

## Department of First Year Engineering: Semester – I

<b>CO of the Course “Engineering Mathematics-I”</b>	
<b>CO1</b>	Apply mean value theorems and its generalizations leading to Taylors and Maclaurin’s series useful in the analysis of engineering problems. Determine the Fourier series representation and harmonic analysis of periodic functions in engineering applications.
<b>CO2</b>	Evaluate derivative functions of several variables that are essential in various engineering problems.
<b>CO3</b>	Apply the concept of Jacobian to find partial derivatives of implicit function and functional dependence. Use of partial derivatives in estimating errors & approximations and finding extreme values of the function.
<b>CO4</b>	Apply the essential tool of matrices and linear algebra in a comprehensive manner for analysis of system of linear equations, Linear dependence & Independence, finding linear and orthogonal transformations.
<b>CO5</b>	Determine Eigen values & Eigen vectors. Use it to diagonalize matrix and to reduce quadratic form to canonical form, applicable to engineering problems.
<b>CO of the Course “Engineering Physics”</b>	
<b>CO1</b>	Develop the understanding of working principle of lasers, optical fibers and extend it to holography and fiber optic communication.
<b>CO2</b>	Deduce Schrödinger's wave equations and apply it to problems on the bound states by summarizing fundamentals of quantum physics.
<b>CO3</b>	Explain phenomena of interference in thin films, polarization, double refraction and connect to the Anti-Reflection Coating, LCD.
<b>CO4</b>	Develop understanding of Fermi level and Fermi energy in semiconductors on the basis of results of Fermi Dirac statistics and relate them with the working of semiconducting devices. Extend the understanding of Ultrasonic to thickness measurement, flaw detection.
<b>CO5</b>	Explain properties of nanoparticles and estimate engineering applications; Explain phenomenon of Superconductivity and estimate engineering applications.
<b>CO of the Course “Engineering Chemistry”</b>	
<b>CO1</b>	Understand the practical approaches and techniques required to effectively monitor water quality.
<b>CO2</b>	Select appropriate electro analytical techniques for understanding the materials.
<b>CO3</b>	Demonstrate the structure and properties of advanced engineering materials for various technological applications.
<b>CO4</b>	Analyze different types of conventional and alternative fuels.
<b>CO5</b>	Explain causes of corrosion and methods for minimizing corrosion.
<b>CO of the Course “Basic Electronics Engineering”</b>	
<b>CO1</b>	Know about the working of P-N Junction diode and its application as rectifier & switch, basics of LED & Photodiode.

<b>CO2</b>	Understand the working of BJT & MOSFET, their characteristics & compare.
<b>CO3</b>	Learn logic gates & realization of the digital circuits.
<b>CO4</b>	Understand the functioning of Opamp and electronic instruments.
<b>CO5</b>	Select sensors based on their working principle for specific applications and its implementation with Communication system.
<b>CO of the Course “Basic Electrical Engineering”</b>	
<b>CO1</b>	Apply Kirchhoff's Laws, Superposition theorem and network simplification techniques for DC circuit analysis.
<b>CO2</b>	Analyze the magnetic circuit parameters, self-Inductance, mutual Inductance and Electromotive Forces (EMF's).
<b>CO3</b>	Calculate AC quantities using mathematical equations, waveforms and phasor diagrams.
<b>CO4</b>	Compute the voltage, current and power of the given 1-phase and 3-phase AC circuits.
<b>CO5</b>	Understand the working principle of 1-Phase Transformer, Motors (DC, Induction) and their practical applications.
<b>CO of the Course “Engineering Graphics”</b>	
<b>CO1</b>	Explain the fundamentals of Engineering Graphics and basic principles of geometric construction and apply the knowledge of Projections, Methods to prepare the drawings for points and lines.
<b>CO2</b>	Apply the types of Projections, Methods to prepare the drawings for planes.
<b>CO3</b>	Construct the various engineering curves and illustrate the application of various engineering curves and draw the development of the lateral surface of solid.
<b>CO4</b>	Apply the concept of orthographic projection of an object to draw several 2D views for visualizing the physical state of the object.
<b>CO5</b>	Apply the visualization skill to draw an isometric projection from given orthographic views.
<b>CO of the Course “Engineering Mechanics”</b>	
<b>CO1</b>	Understand basic concept of forces, moments and couples in two-dimension force system.
<b>CO2</b>	Apply concept of free body diagram for static equilibrium in two-dimension force system.
<b>CO3</b>	Analyze the practical example involving friction and application of two force members
<b>CO4</b>	Analyze rectilinear and curvilinear motion of particle
<b>CO5</b>	Apply Newton's second law, work energy and impulse momentum principles for particles.
<b>CO of the Course “Fundamentals of Programming Languages”</b>	
<b>CO1</b>	To Design algorithms for simple computational problems.
<b>CO2</b>	To Use mathematical, Logical Operators and Expressions.
<b>CO3</b>	To apply Control Flow structures for decision making.

<b>CO4</b>	To design a solution using Arrays, Character and String Arrays.
<b>CO5</b>	To Design and apply user defined functions and structures.
<b>CO of the Course “Manufacturing Practice Workshop”</b>	
<b>CO1</b>	Illustrate various sections of a typical workshop and different types of tools and machinery commonly found in a workshop.
<b>CO2</b>	Explain the importance of workshop safety and apply general workshop safety rules and guidelines.
<b>CO3</b>	Demonstrate proficiency in various cutting techniques such as sawing, shearing, and laser cutting.
<b>CO4</b>	Plan and complete a simple sheet metal job from start to finish, incorporating shearing, bending, and joining operations.
<b>CO5</b>	Describe the applications, advantages and operation of advanced computerized machine tools in modern manufacturing.
<b>CO6</b>	Apply 3D Printing Technology including setup, operation, and post-processing to print simple mechanical component.
<b>CO of the Course “Design Thinking and Idea Lab”</b>	
<b>CO1</b>	Identify and define problems from a user's perspective and articulate design criteria.
<b>CO2</b>	Apply empathy and observation to gain insights into user needs and behaviors.
<b>CO3</b>	Generate innovative ideas and solutions through brainstorming and ideation.
<b>CO4</b>	Prototype and test design solutions to refine and improve them.
<b>CO5</b>	Present and communicate design ideas effectively using visual aids and storytelling
<b>CO6</b>	Collaborate with peers and industry professionals to address real-world design challenges.
<b>CO of the Course “Professional Communication Skills”</b>	
<b>CO1</b>	Recognize, identify, and express advanced skills of Technical Communication in English through Language Laboratory.
<b>CO2</b>	Understand, categorize, differentiate, and infer listening, speaking, reading, and writing skills in societal and professional life.
<b>CO3</b>	Articulate and present the skills necessary to be a competent Interpersonal communicator.
<b>CO4</b>	Deconstruct, appraise, and critique communication behaviors.
<b>CO5</b>	Adapt, negotiate, and facilitate with multifarious socio-economical and professional arenas with effective communication and interpersonal skills.

## Department of First Year Engineering: Semester – II

<b>CO of the Course “Engineering Mathematics – II”</b>	
<b>CO1</b>	Apply advanced integration techniques such as Reduction formulae, Beta functions, Gamma functions, Differentiation under integral sign and Error functions useful in evaluating multiple integrals and their applications.
<b>CO2</b>	Trace the curve for a given equation and measure arc length of various curves. Apply the concepts of solid geometry to solve problems on sphere, cone and cylinder in a comprehensive manner.
<b>CO3</b>	Evaluate multiple integrals and its application to find area bounded by curves, volume bounded by surfaces, Centre of gravity and Moment of inertia.
<b>CO4</b>	Apply the effective mathematical tools for solving first order ordinary differential equations such as Exact and Reducible to exact Linear and reducible to Linear.
<b>CO5</b>	Model physical systems using ordinary differential equations, solve and analyze the solutions apply to Newton’s law of cooling, electrical circuit, rectilinear motion, mass spring systems, heat transfer etc.
<b>CO of the Course “Programming and Problem Solving”</b>	
<b>CO1</b>	Inculcate and apply various skills in problem solving.
<b>CO2</b>	Choose appropriate programming constructs and features to solve the problems in diversified domains.
<b>CO3</b>	Exhibit the programming skills for the problem-solving using functions and string manipulations.
<b>CO4</b>	Demonstrate File handling and dictionaries in Python.
<b>CO5</b>	Apply Object Oriented concepts in Python.
<b>CO of the Course “Indian Knowledge System”</b>	
<b>CO1</b>	Understand the significance and historical context of Indian knowledge systems.
<b>CO2</b>	Comprehend Indian philosophical concepts, scientific achievements, and their interplay.
<b>CO3</b>	Recognize the role of engineering in ancient India and its impact on architecture and materials.
<b>CO4</b>	Apply ancient Indian engineering principles in modern practices while considering cultural and environmental aspects.