DEPARTMENT OF ELECTRICAL ENGINEERING (EE)
SEMESTER - 1st & 2nd

Subject	Course Outcome
MATHEMATICS-I	CO1: To apply differential and integral calculus to notions of curvature and to improper integrals. Apart from some other applications they will have a basic understanding of Beta and Gamma functions.
	CO2: The fallouts of Rolle's Theorem that is fundamental to application of analysis to Engineering problems.
	CO3: The tool of power series for learning advanced Engineering Mathematics.
	CO4: To deal with functions of several variables that are essential in most branches of engineering.
	CO5: Learn how to convert a real life problem into a matrix system and solve it
PHYSICS	CO1: Demonstrate proficiency and perceptive of the basic concepts in physics.
	CO2: Utilize the scientific and experimental methods to investigate and verify the concepts related to content knowledge.
	CO3: Exploring the engineering applications and apply quantum mechanics to engineering Phenomena.
	CO4: Identifying the relevant formulae and work out engineering problems.
	CO5: Comprehend principle, concept, working and application of new technology and comparison of results with theoretical calculations.
PHYSICS LABORATORY	CO1: Express the idea of calculation of acceleration due to gravity at any place using the concept of oscillatory system and simple harmonic motion.
	CO2: Demonstrate the working and operational technique to calculate the mechanical properties of fluid and other materials.
	CO3: Evaluate the voltage, current, power and characteristics behaviour of the electronic devices.
	CO4: Understanding the rigidity concept of solid materials.
	CO:5 Analyzing the electrical and magnetic field measurements and their applications.
CHEMISTRY	CO1: To demonstrate and realise the trend in various periodic properties associated withdifferent elements present in different groups and periods of modern periodic table
	CO2: To acquire the knowledge of free energy concept for the thermodynamics associatedwith chemical reactions and equilibriums.
	CO3: To analyze and implement the concepts of spectroscopic techniques for identificationof various organic and inorganic compounds.
	CO4: To evaluate and visualize the concept of configurations and conformations of variousorganic compounds
	CO5: To assess the generation, reaction and identification of intermediates involved duringorganic reactions and their applications in different organic reaction mechanisms
CHEMISTRY LABORATORY	CO1: To analyze the alkalinity and hardness value of the water sample.
	CO2: To analyze the concentration of copper present in the solution.

	CO3: to analyse kinetics of the reactions
	CO4: To gain hands-on experiences of pH meter, conductometer, and spectrophotometer
	CO5: To analyze viscosity and flash point of lubricating oils
ENGINEERING MECHANICS	CO1: Ability to analyze objects in static equilibrium including the determination of reactions, forces and moments
	CO2 :Enrichfundamental concept offriction and demonstrate the analytical skills to solve the problems involving friction.
	CO3 :Assimilatingthe knowledge for determination of centroid and second moment of area of sectionsand their engineering applications.
	CO4 :To analyze the work done by forces, the energy transferred from one object to other and apply principle of work and energy conservation for realistic (/Practical) engineering problems
	CO5 :Identify the various parameters in projectile motion. Apply the principle of dynamics to analyze the curvilinear motion of rigid bodies.
Workshop and Digital Manufacturing Laboratory	CO1: Acquire knowledge of conventional & CNC (Lathe and Milling Machine). CNC code and part programming for Milling and Turning operations. Different types of hand tool, measuring instruments and machine tools used in Fitting, Carpentry & Smithy work.
	CO2: Know about different types of operations and joints performed in different shops i.e. in Fitting and Carpentry
	CO3: Explore learning about forging temperature of different types of ferrous metals and different types of operation (e.g. upsetting, edging, flattening and bending etc.) carried out on hot metals to prepare jobs.
	CO4: Acquire knowledge for the preparation of different types of jobs by using conventional/ CNC Lathe and Milling Machines (e.g. facing, step turning, knurling, drilling, boring, taper turning, thread cutting and different methods of indexing for machining gears.
	CO5:Acquire skills in using different precision measuring and marking instruments. Understand the importance of safety precaution in different shops.
BASIC ELECTRICAL ENGINEERING	CO1: Implement principles of DC network, theorems and transients
	CO2:Analyze the concept of Single phase and three phase AC circuits.
	CO3: Express the concept of magnetic circuit and DC machines.
	CO4: Apply basic principles of AC machines and their working
	CO5: Demonstrate basic principles of power system
BASIC ELECTRICAL ENGINEERING LABORATORY	CO1: Express the safety rules as per ISS and symbols of different electrical components and the use of various electrical instruments in the laboratory.
	CO2: Demonstrate the working and operational characteristics of dc motor and dc generator.
	CO3: Evaluate the voltage, current, power and power factor of choke coil and study BH curve of a ferromagnetic core.
	CO4: Measure armature and field resistance of DC machines, earth resistance and insulation resistance and demonstrate the internal structure of different machines
	CO5: Analyze the connection and calibration of single phase energy meter
BASIC MECHANICAL ENGINEERING 2-0-0	CO1: Comprehending the Law of Thermodynamics
	CO2: Being aware of how crucial thermodynamics is to IC engines, power plants, refrigerators, and Heat Pump

	CO3: Being aware of fluid mechanics and heat transfer concepts
	CO4: Recognizing the functions of Engineering materials
	CO5: Have a fundamental understanding of welding, Casting, Forming and other manufacturing techniques
	CO6: Recognizing fundamental power transfer mechanisms and aware of the fundamental robotics system.
Engineering Graphics and Design Lab (with AutoCAD)	CO1: Understand the concept and nature of communication and the objective of Technical Communication relevant for the work place as Engineers.
	CO2: Use suitable vocabulary and grammar with confidence and express their ideas both in speech and writing.
	CO3: Evaluate their efficacy as fluent and efficient communicators by learning the voice-dynamics
Communicative Enlish &Report writing lab	CO1: To acquire strategic competence to use both spoken and written language in a wide communication strategies. range
	CO2: To maintain good linguistic competence- through accuracy in grammar, pronunciation
	CO3: Speak English with proper pronunciation
	CO4: Make effective oral presentations by interpreting and analysing data, pictures and videos and participate in Group Discussion on general topics

SEMESTER - 3rd

ELECTRICAL CIRCUIT ANALYSIS	CO1:apply network theorems for the analysis of electrical circuits
	CO2:analyse the transient and steady-state response of electrical circuits.
	CO3:apply Laplace Transform for the analysis of electrical circuits.
	CO4:analyse the behaviour of two-port networks and synthesis of passive two-port networks.
Electrical Machines-I	CO-1:Understand the concepts of Magnetic circuits.
	CO-2:Understand the operation of DC Generators.
	CO-3:Understand the operation and concepts of DC Motors.
	CO-4:Understand the operation of single-phase transformers &auto transformer.
	CO-5:Understand three phase transformers circuits.
ELECTRICAL CIRCUIT ANALYSIS LAB	CO1: validate Superposition, Thevenin, Norton, and Maximum Power Transfer theorems in AC networks.
	CO2: interpret the transient responses of R-L, R-C, and R-L-C circuits using a digital storage oscilloscope.
	CO3: characterize a given two port network using open circuit, short circuit, hybrid and transmission parameters.
	CO4: interpret the frequency response plot of low pass, high pass, band pass, and band elimination filters.
	CO5: validate the self-inductance, mutual inductance, and coupling coefficient of a single-phase two winding transformer.
	CO6: interpret the response of resonance in R-L-C series and parallel circuits using an oscilloscope

Electrical Machine-I Laboratory	**CO1:** Understand load characteristics of DC shunt and compound generators and series motors.
	CO2: Learn speed control methods for DC shunt motors, including armature voltage and flux control.
	CO3: Analyse critical resistance and critical speed determination from DC shunt generator no-loadtests.
	CO4: Explore back-to-back testing of DC machines using Hopkinson's method.
	CO5: Determine efficiency and voltage regulation through open circuit and short circuit tests on single-phase transformers, and study parallel operation and different connection configurations of single-phase transformers.
ANALOG AND DIGITAL ELECTRONICS CIRCUIT	CO1: Understand the characteristics and configurations of single stage BJT and MOSFET amplifiers.
	CO2: Design amplifier circuits using BJT, FET and study the low and high frequency response of BJT, FET amplifiers.
	CO3: Analyse various power amplifiers and to gain knowledge on various oscillator circuits.
	CO4: Understand various types of number systems and their conversions
	CO5: Identify the importance of canonical forms in the minimization of Boolean functions in digital circuits.
	CO6: Design and implement variety of logical devices using combinational circuits and Sequential circuits.
ANALOG & DIGITAL ELECTRONICS CIRCUIT LABORATORY	CO1. Understand about the operation of the various bias circuits of BJT, JFET and MOSFET.
	CO2. Acquire knowledge on the frequency response of different amplifier circuits.
	CO3. Study Decoders, Encoders, Digital multiplexers, Binary comparators, and Flip-Flops.
	CO4. Design and analyse Synchronous and Asynchronous Sequential circuits, registers and Counters.
ENGINEERING ECONOMICS	CO1 Remembering : Define the basic concept of micro and macro economics, engineering economics and their application in engineering economy.
	CO2 Understanding : Evaluate numerically the effects of changes in demand and supply on price determination of products and services.
	CO3 Analyze : the macroeconomic environment and financial systems of the country and its impact on business, society and enterprise.
	CO4 Develop : the ability to account for time value of money using engineering economy factors and formulas.
	CO5 Apply: knowledge of mathematics, economics and engineering principles to solve engineering problems and to analyze decision alternatives in engineering projects considering upon depreciation, taxes and inflation.
ORGANISATIONAL BEHAVIOUR	CO1. Understand the basic concepts of OB, change management, organizational culture and their implementation in organizations.
	CO2. Identify and examine team characteristics for improved organizational performance.

	CO3. Apply theories and frameworks to solve problems and take effective decisions for organizational success.
	CO4. Analyze group behavior and leadership styles for effective people management.
	CO5. Evaluate individual personality types and group behaviours for improving organizational processes and practices.
	CO6. Develop leadership competency to manage organizational situations.
	CO1. Demonstrate understanding of basic programming concepts in Python, including constructing simple programs.
	CO2. Apply gained Python proficiency to pursue more advanced programming courses.
	CO3. Evaluate and use Python's core data structures such as lists, dictionaries, and tuples for sophisticated data analysis.
	CO4. Extract and interpret data from the internet using Python's web scraping tools and APIs.
	CO5. Interpret and manipulate web data, specifically HTML, XML, and JSON, using Python.
	CO6. Synthesize various Python concepts, such as handling different data structures and manipulation of web data, to solve complex problems.
DATA SCIENCE FOUNDATIONS	CO1. Understand and apply basic statistical measures to identify patterns within large sets of data,
	CO2. Develop proficiency in recognizing various data characteristics, patterns, trends, deviations or inconsistencies, and potential outliers.
	CO3. Employ techniques for dealing with big data like dimension reduction and feature selection methods.
	CO4. Leverage advanced tools and charting libraries to improve the efficiency of big data analysis with partitioning and parallel analysis.
	CO5. Visualize data using 2D and 3D formats achieving a better understanding and interpretation.
	CO6. Get value out of Big Data following a specific 5-step process to structure your analysis.
WEB AND APPLICATION DEVELOPMENT	CO1. Demonstrate the fundamentals of HTML5, CSS, and JavaScript to create dynamic websites and web applications.
	CO2. Utilize Git and GitHub for version control, collaboration, and social coding effectively in software engineering and DevOps practices.
	CO3. Leverage React and ES6 to construct rich and interactive front-end applications with features like Hooks and Redux.
	CO4. Design and manipulate dynamic user interfaces through React components, their properties, and states.
	CO5. Develop back-end applications using Node.js and Express with features like asynchronous callbacks, REST APIs, CRUD operations, and session management.
	CO6. Exhibit proficiency in server-side technologies, focusing on most popular server-side web framework- Express.
CLOUD COMPUTING FOUNDATIONS	CO1. Understand the essential features and various service models of cloud computing along with the offerings of prominent market players.
	CO2. Analyze different components of cloud computing architecture such as data centers, virtual machines, containers, and cloud storage options.

	CO3. Demonstrate knowledge of emergent cloud trends such as DevOps, Hybrid and MultiCloud, and cloud security and monitoring.
	CO4. Evaluate the applications of cloud computing in areas like blockchain, analytics, AI, and job roles in this field.
	CO5. Develop competence in distributed computing concepts such as MapReduce, key-value/NoSQL stores, and scalability techniques used in cloud computing.
	CO6. Apply these concepts practically to build or manipulate cloud systems using programming languages like C++.
PROGRAMMING INTERNET OF THINGS	CO1. Understand and define the key concepts of "Internet of Things" and its impact on society, focusing specifically on design considerations and components of IoT devices.
	CO2. Master the composition and firmware programming of the Arduino development board, as well as the usage of "shields" and libraries.
	CO3. Gain the ability to compile and run a program using C language, understanding variables, types, and operators specifically relevant to Arduino sketches.
	CO4. Acquire knowledge on the Raspberry Pi setup and operation, including executing a Linux operating system.
	CO5. Develop expertise in writing and executing basic Python code on Raspberry Pi, also learning to use Python-based IDEs and debugging Python code.
	CO6. Understand the fundamental aspects of networking, including network protocol, structure of the Internet, and their specific implications in IoT devices.
ROBOTICS: MOTION PLANNING	CO1. Understand the mechanics of flight and the design of quadrotor flying robots for operation in 3D environments.
	CO2. Develop dynamic models, derive controllers, and synthesize planners for drone operation.
	CO3. Overcome challenges of using noisy sensors for localization and maneuvering in complex environments.
	CO4. Familiarize with the components of robotic systems: mechanism, perception system, and decision and control system.
	CO5. Grasp common approaches for motion planning in robotics including graph-based methods, randomized planners, and artificial potential fields.
	CO6. Analyze real-world examples of the applications and challenges for the rapidly-growing drone industry.
IT FUNDAMENTALS FOR CYBERSECURITY	CO1. Understand basic Cybersecurity concepts, gaining foundational knowledge of the Cybersecurity landscape including types, motives of cyber attacks, and the history behind them.
	CO2. Grasp key Cybersecurity terminology and tools, learning essential terms and introductory tools relevant to Cybersecurity, facilitating a deeper understanding of system concepts.
	CO3. Recognize the key roles and typical processes within a Cybersecurity organization, enhancing comprehension of operational security.
	CO4. Develop skills to navigate and manage Windows, MacOS, Linux, and mobile operating systems from a security perspective.
	CO5. Understand and apply cybersecurity compliance standards and protocols to maintain the integrity and security of information systems.

		CO6. Learn fundamental concepts and practices of cryptography and encryption, crucial for protecting information against cyber threats.

Second Year/ 4th semester

SUBJECT		Course Outcomes
Electrical Machines - I	CO1	To familiarize with Magnetic-circuit analysis and introduce magnetic materials.
	CO2	To understand the governing principle of electromagnetic force and torque in all electrical machines.
	CO3	To understand the Working principles of electrical machines using the concepts of electromechanical energy conversion principles and derive expressions for generated voltage and torque developed in all Electrical Machines.
	CO4	To understand the Working principles of DC machines as Generator types, determination of their no-load/load characteristics, starting and methods of speed control of motors.
Digital Electronics	CO1	Define and analyze Number System, Boolean Algebra, Binary Codes and Logic Gates.
	CO2	Apply different minimization methods to design Combinational Logic Circuits.
	CO3	Understand the concept of Sequential Logic Circuits to model different Registers and design Counters.
	CO4	Explain, analyze and design Memories, PLDs and Converters.
Organizational Behaviour	CO1	Define, explain and illustrate a range of organizational behaviour theories.
	CO2	Analyse the behaviour of individuals and groups in organizations in terms of organizational behaviour theories, models and concepts.
	CO3	To explain group dynamics and demonstrate skills required for working in groups (team building)
	CO4	Communicate effectively in oral and written forms about organizational behaviour theories and their application using appropriate concepts, logic and rhetorical conventions.
Power Electronics	CO1	Students will able to Understand the differences between signal level and power level devices.
	CO2	Ability to analyses various single phase and three phase power converter circuits and understand their applications.
	CO3	Student will able to analyze the operation of DC-DC choppers and their applications.
	CO4	Student will able to analyze voltage and current wave form of Buck converter and their applications

Electromagnetic Theory	CO1	To differentiate different types of coordinate systems and use them for solving the problems of electromagnetic field theory
	CO2	To describe static electric and magnetic fields, their behavior in different media, associated laws, boundary conditions and electromagnetic potentials
	CO3	To use integral and point form of Maxwell`s equations for solving the problems of electromagnetic field theory
	CO4	To describe time varying fields, propagation of electromagnetic waves in different media, pyonting theorem, their sources & effects and to apply the theory of electromagnetic waves in practical problems.
Digital Signal Processing	CO1	Recall the concepts of discrete signal representation, its operation and discrete time systems.
	CO2	Convert the time domain signal analysis to frequency domain analysis using various transform.
	CO3	Capable of understanding Digital Signal Processing Applications using z transform and DFT.
	CO4	Apply Fast Fourier Transform (FFT) Algorithms for faster realization of discrete signals and systems and analyze the response of filter.
Constitution Of India	CO1	Understand the meaning and importance of Constitution
	CO2	Explain about making of Indian Constitution - contribution of Constituent assembly on it
	CO3	Describe the Salient (Outstanding) features of Indian Constitution.
	CO4	Describe the importance of Preamble of the Indian Constitution and its significance
Digital Electronics Lab	CO1	List the truth tables of all the Logic Gates and their behaviours/Boolean expression.
	CO2	Explain all the combinational logic circuits and verification of their truth tables.
	CO3	Demonstrate different types of memory elements.
	CO4	Differentiate different types of flipflops.
Electrical Machines-I Lab	CO1	Understand the working principle of single phase transformer.
	CO2	Obtain the No load test and Block Rotor test of three phase induction motor
	CO3	Analyze the parallel operation of two single phase transformers
	CO4	Analyze the parameters of single phase induction motor
Power Electronics lab	CO1	Understand the differences between signal level and power level devices.

	CO2	Ability to analyze various single phase and three phase power converter circuits and understand their applications
	CO3	Ability to analyze the operation of DC-DC choppers and their applications
	CO4	Ability to analyze the operation of voltage source inverters and their applications

Third Year/ 5th semester

Electrical Power Transmission & Distribution	CO1	Awareness of general structure of power systems
	CO2	Impart the knowledge of electrical design aspects of transmission line..
	CO3	Analyze the performance and function of transmission line
	CO4	Analysis of mechanical design aspects of transmission system
Control System	CO1	Define different types of control system.
	CO2	Identify 1st and 2nd order system in time domain using different technique like root locus, RH criteria etc
	CO3	Apply 1st and 2nd order system in frequency domain using different technique like Bode Plot, Polar Plot, Nyquist Plot etc.
	CO4	Validate the controllability and observability and design suitable observers for the systems.
Electrical Machines - II/ Applied Mathematics - III	CO1	Fundamental of electrical windings. Design and analysis on different windings for electrical machine. Basic idea on various windings.
	CO2	Basic knowledge on different fundamental terms of magnetic field. Analysis and evaluation of resultant magnetic field in different supply system.
	CO3	Analysis and discussion on 3 phase induction motor. Basic knowledge on starting and braking on induction motor. Analysis on industrial application of induction motor.
	CO4	Fundamental on single phase induction motor. Design and analysis on single phase induction motor starting method and performance evaluation. Various applications of single phase induction motor.
Industrial Process Control and Dynamics	CO1	study over different parameters of the power system especially voltage and frequency. Analysis over cause for voltage and frequency fluctuations and their remedies. Basic knowledge over power system reliability.
	CO2	familiar with various power system components and their applications. Study and analysis over various protective devices to protect system components under abnormal conditions.

	CO3	study over different transients' i.e. normal transients, switching transients, with their impact on power system. Analysis over different protective schemes like over voltage protection, lightning protection etc.
	CO4	study on harmonics and different sources to produce harmonics in the power system. Impact of harmonics in the power system. Analysis on harmonic distortion.
Renewable Power Generation Sstem	CO1	Imparting knowledge for the needs of alternative and "clean" energy technologies and resources,
	CO2	Describe the importance, scope and potential of renewable energy resources and analyze its applications.
	CO3	Imparting knowledge on solar-PV systems and evaluate MPPT in solar PV system.
	CO4	Analysis of wind energy system and applications of wind turbines.
Electrical Power Transmission & Distribution Lab	CO1	Understand the causes of Ferranti effect
	CO2	Ability to calculate parameters of ABCD network
	CO3	Ability to measure the resistance of an Earth
	CO4	Understand the knowledge of Corona
Control & Instrumentation Lab	CO1	Recognize analog and digital control skills to evaluate & control engineering problems.
	CO2	Demonstrate the analog control experiments using analog computers and digital control experiments using PC & servo trainers.
	CO3	Apply Laplace transform, transfer function, modelling RLC circuit and block diagram for simulation & control.
	CO4	Analyze various practical sessions in control engineering leading towards a research point.
Electrical Machines - II Lab	CO1	Find the voltage regulation of an Alternator by different methods
	CO2	Plot the V and inverted V curve of a Synchronous motor
	CO3	Find the direct and quadrature axis reactance of a salient pole synchronous machine
	CO4	Understand the Torque-Slip Characteristics of Three Phase Induction motor
Evaluation of Summer Internship-II	CO1	State the functioning of organization and observe changes for self improvement..
	CO2	Explain how the internship placement site fits into a broader career field
	CO3	Apply appropriate workplace behaviors in a professional setting
	CO4	Solve real life challenges in the workplace by analysing work environment and conditions, and selecting appropriate skill sets acquired from the course

Third Year/ 6th semester		
Power System & Operation & Control	CO1	Verify the various signals processing technique, data modelling using MATLAB.
	CO2	Discussion and analysis over power flow studies in interconnected power system. Application of gauss seidel and newton's raphon's method to compute power and voltage in power system.
	CO3	Analysis over economic load dispatch with and without considering the transmission loss. Calculation of generation cost for different power plants. Study on unit commitment.
	CO4	Study and analysis over frequency fluctuation issues in power system. Automatic generation control of interconnected power system in response to load variation.
Microprocessor & Microcontroller	CO1	Explain the basic architecture of 8085 and 8086 microprocessor and list its features
	CO2	Develop the assembly language program for 8085 ,8086 microprocessor and 8051 microcontroller and identify the addressing mode of the instructions
	CO3	Analyze the working of different peripheral devices to develop a microprocessor system and analyze the memory interfacing concept
	CO4	Explain the 8051 Microcontroller architecture and compare the use of microprocessor and microcontroller in various application
Optimization in Engineering	CO1	Formulate the engineering problems as an optimization problem
	CO2	Apply necessary and sufficient conditions for a given optimization problem for optimality
	CO3	Select appropriate solution methods and strategies for solving an optimization problem and interpret and analyze the solution obtained by optimization algorithms
	CO4	Justify and apply the use of modern heuristic algorithms for solving optimization problems
Electric Power System Protection	CO1	Explain the working of different types of switchgear equipments like circuit breakers and relays.
	CO2	Design the ratings for fuses according to the requirement
	CO3	Elucidate various protection schemes of various power system components like alternators, transformers and bus-bars
	CO4	Explain various methods of over voltage protection in power systems.
Communication Engineering	CO1	Understand modulation schemes and provide an insight to analog communication
	CO2	Identify and describe different theoretical terms related to TV transmission and reception

	CO3	Analyze mechanism used in radar and satellite systems
	CO4	Implement their knowledge in communication engineering using analog systems
Essence of Indian Knowledge Tradition-1	CO1	Understand the concept of Traditional knowledge and its importance.
	CO2	Know the need and importance of protecting traditional knowledge.
	CO3	Know the various enactments related to the protection of traditional knowledge
	CO4	Understand the concepts of Intellectual property to protect the traditional knowledg
Power System & Operation & Control Lab	CO1	Find the negative and zero sequence synchronous reactance of an alternator
	CO2	To determine location of fault in a cable using cable fault locator
	CO3	To formulate the Y-Bus matrix
	CO4	To perform symmetrical fault and unsymmetrical fault analysis in a power system
Microprocessor and Microcontroller lab	CO1	Understand and apply the fundamentals of assembly level programming of microprocessors and microcontroller.
	CO2	An in depth knowledge of applying the concept of real time application.
	CO3	Troubleshoot interactions between software and hardware.
	CO4	Analyze abstract problems and apply a combination of hardware and software to address the problem.
Future ready Contributor Program	CO1	learn beyond graduation
	CO2	take on future lifework
	CO3	thrive in a changing society and environment
	CO4	community practices, school leadership and management practices
Seminar-I	CO1	Work in actual working environment.
	CO2	Utilize technical resources.
	CO3	Write technical documents and give oral presentations related to the work completed.
	CO4	Get acquainted with the organization structure, business operations and administrative functions.

Forth Year/ 7th semester

Advanced Control Systems	CO1	Able to do the mathematical model of physical system, understand about the discrete time control system
	CO2	Understand how the Analog to Digital Conversion is taken place and know about the stability analysis as well as mapping between S-plane and Z-plane.

	CO3	Able to understand about the state space analysis and state space models and able to do derivation of z-Transfer Function from Discrete-Time State Model	
	CO4	Able to understand the behavior of Nonlinear Systems.	
Smart Grid	CO1	Students will be able to identify the scope and significance of Marketing In Domain Industry	
	CO2	Students will be able to examine marketing concepts and phenomenon to current business events In the Industry.	
	CO3	Students will be able to coordinate the various marketing environment variables and interpret them for designing marketing strategy for business firms	
	CO4	Students will be able to illustrate market research skills for designing innovative marketing strategies for business firms	
Internet of Things	CO1	Identify the IoT networking components with respect to OSI layer.	
	CO2	Demonstrate schematic for IoT solutions	
	CO3	Analyze different IoT protocols and software.	
	CO4	Design and develop IoT based sensor systems.	
Green Technology	CO1	work in actual working environment.	
	CO2	utilize technical resources.	
	CO3	write technical documents and give oral presentations related to the work completed.	
	CO4	Get acquainted with the organization structure, business operations and administrative functions.	
Soft Computing	CO1	Define importance of applications of soft computing in real life problems	
	CO2	Explain supervised and unsupervised learning algorithms to find optimized solutions for linear and non-linear problems.	
	CO3	Demonstrate fuzzy systems using knowledge of fuzzy rule based system and fuzzy rule based reasoning.	
	CO4	Devlop soft computing techniques to solve real life problems	
Minor Project	CO1	Identify the components required for the project of the chosen area of defined technology for project development.	
	CO2	Describe the technical aspects of the chosen project with a comprehensive and systematic approach	
	CO3	Apply technical aspects for engineering projects	
	CO4	Work as an individual or in a team to develop and analyse the technical projects.	
Seminar 2	CO1	List new research area from a range of academic disciplines	

	CO2	Estimate new perspectives in the emerging technology
	CO3	Develop argumentative Skills and Critical Thinking
	CO4	Argue the impact of engineering solutions on the society and contemporary issues
Essence of Indian Knowledge Tradition-2	CO1	Identify the concept of Traditional knowledge and its importance.
	CO2	Explain the need and importance of protecting traditional knowledge.
	CO3	IIllustrate the various enactments related to the protection of traditional knowledge.
	CO4	Interpret the concepts of Intellectual property to protect the traditional knowledge
Comprehensive Viva		

Fourth Year/ 8th semester

Major Project/ Internship	CO1	Define engineering problem, devise a means of solving and exhibit the ability to execute the solution.
	CO2	Describe the impact of engineering solutions on the society
	CO3	Demonstrate knowledge of professional and ethical responsibilities
	CO4	Conclude effectively in both verbal and written form