Level-1 Term-I (Common to all)

Sl. No	Course Number	Course Name	Contact Hours per Week	Credit Hour
1	EEE 101	Electrical Circuits I	3.0	3.0
2	EEE 102	Electrical Circuits I Laboratory	3.0	1.5
3	CSE 109	Computer Programming	3.0	3.0
4	CSE 110	Computer Programming Laboratory	3.0	1.5
5	CE 106	Engineering Drawing	3.0	1.5
6	PHY 121	Waves and Oscillations, Optics and Thermal Physics	3.0	3.0
7	MATH 157	Calculus I	3.0	3.0
8	MATH 159	Calculus II	3.0	3.0
		Total	**24.0**	**19.5**

EEE 101 Electrical Circuits I

3 Credit Hours, 3 Contact Hours per Week

Circuit variables: voltage, current, power and energy, Voltage and current independent and depended sources, Circuit elements resistance, inductance and capacitance. Modeling of practical circuits, Ohm's law and Kirchhoff's laws, Solution of simple circuits with both dependent and independent sources, Series-parallel resistance circuits and their equivalents, Voltage and current divider circuits, Delta-Wye equivalent circuits, Techniques of general DC circuit analysis (containing both independent and dependent sources): Node-voltage method, Mesh-current method, Source transformations. Thevenin and Norton equivalents, Maximum power transfer. Superposition technique. Properties of Inductances and capacitances. Series-parallel combinations of inductances and capacitances; Concepts of transient and steady state response with dc source.

Definitions of ac voltage, current, power, volt-ampere and various factors (including power, peak, form factors etc.) , Introduction to sinusoidal steady state analysis: Sinusoidal sources, phasor, impedance, admittance, reactance, susceptance; voltage, current, power of R, L, C. R-L, R-C, R-L-C circuits with sinusoidal source, Series - parallel and Delta-Wye simplifications of circuits with R, L, Cs. Techniques of general ac circuit analysis (containing both independent and dependent sources): Node-voltage method, Mesh-current method, Source transformations, Thevenin and Norton Equivalents, Phasor diagrams. Sinusoidal steady state power calculations, RMS values, Real and reactive power. Maximum power transfer, impedance matching. Steady state voltage, current.

EEE 102 Electrical Circuits I Laboratory

1.5 Credit Hours, 3 Contact hours per week

In this course students will perform simulation study and experiments to verify practically the theories and concepts learned in EEE 101.

CSE 109 Computer Programming

3 Credit Hours, 3 Contact Hours per Week

Introduction to digital computers. Programming languages, algorithms and flow charts. Structured Programming using C: Variables and constants, operators, expressions, control statements, functions, arrays, pointers, structure unions, user defined data types, input-output and files. Object-oriented Programming using C++: introduction, classes and objects; polyorphism; function and operator overloading; inheritance.

CSE 110 Computer Programming Sessional

1.5 Credit Hours, 3 Contact Hours per Week

This course consists of two parts. In the first part, students will perform experiments to verify practically the theories and concepts learned in CSE 109. In the second part, students will learn program design.

CE 106 Engineering Drawing

1.5 Credit Hours, 3 Contact Hours per Week

Introduction- lettering, numbering and heading; instrument and their use; sectional views and isometric views of solid geometrical figures. Plan, elevation and section of multistoried building; building services drawings; detailed drawing of lattice towers.

PHY 121 Waves and Oscillations, Optics and Thermal Physics

3 Credit Hours, 3 Contact Hours per Week

Waves and oscillations: Differential equation of simple harmonic oscillator, total energy and average energy, combination of simple harmonic oscillations, spring mass system, torsional pendulum; two body oscillation, reduced mass, damped oscillation, forced oscillation, resonance, progressive wave, power and intensity of wave, stationary wave, group and phase velocities.

Optics: Defects of images: spherical aberration, astigmatism, coma, distortion, curvature, chromatic aberration. Theories of light; Interference of light: Young’s double slit experiment, displacement of fringes and its uses, Fresnel bi-prism, interference in thin films, Newton's rings,

interferometers; Diffraction: Diffraction by single slit, diffraction from a circular aperture, resolving power of optical instruments, diffraction at double slit and N-slits, diffraction grating; polarization: Production and analysis of polarized light, Brewster's law, Malus law, polarization by double refraction, Nicol prism, optical activity, Polarimeters.

Thermal Physics: Heat and work- the first law of thermodynamics and its applications; Kinetic Theory of gases- Kinetic interpretation of temperature, specific heats of ideal gases, equipartition of energy, mean free path, Maxwell's distribution of molecular speeds, reversible and irreversible processes, Carnot's cycle, second law thermodynamics, Carnot's theorem, entropy, Thermodynamic functions, Maxwell relations, Clausius and Clapeyron equation.

MATH 157 Calculus I

3 Credit Hours, 3 Contact Hours per Week

Differential Calculus: Limits, continuity and differentiability. Successive differentiation of various types of functions. Leibnitz's theorem. Rolle's theorem, Mean value theorem, Taylor's and Maclaurin's theorems in finite and infinite forms. Lagrange's form of remainders. Cauchy's form of remainders. Expansion of functions, evaluation of indeterminate forms of L' Hospital's rule. Partial differentiation. Euler's theorem. Tangent and normal. Subtangent and subnormal in cartesian and polar co-ordinates. Determination of maximum and minimum values of functions. Curvature. Asymptotes. Curve tracing.

Integral Calculus: Integration by the method of substitution. Standard integrals. Integration by successive reduction. Definite integrals, its properties and use in summing series. Walli's formulae. Improper integrals. Beta function and Gamma function. Area under a plane curve and area of a region enclosed by two curves in cartesian and polar co-ordinates. Volumes and surface areas of solids of revolution.

MATH 159 Calculus II

3 Credit Hours, 3 Contact Hours per Week

Complex Variable: Complex number system. General functions of a complex variable. Limits and continuity of a function of complex variable and related theorems. Complex differentiation and the Cauchy-Riemann equations. Infinite series. Convergence and uniform convergence. Line integral of a complex function. Cauchy's integral formula. Liouville's theorem. Taylor's and Laurent's theorem. Singular points. Residue. Cauchy's residue theorem.

Vector Analysis: Multiple product of vectors. Linear dependence and independence of vectors. Differentiation and integration of vectors together with elementary applications. Line, surface, and volume integrals. Gradient of a scalar function, divergence and curl of a vector function, various formulae. Integral forms of gradient, divergence and curl. Divergence theorem. Stoke's theorem, Green's theorem and Gauss's theorem.