NETAJI SUBHASH INSTITUTE OF TECHNOLOGY, BIHTA, PATNA
Affilted to Bihar Engineering University
Bachelor of Technology

Department of Electrical & Electronics
List of Course Outcomes with Program Outcome Mapping

Course Name : CHEMISTRY	Course Code : 100103

At the end of course student will able to

CO1	Analyse microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces.
CO2	Rationalise bulk properties and processes using thermodynamic considerations.
CO3	Analyze hardness of water for industrial and domestic applications.
CO4	Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques.
CO5	Learn periodic properties such as ionization potential, electronegativity, oxidation states and electronegativity.
CO6	List major chemical reactions that are used in the synthesis of molecules.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1	1	1	1	0	0	3	0	2	0	2	1	1
CO2	1	1	0	1	0	0	0	3	0	1	0	2	1	1
CO3	1	1	2	2	3	2	3	0	1	2	3	1	1	1
CO4	1	1	1	2	1	2	2	0	1	2	0	2	1	1
CO5	2	1	0	1	0	0	0	0	0	1	0	2	1	1
CO6	0	1	1	2	3	3	3	2	2	2	3	2	1	1

COURSE/PO MAPPING	1.2	1.0	0.8	1.5	1.3	1.2	1.3	1.3	0.7	1.7	1.0	1.8	1.0	1.0

Course Name : PROGRAMMING FOR PROBLEM SOLVING	Course Code : 100104

At the end of course student will able to

CO1	To formulate simple algorithms for arithmetic and logical problems.
CO2	To translate the algorithms to programs (in c language).
CO3	To test and execute the programs and correct syntax and logical errors.
CO4	To implement conditional branching, iteration and recursion.
CO5	To decompose a problem into functions and synthesize a complete program using divide and conquer approach.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1	1	1	0	0	0	0	1	1	0	1	1	1
CO2	0	1	1	1	0	0	0	0	1	1	0	1	1	1
CO3	0	1	1	1	0	0	1	0	1	1	0	1	1	1
CO4	1	1	1	1	0	0	1	0	1	1	0	1	1	1
CO5	1	1	1	1	0	0	1	0	1	1	0	1	1	1

COURSE/PO MAPPING	0.8	1	1	1	0	0	0.6	0	1	1	0	1	1	1

Course Name : WORKSHOP MANUFACTURING PRACTICES	Course Code : 100105

At the end of course student will able to

CO1	Undersatnd different types of manufacturing techniques, their advantagas with their economic,socail and susatainable aspects.
CO2	Apply principalof fundamental and advanced mathematics, basic science and engineering, statistical techniques to calculate process parameters and design parameters to craete a product satisfying national and international standards used in any manufacturing process.
CO3	Compare, analyze,document and present various traditional workshop manufacturing processes as well as modern manufacturing tools.
CO4	Analyze alternative design as well as economic aspects of a given manufacturing process
CO5	Identify emerging technologies and make students aware of them for their continuous professional growth by bridging knowledge about emerging industry oriented technology

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1	0	1	2	2	2	0	1	1	2	3	1	0
CO2	3	3	2	2	3	3	1	3	0	1	0	0	2	0
CO3	2	2	2	2	2	0	0	0	0	3	1	2	0	1
CO4	0	1	2	2	1	0	0	0	0	1	3	0	0	2
CO5	0	2	1	1	1	0	0	0	0	1	1	2	0	1

COURSE/PO MAPPING	1.4	1.8	1.4	1.6	1.8	1	0.6	0.6	0.2	1.4	1.4	1.4	0.6	0.8

Course Name : ENGLISH	Course Code : 100106

At the end of course student will able to

CO1	Ability to communicate effectively and write and present properly.
CO2	Ability to work individually and in intra disciplinary and multidisciplinary teams

CO3	Recognition of the need for lifelong learning and to access information as well as development in science and technology
CO4	Knowledge of project management, risk management, innovation and change management, entrepreneurship and sustainable development
CO5	Ability to identify, define, formulate and solve complex engineering problems as well as electing and applying appropriate analysis and modelling methods for wide purpose.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	1	2	0	2	2	1	2	2	0	0	0
CO2	0	2	2	2	2	0	0	0	0	1	1	0	0	0
CO3	2	1	1	0	2	0	0	0	1	1	1	0	0	0
CO4	1	2	2	2	2	3	2	0	0	1	1	0	0	0
CO5	2	2	1	1	2	2	0	0	1	0	2	0	0	0

COURSE/PO MAPPING	1.4	1.8	1.6	1.2	2	1	0.8	0.4	0.6	1	1.4	0	0	0

Course Name : MATHEMATICS –I (CALCULUS AND DIFFERENTIAL EQUATIONS)	Course Code : 103102

At the end of course student will able to	
CO1	Discuss the applications of mean value theorems to the mathematical problem, evaluation of improper integrals using Beta and Gamma functions.
CO2	Basic concept of convergence and Divergence, and Discuss the applications of convergence of sequence and series .,half range sine and cosine series
CO3	Examine the extrema of functions of two variables with / without constraints.
CO4	Discuss the double and triple integrals and its applications
CO5	Classifies the differential equation, ODE and PDE and Discuss the different types of problems. ODE and PDE and understand that physical system ,practical importance and boundary value problem.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3	1	2	1	0	1	0	0	1	2	0	1	1
CO2	3	3	1	3	2	0	0	0	0	1	0	0	1	1
CO3	3	0	0	0	0	0	0	0	0	0	0	0	1	1
CO4	3	3	2	2	2	3	2	0	0	0	2	0	1	1
CO5	3	3	1	2	2	0	1	0	0	0	2	0	1	1

COURSE/PO MAPPING	2.8	2.4	1	1.8	1.4	0.6	0.8	0	0	0.4	1.2	0	1	1

Course Name : CHEMISTRY LAB	Course Code : 100103P

At the end of course student will able to													
CO1	Determine the choride content of water												
CO2	Learnand apply basic techniques used in chemistry laboratoryfor volumetric analysis redox titration with different indicators, EDTA titration .												
CO3	Expose to different methodsof chemicals analysis anduse of some commonly employed.												
CO4	Synthesis a small drugs molecule and analysea salt samples .												
CO5	Estimate rate constant of reaction from concentration of reatant such as surface tension aand viscosity .												

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1	0	1	0	0	0	0	0	0	0	0	1	1
CO2	1	1	0	1	0	3	0	0	1	0	2	1	1	1
CO3	1	2	1	2	2	2	0	0	0	1	2	0	1	1
CO4	1	1	2	3	2	3	2	0	2	2	3	2	1	1
CO5	2	1	2	2	2	0	1	0	1	2	0	1	1	1

COURSE/PO MAPPING	1.4	1.2	1	1.8	1.2	1.6	0.6	0	0.8	1	1.4	0.8	1	1

Course Name : PROGRAMMING FOR PROBLEM SOLVING LAB		**Course Code : 100104P**
At the end of course student will able to		
CO1	Develop C programs for simple applications making use of basic constructs	
CO2	Develop C programs for simple applications using Arrays and Strings	
CO3	Develop C programs involving Functions, Recursion, and Pointers.	
CO4	Develop C programs involving Structures	
CO5	Design applications using sequential and random access file processing.	

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	0	1	1	0	2	0	0	0	0	2	0	1	1
CO2	0	0	1	1	0	2	0	0	0	0	2	0	2	2
CO3	0	0	1	1	0	2	1	0	0	1	2	0	1	2
CO4	0	0	1	1	0	2	1	0	0	1	2	0	1	1
CO5	0	0	1	1	0	2	1	0	0	1	2	0	1	1

COURSE/PO MAPPING	0.4	0	1	1	0	2	0.6	0	0	0.6	2	0	1.2	1.4

Course Name : WORKSHOP MANUFACTURING PRACTICES LAB	Course Code : 100105P

At the end of course student will able to

CO1	Understand the appropriate conventional and modern tools, materials, instruments required for specific operations with their limitations in workshop.
CO2	Identify , develop and improve practical skills in various machining operations and safety consciousness and show team work.
CO3	Design ,anlayze ,create and inspect an object in workshop using various machine and hand tool available in different shops such as fitting , carpentary weleding and machine shop.
CO4	Apply different conventional and advanced manufacturing techniques and measuring instruments for making a job with help of laws of basic science under economic constraints.
CO5	Discriminate and develop various sustainable,ethical and cost-effective solutions for real engineering problems using machine and equipments in workshop .

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	1	1	1	2	0	0	0	0	1	0	1	1	0
CO2	1	2	1	2	2	2	0	2	3	1	1	2	2	0
CO3	2	1	1	2	2	0	1	0	1	3	1	0	0	1
CO4	3	1	2	2	1	0	0	0	0	1	2	2	0	2
CO5	2	2	1	1	1	0	3	3	0	0	2	1	0	1

COURSE/PO MAPPING	1.8	1.4	1.2	1.6	1.6	0.4	0.8	1	0.8	1.2	1.2	1.2	0.6	0.8

Course Name : ENGLISH LAB	Course Code : 100106P

At the end of course student will able to

CO1	Identify common errors in spoken and written communication
CO2	Get familiarized with English vocabulary and language proficiency
CO3	Improve nature and style of sensible writing, acquire employment and workplace communication skills.
CO4	Improve their Technical Communication Skills through Technical Reading and Writing practices.
CO5	Perform well in campus recruitment, engineering and all other general competitive examinations

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	1	2	0	2	2	1	2	2	2	0	1
CO2	0	2	2	2	2	0	0	0	0	1	1	1	0	1
CO3	2	1	1	0	2	0	0	0	1	1	1	0	0	1

CO4	1	2	2	2	2	3	2	0	0	1	1	2	0	1
CO5	2	2	1	1	2	2	0	0	1	0	2	2	0	1

COURSE/PO MAPPING	1.4	1.8	1.6	1.2	2	1	0.8	0.4	0.6	1	1.4	1.4	0	1

SEMESTER - II

Course Name : BASIC ELECTRICAL ENGINEERING	Course Code : 100201

At the end of course student will able to

CO1	Examine and execute the basic concepts of AC and DC electric circuit and its behaviour.
CO2	Analyse the fundamental ideas behind magnetic circuits, including their definition, magnetic hysteresis phenomena, B-H curve, and hysteresis loop.
CO3	Apply the essential ideas and definitions of AC circuits, including single-phase, three-phase, RC and RLC circuits, and star and delta connections.
CO4	Identify the different kinds of single-phase transformers and to compute efficiency, losses, and regulations
CO5	Analyze the performance characteristics of DC and AC electrical machines.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	1	2	0	2	2	0	0	1	0	1	3	2
CO2	2	2	1	3	0	2	2	0	0	1	1	1	3	2
CO3	3	3	1	0	0	2	3	0	0	1	1	1	3	2
CO4	3	3	2	3	0	2	3	0	0	1	2	3	2	2
CO5	3	3	1	2	0	2	3	0	0	1	2	3	2	2

COURSE/PO MAPPING	2.8	2.8	1.2	2	0	2	2.6	0	0	1	1.2	1.8	2.6	2

Course Name : ENGINEERING GRAPHICS & DESIGN	Course Code : 100202

At the end of course student will able to

CO1	Apply the concept of drawing in practical applications
CO2	Draw the projection of points, lines and planes
CO3	Classify solids and projection of solids at different positions
CO4	Show sectioned view of solids and development of surfaces
CO5	Discuss about conics and orthographic views , isometric view of engineering components.
CO6	Understand the basic AUTOCAD commands and other emerging designing tools.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1	1	1	0	2	1	0	1	1	0	2	1	0
CO2	1	1	1	1	2	0	0	0	1	1	0	0	2	0
CO3	0	1	1	1	1	0	0	0	0	1	0	0	0	2
CO4	0	1	1	1	0	0	0	0	1	1	0	0	0	2
CO5	0	0	1	1	1	0	1	0	1	1	2	1	0	1
CO6	0	0	0	1	3	0	0	2	0	1	0	1	0	0

COURSE/PO MAPPING	0.5	0.7	0.8	1.0	1.2	0.3	0.3	0.3	0.7	1.0	0.3	0.7	0.5	0.8

Course Name : PHYSICS (WAVE & OPTICS AND INTRODUCTION TO QUANTUM MECHANICS)	Course Code : 103201

At the end of course student will able to

CO1	Study various types of oscillators and to understand the behaviour of waves through various examples.
CO2	To understand and analyse the intensity variation of light due to polarization, interference and diffraction.
CO3	Understand the different optical phenomenon and apply to real life incidents.
CO4	To undersatnd the concept, properties of different types of lasers and their applications
CO5	Study of material properties and their applications and also understand solids on the basis of band theory.
CO6	Explain fundamentals of quantum mechanics and to understand the difference in particle and wave nature with explanation of Schrodinger wave equation

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1	2	1	2	0	1	0	0	1	0	0	2	2
CO2	2	2	2	2	2	0	1	0	0	1	0	0	1	2
CO3	2	2	2	1	2	0	1	0	0	1	0	0	1	2
CO4	3	2	2	2	2	0	1	0	0	1	0	0	1	2
CO5	3	3	3	1	2	0	1	0	0	1	0	0	1	2
CO6	3	3	2	1	2	0	1	0	0	1	0	0	2	2

COURSE/PO MAPPING	2.7	2.2	2.2	1.3	2.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.3	2.0

Course Name : MATHEMATICS - II (LINEAR ALGEBRA, TRANSFORM)	Course Code : 103202

	At the end of course student will able to
CO1	Learn about inverse and rank of a matrix and solution of system of equations.
CO2	Analyse symmetric, skew symmetric Matrices and its properties (orthogonal, diagonal Cayley Hamilton theorem).
CO3	Compute bisection method, Newton Raphson method, Regula Falsi, Newton's forward, backward difference,; Gauss's Forward and backward formulae,; Trapezoidal rule, Simpson's 1/3rd and 3/8th rule.
CO4	Solve ODE of first and second order by Taylor's series, Euler, Runge kutta methods,; Milne's and Adam's Predictor corrector method and PDE.
CO5	Discuss about Laplace and Fourier transform.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3	1	2	1	0	1	0	0	1	2	0	1	1
CO2	3	3	1	3	2	0	0	0	0	1	0	0	1	1
CO3	3	0	0	0	0	0	0	0	0	0	0	0	1	1
CO4	3	3	2	2	2	2	2	0	0	0	2	0	1	1
CO5	3	3	1	2	2	0	1	0	0	0	2	0	1	1

COURSE/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	2.8	2.4	1	1.8	1.4	0.4	0.8	0	0	0.4	1.2	0	1	1

Course Name : BASIC ELECTRICAL ENGINEERING LAB	Course Code : 100201P

	At the end of course student will able to
CO1	To analyze a given network by applying various electrical laws and network theorems.
CO2	To know the response of electrical circuits for different excitations.
CO3	To calculate, Measure and know the relation between basic electrical parametres.
CO4	To analyze the performance characteristics of DC and AC electrical machines.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	1	2	0	2	0	0	0	1	0	1	2	3
CO2	2	2	1	3	0	2	1	0	0	1	1	1	2	3
CO3	3	3	1	0	0	2	1	0	0	1	1	1	3	3
CO4	3	3	2	3	0	2	1	0	0	1	2	3	2	2

COURSE/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	2.8	2.8	1.3	2.0	0.0	2.0	0.8	0.0	0.0	1.0	1.0	1.5	2.3	2.8

Course Name : ENGINEERING GRAPHICS & DESIGN LAB		Course Code : 100202P

At the end of course student will able to

CO1	Get acquainted with the knowledge of various lines, geometrical constructions and construction of various kinds of scales, and Ellipse.
CO2	Improve their imagination skills by gaining knowledge about points, lines and planes.
CO3	Become proficient in drawing the projections of various solids.
CO4	Gain knowledge about orthographic and isometric projections.
CO5	Development of surface of different kind of solid.
CO6	Gain knowledge of basic Auto Cad command and their uses.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1	1	1	0	2	1	0	1	1	0	2	1	0
CO2	1	1	1	1	2	0	0	0	1	1	0	0	2	0
CO3	0	1	1	1	1	0	0	0	0	1	0	0	0	1
CO4	0	1	1	1	0	0	0	0	1	1	0	0	0	2
CO5	0	0	1	1	1	0	1	0	1	1	2	1	0	1
CO6	0	0	0	1	3	0	0	2	0	1	0	1	0	0

COURSE/PO MAPPING	0.5	0.7	0.8	1.0	1.2	0.3	0.3	0.3	0.7	1.0	0.3	0.7	0.5	0.7

Course Name : PHYSICS (WAVE & OPTICS AND INTRODUCTION TO QUANTUM MECHANICS) LAB		Course Code : 103201P

At the end of course student will able to

CO1	Estimate the optical properties of light such as interference, diffraction and polarization by different experiments.
CO2	Student will understand the characteristics of diode.
CO3	To determine the energy band gap of a given semiconductor material.
CO4	Students will understand how to find out threshold voltage and calculate Planck's constant using various LEDs.
CO5	Determine the frequency of alternating current using sonometer and they will be able to relate the tension of the wire, linear density of the wire, and the resonating length of the wire.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	1	2	0	2	2	0	1	1	1	0	1	1
CO2	2	2	1	2	0	2	2	0	1	1	1	0	2	2
CO3	2	2	1	2	0	2	2	0	1	1	0	0	2	3

CO4	2	2	1	2	0	2	2	0	1	1	0	0	2	3
CO5	2	2	1	2	0	2	2	0	1	1	0	0	2	3

COURSE/PO MAPPING	2.0	2.0	1.0	2.0	0.0	2.0	2.0	0.0	1.0	1.0	0.4	0.0	1.8	2.4

SEMESTER - III

Course Name : DIGITAL ELECTRONICS	Course Code : 100305

At the end of course student will able to	
CO1	Convert different type of codes and number systems which are used in digital communication and computer systems
CO2	logic gates in the domain of economy,performance and efficiency
CO3	Analyze different types of digital electronics circuits using various mapping and logical tools and know the techniques to prepare themost simplified circuit using various mapping and mathematical methods.
CO4	Design different types of with and without memory element digital electronics circuits for particular operation, with the realm of economics, performance, efficiency , users friendly and environmental constraints.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3	1	2	0	2	2	0	0	1	0	2	2	2
CO2	3	3	1	3	0	2	2	0	0	1	1	3	2	2
CO3	2	1	1	1	1	2	3	0	0	1	1	2	2	2
CO4	3	3	3	3	0	2	3	0	0	1	2	3	2	2

COURSE/PO MAPPING	2.5	2.5	1.5	2.25	0.25	2	2.5	0	0	1	1	2.5	2	2

Course Name : ELECTRICAL CIRCUIT ANALYSIS	Course Code : 100306

At the end of course student will able to	
CO1	Analyse electrical circuits using the mesh current and node voltage approaches.
CO2	Utilise network theorems to examine networks.
CO3	Determine the electrical circuits' steady-state and transient responses.
CO4	To analyse networks, synthesise waveforms and use Laplace transforms.
CO5	Assess Various Network Functions and Gain Knowledge about Two Port Network Behaviour

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	1	2	0	2	2	0	0	1	0	2	2	2

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO2	3	2	1	3	0	2	2	0	0	1	0	3	3	3
CO3	3	3	1	0	0	2	3	0	0	1	1	2	3	3
CO4	3	3	2	3	0	2	3	0	0	1	2	3	3	3
CO5	3	3	1	1	0	2	3	0	0	1	2	3	2	2

COURSE/PO MAPPING	3	2.8	1.2	1.8	0	2	2.6	0	0	1	1	2.6	2.6	2.6

Course Name : ELECTRICAL MACHINES -I	Course Code : 100307

At the end of course student will able to

CO1	Understand the concepts of magnetic circuits.
CO2	Understand the concept of generation of emf with static fields.
CO3	Understand the operation of DC machines.
CO4	Analyse the differences in the operation of different DC machine configurations.
CO5	Analyse single-phase and three-phase transformer circuits.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	3	0	0	0	0	0	1	1	2	2	2
CO2	3	3	2	3	0	2	1	0	0	1	2	3	2	3
CO3	2	2	2	3	0	0	0	0	0	1	2	2	2	2
CO4	2	2	2	3	1	2	1	0	0	1	2	3	2	2
CO5	2	2	2	3	1	2	1	0	0	1	1	3	2	3

COURSE/PO MAPPING	2.4	2.4	2	3	0.4	1.2	0.6	0	0	1	1.6	2.6	2	2.4

Course Name : ELECTROMAGNETIC FIELDS	Course Code : 100308

At the end of course student will able to

CO1	To understand divergence, gradient, curl and their physical significance and also study about different types of coordinate systems which are important for solving the problems of electromagnetic field theory.
CO2	To describe static electric and magnetic fields and their behaviour in different medium, associated law, and their boundary conditions.
CO3	To understand the concept of conducotrs, dielectric and capacitance and boundary condition for dielectric materials.
CO4	Gain knowledge on electromagnetic induction and Faraday's law, and understand the concept of static and time varying fields.
CO5	To understand the concept of displacement current and consistency of Ampere's law and Maxwell equations in point form and integral form.

CO6	To describe time varying fields, propagation of electromagnetic waves in different media, poynting theorem and their sources & effects and to apply the theory of electromagnetic waves practically.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1	2	1	2	0	1	0	0	1	0	0	1	2
CO2	2	2	2	2	2	0	1	0	0	1	0	0	1	2
CO3	2	2	2	1	2	0	1	0	0	1	0	0	2	3
CO4	3	2	2	2	2	0	1	0	0	1	0	0	2	3
CO5	3	3	3	1	2	0	1	0	0	1	0	0	2	3
CO6	3	3	2	1	2	0	1	0	0	1	0	0	2	3

COURSE/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	2.7	2.2	2.2	1.3	2.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.7	2.7

Course Name : ENGINEERING MECHANICS	Course Code : 100310

At the end of course student will able to

CO1	Identify unknown forces in relation to a given equilibrium force system using derived scintific ,mechanical and mathematical laws.
CO2	Analyze and document the static and dynamic friction laws with proper assumptions and approximation for the equilibrium state of a wedge, ladder and screw jack.
CO3	Calculate the centre of mass, centroid, centre of gravity and moment of inertia for the simple and composite plane sections using principal of mechanics and basic mathematics
CO4	Understand and verify various theorem regarding work and energy and momentum methods for particles and rigid bodies and their application in real life engineering problems
CO5	Apply the knowledge of kinetics and kinematics in solving the real time problems.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	1	0	2	0	0	0	0	1	1	1	1	0
CO2	0	1	2	1	2	2	1	2	1	3	1	0	0	2
CO3	2	1	1	0	1	0	1	2	1	2	1	0	1	1
CO4	0	1	1	1	2	0	0	0	0	2	0	2	0	0
CO5	2	1	1	1	0	0	1	0	0	1	0	0	1	1

COURSE/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	1.4	1.2	1.2	0.6	1.4	0.4	0.6	0.8	0.4	1.8	0.6	0.6	0.6	0.8

Course Name : ELECTRICAL MACHINES LABORATORY-I	Course Code : 100307P

At the end of course student will able to

CO1	Determine the parameters of equivalent circuit for transformer for different tests (open circuit & short circuit test) and its performance parameters
CO2	Apply direct loading method on single phase transformer and determine its efficiency and voltage regulation.
CO3	Control the speed of dc shunt motor using field current control and armature voltage control methods respectively and plot their performance characteristic.
CO4	Determine the efficiency of dc shunt machine considering motoring mode.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	1	3	2	0	2	0	2	1	1	2	2	2
CO2	3	2	1	3	2	0	2	0	2	1	1	2	2	2
CO3	3	2	1	3	2	0	2	0	2	1	1	2	2	2
CO4	3	2	1	3	2	0	2	0	2	1	1	2	2	2
CO5	0	0	0	0	0	0	0	0	0	0	0	0	0	0

COURSE/PO MAPPING	2.4	1.6	0.8	2.4	1.6	0	1.6	0	1.6	0.8	0.8	1.6	1.6	1.6

Course Name : INTERNSHIP	Course Code : 100399P

At the end of course student will able to

CO1	Identify the industry and their locations, products/expertise/domain, and interact with the authorities there at.
CO2	Participate in the projects in industries during the enterepreneurship.
CO3	Interact with idustrial personnael and follow engneering practices.
CO4	Acquire knowledge and skills to compete in the job market with this experience and exposure.
CO5	Prepaire professional work reports and presntation.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	0	1	0	0	0	0	0	0	1	0	1	2	1	0
CO2	1	1	0	0	3	3	0	2	2	1	2	3	0	1
CO3	1	1	0	1	3	3	0	2	2	1	2	3	1	1
CO4	1	1	0	1	1	3	0	3	2	1	2	3	1	0
CO5	1	1	0	1	0	2	0	0	2	3	1	3	0	0

COURSE/PO MAPPING	0.8	1	0	0.6	1.4	2.2	0	1.4	1.8	1.2	1.6	2.8	0.6	0.4

Course Name : BIOLOGY FOR ENGINEERS	Course Code : 100401

At the end of course student will able to

CO1	Describe how biological observations of 18th Century that lead to major discoveries.
CO2	Convey that classification per seis not what biology is all about but highlight the underlying criteria, such as morphological, biochemical and ecological
CO3	Highlight the concepts of recessiveness and dominance during the passage of genetic material from parent to offspring
CO4	Convey that all forms of life have the same building blocks and yet the manifestations are as diverse as one can imagine
CO5	Classify enzymes and distinguish between different mechanisms of enzyme action
CO6	Identify DNA as a genetic material in the molecular basis of information transfer.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	0	1	1	1	0	0	3	0	1	0	1	1	1
CO2	2	1	1	1	1	0	1	3	1	2	0	1	2	2
CO3	1	1	0	0	0	0	0	0	0	0	1	0	1	1
CO4	2	1	1	1	0	2	0	0	0	1	1	0	2	2
CO5	0	1	0	1	2	0	0	0	0	1	0	0	0	0
CO6	0	1	2	1	3	0	0	0	1	1	0	0	0	0

COURSE/PO MAPPING	1.0	0.8	0.8	0.8	1.2	0.3	0.2	1.0	0.3	1.0	0.3	0.3	1.0	1.0

Course Name : ANALOG ELECTRONICS	Course Code : 110401

At the end of course student will able to

CO1	Explain the Construction and working of PN Junction Diodes with V-I Characteristics
CO2	Explain the Construction and working of Zeenar Diodes with V-I Characteristics
CO3	Appraise the principle operation of BJTs, schematize their characteristics, and analyse them.
CO4	Design and analysis of common source FET amplifier and its frequency response.
CO5	Design and analysis of negative feedback amplifiers and oscillators

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	2	1	0	0	0	0	0	1	2	3	3
CO2	3	2	2	2	2	0	0	0	0	0	2	2	3	3

CO3	3	2	2	2	2	0	0	0	0	0	2	2	3	3
CO4	3	2	2	2	2	0	0	0	0	0	2	2	3	3
CO5	3	2	1	2	1	0	0	0	0	0	1	2	3	3

COURSE/PO MAPPING	3.0	2.0	1.8	2.0	1.6	0.0	0.0	0.0	0.0	0.0	1.6	2.0	3.0	3.0

Course Name : ELECTRICAL MACHINES - II	Course Code : 110402

At the end of course student will able to

CO1	Understand the concepts of rotating magnetic fields.
CO2	Understand pulsating and revolving magnetic fields with spatial displacement.
CO3	Understand the operation of 3-phase and single-phase Induction machines.
CO4	Analyse the differences in characteristics of 3-phase and single-phase Induction machines
CO5	Understand the operation and characteristics of the 3-phase Alternator.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	3	0	0	0	0	0	1	1	2	2	2
CO2	3	3	2	3	0	2	1	0	0	1	2	3	2	2
CO3	2	2	2	3	0	0	0	0	0	1	2	2	2	2
CO4	2	2	2	3	1	2	1	0	0	1	2	3	2	2
CO5	2	2	2	3	1	2	1	0	0	1	1	3	2	2

COURSE/PO MAPPING	2.4	2.4	2.0	3.0	0.4	1.2	0.6	0.0	0.0	1.0	1.6	2.6	2.0	2.0

Course Name : ORGANIZATIONAL BEHAVIOR & INDUSTRIAL PSYCHOLOGY	Course Code : 110403

At the end of course student will able to

CO1	Analyse the behaviour of individuals and groups in organisations in terms of the key factors that influence organisational behaviour
CO2	Assess the potential effects of organisational-level factors (such as structure, culture and change) on organisational behaviour.
CO3	Critically evaluate the potential effects of important developments in the external environment (such as globalisation and advances in technology) on organisational behaviour.
CO4	Analyse organisational behavioural issues in the context of organisational behaviour theories, models and concepts.
CO5	Understanding of organisational behaviour is a must for an engineer since it directly affects the industry in the larger sense.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	1	2	2	2	0	2	2	2	2	1	1
CO2	1	2	2	2	1	0	0	0	0	1	1	1	1	1
CO3	2	1	1	0	2	2	2	2	0	1	1	2	1	1
CO4	1	2	2	2	2	3	1	0	0	1	2	2	1	1
CO5	3	2	1	1	2	2	0	0	1	1	2	2	1	1

COURSE/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	1.8	1.8	1.6	1.2	1.8	1.8	1.0	0.4	0.6	1.2	1.6	1.8	1.0	1.0

Course Name : MATHEMATICS - III (PROBABILITY & STATISTICS)	Course Code : 110404

At the end of course student will able to

CO1	Learn about the probability spaces, conditional and independent probabilities,; Poisson approximation; Bernoulli trials their expectations and moments.
CO2	Study continuous random variable; Normal, Exponential and Gamma Densities
CO3	Analyse Bivariate distributions and their properties.
CO4	Describe measure of Central tendency: Moments, Skewness, kurtosis, Correlation and regression.
CO5	Discuss curve fitting by the method of least squares; Fitting of straight lines, Parabolas and general curves; test for single mean, difference of means, correlation coefficients,Chi squares test for goodness of Fit.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3	1	2	1	0	1	0	0	1	2	0	2	2
CO2	3	3	1	3	2	0	0	0	0	1	0	0	2	2
CO3	3	0	0	0	0	0	0	0	0	0	0	0	2	2
CO4	3	3	2	2	2	2	2	0	0	0	2	0	2	2
CO5	3	3	1	2	2	0	1	0	0	0	2	2	2	2

COURSE/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	2.8	2.4	1.0	1.8	1.4	0.4	0.8	0.0	0.0	0.4	1.2	0.4	2.0	2.0

Course Name : MICROPROCESSORS	Course Code : 110405

At the end of course student will able to

CO1	Understand the fundamentals of microprocessors and microcontrollers.
CO2	Discuss the architectures of microcontroller family
CO3	Illustrate the instruction set of microcontrollers and do assembly language programming

CO4	Study the interfacing designs of peripherals like I/O ,A/D,D/A and timers etc	
CO5	Develop various systems with the help of microcontrollers.	

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	1	0	0	2	0	0	0	0	1	1	3	1	1
CO2	2	0	0	1	2	0	0	0	0	1	1	3	1	2
CO3	2	2	1	3	2	0	0	0	0	2	1	2	1	2
CO4	2	3	2	3	2	0	1	0	0	2	2	3	2	2
CO5	2	2	2	3	2	0	1	0	0	2	2	3	1	2

COURSE/PO MAPPING	1.8	1.6	1.0	2.0	2.0	0.0	0.4	0.0	0.0	1.6	1.4	2.8	1.2	1.8

Course Name : SIGNALS AND SYSTEMS	Course Code : 110406

At the end of course student will able to

CO1	Understand different types of signals- continuous and discrete, odd and even, periodic and aperiodic etc.
CO2	Analyze continuous time signals and systems by using appropriate mathematical toolslike Fourier Transform.
CO3	Analyze sampling process and sampling of discrete time signals.
CO4	Analyze discrete time signals and systems by using appropriate mathematical tools like Fourier Transform.
CO5	Utilize standard signals such as sine, ramp, exponential to characterize systems.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	1	2	0	3	2	3	0	3	3	3	2	2
CO2	3	3	3	3	3	3	3	0	1	3	2	3	3	3
CO3	3	3	2	3	3	3	3	3	1	3	3	3	3	3
CO4	3	3	3	3	3	3	3	0	1	3	2	3	3	3
CO5	3	2	2	2	2	3	2	2	2	3	3	3	3	2

COURSE/PO MAPPING	2.8	2.6	2.2	2.6	2.2	3.0	2.6	1.6	1.0	3.0	2.6	3.0	2.8	2.6

Course Name : ANALOG ELECTRONICS LAB	Course Code : 110401P

At the end of course student will able to

CO1	Explain the Construction and working of PN Junction Diodes with V-I Characteristics
CO2	Explain the Construction and working of Zeenar Diodes with V-I Characteristics
CO3	Appraise the principle operation of BJTs, schematize their characteristics, and analyse them.
CO4	Design and analysis of common source FET amplifier and its frequency response.
CO5	Design and analysis of negative feedback amplifiers and oscillators

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3	1	2	2	2	0	0	0	0	0	2	2	2
CO2	2	2	1	3	3	2	1	0	0	0	1	2	2	2
CO3	2	3	1	1	3	2	1	0	0	0	1	2	2	2
CO4	2	3	2	3	3	2	1	0	0	0	2	2	2	2
CO5	2	2	2	3	3	2	1	0	0	0	2	2	2	2

COURSE/PO MAPPING	2.0	2.6	1.4	2.4	2.8	2.0	0.8	0.0	0.0	0.0	1.2	2.0	2.0	2.0

Course Name : ELECTRICAL MACHINES - II LAB	Course Code : 110402P

At the end of course student will able to

CO1	Understand the different Starting and speed control methods of 3-Phase Induction Motor.
CO2	Perform no-load and blocked rotor test to analyse the performance of 3-Phase Induction Motor.
CO3	Understand the different Starting and speed control methods of Single-Phase Induction Motor.
CO4	Perform no-load and blocked rotor test to analyse the performance of Single-Phase Induction Motor.
CO5	Determine equivalent circuit parameters of an alternator and also its voltage regulation by different methods.
CO6	Analyze the behavior of Synchronous motor at different loading conditions using V and inverted V curve.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	1	3	2	0	2	0	2	1	1	2	2	1
CO2	3	2	1	3	2	0	2	0	2	1	1	2	2	1
CO3	3	2	1	3	2	0	2	0	2	1	1	2	2	1
CO4	3	2	1	3	2	0	2	0	2	1	1	2	2	1
CO5	3	2	1	3	2	0	2	0	2	1	1	2	2	1

COURSE/PO MAPPING	3.0	2.0	1.0	3.0	2.0	0.0	2.0	0.0	2.0	1.0	1.0	2.0	2.0	1.0

Course Name : MICROPROCESSORS LAB	Course Code : 110405P

At the end of course student will able to

CO1	Understand the basics of digital electronics and able to design the simple logic circuits and test/verify the functionality of the logic circuits.
CO2	Identify the various digital ICs and understand their operation.
CO3	Understand and apply the fundamentals of assembly level programming of microprocessors.
CO4	Analyze abstract problems and apply a combination of hardware and software to solve problem.
CO5	Work with standard microprocessor real time interfaces including PPI, digital-to-analog converters, and analog-to-digital converters.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	1	3	2	0	0	0	1	2	1	2	2	2
CO2	2	2	1	2	2	0	0	0	1	2	1	2	2	2
CO3	2	2	1	3	2	0	0	0	1	2	1	2	2	2
CO4	2	2	1	3	2	0	0	0	1	2	1	2	2	2
CO5	2	2	1	3	2	0	0	0	1	2	1	2	2	2

COURSE/PO MAPPING	2.0	2.0	1.0	2.8	2.0	0.0	0.0	0.0	1.0	2.0	1.0	2.0	2.0	2.0

SEMESTER - V

Course Name : CONTROL SYSTEMS	Course Code : 100502

At the end of course student will able to

CO1	Model the linear system and study the control system component specification through classical approach
CO2	Understand the time response specification and its control
CO3	Analyze the absolute and relative stability
CO4	Understand Frequency response tools like bode plot and Nyquist plot.
CO5	Understand the introductory concept of state variable approach.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	3	3	3	2	0	0	2	3	2	2	2
CO2	2	2	2	2	1	2	1	0	0	3	3	2	2	2

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO3	2	3	2	3	3	3	3	0	0	3	3	2	2	2
CO4	3	3	2	2	1	2	1	0	0	3	3	2	2	2
CO5	2	3	2	2	1	2	1	0	0	3	3	2	2	2

COURSE/PO MAPPING	2.4	2.6	2.0	2.4	1.8	2.4	1.6	0.0	0.0	2.8	3.0	2.0	2.0	2.0

Course Name : POWER ELECTRONICS	Course Code : 100506

At the end of course student will able to

CO1	Understand the different types of power switching devices
CO2	Analyse the different types of controlled AC to DC Converters.
CO3	Analyse the operation of different types of DC-DC Converters.
CO4	Explain the working of single & three phase inverter circuit.
CO5	Understand the operation of single & three phase AC to AC Converters

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	3	3	2	3	3	0	0	3	3	3	2	2
CO2	3	3	1	0	0	0	0	0	0	0	3	0	2	2
CO3	3	3	1	0	0	0	0	0	0	0	0	0	2	2
CO4	3	2	2	0	1	3	3	0	0	2	2	3	2	2
CO5	3	3	3	2	2	0	2	0	0	2	2	2	2	2

COURSE/PO MAPPING	3.0	2.6	2.0	1.0	1.0	1.2	1.6	0.0	0.0	1.4	2.0	1.6	2.0	2.0

Course Name : POWER SYSTEMS-I (APPARATUS AND MODELLING)	Course Code : 100507

At the end of course student will able to

CO1	Understand the basic structure of power system, smart grid and micro grid.
CO2	Analyse the parameters of Transmission Lines and cables.
CO3	Compare switching phenomenon and working of various types of circuit breakers.
CO4	Describe the importance of evaluation of efficiency & power output equation & curves and application of this in other system.
CO5	Analyse the symmetrical and unsymmetrical faults.
CO6	Understand the solar and wind energy system.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	2	1	0	1	0	1	1	2	2	0	0
CO2	3	3	3	3	2	2	2	0	0	1	2	2	0	0
CO3	2	2	2	2	2	2	2	0	0	1	2	2	0	0
CO4	1	2	2	3	2	2	2	0	1	1	2	3	0	0
CO5	3	3	2	3	0	0	1	0	0	0	1	2	0	0
CO6	2	1	2	0	2	0	2	3	2	1	1	1	0	0

COURSE/PO MAPPING	2.2	2.2	2.2	2.2	1.5	1.0	1.7	0.5	0.7	0.8	1.7	2.0	0.0	0.0

Course Name : ANALOG & DIGITAL COMMUNICATION SYSTEM	Course Code : 110501

At the end of course student will able to

CO1	Understand the basics of communication system.
CO2	Understand and compare various types of analog modulation techniques.
CO3	Understand and compare various types of digital modulation techniques.
CO4	Apply the knowledge of digital electronics and study error control coding techniques.
CO5	Study different types of communication systems and its practical applications

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1	0	2	0	2	0	0	0	1	0	3	2	2
CO2	2	3	2	2	1	2	0	0	0	1	1	3	2	2
CO3	2	3	2	1	1	2	0	0	0	1	1	3	2	2
CO4	2	3	2	2	0	2	0	0	0	1	0	2	2	2
CO5	2	2	1	1	2	2	0	0	0	1	1	3	2	2

COURSE/PO MAPPING	2.0	2.4	1.4	1.6	0.8	2.0	0.0	0.0	0.0	1.0	0.6	2.8	2.0	2.0

Course Name : CONTROL SYSTEMS LAB	Course Code : 100502P

At the end of course student will able to

CO1	Represent a system (in the form of transfer function) in MATLAB considering it's zeros, poles and gain.

CO2	Analyze the Time Domain response analysis of first and second order systems.
CO3	Analyze the response of RLC circuit. Assess gain and phase margin to examine the effect of stability margins on closed loop response characteristics o
CO4	Design lead-lag compensator for the given system.
CO5	Analyze the plots of time and frequency responses of SISO and MIMO systems.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	1	3	3	0	0	0	2	1	1	1	2	2
CO2	2	2	1	3	3	0	1	0	2	1	1	1	2	2
CO3	3	2	1	3	3	0	1	0	2	1	1	2	2	2
CO4	3	2	1	3	3	0	1	0	2	1	1	2	2	2
CO5	2	2	1	3	3	0	1	0	2	1	1	2	2	2

COURSE/PO MAPPING	2.4	2.0	1.0	3.0	3.0	0.0	0.8	0.0	2.0	1.0	1.0	1.6	2.0	2.0

Course Name : POWER ELECTRONICS LAB	Course Code : 100506P

At the end of course student will able to

CO1	Understand the operation of power electronic devices and its applications.
CO2	Analyze the I-V characteristics of SCR
CO3	Analyze the output of controlled and uncontrolled rectifiers
CO4	Simluate various types of converters with help of MATLAB SIMULINK

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	1	3	3	0	0	0	2	1	1	1	1	1
CO2	2	2	1	3	3	0	1	0	2	1	1	1	1	1
CO3	3	2	1	3	3	0	1	0	2	1	1	2	1	1
CO4	3	2	1	3	3	0	1	0	2	1	1	2	1	1

COURSE/PO MAPPING	2.5	2.0	1.0	3.0	3.0	0.0	0.8	0.0	2.0	1.0	1.0	1.5	1.0	1.0

Course Name : POWER SYSTEMS- I (APPARATUS AND MODELLING) LAB	Course Code : 100507P

At the end of course student will able to

CO1	Understanding power system installation at different generating stations and EHV substation to be accquainted with various components.												
CO2	Understand and calculate the transmission line parameters.												
CO3	Learn the various faults in transmission lines.												
CO4	Analyse the performance of various type of relays												
CO5	Understanding the economics of energy,environmental issues and its control.												

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	2	3	2	2	2	2	2	0	2	2	1
CO2	3	2	2	3	2	2	0	0	1	1	1	1	2	1
CO3	3	3	2	0	2	2	2	2	1	2	1	1	2	1
CO4	3	3	1	3	2	2	3	0	1	1	2	3	2	1
CO5	1	1	1	2	2	2	2	2	2	2	3	3	2	1

COURSE/PO MAPPING	2.6	2.4	1.6	2.0	2.2	2.0	1.8	1.2	1.4	1.6	1.4	2.0	2.0	1.0

Course Name : SUMMER ENTREPRENEURSHIP - II	Course Code : 100510P

At the end of course student will able to

CO1	To Improve knowledge and skills relevant to power supply and transmission system.
CO2	To Relate, apply and adapt relevant knowledge, concepts and theories within an industrial organization, practice and ethics.
CO3	Acquaint various structural partitions such as labs, workshops, assembly units, stores, and administrative unit and machinery units.
CO4	Understand their functions, applications and maintenance; understand the business model of the industry.
CO5	Prepaire interenship report and presntation.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	0	1	0	0	0	0	0	0	1	0	1	2	1	1
CO2	1	1	0	0	3	3	0	2	2	1	2	2	1	1
CO3	1	1	0	1	3	3	0	3	2	1	2	2	1	1
CO4	1	1	0	1	1	3	0	3	2	1	2	3	1	1
CO5	1	1	0	1	0	2	0	0	2	3	1	3	1	1

COURSE/PO MAPPING	0.8	1.0	0.0	0.6	1.4	2.2	0.0	1.6	1.8	1.2	1.6	2.4	1.0	1.0

Course Name : ANALOG & DIGITAL COMMUNICATION SYSTEM LAB	Course Code : 110501P

At the end of course student will able to

CO1	Study and compare the different amplitude modulation techniques
CO2	Study and analyze frequency modulation techniques
CO3	Apply time division multiplexing concepts in different pulse modulation techniques.
CO4	Apply time division multiplexing concepts in different pulse modulation techniques.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	1	3	2	2	0	0	1	2	1	2	2	2
CO2	2	2	1	3	3	2	0	0	1	2	1	2	2	2
CO3	2	2	1	3	3	2	0	0	1	2	1	2	2	2
CO4	2	2	1	3	2	2	0	0	1	2	1	2	2	2

COURSE/PO MAPPING	2.0	2.0	1.0	3.0	2.5	2.0	0.0	0.0	1.0	2.0	1.0	2.0	2.0	2.0

Course Name : PROFESSIONAL ELECTIVE LABORATORY-1	Course Code : 110503P

At the end of course student will able to

CO1	Study the components, Pins, and IDE of Aurduino
CO2	Learn the library used in Aurduino IDE
CO3	Interface the LCD display and Led to Aurduino
CO4	Devlop a mini project with the help of Aurduino

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1	1	1	0	0	0	0	1	0	1	2	1	2
CO2	0	1	0	0	3	0	0	0	1	1	1	2	0	0
CO3	2	1	1	1	3	0	0	0	2	2	2	2	1	1
CO4	2	1	1	1	2	0	0	0	2	1	2	2	1	2

COURSE/PO MAPPING	1.5	1.0	0.8	0.8	2.0	0.0	0.0	0.0	1.5	1.0	1.5	2.0	0.8	1.3

Course Name : DIGITAL SIGNAL PROCESSING	Course Code : 100606

At the end of course student will able to

CO1	Describe discrete-time signals and systems and represent them in the frequency domain
CO2	Compute DFT using FFT algorithms and derive DFT properties
CO3	Design IIR digital filters using various techniques
CO4	Design FIR digital filters using various techniques
CO5	Analyse multi-rate signal processing techniques

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	3	1	0	1	0	0	1	1	2	3	3
CO2	3	3	2	3	2	2	2	0	0	1	2	3	3	3
CO3	3	3	2	3	2	2	2	0	0	1	2	3	3	3
CO4	3	3	2	3	2	2	2	0	0	1	2	3	3	3
CO5	3	3	2	3	1	0	1	0	0	1	1	2	3	3

COURSE/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	3.0	3.0	2.0	3.0	1.6	1.2	1.6	0.0	0.0	1.0	1.6	2.6	3.0	3.0

Course Name : INTRODUCTION TO VLSI DESIGN	Course Code : 100607

At the end of course student will able to

CO1	Explain Mathematical methods and circuit analysis of MOSFETs.
CO2	Understand and study of various characteristics of CMOS inverters.
CO3	Understand and apply various layout design rules.
CO4	Analyze and study various performance factors of CMOS design then apply to develop circuits for logical analysis.
CO5	Design of arithmetic circuits, memory, and its behavior

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	2	1	2	1	0	0	0	0	1	0	2	1	2
CO2	2	2	2	2	0	0	0	0	0	1	0	3	2	2
CO3	2	2	2	2	3	2	0	0	0	2	2	3	2	2
CO4	2	3	2	3	2	0	0	0	0	1	2	3	2	3

CO5	2	3	2	2	2	0	0	0	0	1	2	3	2	3

COURSE/PO MAPPING	1.8	2.4	1.8	2.2	1.6	0.4	0.0	0.0	0.0	1.2	1.2	2.8	1.8	2.4

Course Name : PROFESSIONAL SKILL DEVLOPMENT	Course Code : 100608

At the end of course student will able to

CO1	Graduates will master various comunication strategies, including written, verbal, and digital communication, fostering clarity and professionalism in interaction with colleagues.
CO2	Participants will develop robust critical thinking skills, enabling them to analyze complex situation, make informed decision and solve problem strategically within the professional context.
CO3	Through practical exercises and tools, students will learn to prioritize tasks, set realistic goals, and manage their time efficiently, ensuring increased productivity and reduced stress in professional settings.
CO4	The course will cultivate the ability to work effectively in diverse teams, fostering collaboration, conflict resolution, and collective achievement in the workplace.
CO5	Graduates will embrace a mindset of adaptability and continuous learning, acquiring the agility to navigate evolving professional landscapes and stay abreast of industry trends and advancements.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	0	1	1	1	2	2	2	3	3	2	1	3	0	0
CO2	0	1	1	1	2	3	3	3	2	2	2	3	0	0
CO3	0	1	1	1	1	2	2	3	3	2	2	3	0	0
CO4	0	1	1	1	2	2	1	2	2	3	2	2	0	0
CO5	0	1	1	2	2	2	3	3	3	2	2	2	0	0

COURSE/PO MAPPING	0.0	1.0	1.0	1.2	1.8	2.2	2.2	2.8	2.6	2.2	1.8	2.6	0.0	0.0

Course Name : COMPUTER ARCHITECHTURE	Course Code : 100611

At the end of course student will able to

CO1	Understand the basics of instructions sets and their impact on processor design
CO2	Demonstrate an understanding of the design of the functional units of a digital computer system.
CO3	Evaluate cost performance and design trade-offs in designing and constructing a computer processor
CO4	Design a pipeline for consistent execution of instructions with minimum hazards
CO5	Manipulate representations of numbers stored In digital computers.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	1	0	1	0	0	1	0	0	1	1	3	1	1

CO2	2	1	1	1	0	0	1	0	0	1	2	3	2	1
CO3	2	3	2	2	1	0	2	0	0	1	2	3	2	1
CO4	2	3	2	2	1	0	2	0	0	1	2	3	2	1
CO5	2	3	2	2	1	0	1	0	0	1	1	2	2	1

COURSE/PO MAPPING	1.8	2.2	1.4	1.6	0.6	0.0	1.4	0.0	0.0	1.0	1.6	2.8	1.8	1.0

Course Name : DIGITAL CONTROL SYSTEM	Course Code : 100612

At the end of course student will able to

CO1	Build a lead, lag, and lead-lag compensator in the frequency and temporal domains.
CO2	Compute STM and state equation solution.
CO3	Evaluate a system's observability and controllability. For the purpose of placing closed loop poles at desired places, design a state variable feedback co
CO4	Create an optimum control problem that reduces the chosen performance index to the minimum.
CO5	Use descriptive function analysis to locate and examine non-linear systems
CO6	Use the Z transform to apply all ideas to discrete and continuous time systems.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	1	2	0	2	0	0	0	1	0	0	2	2
CO2	2	2	1	3	0	2	1	0	0	1	0	0	2	2
CO3	3	3	1	0	0	2	1	0	0	1	0	0	2	2
CO4	3	3	2	3	0	2	1	0	0	1	0	0	2	2
CO5	3	3	1	2	0	2	1	0	0	1	0	0	2	2
CO6	3	3	0	0	0	0	0	0	0	0	0	0	2	2

COURSE/PO MAPPING	2.8	2.8	1.0	1.7	0.0	1.7	0.7	0.0	0.0	0.8	0.0	0.0	2.0	2.0

Course Name : MEASUREMENT AND INSTRUMENTATION	Course Code : 110601

At the end of course student will able to

CO1	To understand the appropriate tools, material, applications of instruments to design and validate DC and AC bridges.
CO2	To apply the practical skills & to analyze the dynamic response, to develop skill for the calibration of instruments.
CO3	To learn about various measurement devices, to analyze their characteristics, application and operation of these devices, To analyze their limitations.

CO4	To understand statistical data analysis in details.
CO5	To understand computerized data acquisition.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	3	3	0	3	0	0	2	0	3	2	1
CO2	3	2	2	2	3	0	3	0	0	2	0	2	2	1
CO3	3	2	2	3	3	0	3	0	0	2	0	1	2	1
CO4	3	2	3	3	3	0	3	0	0	2	0	3	2	1
CO5	3	2	2	3	3	0	3	0	0	3	0	2	2	1

COURSE/PO MAPPING	3.0	2.0	2.2	2.8	3.0	0.0	3.0	0.0	0.0	2.2	0.0	2.2	2.0	1.0

Course Name : DIGITAL SIGNAL PROCESSING LAB	Course Code : 100606P

At the end of course student will able to

CO1	Experiment concepts of DSP and its applications using MATLAB Software
CO2	Understand about the basic signal generation
CO3	Learn to apply DFT & IDFT on given signal In MATLAB
CO4	Learn to apply FFT on given signal In MATLAB
CO5	Design IIR and FIR filters in MATLAB

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	1	3	3	0	0	0	2	1	1	1	1	2
CO2	2	2	1	3	3	0	1	0	2	1	1	1	1	1
CO3	3	2	1	3	3	0	1	0	2	1	1	2	3	3
CO4	3	2	1	3	3	0	1	0	2	1	1	2	1	2
CO5	2	2	1	3	3	0	1	0	2	1	1	2	1	2

COURSE/PO MAPPING	2.4	2.0	1.0	3.0	3.0	0.0	0.8	0.0	2.0	1.0	1.0	1.6	1.4	2.0

Course Name : INTRODUCTION TO VLSI DESIGN LAB	Course Code : 100607P

At the end of course student will able to

CO1	Create and simulate basic digital gates using VHDL.
CO2	Analyze various combinational and sequential logic circuits using simulation tools.
CO3	Model arithmetic logic circuits using VHDL.
CO4	Simulate and analyze memories using simulation tools

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	0	1	0	2	0	2	0	0	0	1	0	3	1	1
CO2	2	3	2	2	1	2	0	0	0	1	2	3	2	2
CO3	2	3	2	1	1	2	0	0	0	1	2	3	2	2
CO4	2	3	2	2	0	2	0	0	0	1	1	3	1	1

COURSE/PO MAPPING	1.5	2.5	1.5	1.8	0.5	2.0	0.0	0.0	0.0	1.0	1.3	3.0	1.5	1.5

Course Name : ELECTRONICS DESIGN LABORATORY	Course Code : 100609P

At the end of course student will able to

CO1	Understand the design and implementation issues of electronic system
CO2	Design analog, digital and mixed-signal electronics system
CO3	Understand the challenges of interfacing of analog and digital systems
CO4	Design and develop PCB-based electronics system.
CO5	Design PCB-based electronics and embedded system using electronic design tools

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	0	1	1	3	3	0	1	0	2	2	1	2	1	1
CO2	3	2	1	2	2	0	1	0	2	1	0	1	2	1
CO3	1	1	1	3	3	0	1	0	2	2	1	2	0	0
CO4	1	2	1	2	2	0	1	0	2	1	0	1	2	2
CO5	1	2	1	2	2	0	1	0	2	1	0	1	1	2

COURSE/PO MAPPING	1.2	1.6	1.0	2.4	2.4	0.0	1.0	0.0	2.0	1.4	0.4	1.4	1.2	1.2

Course Name : MEASUREMENT AND INSTRUMENTATION LAB	Course Code : 110601P

	At the end of course student will able
CO1	To measure the L & C using a bridge technique as well as LCR meter, to measure the batch of resistors and estimating statistical parameters.
CO2	To measure Low Resistance using Kelvin's double bridge and high resistance & insulation resistance using Megger.
CO3	To use the DSO for steady state periodic waveforms produced by a function generator, to capture the trasients like a step change in R-L-C, downloading of one-cycle data of a periodic waveform for usage of RMS values using a C Program.
CO4	To measure the Bandwidth, sampling rate, to understand the selection of trigger source and trigger level, time-scale and voltage scale.
CO5	To measure the current using Shunt, CT & Hall sensors,

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	3	3	0	1	0	0	2	0	0	2	1
CO2	3	3	2	3	3	0	1	0	0	2	0	0	2	1
CO3	3	3	2	3	3	0	1	0	0	2	0	0	2	1
CO4	2	2	1	3	3	0	0	0	0	2	0	0	2	1
CO5	3	3	2	3	3	0	1	0	0	2	0	0	2	1

COURSE/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	2.8	2.8	1.8	3.0	3.0	0.0	0.8	0.0	0.0	2.0	0.0	0.0	2.0	1.0

SEMESTER - VII

Course Name : ELECTROMAGNETIC WAVES	Course Code : 100704

At the end of course student will able to

CO1	Analyse transmission lines and estimate voltage and current at any point on tranmission line for different load conditions.
CO2	Gain knowledge on electromagnetic induction, Faraday's law, and understand the concept of displacement current and consistency of Ampere's law and Maxwell equations.
CO3	To describe time varying fields, propagation of electromagnetic waves in different media, poynting theorem and their sources & effects and to apply the theory of electromagnetic waves practically.
CO4	Analyze uniform plane wave propagation in different media and reflection and refraction of plane wave at different media interface.
CO5	Understand and analyse radiation by Antennas and its applications.
CO6	Describe the characteristics of guided waves between parallel plane and rectangular waveguide.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1	2	1	2	0	1	0	0	1	0	2	2	2
CO2	3	2	2	2	2	0	1	0	0	1	0	2	2	2
CO3	3	2	2	1	2	0	1	0	0	1	0	2	2	2
CO4	3	2	2	2	2	0	1	0	0	1	0	2	2	2

CO5	3	3	3	1	2	0	1	0	0	1	0	2	2	2
CO6	3	3	2	1	2	0	1	0	0	1	0	2	2	2

COURSE/PO MAPPING	3.0	2.2	2.2	1.3	2.0	0.0	1.0	0.0	0.0	1.0	0.0	2.0	2.0	2.0

Course Name : POWER SYSTEM II	Course Code : 100706

At the end of course student will able to

CO1	Analyse power flow with the help of numerical analysis techniques such as Gauss seidel and Newton-Raphson methods.
CO2	Understand stability constraints in a synchronous grid.
CO3	Analyse the effects of variations in frequency and voltage on power system and various mechanisms to effectively control the same.
CO4	Acquire the knowledge of the monitoring and control of power system.
CO5	Acquire knowledge about the regulatory framework, ancillary services, power system economics and power management.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	3	2	3	2	3	0	0	2	2	2	2	2
CO2	2	2	3	2	3	2	2	0	0	1	2	2	1	1
CO3	2	2	2	2	2	2	2	0	0	1	2	2	1	1
CO4	1	2	2	2	3	2	2	0	0	1	2	2	2	1
CO5	3	2	3	2	2	3	3	0	0	1	2	2	1	2

COURSE/PO MAPPING	2.2	2.0	2.6	2.0	2.6	2.2	2.4	0.0	0.0	1.2	2.0	2.0	1.4	1.4

Course Name : MANAGEMENT INFORMATION SYSTEM	Course Code : 110724

At the end of course student will able to

CO1	Identify the need of MIS, implementation issues in MIS in that organization andfuture trends in that system.
CO2	Relate the basic concepts and technologies used in the field of management informationsystems
CO3	Outline the role of the ethical, social, and security issues of information systems.
CO4	Translate the role of information systems in organizations, the strategic management processes,with the implications for the management.
CO5	Apply the understanding of how various information systems like DBMS work together toaccomplish the information objectives of an organization.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2

CO1	1	2	2	3	2	2	2	0	2	2	2	2	0	0
CO2	1	2	2	2	3	0	2	3	1	1	2	2	0	0
CO3	1	1	1	1	2	3	3	3	3	3	1	3	0	0
CO4	0	1	1	0	2	2	3	3	3	3	3	3	0	0
CO5	0	2	1	2	2	0	0	0	1	3	1	1	0	0

COURSE/PO MAPPING	0.6	1.6	1.4	1.6	2.2	1.4	2.0	1.8	2.0	2.4	1.8	2.2	0.0	0.0

Course Name : OBJECT ORIENTED PROGRAMMING USING C++	Course Code : 110728

At the end of course student will able to

CO1	Interpret Java programs using Object Oriented Programming principles
CO2	Explain Java programs with the concepts inheritance and interfaces
CO3	Relate Java applications with threads and generics classes
CO4	Develop Java applications with threads and generics classes
CO5	Develop interactive Java programs using swings, Demonstrate simple Graphical user interface

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1	1	1	1	0	1	0	0	1	1	2	1	1
CO2	2	1	0	1	2	2	2	0	0	1	1	2	1	1
CO3	2	1	0	1	2	2	2	0	0	1	1	2	1	1
CO4	2	1	1	1	2	2	2	0	0	1	1	2	1	1
CO5	2	1	1	1	1	0	1	0	0	1	1	2	1	1

COURSE/PO MAPPING	2.0	1.0	0.6	1.0	1.6	1.2	1.6	0.0	0.0	1.0	1.0	2.0	1.0	1.0

Course Name : SUMMER ENTREPRENEURSHIP - III	Course Code : 100702P

At the end of course student will able to

CO1	Understanding the modern tools used in the field of Electrical and Electronics engineering for product development.
CO2	To Demonstrate ethical conduct and professional accountability while working in a team for the benefit of society.
CO3	Acquire knowledge and skills to compete in the job market with this experience and exposure.
CO4	To identify career goals and paths based on individual attributes such as affinity, aptitude, strengths and challenges, and inputs from the in-plant train

CO5	Prepaire interenship report and presntation.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	0	1	0	0	0	0	0	0	1	0	1	2	1	1
CO2	1	1	0	0	3	3	0	2	2	1	2	2	0	0
CO3	1	1	0	1	3	3	0	3	2	1	2	2	0	0
CO4	1	1	0	1	1	3	0	3	2	2	2	3	0	0
CO5	1	1	0	1	0	2	0	0	2	3	1	3	0	0

COURSE/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	0.8	1.0	0.0	0.6	1.4	2.2	0.0	1.6	1.8	1.4	1.6	2.4	0.2	0.2

Course Name : SEMINAR	Course Code : 100706P

At the end of course student will able to

CO1	Establish motivation for any topic of interest and develop a thought process for technical presentation.
CO2	Organize a detailed literature survey and build a document with respect to technical publications.
CO3	Analysis and comprehension of proof-of-concept and related data.
CO4	Demonstrate effective presentation and improve soft skills.
CO5	Use new and recent technology (e.g. Latex) for creating technical reports

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	1	2	0	2	2	1	2	2	2	0	0
CO2	0	2	2	2	2	0	0	0	0	1	1	1	1	1
CO3	2	1	1	0	2	0	0	0	1	1	1	0	0	0
CO4	1	2	2	2	2	3	2	0	0	1	1	2	0	0
CO5	2	2	1	1	3	2	0	0	1	0	2	2	0	0

COURSE/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	1.4	1.8	1.6	1.2	2.2	1.0	0.8	0.4	0.6	1.0	1.4	1.4	0.2	0.2

Course Name : PROJECT - I	Course Code : 100709P

At the end of course student will able to

CO1	Students will be able to practice acquired knowledge within the chosen area of technology for project development.

CO	
CO2	Identify, discuss and justify the technical aspects of the chosen project with a comprehensive and systematic approach.
CO3	Reproduce, improve and refine technical aspects for engineering projects.
CO4	Work as an individual or in a team in development of technical projects.
CO5	Communicate and report effectively project related activities and findings.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	1	2	3	2	1	2	2	2	3	3	2	2
CO2	3	2	2	3	3	0	1	2	3	3	3	1	2	2
CO3	1	2	2	2	3	3	0	3	3	3	3	3	2	2
CO4	0	0	0	0	3	0	0	0	3	0	1	0	0	0
CO5	3	3	0	1	3	0	1	0	3	3	3	2	2	2

COURSE/PO MAPPING	1.8	1.8	1.0	1.6	3.0	1.0	0.6	1.4	2.8	2.2	2.6	1.8	1.6	1.6

SEMESTER - VIII

Course Name : SATELLITE COMMUNICATION	Course Code : 100819

At the end of course student will able to

CO	
CO1	To understand the principle & architecture of satellite Communication, to apply the frequency bands for satellite communication.
CO2	To understand & applly the Kepler's laws, To be aware of Apogee and Perigee for an elliptical orbit, velocity, orbital period, angular velocity of a satellite, to understand the Solar day and Sidereal day.
CO3	To understand the architecture and roles of various satellite system , Application of Telemetry, tracking, command and monitoring, to identify the Attitude and orbit control system etc.
CO4	To understand the Phenomena like Solar Eclipse on satellite, Aware of Sun Transit Outage phenomena, to analyze the Doppler frequency shift Phenomena and expression for Doppler shift etc.
CO5	To understand the Flux density and application of signal power equations,to know the noise temperature for satellite receiver, To analyze the noise power calculation, CNR calculations etc.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	3	1	0	2	0	0	1	1	2	2	2
CO2	3	2	2	3	1	2	2	0	0	1	2	3	1	1
CO3	3	1	2	3	2	0	0	0	0	1	1	2	1	1
CO4	3	2	2	3	3	2	2	0	0	1	1	2	1	1
CO5	3	2	3	3	2	2	1	0	0	1	0	2	2	2

COURSE/PO MAPPING	3.0	1.8	2.2	3.0	1.8	1.2	1.4	0.0	0.0	1.0	1.0	2.2	1.4	1.4

Course Name : FIBER OPTIC COMMUNICATIONS	Course Code : 110801

At the end of course student will able to

CO1	Describe the fundamental components of optical fibre
CO2	Examine various loss types, optical wave guide signal distortion, and additional signal degradation components.
CO3	Classify different materials used as optical sources, LED architectures, and laser diodes.
CO4	Describe the features of fibre optic receivers, including PIN, APD diodes, and receiver performance.
CO5	Design a fibre optic connection based on finances.
CO6	Describe how WDM, SONET, and the measurement of attenuation, dispersion, and the refractive index profile in optical fibres work.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	1	2	0	0	1	2	0	1	0	1	2	2
CO2	2	3	1	3	0	2	2	2	0	1	1	1	2	2
CO3	3	3	1	0	0	2	2	2	0	1	1	1	2	2
CO4	3	3	2	3	0	2	1	0	0	1	2	3	2	2
CO5	3	3	2	2	0	0	0	0	0	1	2	3	2	2
CO6	3	0	1	0	0	0	0	0	0	0	0	3	2	2

COURSE/PO MAPPING	2.8	2.5	1.3	1.7	0.0	1.0	1.0	1.0	0.0	0.8	1.0	2.0	2.0	2.0

Course Name : WIND AND SOLAR COMMUNICATIONS	Course Code : 110806

At the end of course student will able to

CO1	Explain the fundamental of solar radiation geometry
CO2	Analyse the process of power generation through solar photovoltaic
CO3	Highlighting the various applications of solar energy.
CO4	Outline the site requirement criteria for wind farm & compare different types of wind generators.
CO5	Identify non-conventional energy sources such as Geothermal, MHD, Biomass, fuel cell, tidal for generating Electricity.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3	1	2	0	2	2	0	0	1	0	2	2	2
CO2	3	3	1	3	0	2	2	0	0	1	1	3	2	2

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO3	2	1	1	0	0	2	3	0	0	1	1	2	2	2
CO4	2	3	2	3	0	2	3	0	0	1	2	3	2	2
CO5	1	1	1	1	0	2	3	0	0	1	2	3	1	2

COURSE/PO MAPPING	2.0	2.2	1.2	1.8	0.0	2.0	2.6	0.0	0.0	1.0	1.2	2.6	1.8	2.0

Course Name : PROJECT - II	Course Code : 100801P

At the end of course student will able to

CO1	Demonstrate literature survey and technical pre-requisites of the selected project topic.
CO2	Predict the challenges in practical implementation of the project hardware/software and draft their possible alternate solutions.
CO3	Design engineering solutions of complex problems utilizing systems and engineering approach.
CO4	Practically fabricate /implement, test /debug and run/simulate the project (hardware/software)
CO5	Communicate with the engineering community in written and oral forms.

CO/PO MAPPING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	1	2	3	2	1	2	2	2	3	3	1	2
CO2	3	2	2	3	3	0	1	2	3	3	3	1	1	2
CO3	1	2	2	2	3	3	0	3	3	3	3	3	0	0
CO4	3	3	0	2	3	0	0	0	3	3	3	2	2	2
CO5	3	3	0	3	3	0	1	0	3	3	3	2	1	2

COURSE/PO MAPPING	2.4	2.4	1.0	2.4	3.0	1.0	0.6	1.4	2.8	2.8	3.0	2.2	1.0	1.6