SEMESTER – II

SL No.	Course No.	Course Title	Contact Hour/ Week	Credit
1.	CE-103	Engineering Mechanics	4	4
2.	EEE 103	Basic Electrical Engineering	3	3
3.	CH 103	Chemistry-II	3	3
4.	PH-103	Physics-II	3	3
5.	Math-103	Mathematics-II	3	3
6.	CE-102	Practical Surveying	3	1.5
7.	CE-110	Civil Engineering Drawing-II	3	1.5
8.	CH 104	Chemistry Sessional-II	1.5	0.75
9.	PH-104	Physics Sessional -II	1.5	0.75
Total			**25**	**20.5**

No. of Theory Courses = 05 Total Contact Hour =25
No. of Sessional Courses = 04 Total Credit = 20.5

SEMESTER - II

CE 102 Practical Surveying

Sessional:3 Weeks in field **Credit:1.50**

Practice on handling of instruments, chain survey, plane table survey, Theodolite traversing, Leveling and contouring, route project, house setting, curve setting, stadia surveying, height and distance problem.

CE 103 Engineering Mechanics

Lecture:4 hrs/ week **Credit:4.00**

Introduction to SI Units, coplanar concurrent forces, moments and parallel coplanar forces, non-concurrent non-parallel coplanar forces, centroids, moment of inertia of areas, moment of inertia of masses, Friction, flexible cords, plane motion, force systems that produce rectilinear motion, work, kinetic energy, power, impulse and momentum.

CE 110 Civil Engineering Drawing-II

Sessional: 3 hrs/ week **Credit:1.50**

Plan, elevation and sections of multi-storied buildings, reinforcement details of beams, slabs, stairs etc. Plan and section of septic tank, detailed drawing of roof truss, plan, elevation and sections of culverts, bridges and other hydraulic structures, building services drawings, introduction to computer aided drafting.

EEE 103 Basic Electrical Engineering

Lecture:3 hrs/ week **Credit:3.00**

Electrical units and standards. Electrical networks, series, parallel and series-parallel networks. Method of network analysis. Measurement of electrical quantities, resistance, current, voltage, power and energy measurements.

Alternating current: Instantaneous, rms and average values of current and voltage. Real and reactive power. Steady AC circuit analysis, single phase RLC circuit with sinusoidal excitation. Polyphase circuit, Balanced three phase circuit, Familiarization with different types of electrical machines, DC generators and motors, AC generators and motors and transformers.

Introduction to electronic principles and its simple applications.
Introduction to electrical wiring.

CH 103 Chemistry-II

Lecture:3 hrs/ week **Credit:3.0**

Chemical corrosion: introduction to chemical corrosion, corrosion of metals and alloys in dry and wet environments, mechanism of corrosion, atmospheric and soil corrosion and their protective measures.

Chemistry of environmental pollution: environment and its characteristics, chemistry of toxic metal and non-metal pollutants, analytical techniques used in the determination of pollutants, chemical concept of DO, BOD, COD and threshold odour number, chemistry involved in water treatment plants, quality of industrial waste water.

Polymers: chemistry of polymerization, different types of polymers and their properties, polymer-degradation, elastomers and composite materials.
Paints and varnishes: introduction to paints and varnishes, pre-treatment of the surface, metallic, non-metallic and organic protective coating, types of paints and their uses.

Principle of spectophotometric analysis: Beer Lambert law and its applications.

Thermo chemistry: Laws of thermo chemistry and problems based on them, Kirchoff's equation, Heat of solution and heat of neutralization.

CH 104 Chemistry Sessional-II

Lecture:1.5 hrs/ week **Credit:0.75**

Gravimetric analysis: determination of Fe, Cu, Ca, Cl, SO_4 Volumetrically spectophotometric estimation of As, Cr, Mn, Ca, Fe, Ni, Zn. Determination of pH of a solution.

PH 103 Physics-II

Lecture:3 hrs/ week **Credit:3.00**

Structure Matter: States of matter: Solid, liquid and gas. Classification of solids: amorphous, crystalline, ceramics and polymers. Atomic arrangement in solids. Different types of bonds in solids: metallic. Vander Waals, covalent and ionic bond, packing in solids, interatomic distances and forces of equilibrium, x-ray diffraction, Bragg's law. Plasticity and elasticity. Distinction between metal, insulator and semi-conductor.

Electricity and Magnetism: Electric charge, Coulomb's law, the electric field electric flux and Gauss's law, some application of Gauss's law, electric potential V, relation between E and V, electrical potential energy. Capacitors, capacitance, dielectrics: an atomic view, dielectrics and Gauss' law.

Current and resistance: current and current density, Ohm's law, Ampere's law, Faraday's law, Lenz's law, self-inductance and mutual inductance. Magnetic properties of matter: magnetomotive force, magnetic field intensity, permeability, susceptibility, classifications of magnetic materials, magnetization curves.

Modern Physics: Michelson Morley's experiment, Gallilean transformation, special theory of relativity, Lorentz-transformation, relative velocity, length contraction, time dilation, mass energy relation. Photoelectric effect, Compton effect, De-Broglie wave, Bohr's atom model. Nuclear Physics: Radioactive decay, half life, mean life, isotopes, nuclear binding energy, alpha, beta and gamma decay.

PH 104 Physics Sessional -II

Lecture:1.5 hrs/ week **Credit:0.75**

Laboratory Experiment:

Determination of the radius of curvature of a plano-convex lens by Newton's ring method. Determination of threshold frequency for the photoelectric effect of a photocathode and the value of the Planck's constant. To plot thermoelectromotive force-temperature (calibration) curve for a given thermocouple. Determination of the melting point of a solid using the calibration curve. Determination of the specific rotation of sugar solution by a polarimeter. Determination of the temperature coefficient of the resistance of the material of a wire. Measurement of unknown resistance and verification of the laws of resistance by P.O. (post office) box. Comparison of the E.M.F's of two cells by potentiometer.

Math 103 Mathematics-II

Lecture:3 hrs/ week **Credit:3.00**

Matrices: Definition of matrix, Algebra of matrices. Multiplication of matrices. Transpose of a matrix and inverse of a matrix. Rank and elementary transformation of matrices. Solution of linear equations. Linear dependence and independence of vector. Quadratic forms. Matrix polynomials. Determination of characteristic roots and vectors. Null space and nullity of a matrix. Characteristic subspace of a matrix.

Two and three-dimensional Co-ordinate Geometry: A pair of straight lines and conic section in two dimensions. System of co-ordinate. Projection. Direction Cosines. Equations of planes and lines. Angle between lines and planes. Distance from a point to a plane. Co-planar lines. Shortest distance between two given straight lines. Standard equation of conicoids, sphere ellipsoid. Hyperboloid of one sheet, hyperboloid of two sheets. Tangent planes. Normal lines. Condition of tangency.