issues and the Environment

· From Unsustainable to Sustainable development

· Urban problems related to energy

· Water conservation, rain water harvesting, watershed management

· Resettlement and rehabilitation of people; its problems and concerns. Case Studies

· Environmental ethics: Issues and possible solutions.

· Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies.

· Wasteland reclamation.

· Consumerism and waste products.

· Environment Protection Act.

· Air (Prevention and Control of Pollution) Act.

· Water (Prevention and control of Pollution) Act

· Wildlife Protection Act

· Forest Conservation Act

· Issues involved in enforcement of environmental legislation.

· Public awareness.

Unit VII

Human Population and the Environment

· Population growth, variation among nations.

· Population explosion – Family Welfare Programme.

· Environment and human health.

· Human Rights.

· Value Education.

· HIV/AIDS.

· Women and Child Welfare.

· Role of Information Technology in Environment and human health.

· Case Studies.

Unit VIII

Field work

· Visit to a local area to document environmental assets
river/forest/grassland/hill/mountain

· Visit to a local polluted site-Urban/Rural/Industrial/Agricultural

· Study of common plants, insects, birds.

· Study of simple ecosystems-pond, river, hill slopes, etc.

REFERENCE

1. Environmental Biology by K.C. Agarwal, Nidi Publications Ltd. Bikaner.

- 2.** The Biodiversity of India by Bharucha Erach,, Mapin Publishing Pvt. Ltd.
- 3.** Hazardous Waste Incineration by R.C. Brunner, McGraw Hill.
- 4.** Marine Pollution by R.S. Clark Clanderson Press Oxford (TB).
- 5.** M.T. Environmental Encyclopedia by Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth,, Jaico Publications House, Mumbai,
- 6.** Environmental Chemistry by A.K. De, Wiley Eastern Ltd.
- 7.** Down to Earth, Centre for Science and Environment (R)
- 8.** Water in crisis, Pacific Institute for Studies in Dev. Environment & Security by H.P. Gleick, Stockholm Env. Institute Oxford Univ. Press.
- 9.** Encyclopedia of Indian Natural History, Bombay Natural History Society by R.E. Hawkins Bombay (R)
- 10.** Global Biodiversity Assessment by V.H. Heywood, & R.T. Waston, Cambridge Univ. Press 1140p.
- 11.** Environmental Protection and Laws by H. Jadhav, & V.M. Bhosale, Himalaya Pub. House, Delhi.

Engineering Drawing

CIV-101T/P

L - P
2 - 3

UNIT I

Basic concepts of drawing quadrants, drawing instruments, types of lines etc. Dimensioning: General rules of dimensioning, Types: Aligned, unidirectional, chain, parallel, combined, title, block & margins. Orthographic projections: Concept of horizontal and vertical planes, first and third angle projections, orthographic projections of simple blocks, missing lines and missing views,

Projection of points, lines and planes: Projection of points in different quadrants, projection of lines and planes positioned in different orientations with respect to the principle planes.

UNIT II

Projection of solids: Projection of simple geometrical solids placed in simple positions and with single rotations of the face, edge or axis of the solid with respect to one of the principal planes of projection.

UNIT III

Section of solids: Principal of sectioning, Section of simple geometrical solids, types of the section planes and their trace representation and location, true shape sections, sectioning by auxiliary planes.

UNIT IV

Development of surfaces: Development of surfaces of simple sectional solids and intersecting solids, transition pieces, cones & cylinders.

UNIT V

Isometric projections: Classification of pictorial projections, Isometric projection of plane figures, prisms, pyramids, cylinders and for the given orthographic projections, Introduction to Auto CADD, Basic commands of CADD.

Books Recommended :

1. Engineering Drawing by P.S. Gill, S.K. Kataria and son.
2. Engineering Drawing by N.D. Bhatt, Charotar Book Stall, Tulsi Sadan, Anand
3. Engineering Graphics with Auto CADD by James, D Bethune.
4. Engineering Drawing by Narayana, Kannaiya, Scitech Publications, Chennai

Reference Books:

1. Sham Tickoo, Auto CADD
2. B.C. Rana M.B. Shah Engineering Drawing, Pearson Education

Engineering Workshop

MEC-101P

L - P
0 - 3

UNIT I

Machine Shop: Operation and function of various machine tools like Lathe, for turning, facing, chamfering, grooving, knurling, boring & thread cutting, Shaper machine, for preparation of horizontal surfaces, slots and V-grooves, Milling machine, for side, end and face milling & making of spur gear, Drilling machines, for drilling and reaming operations, Grinding machines, for various grinding operations and CNC machine, for simple, step and taper turning operations.

UNIT II

Fitting Shop: Exercise on marking, cutting, chipping, filing, drilling, tapping, reaming, pipe threading and making nut & bolt and single ended spanner, Exercise on V, L, dove-tail & radius fittings.

UNIT III

Sheet Metal Shop: Exercise on development of sheet metal surfaces like cylinder, funnel, rectangular duct and 90° bend. Soldering & brazing of various joints, making single/double riveted lap-joint & single cover plate riveted but-joint.

UNIT IV

Welding Shop: Operation and function of various welding machines like Electric arc welding machine for various joints like lap, butt & T and preparation of small cot-frame from conduit pipe, Gas welding machine for cutting & joining operations and square pyramid from conduit pipe, TIG & MIG welding machines for basic operations, Spot & Seam welding machines for simple joints.

UNIT V

Carpentry and Pattern Making Shop: Various types of timber, defects in timber, exercise on various operations and making joints like half lap (T, dove-tail, cross), mitre & lengthening and mortise & Tenon, Simple exercise on wooden, Lathe including pattern making and railing.

UNIT VII

Foundry Shop: Exercise to prepare the green moulding sand, to prepare core and mould (single/double piece pattern), Casting of ferrous & non-ferrous metals after mould preparation for simple castings.

UNIT VIII

Smithy Shop: Smith's tools & their use, exercise for forging operations for making L-hook, chisel, square & hexagonal head bolts.

BOOKS RECOMMENDED

1. A course in workshop technology B.S. Raghuvanshi, Vol. I - II. Dhanpat Rai and Sons.
2. Workshop Practice, Vol I - II Hajira Chowdry.

Physics-I Lab PHY-112P

L - P
0 - 2

List of Experiments

1. To determine the value of e/m of electron
2. To study the bar pendulum
3. To study the Kater's reversible pendulum
4. To study the bending of beam apparatus
5. To study the Newton's ring apparatus
6. To determine the wavelength of light using a spectrometer
7. To study a Polarizer and analyzer
8. Stephens constant using incandescent lamps
9. Energy band of a semi-conductor diode

Recommended Books:

1. Practical Physics by SL Gupta
2. Advanced Practical Physics, SP Singh, Pragati Prakashan

Chemistry Lab-I CHM-112P

L - P
0 - 2

List of Experiments

Basic Introduction on Solution Preparation, Concentration terms, Handling of Glass wares, Chemicals and Instruments, Precautions

1. Determination of strength of NaOH solution by standardization of sodium hydroxide using Oxalic acid
2. To determine the acid value of a given mineral oil or vegetable oil.
3. To determine the moisture content of a given sample of coal.
4. To determine the Degree of dissociation of a weak acid by Conductometry
5. Determination of the strength and pK_a value of the weak acid by titration with an alkali.
6. Estimation of calcium in Lime stone
7. To determine the Aniline point of the given sample of a Lubricating oil
8. To test the validity of Beer-Lambert law using spectrophotometer and determine the unknown concentration of solution.

Demonstration Experiments

1. Determination of pH of different concentration of acid and bases by pH meter
2. Determination of calorific value of solid fuels using Bomb Calorimetry.

Semester 2nd

Course Code	Course Title	Type of Course	L-P	Credit
PHY-211T	Physics II	C	4-0	4
CHM-211T	Chemistry II	C	4-0	4
MTH-211T	Mathematics II	C	4-0	4
CSE-201T	C Programming	CF	4-0	4
CIV-201T	Elements of Civil Engineering	CF	3-0	3
ECE-201T	Basic Electronics & Communication Engineering	CF	3-0	3
PHY-212P	Physics II Lab	C	0-2	1
CHM-212P	Chemistry II Lab	C	0-2	1
CSE-202P	C Programming Lab	CF	0-2	1
Total Credits	22-6	25		
Course Code	Course Title	Type of Course	L-P	Credit

Physics - II

PHY-211T

L - P
4 - 0

Unit-I

Quantum Mechanics: Why Quantum Physics, De-Broglie Hypothesis, Davison Germer experiment, Young's Double slit experiment, Uncertainty principle and Wave Packet, Wave function and its properties, Expectation value, Operators, Normalisation, Schrodinger wave Equation, Time Dependent and Time Independent, Continuity equation in QM, Schrodinger equation for free Particle, Particle in a Box, Step potential Tunnelling effect and its example (Tunnel diode or alpha decay).

Unit-II

Elementary Solid State Physics: Crystal lattice, Crystal structure, Unit cells, Miller Indices, Bravais lattice, Photographic crystal X-ray diffraction techniques, Laue's method, Classification of solids, formation of energy bands in metals, semiconductors and insulators, intrinsic and extrinsic semiconductors, Fermi energy.

Unit-III

Diffraction: Optical diffraction techniques- Fresnel diffraction, Fresnel Diffraction from a Slit. Fraunhofer Diffraction, Fraunhofer diffraction from a circular aperture, Fraunhofer diffraction from a rectangular aperture, Polarization of light, Plane, Circular, Elliptical Polarization.

Unit-IV

Special theory of Relativity: Frames of reference, Michelson-Morley experiment, Absolute Space and Absolute Time, Need for Relativity, Basic postulates of special theory of relativity, Length contraction, Time dilatation, Relativistic Momentum, Mass-energy relation, Superconductivity: Meisner Effect, Type I and Type II Superconductors, BCS theory (Qualitative only), applications of superconductors.

Unit-V

Lasers: Introduction, Principle of laser, Stimulated and spontaneous emission, Population inversion, Einstein coefficients, optical pumping, Resonant Cavity and its modes, He-Ne Laser, Ruby Laser, Semiconductor Lasers, Applications of Lasers.

Text Books :

1. Optics by Ghatak
2. Optics by N. Subrahmanyam and BrijLal

Reference Books :

1. Fundamentals of Optics by Jenkins and White
2. Applied Solid State Physics by Rajnikant

Chemistry-II

CHM-211T

L - P
4 - 0

Unit-I

Nano-Technology: Nano scale and Its Significance, Properties at Nano scale: Optical, Electrical, Thermal, Mechanical and Magnetic, General Methods of Preparation of Nanomaterial's viz Top Down (Ball Milling, Nanolithography) and Bottom up Methods (Sol-Gel, Solution Based Method), Carbon Nanotubes (Properties and Applications)

Unit-II

Corrosion: Introduction, effects of corrosion, Factors effecting the rate of corrosion (Nature of the metal and Nature of the environment), Electrochemical Theory of Corrosion, Dry Corrosion and Wet Corrosion, Types of Corrosion (Pitting Corrosion, Crevice Corrosion, Galvanic Corrosion and Stress corrosion), Testing and Measurement of Corrosion, Corrosion Protection and Inhibition, Cathodic Protection, Anodic Protection, Protective Coatings.

Unit-III

Polymers: Advantages of Polymers over other Engineering Materials, Functionality, Degree of Polymerization, Concept of Molecular Weight, Polymerization (Addition, Condensation and Copolymerization), Polymerization Techniques (Bulk, Solution, Suspension and Emulsion polymerizations), Preparation, Properties and Engineering application of some Important Polymers, Polythene (LDPE and HDPE), Polyvinyl Chloride, Polystyrene, Teflon, Phenol Formaldehyde, urea-formaldehyde resin, Introduction to polymer iccomposites.

Unit-IV

Lubricants: Introduction, Function of Lubricants, Mechanism of Lubrication, Classification of Lubricants (Liquid ,Semisolid , Solid), Properties of Lubricants (Flash Point and Fire Point, Viscosity , Aniline Point Acid value).

Unit-V

Instrumental Techniques-II: Nuclear Magnetic Resonance: Principle, shielding mechanism, chemical shift, number of Signals, application of nuclear magnetic resonance to simple organic molecules, Introduction to Thermal Analysis: Principle, Working and Application (TGA,DTA), X-ray Spectroscopy: Principle and Applications.

Books Recommended:

1. A Text Book of Engineering by S.S Dara S Chand & Co limited New Delhi
2. Advanced Practical Physical Chemistry by Yadav, Goyal publication
3. Spectroscopic methods by Williams and Fleming
4. Applied Chemistry : Theory And Practice by O. P. Vermani
5. Laboratory Manual on Engineering Chemistry by S.K. Bhasin and Sudha Rani, DhanpatRai Publishing Company, New Delhi
6. Applied chemistry by V. M. Balsaraf &Et. I. K. Al, International Publishing House Pvt. Ltd.
7. Electrochemistry and Corrosion Science by N.Perez
8. Analytical chemistry: An Introduction byDouglas A. Skoog, Donald M. West, F. James Holler
9. Polymer Science by V.R.Goowriker, N.V Viswanathan and jayadevSreedhar by Wiley Easter Limited New Delhi
10. Nanotechnology Fundamentals And Applications by ManasiKarkare & Rajni Bahuguna
11. Nanotechnology Importance And Application by Fulekar
12. Physical Chemistry by Puri Sharma and Patharua.
13. Solid State Chemistry and its Applications by Anthony R. West, Wiley Publisher

Mathematics-II

MTH-211T

L - P
4 - 0

UNIT-I

Non-linear differential equation of first order, Simultaneous differential equation, Simultaneous differential equation of the form $u_1 = u_2 = u_3$, Applications of ordinary differential equations, Differential Equation: Partial differential equations of first order, langrage linear equation Standard form, Charpit`s Method to solve non-linear partial differential equation.

UNIT-II

Partial differential equations of second and higher, Homogeneous Partial Differential equations with constant coefficients, vibration of stretched flexible string, heat flow equation, Wave equation, solutions by the method of separation of variables.

UNIT-III

Fourier series, Integral Calculus: Differential under the sign of integration. Double and triple integrals, change of variables, Beta and Gamma functions.

UNIT-IV

Matrices: Review of algebra of matrices, Orthogonal and unitary matrices, partitioning of Matrices, Trace of Matrices, Triangular matrices, Rank of a matrix, elementary transformations, Inverse by Elementary Transformation.

UNIT-V

Normal Form of a Matrix, solution of simultaneous equation by elementary operation, Caley- Hamilton theorem, Eigen values, and Eigen vectors of a matrix, Quadratic Form.

Books Recommended:

1. Advanced Engineering Mathematics by E.Kreyszig
2. Differential equations and its applications, H.T. Piaggio, Prentice-Hall
3. Applied Mathematics for Engineers by P.N. Wartikar
4. Advanced Engineering Mathematics,2/e by Greenberg, Pearson education, 2004
5. Ordinary and partial Differential equation, M.D. Raisingania, S.Chand and Co
6. Linear Algebra, Hoffmann & Kunze, Prentice-Hall
7. Mathematical Analysis by S.C. Malik & Savita Arora New Age international Limited
8. Integral Calculus by Shanty Narayan.

C Programming

CSE-201T

L – P
4 – 0

Unit-I

Computer components, characteristics & classification of computers, hardware & software, peripheral devices, system software, application software, utility program, compiler, interpreter, Assemblers, Evolution of programming languages, Algorithms, Dataflow Diagram, introduction to compiler/ Assembler/Interpreter.

Unit-II

Structure of C program, Identifiers, Keywords, Data Types, Constant and Variables, Operators: Precedence and Associativity, Expressions, Statements, Input and Output functions, storage classes, type casting, Macros.

Unit-III

Control structures: Branching & looping, One Dimensional Array, Multidimensional Array and their applications, string manipulation.

Unit-IV

Library and User defined functions, Formal and Actual parameters, function prototypes, Parameter passing (Call-by-value,), Recursion, Structures, unions.

Unit-V

Pointer variable, Pointer Arithmetic, passing parameters by reference, pointer to pointer, pointers to functions, dynamic memory allocation, pointer to structure & pointer to union, Pointers to Multidimensional Arrays, Declaration of file pointer, opening and closing files, working with text files.

Books Recommended:

1. Programming in ANSI C by E. Balaguruswami, TMH
2. Programming in C by Byron Gottfried, TMH
3. Computer fundamentals and programming in C by Pradip Dey & Manas Ghosh, OXFORD University Press
4. The 'C' programming language by Ritchi, Kernighan & D.M. Ritchie, PHI
5. C The Complete Reference by H. Schildt, TMH
6. Let us C by Y. Kanetkar, BPB Publications
7. Computer Science - A Structured Programming Approach using C by B.A. Forouzan & R.F. Gillberg, Cengage Learning.

Elements of Civil Engineering

CIV-201T

L - P
3 - 0

UNIT-I

Introduction to Civil Engineering: Overview of Civil Engineering; Civil Engineering landmarks, Impact (social, economic, environmental) of Civil Engineering on society, introduction to various branches of civil Engineering, Future directions: Job opportunities in Civil Engineering.

UNIT-II

Stress & Strain: Forces & stresses, Body Forces, surface forces, Internal forces, components of stress in rectangular co-ordinates, Uni-axial tensile test, Elasticity, An-elasticity, Work hardening, anisotropy, homogeneity and continuity, generalized Hooke's law, Lamé's constants, Modulus of rigidity, Bulk modulus, relation between the elastic constants, Principle of superposition, Uniqueness theorem, Thermal effects, centre of Gravity (symmetrical & unsymmetrical sections), moment of inertia of symmetrical & unsymmetrical sections, parallel axis theorem, perpendicular axis theorem, radius of gyration.

UNIT-III

Bending moment & Shearing Force: Notation & sign convention for flexural loads, shear force & bending moment, diagrams of determinate structures, (Cantilever, simply supported beams & varying load beams) supported to point loads, UDL and VDL, computing of reactions using equation of equilibrium.

UNIT-IV

Trusses: Planar Truss structures, idealization of planar structures, sign convention & member force representation, analysis of trusses by methods of Joints, graphical and sections.

UNIT-V

Torsion of shafts: Geometry of deformation of a twisted circular shaft, Stress and deformation in twisted circular solid and hollow shafts, Strain energy due to torsion, Power transmitted by circular shafts.

BOOKS RECOMMENDED:

1. Engineering Mechanics by I.H. Shames Prentice Hall, New Delhi.
2. Vector Mechanics for Engineers by F.P. Beer, and Johnston, McGraw Hill Edition.
3. Engineering Mechanics by D.S. Kumar, S.K. Kataria & Sons, New Delhi.
4. Engineering Mechanics by J. L. Meriam and L. G. Kraige, John Wiley.
5. Strength of Materials by Khurmi.
6. Strength of Materials by Ramamurtha.

Basic Electronics and Communication Engineering

ECE-201T

L – P
3 – 0

UNIT-I

Electronic Components: Active and Passive (Resistors, Inductors and Capacitors) components, Introduction to Semiconductors: P and N type Semiconductors, Transport Mechanism of Charge Carriers, Charge Densities in a Semiconductor, Electric properties, Hall Effect, Generation, Recombination, Diffusion, Continuity Equation, Injected Minority Carrier Charge.

UNIT-II

PN Junction: Open Circuited PN Junction, Current Components in PN junction Diode, Basic Principle, Operation and Volt-Ampere Characteristics of PN Junction Diode, Temperature Dependence of V/I Characteristics, Piecewise linear Diode Characteristics, Diode Resistance, Diode Capacitances in detail, Charge Control Description of a Diode, Junction Diode Switching Times, BJT and its types.

UNIT-III

Digital Electronics: Introduction to digital Electronics, Gates (Basic & universal), Boolean algebra, laws & theorems, simplification of Boolean expression, Basics of Microprocessor 8085 and its pin diagram.

UNIT-IV

Communication Systems: Introduction to Communication System, elements of Communication System, Benefits of Communication, Communication Media, Modulation and Demodulation (brief idea).

UNIT-V

Transducers: Classification of Transducers, Basic Requirements of Transducers, Passive Transducers, Strain Gauge, Thermistor, LVDT, Active Transducers, Piezoelectric and Thermocouple.

TEXT BOOKS:

1. Electronic Devices & Circuits by J.B. Gupta
2. Integrated Electronics by Millman & Halkias
3. Communication system Analog and Digital by Sanjay Sharma

REFERENCE BOOKS:

1. Electronic Communication system by G. Kennedy
2. Electronic Communication Systems (Fundamentals through advanced) by W. Tomassi, Pearson Education.
3. Electronic Devices and Circuit Theory by Boylestead and Nashelsky.

Physics - II Lab PHY-212P

**L - P
0 - 2**

List of Experiments:

1. Determination of refractive index of prism by spectrometer.
2. Determination the wavelength of sodium light by diffraction grating.
3. Determination of Wavelength of sodium light by Newton's ring.
4. Study of Zener diode voltage regulating characteristics.
5. To study double slit interference by He-Ne laser.
6. To plot the graph for the transistor characteristics.
7. To plot the graph for the semi-conductor diode.
8. To find the dead time of a G. M. Counter

Chemistry-II Lab CHM-212P

**L - P
0 - 2**

List of Experiments:

1. Synthesis of the phenol formaldehyde resin
2. To titrate Fe(II) with KMnO_4 spectrophotometrically.
3. To determine the dissociation constant of methyl red by spectro photometric method
4. To determine the temporary and permanent hardness of the a sample of water by complex ometeric titration
5. To determine the Alkalinity of the given sample of water.
6. Determination of the ion exchange capacity of cation exchange resin.
7. Separation of a mixture of inorganic ions by paper chromatography.

Demonstration of experiments:

Determination of specific rotation of the sucrose by polraimetry
Spectrophotometer (concentration determination, wavelength maximum)

C Programming Lab CSE-202P

**L - P
0 - 3**

List of Experiments:

1. Programs to understand the basic data types.
2. Program for looping and decision statements.
3. Programs to generate odd, even, fibnocci, Lucas and other common series using loops.
4. Programs using built-in math functions.
5. Programs on arrays.
6. Program to implement linear search.
7. Programs on two dimension array.
8. Program to add and multiply two Matrices.
9. Program to find transpose of a Matrix
10. Program to read and display array using functions
11. Programs on string manipulations.

- 12.** Write functions for finding sum, difference, product and remainder between two numbers and return the result
- 13.** Programs on functions.
- 14.** Write a function to find factorial using recursion
- 15.** Programs on structures and unions.
- 16.** Programs on pointers
- 17.** Write a function to swap two numbers using call by reference?
- 18.** Write a function to find minimum of an array using pointers?
- 19.** Write a function to reverse a string using pointers?
- 20.** Programs on basic file operations