

Criteria 2- Teaching- Learning and Evaluation

Key Indicator- 2.6 Student Performance and Learning Outcome

2.6.1 Teachers and students are aware of the stated Programme and course outcomes of the Programmes offered by the institution.

Department of Civil Engineering		
Course	CO	Statements
Engineering Mathematics III	3CE01.1	Demonstrate the knowledge of differential equations and partial differential equations, applied to electrical engineering systems.
	3CE01.2	Apply Laplace transform to solve differential equations
	3CE01.3	Demonstrate the use of Partial Differential Equations.
	3CE01.4	Compute different Numerical Methods
	3CE01.5	Apply the knowledge of Complex Analysis
	3CE01.6	Demonstrate the basic concepts of probability and statistics.
Strength of Materials	3CE02.1	To understand the basics of material properties, stress and strain
	3CE02.2	To apply knowledge of mathematics, science, for engineering applications
	3CE02.3	To identify, formulate, and solve engineering & real life problems
	3CE02.4	To design and conduct experiments, as well as to analyze and interpret action and reaction data.
	3CE02.5	To understand specific requirement from the component to meet desired needs within realistic constraints of safety.
Building Construction & Engineering. Geology	3CE03.1	To understand Load bearing and Frame structure.
	3CE03.2	To recognize various types of construction material and its suitability
	3CE03.3	To recognize the various levels in building and its need.
	3CE03.4	To know types of staircase, doors, windows and other related fixtures.
	3CE03.5	To recognize types of rock and minerals and its construction properties.
	3CE03.6	To know reason for earthquake and seismic waves.
Transportation Engineering	3CE04.1	To identify type of roads and its utility.
	3CE04.2	To understand the application of various road studies at time of survey and actual construction
	3CE04.3	To design the various types of road pavements.
	3CE04.4	To understand rules regulations, signals , type of gauges and railway sleepers density.
	3CE04.5	To recognize the Airport features and design concept of components for Aero plains movement.
	3CE04.6	To identify types and components of Tunnels and bridges and its design components.
Concrete Technology & RCC	3CE05.1	To know need and composition of binding material, cement.
	3CE05.2	To recognize concrete and RCC and will be able to perform desired test for suitability
	3CE05.3	To analyze RCC Components like slab and lintels.
	3CE05.4	To decide and utilize the admixtures as per the need of Concrete.
	3CE05.5	To understand importance of mix design.

Course	CO	Statements
Building Planning Designing & CAD	4CE01.1	To make engineering drawings by First angle and Third angle method.
	4CE01.2	To apply building planning principles practically while developing projects.
	4CE01.3	To study the climatic conditions and decide the corresponding provision in structure.
	4CE01.4	To know about Bylaws, Town development authority rules and terms.
	4CE01.5	To draw various plans manually and computationally
Hydrology & Water Resource Engineering	4CE02.1	Explain the hydrology and hydrological data.
	4CE02.2	To analyze the hydrological methods for runoff.
	4CE02.3	Evaluate the ground water hydrological problems.
	4CE02.4	Explain the need of irrigation systems and its alternatives.
Surveying	4CE03.1	Define principles of Surveying, Remote Sensing and Geomatics.
	4CE03.2	Describe different instruments, tools, applications and techniques to determine the positions on the surface of the earth, change detection.
	4CE03.3	To perform Linear measurement methods of surveying.
	4CE03.4	Differentiate the techniques for setting out alignments, curves, other layouts, modern survey systems etc.
	4CE03.5	To perform survey at elevation and conduct Plane Table survey.
Geotechnical Engineering– I	4CE04.1	To determine the Index properties and Atterberg limits for soil classification.
	4CE04.2	To understand the mechanics of compaction and quality control in field.
	4CE04.3	To explain permeability of soil and methods of dewatering.
	4CE04.4	To calculate the seepage discharge and design the graded filter.
	4CE04.5	To understand the concept of consolidation and stress distribution in soil mass.
Structural Analysis-I	4CE05.1	To decide what is required to be analyzed depending upon type of structural element.
	4CE05.2	To know about degree of freedom, Condition of equilibrium and determinacy of element.
	4CE05.3	To understand reason for failure and permissible limits for safety.
	4CE05.4	To apply the knowledge of beam analysis for practical analysis and design purpose.
	4CE05.5	To make application of various analysis methods for actual structural member analysis and design.
	4CE05.6	To know merits for utilization of suspension, 2 hinged and 3 hinged arches.
Design of Reinforced & Prestressed Concrete Structures	5CE01.1	To analyze and design of rectangular section.
	5CE01.2	To analyze and design of slab.
	5CE01.3	To analyze and design of staircase and retaining wall.
	5CE01.4	To analyze and design of column and footing.
	5CE01.5	To understand grid slab and ductile detailing.
	5CE01.6	Explain the general behavior of PC sections under external load.
	5CE02.1	Understand the use of different types of curves and their field implications.
	5CE02.2	Understand the triangulation adjustment.

Course	CO	Statements
Surveying and Geometrics	5CE02.3	Understand the hydrographic survey.
	5CE02.4	Acquire skills in handling spatial data base warehousing and mining.
	5CE02.5	Understand the surveying with advance instrument like remote sensing, GPS and GIS
Numerical Methods And Computer Programming	5CE03.1	To use spreadsheet software for solving civil engineering problems.
	5CE03.2	To impart knowledge to analyze, solve, design and code numerical method problems using C language.
	5CE03.3	To impart knowledge to analyze, solve, design and code civil engineering problems using C language.
Professional Elective-I (Highway Construction and Management)	5CE04.1	Explain the basic concepts about highway engineering
	5CE04.2	To design geometric elements of the highway.
	5CE04.3	To design the various types of road pavements with construction and maintenance of highway.
	5CE04.4	To carry out traffic studies and implement traffic regulation and control measures and intersection design.
	5CE04.5	To apply the knowledge to prevent the road accidents
Open Elective (Basics Of Building Construction)	5CE05.1	To understand Load bearing and Frame structure with their foundations.
	5CE05.2	To recognize various types of construction material and its suitability
	5CE05.3	To recognize the various levels in building and its need.
	5CE05.4	To know types of openings, doors, windows and other related fixtures.
	5CE05.5	To recognize types of rock and minerals and its construction properties
	5CE05.6	To understand the basic concepts of DPC, fireproof, soundproof and expansion joints in structure.
Design of Steel Structures	6CE01.1	To explain the methods of design of steel structure.
	6CE01.2	To design bolted and welded connection.
	6CE01.3	To identify the different failure modes of bolted and welded connections, and determine their design strengths.
	6CE01.4	To design the Tension and compression member.
	6CE01.5	To identify and compute the design loads on a typical steel roof trusses.
	6CE01.6	To design basic elements of steel structure like beams, column and bases.
Environmental Engineering-I	6CE02.1	Define and explain the significance of terms and parameters frequently used in water supply engineering.
	6CE02.2	Evaluate the influence of the different parameter in design and treatment of water treatment plant (water quality parameters).
	6CE02.3	Basic methodology for water treatment (viz., sedimentation, coagulation, flocculation, filtration, disinfection and water softening.)
	6CE02.4	An understanding of water quality criteria and standards, and their relation to public health.
Fluid Mechanics	6CE03.1	Describe basic properties of fluid flow
	6CE03.2	Apply the knowledge to fluid flow problems.
	6CE03.3	Analyze the type of flow by using basic of mathematical principle.
	6CE03.4	Solve and modeling the pipe flow problems.

Course	CO	Statements
Professional Elective-II (Advanced Construction Materials)	6CE04.1	To understand special type of concrete and supplementary cementitious materials.
	6CE04.2	To recognize various types of metals and new alloy steels.
	6CE04.3	To understand Thermal and Sound insulating materials.
	6CE04.4	To know types of construction chemicals and wastes.
	6CE04.5	To recognize types of shoring and formwork materials.
	6CE04.6	To understand the elementary concept of smart materials.
Open Elective (Introduction to Earthquake Engineering)	6CE05.1	Identify type of earthquake, its properties.
	6CE05.2	Earthquake resistance planning.
	6CE05.3	Apply knowledge of seismic bands in masonry structure construction
	6CE05.4	Solve engineering problems in the context of Earthquake Engineering.
Estimating And Costing	6CE06.1	Explain purpose of quantity estimates, Modes of measurement and units of measurement as per IS1200, Specification, its Purpose and principles of specification.
	6CE06.2	Understand Schedule of rates, market rate analysis of some specific items.
	6CE06.3	Determination of Cost & Quantity Estimate, detailed estimates of Civil Engineering works, Building, etc.
	6CE06.4	Explain earth work estimates in Roads including hill road.
	6CE06.5	Explain Purpose of valuation, value and cost, market value, potential value, sentimental value, scrap value, etc.
	6CE06.6	Explain organization of construction industry specific to Govt.Organization P.W.D.Organization, Site administration
Structural Analysis-- II	7CE01.1	To decide what is required to be analyzed depending upon type of structural element.
	7CE01.2	To know about degree of freedom, Condition of equilibrium and determinacy of element.
	7CE01.3	To understand reason for failure and permissible limits for safety.
	7CE01.4	To apply the knowledge of beam analysis for practical analysis and design purpose.
	7CE01.5	To make application of various analysis methods for actual structural member analysis and design.
Geotechnical Engineering- II	7CE02.1	To select the appropriate soil investigation method and get true sub soil parameters used for selection of
	7CE02.2	To determine the bearing capacity of shallow foundation.
	7CE02.3	To calculate the lateral earth pressure on retaining wall
	7CE02.4	To find bearing capacity of well foundation and design of pile foundation.
	7CE02.5	To evaluate the settlement of different types of foundation.
	7CE02.6	To suggest the suitable method o ground improvement.
Hydraulics Engineering	7CE03.1	Illustrate the flow pattern in the open channels, criteria for formation hydraulics jump.
	7CE03.2	Identify different types of GVF profiles and methods.
	7CE03.3	Compute of water hammer pressures in pipe.
	7CE03.4	Design penstocks and surge tanks, understand causes of water hammer.
	7CE04.1	Define and explain the significance of terms and parameters frequently used in wastewater Treatment.

Course	CO	Statements
Environmental Engineering – II	7CE04.2	Evaluate the influence of the different parameter in design and treatment of wastewater treatment plant(wastewater characteristics).
	7CE04.3	Basic methodology for wastewater treatment (screening, grit chambers, sedimentation, biological treatment)
	7CE04.4	Appreciate the advantages, disadvantages and limitations of the technologies and new developments.
	7CE04.5	An ability to identify and interpret the criteria for the classification of a substance as a solid/hazardous
	7CE04.6	Ability to identify air pollution problems and interpret criteria air quality data.
	7CE04.7	Evaluate the engineering solutions for industrial and vehicular air pollution problems.
	7CE04.8	The candidate at the end of the experimental exercise would be able to perform field-oriented testing of water
Professional Elective – III (Water Power Engineering)	7CE05.1	Describe the various sources of energy systems.
	7CE05.2	Classify the different power plants.
	7CE05.3	Identify the problems related to hydraulic pressure.
	7CE05.4	To understand the powerhouse and its components.
Construction Project Management	8CE01.1	To understand meaning of Project and Project Management.
	8CE01.2	To understand the phases of Project Life Cycle and process of developing it.
	8CE01.3	To use and apply various planning tools like BAR chart, Milestone Chart, Networking Methods like CPM , PERT .
	8CE01.4	To compare and control the project at the time of execution.
	8CE01.5	To update projects and review the status of work.
	8CE01.6	To optimize project using Network crashing method
	8CE01.7	To understand the concept of Project Smoothing/ leveling.
	8CE01.8	To plan and develop the project using Project Planner software's.
	8CE01.9	To understand importance and application of various management like Quality , Safety , Risk handling and Inventory
	8CE01.10	To turn good manager at individual and organizational level.
Construction Economics and Estimating-costing	8CE02.1	Determine need and basics of Estimation and Construction Economics.
	8CE02.2	Carry of estimation by various methods.
	8CE02.3	Write and understand specification of materials and items of construction.
	8CE02.4	Carry out rate analysis of basic construction material and apply calculation logic for other construction materials.
	8CE02.5	Use of CSR for Estimation work and carry out estimation of residential , Commercial building, Flexible and Rigid Roads, Water Tank , Septic tank etc.
	8CE02.6	Understand need, purpose and process of valuation .
	8CE02.7	Understand and carry out Bidding and tendering process .
	8CE03.1	In-depth knowledge of physical chemical unit processes for advanced water treatment.
	8CE03.2	Consider the application of this in research projects, and to contribute to the development of new theories and methods in the field.

Course	CO	Statements
Professional Elective – IV (Advanced Water Treatment)	8CE03.3	Select or construct appropriate treatment schemes to remove certain pollutants present in water or waste water.
	8CE03.4	Developed conceptual schematics required for the treatment of water.
	8CE03.5	Translate pertinent forcing criteria into physical and chemical treatment system.
	8CE03.6	Provide recommendations of appropriate treatment processes for upgrading water and treatment efficiency
Professional Elective – V (Construction Equipment and Machinery)	8CE04.1	To recognize the various terms related to the tools that are required for any construction work.
	8CE04.2	To decide which machine or tool can be implemented as per the project life cycle stage.
	8CE04.3	To understand the survey process with help of Total station and will be able to analyze the performance of basic minor tools and machinery
	8CE04.4	To understand various equipments like excavators, shovels, mixers, compactors , crane , hoist , lift etc.
Department of Mechanical Engineering		
Engineering Mathematics- III	3ME01.1	Demonstrate the knowledge to solve ordinary Linear Differential equations with constant coefficient and its reducible equation using particular integral and complementary function and apply method of variation of parameter to solve ordinary Linear differential equations
	3ME01.2	Define the Laplace transform and its inverse transform for the basic functions. Locate the Laplace transform of periodic function. Apply the Laplace transform to solve differential equation
	3ME01.3	Apply False Position, Newton Raphson method to solve nonlinear & polynomial equations Apply Gauss Elimination method, Gauss Seidal iterative method, Relaxation method to solve system of linear equations, Apply Eulers method, Runge-Kutta method, Picards method to solve differential equations
	3ME01.4	Define Gradient, divergent and curl of vector point functions. Finds the directional derivatives of scalar point functions. Discuss the Irrotational and solenoidal vector fields. Define line surface and volume integrals.
Manufacturing Process	3ME02.1	basic concept of foundry process and related activities
	3ME02.2	concept of complete sand casting process with advance casting methods
	3ME02.3	fundamentals of welding processes
	3ME02.4	various processes like electroplating, anodizing etc and their importance in industries
Mechanics of Material	3ME03.1	Determine the stress & strain in the member subjected to axial, bending & torsional load
	3ME03.2	To observe different types of material behavior such as elastic, plastic, ductile and brittle
	3ME03.3	Apply SF and BM diagrams to analyse resistance offered by the beam and able to solve practical problems in real world
	3ME04.4	Apply deflection criteria to check the stability of beam
	3ME04.1	Understand the basic concepts of thermodynamics, thermodynamic systems, work and heat

Course	CO	Statements
Engineering Thermodynamics	3ME04.2	Apply first law of thermodynamics and application of first law to flow and non-flow processes
	3ME04.3	Apply second law of thermodynamics and understand concept of entropy
	3ME04.4	Understand the properties of steam, work done and heat transfer during various processes with steam as working fluid thermodynamics
	3ME04.5	Understand the concept of air standard cycles
	Fluid Mechanics	3ME05.1
3ME05.2		Derive and apply general governing equations for various fluid flows
3ME05.3		Understand the concept of boundary layer theory and flow separation.
3ME05.4		Calculate energy losses in pipe flow.
3ME05.5		Evaluate the performance characteristics of hydraulic jets
Material Science	4ME01.1	Basic concepts of metallurgy and types of materials.
	4ME01.2	2. Iron-Carbon Equilibrium Diagram, critical temperatures, formation of microstructures and they will get the knowledge of alloys.
	4ME01.3	3. Uses and practical applications of ferrous & non ferrous materials
	4ME01.4	4. Various heat treatment processes, powder metallurgy and industrial applications
Energy Conversion-I	4ME02.1	Students will study the concept steam and steam power plant, mounting and accessories.
	4ME02.2	Students will demonstrate the calculation of various efficiency & related parameters.
	4ME02.3	Student will show the adequate knowledge of fuel & ash handling systems.
	4ME02.4	Students will demonstrate the knowledge of condenser & application.
	4ME02.5	Students will understand the concepts of steam nozzles & steam turbine.
Manufacturing Technology	4ME03.1	Apply the knowledge of theory of metal cutting, tool selection & calculate cutting forces
	4ME03.2	Demonstrate the knowledge of basics of turning operations
	4ME03.3	Understand the drilling and boring operations and working of drilling & boring machines
	4ME03.4	Understand the milling and gear cutting operations and working of respective machines
	4ME03.5	Understand the working of grinding, shaper, planer and slotter machines
	4ME03.6	Understand the knowledge of unconventional machining processes
Basic Electrical Drives & Control	4ME04.1	Understand the working of electrical drives and their components
	4ME04.2	Understand the basics of DC motors and their characteristics
	4ME04.3	Understand the working of AC motors, induction motors and concept of braking
	4ME04.4	Understand the different speed control methods of A.C. and D.C. motors

Course	CO	Statements
	4ME04.5	Understand the design of transducers and their applications
	4ME04.6	Understand the industrial applications of different drives
Hydraulics & Pneumatics Systems	4ME05.1	Demonstrate basic concepts of prime movers and turbines
	4ME05.2	Utilize the knowledge of centrifugal and reciprocating pumps for applications
	4ME05.3	Reveal the importance of other water lifting devices
	4ME05.4	Solve the elementary treatment on compressible fluid flow
	4ME05.5	Understand the concept of hydrostatic and hydrokinetic systems
	4ME05.6	Use the knowledge of hydraulics & pneumatics in developing project work
Heat Transfer	5ME01.1	Apply the concept of heat transfer, laws of heat transfer and various mathematical equations.
	5ME01.2	Demonstrate the knowledge of determining the thermal conductivity of various materials.
	5ME01.3	Remember the skills of understanding and verifying various laws of radiation
	5ME01.4	Capable to explain the concept of heat exchanger and demonstrate the calculations of efficiency.
Metrology & Quality Control	5ME02.1	Create & apply the concept of inspection, quality control and its importance to industry.
	5ME02.2	Demonstrate the skills of controlling various out of control processes using statistical quality control tools.
	5ME02.3	Understand the importance of improving production and productivity using work study approach.
	5ME02.4	Apply the knowledge of various measurement standards and techniques in the industry to measure various parameters related to metrology
Kinematics of Machines	5ME03.1	Understand & apply the concept and its applications of link, mechanisms and machines.
	5ME03.2	Demonstrate the ability to analyze the mechanisms and machines on the basis of velocity and acceleration and they will show the ability to solve analytical methods.
	5ME03.3	Show the ability to use graphical and analytical methods for synthesis of mechanisms to develop mini projects in the course duration
	5ME03.4	Understand the practical for study of brake, clutch, dynamometer, gear train etc.
Measurement Systems	5ME04.1	Understand & apply the concept of measurement system and will know its importance related to the industry
	5ME04.2	Demonstrate the ability to measure various parameters like pressure, flow, speed, vibration etc.
	5ME04.3	Understand to use various measuring instruments.
	5ME04.4	Understand the practical approach of engineering and will be confident in industry.
Manufacturing Techniques	5FEME05.1	Apply the knowledge of various manufacturing techniques and its applications in engineering.
	5FEME05.2	Understand the knowledge of machining operations, sheet metal working and processes

Course	CO	Statements
Manufacturing Techniques	5FEME05.3	Students will show the ability to apply various joining methods in practice.
	5FEME05.4	Students will exhibit the knowledge of powder metallurgy
Design of Machine Elements	6ME01.1	Understand the concept of various stresses and apply the design procedure to riveted joints and welded joints.
	6ME01.2	Understand design procedure of knuckle joint, springs and power screw
	6ME01.3	Analyze & select types of shafts, keys, couplings for various machines and industrial applications.
	6ME01.4	Analyze the various types of bearings and understand the design procedure of IC Engine parts.
Dynamics of Machines	6ME02.1	Remember & apply basic concept of static force analysis and hydrodynamic lubrication
	6ME02.2	Understand the knowledge of dynamic force analysis and use graphical methods to solve problems.
	6ME02.3	Apply the knowledge of space mechanism and vehicle dynamics.
	6ME02.4	Understand concept of free vibration and force vibration, concept of Torsional vibration, concept of balancing of machinery
Control System Engineering	6ME03.1	Understand the basic system concept and study different types of systems
	6ME03.2	Understand the concept Transient- Response analysis and will apply in numerical methods, the knowledge of basic control action and industrial controllers.
	6ME03.3	Understand the concept of Stability and exhibit the knowledge of root locus concept
	6ME03.4	Understand the concept of Frequency Response method and use bode diagram in solving analytical problems.
Non Conventional Energy Systems	6ME04.1	Remember the concept of renewable and non-renewable sources.
	6ME04.2	Apply the basic concept of solar energy utilization and storage.
	6ME04.3	Apply the concept of energy from ocean and wind.
	6ME04.4	Remember the concept of bio-mass energy resources.
Automobile Engineering	6FEME05.1	Understand the basics of automobile engineering and its components
	6FEME05.2	Analyze & develop about the cooling system and its function
	6FEME05.3	Understand basic concept of transmission system and types of gears box, basic concept of electrical system and ignition system
	6FEME05.4	Apply the knowledge of suspension and lubrication
Mechatronics	7ME01.1	Understand the concept of computer process control.
	7ME01.2	Create the working models for various mechatronics system for industrial applications.
	7ME01.3	Create mini projects on material handling systems like pick and place type robot, machine loading system etc.
	7ME01.4	Create pneumatic and hydraulic circuits for various industrial applications.
	7ME02.1	Understand Productivity.
	7ME02.2	Differentiate Method Study & Work Measurement

Course	CO	Statements
Production Techniques	7ME02.3	Apply Ergonomics Principles.
	7ME02.4	Analyze Wedge payment & Incentive Plans
	7ME02.5	Implement reengineering.
	7ME02.6	Understand different Maintenance methods.
Industrial Management & Costing	7ME03.1	Understand the working of business environment.
	7ME03.2	Understand the management thoughts, its evolution and functions.
	7ME03.3	Apply standard and scientific techniques in materials management
	7ME03.4	Evaluate time, costs, cost sheet and depreciation of industry
ENERGY CONVERSION-II	7ME04.1	Understand the working of different types of compressors
	7ME04.2	Analyze, handle and resolve the problems related to working of air compressor.
	7ME04.3	Understand the principle of working of refrigeration systems, air conditioning and its applications.
	7ME04.4	Understand various nuclear reactions and issues related to working and maintenance of nuclear power generation.
Automobile Engineering (PE)	7ME05.01	Understand the basics of automobile engineering and its components.
	7ME05.02	Idea creation of cooling system, electrical system and ignition system.
	7ME05.03	Analysis of transmission system and types of gears box.
	7ME05.04	Design and development of suspension and lubrication.
Operations Research Techniques	8ME01.1	Understand the knowledge of OR and OR models.
	8ME01.2	Analyze the transportation problems and related issues.
	8ME01.3	Understand the concept network models, CPM and PERT analysis.
	8ME01.4	Understand the concept replacement models and solve the problem on simulation techniques.
Internal Combustion Engine	8ME02.1	Remember fundamentals of I.C. engines, their types and cycle analysis.
	8ME02.2	Remember the knowledge of fuels and alternative fuels, study of fuel injection pump.
	8ME02.3	Remember the concept of combustion of CI engine.
	8ME02.4	Understand the concept of supercharging its objectives, advantages and limitations
PRODUCT DESIGN & DEVELOPMENT (PE III)	8ME03.1	Manage the development of an idea from concept through to production.
	8ME03.2	Employ research and analysis methodologies as it pertains to the product design process, meaning, and user experience.
	8ME03.3	Apply creative process techniques in synthesizing information, problem-solving and critical thinking.
	8ME03.4	Demonstrate, apply, explain, and recognize basic engineering, mechanical, and technical principles for decision making
	8ME03.5	Use sustainable materials and manufacturing processes & Carry out cost and benefit analysis through various cost models.
Refrigeration & Air Conditioning	8ME04.1	Understand the fundamental basics of simple vapour compression system, types of refrigerant used in refrigeration system.
	8ME04.2	Understand the multistage pressure system, its types and elementary treatment of refrigeration system.

Course	CO	Statements
Air Conditioning (PE IV)	8ME04.3	Apply the knowledge of refrigeration system and its controls, defrosting.
	8ME04.4	Apply the concept air conditioning system as winter, summer air conditioning system applications and its related issues.
Department of Computer Science and Engineering		
Engineering Mathematics- III	3KS01.1	Demonstrate the knowledge of differential equations and linear differential equations .
	3KS01.2	Apply Laplace transform to solve differential equations.
	3KS01.3	Demonstrate the use of Fourier Transform to connect the time domain and frequency domain.
	3KS01.4	Demonstrate the basic concepts of probability and statistics.
	3KS01.5	Apply the knowledge of Complex Analysis.
	3KS01.6	Apply the knowledge of vector calculus to solve physical problems.
Discrete Structure & Graph Theory	3KS02.1	Analyze and express logic sentence in terms of predicates, quantifiers, and logical connectives.
	3KS02.2	Derive the solution for a given problem using deductive logic and prove the solution based on logical inference.
	3KS02.3	Classify algebraic structure for a given mathematical problem.
	3KS02.4	Perform combinatorial analysis to solve counting problems.
Object Oriented Programming	3KS03.1	Apply Object Oriented approach to design software.
	3KS03.2	Implement programs using classes and objects.
	3KS03.3	Specify the forms of inheritance and use them in programs.
	3KS03.4	Analyze polymorphic behaviour of objects.
	3KS03.5	Design and develop GUI programs.
	3KS03.6	Develop Applets for web applications
Data Structure	3KS04.1	Apply various linear and nonlinear data structures
	3KS04.2	Demonstrate operations like insertion, deletion, searching and traversing on various data structures
	3KS04.3	Examine the usage of various structures in approaching the problem solution.
	3KS04.4	Choose appropriate data structure for specified problem domain
Analog and Digital Electronics	3KS05.1	Explain basic concepts of semiconductor devices and its application.
	3KS05.2	Compare different Number System and basics of conversion of number systems.
	3KS05.3	Realize different minimization technique to obtain minimized expression.
	3KS05.4	Design Combinational Circuits.
	3KS05.5	Design and Develop Sequential Circuits.
Artificial Intelligence	4KS01.1	Explain concepts of Artificial Intelligence and different types of intelligent agents and their architecture.
	4KS01.2	Formulate problems as state space search problem & efficiently solve them.
	4KS01.3	Summarize the various searching techniques, constraint satisfaction problem and example
	4KS01.4	Apply AI techniques in applications which involve perception, reasoning and learning.

Course	CO	Statements
	4KS01.5	Compare the importance of knowledge, types of knowledge, issues related to knowledge
Data Communication and Networking	4KS02.1	Describe data communication Components, Networks, Protocols and various topology based network architecture
	4KS02.2	Design and Test different encoding and modulating techniques to change digital –to- digital conversion, analog-to-digital conversion, digital to analog conversion, analog to analog conversion,
	4KS02.3	Explain the various multiplexing methods and evaluate the different error detection & correction techniques.
	4KS02.4	Illustrate and realize the data link control and data link protocols.
Operating System	4KS03.1	Explain memory management issues like external fragmentation, internal fragmentation.
	4KS03.2	Illustrate multithreading and its significance.
	4KS03.3	List various protection and security mechanisms of OS.
	4KS03.4	Analyze and solve the scheduling algorithms.
	4KS03.5	Analyze the deadlock situation and resolve it.
Microprocessor and Assembly Language programming	4KS04.1	Describe 8086 microprocessor and its architecture; also understand instruction processing during he fetch-decode-execute cycle.
	4KS04.2	Design and Test assembly language programs using 8086 microprocessor instruction set.
	4KS04.3	Demonstrate the implementation of standard programming constructs, including control structures and functions, in assembly language.
	4KS04.4	Illustrate and realize the Interfacing of memory & various I/O devices with 8086 microprocessor.
	4KS04.5	Explain the basic concepts of Internet of Things
Theory of Computation	4KS05.1	To construct finite state machines to solve problems in computing.
	4KS05.2	To write regular expressions for the formal languages.
	4KS05.3	To construct and apply well defined rules for parsing techniques in compiler
	4KS05.4	To construct and analyze Push Down, Turing Machine for formal languages
	4KS05.5	To express the understanding of the Chomsky Hierarchy.
	4KS05.6	To express the understanding of the decidability and un-decidability problems.
Database Management System	5KS01.1	Model, design and normalize databases for real life applications.
	5KS01.2	Discuss data models, conceptualize and depict a database system using ER diagram.
	5KS01.3	Query Database applications using Query Languages like SQL
	5KS01.4	Design & develop transaction processing approach for relational databases
	5KS01.5	Understand validation framework like integrity constraints, triggers and assertions
Compiler Design	5KS02.1	Describe the fundamentals of compiler and various phases of compilers
	5KS02.2	Design and implement LL and LR parsers
	5KS02.3	Solve the various parsing techniques like SLR,CLR,LALR
	5KS02.4	Examine the concept of Syntax-Directed Definition and translation

Course	CO	Statements
	5KS02.5	Assess the concept of Intermediate-Code Generation and run-time environment
	5KS02.6	Explain the concept code generation and code optimization.
Computer Architecture & Organization	5KS03.1	Discuss basic structure of computer.
	5KS03.2	Understand the basic operation of CPU.
	5KS03.3	Compare and select various Memory and I/O devices as per requirement.
	5KS03.4	Solve the concepts of number representation and their operation.
	5KS03.5	Explain the concept of parallel processing and pipelining.
Introduction to Cyber Security	5KS04.1	Know fundamentals of Cybercrimes and Cyber offenses
	5KS04.2	Realize the Cyber threats, attacks and Vulnerabilities.
	5KS04.3	Explore the industry practices and tools.
	5KS04.4	Comprehend the Access Control and Authentication Process.
	5KS04.5	Implement Intrusion Detection and Prevention.
Security Policy & Governance	6KS01.1	List and discuss the key characteristics of Information Security, Leadership
	6KS01.2	Differentiate between Law and Ethics
	6KS01.3	Describe why ethical codes of conduct are important to Information Security
	6KS01.4	Discuss the importance, benefits and desired outcomes of Information Security Governance
	6KS01.5	Discuss the process of developing, implementing and maintaining various types of Information Security Policies.
Design and Analysis of Algorithms	6KS02.1	Carry out the analysis of various Algorithms for mainly Time complexity
	6KS02.2	Apply design principles and concepts to algorithm design.
	6KS02.3	Understand different algorithmic design strategies
	6KS02.4	Analyze the efficiency of algorithms using time complexity.
	6KS02.5	Apply the standard sorting algorithms
Software Engineering	6KS03.1	Decide on a process model for a developing a software project
	6KS03.2	Classify software applications and identify unique features of various domains
	6KS03.3	Design test cases of a software system
	6KS03.4	Understand basics of Project management.
	6KS03.5	Plan, schedule and execute a project considering the risk management.
	6KS03.6	Apply quality attributes in software development life cycle.
Sensors and Actuators	6KS04.1	Fabricate some of those sensors
	6KS04.2	Simulate sensors and characterize before fabricating it
	6KS04.3	Design application with sensors and actuators for real world
Social Science & Engineering Economics	7KS01.1	An ability to understand the importance of social science and economics in professional life. An ability to utilize high-level interpersonal skills to negotiate with stakeholders and maintain cordial
	7KS01.2	An ability to utilize high-level interpersonal skills to negotiate with stakeholders and maintain cordial
	7KS01.3	Understanding of professional responsibility with socioeconomic constraints and norms

Course	CO	Statements
	7KS01.4	An ability to understand the need of society and design the system to fulfil it with deep analysis
	7KS01.5	Understanding of professional responsibility with socioeconomic constraints and norms
	7KS01.6	An ability to understand the social science and engage in a lifelong learning process performing better in
Computer Graphics	7KS02.1	Describe the basic concepts of Computer Graphics.
	7KS02.2	Demonstrate various algorithms for basic graphics primitives.
	7KS02.3	Apply 2-D geometric transformations on graphical objects
	7KS02.4	Use various Clipping algorithms on graphical objects
	7KS02.5	Explore 3-D geometric transformations, curve representation techniques and projections methods
	7KS02.6	Explain visible surface detection techniques and Animation
Cloud Computing	7KS03.1	Describe the fundamental concept, architecture and applications of Cloud Computing
	7KS03.2	Discuss the problems related to cloud deployment model.
	7KS03.3	Examine the concept of virtualization.
	7KS03.4	Identify the role of network connectivity in the cloud.
	7KS03.5	Assess different Cloud service providers.
	7KS03.6	Inspect the security issues in cloud service models.
Professional Elective III: Embedded System	7KS04.1	Describe the basics of embedded systems and structural core units as well as memory organization for embedded system
	7KS04.2	Explain components of embedded system, characteristics and quality attributes of embedded systems.
	7KS04.3	Discuss role of 8051 microcontroller and its architecture in design of embedded systems
	7KS04.4	Examine the different Addressing modes and Instruction Set of 8051 microcontrollers.
	7KS04.5	Use knowledge of C programming to do embedded programming
	7KS04.6	Assess the Real-Time Operating System concepts with VxWorks RTOS.
Professional Elective IV: Image Processing	7KS05.1	Explain fundamental steps in Image Processing
	7KS05.2	Compare different methods for image transform with its properties
	7KS05.3	Illustrate Image Enhancement in spatial domain
	7KS05.4	Examine Image Enhancement in Frequency Domain
	7KS05.5	Apply various methods for segmenting image and identifying image components
	7KS05.6	Investigate morphological operations to improve the quality of image.
Object Oriented Analysis and Design	8KS01.1	Describe Object Oriented principles, for performing object-oriented analysis and
	8KS01.2	Explain the basic concepts of UML, Software Development Processes and Design
	8KS01.3	Illustrate requirements for developing a software.
	8KS01.4	Create initial domain model & system sequence diagram for use case scenario.
	8KS01.5	Design static and dynamic objects for modeling.

Course	CO	Statements
	8KS01.6	Construct UML and Design Patterns for developing object-oriented software
Professional Ethics and Management	8KS02.1	Relate ethical and non-ethical situations
	8KS02.2	Outline ethics in the society & environment
	8KS02.3	Examine the moral judgment & correlate the concepts in addressing the ethical dilemmas
	8KS02.4	Identify risk and safety measures in various engineering fields
	8KS02.5	Justify ethical issues related to engineering responsibilities and rights
	8KS02.6	Synthesize cognitive skills in solving social problems
Professional Elective V :Virtual and Augmented Reality	8KS03.1	Describe Virtual reality & its applications.
	8KS03.2	Discuss virtual reality world and types.
	8KS03.3	Examine geometry of virtual world and the physiology of human vision
	8KS03.4	Investigate Visual Perception, Motion and Tracking
	8KS03.5	Inspect Physics of Sound and the Physiology of Human Hearing
	8KS03.6	Explain Augmented reality & examples based on Augmented reality
Professional Elective VI : Multimedia Computing	8KS04.1	Describe technical aspect of Multimedia Computing.
	8KS04.2	Compare various file formats for audio, video and text media
	8KS04.3	Examine lossless data compression techniques in real time.
	8KS04.4	Illustrate lossy data compression techniques in real time scenario
	8KS04.5	Investigate video compression technique
	8KS04.6	Construct various networking protocols for multimedia applications.
Department of Electronics and Telecommunication Engineering		
Engineering Mathematics- III	3ETC1.1	Demonstrate the knowledge of differential equations to solve engineering problems of analog systems.
	3ETC1.2	Apply Laplace transform to solve differential equations.
	3ETC1.3	Apply knowledge of vector calculus.
	3ETC1.4	Comprehend knowledge of complex analysis in terms of complex variables, harmonic functions and conformal Mapping.
	3ETC1.5	Apply numerical methods to obtain approximate solutions to mathematical problems.
	3ETC1.6	Identify and solve certain forms of partial difference equations as applied to discrete systems.
Electronic Devices & Circuits	3ETC02.1	Comprehend the knowledge of diode and its applications in rectifier and regulator circuits.
	3ETC02.2	Understand basics of BJT, JFET, MOSFET, UJT and their operational parameters.
	3ETC02.3	Understand feedback concept, topologies and their applications.
	3ETC02.4	Implement and analyze various electronic circuits.
Digital System Design	3ETC03.1	Use Boolean algebra to solve logic functions, minimization techniques, number systems and its conversion, arithmetic functions.
	3ETC03.2	Identify, analyze and design combinational and sequential circuits.
	3ETC03.3	Understand digital logic families and their characteristics.
	3ETC03.4	Use the knowledge of semiconductor memories and mapping of memories, programmable logic devices in digital design.
	3ETC04.1	Understand the coordinate systems and vector integrals.
	3ETC04.2	Evaluate Electric Field Intensity for different charge distributions.
	3ETC04.3	Evaluate Magnetic Field Intensity due to current carrying conductors.

Course	CO	Statements
Electromagnetic Waves	3ETC04.4	Understand scientifically about Maxwell's equations & Boundary conditions.
	3ETC04.5	Characterize uniform plane wave & can calculate reflection and transmission coefficient of waves at media interface.
	3ETC04.6	Understand principle of radiation and radiation characteristics of theoretical & practical antennas.
Object Oriented Programming	3ETC05.1	Justify the basic concepts of object-oriented programming such as data types, functions, classes, objects, constructors, inheritance, overloading etc.
	3ETC05.2	Design, implement, test, and debug simple programs in C++.
	3ETC05.3	Describe how the class mechanism supports encapsulation and information hiding.
	3ETC05.4	To know the concept of operator overloading
	3ETC05.5	Understand inheritance in C++
	3ETC05.6	Design and test the implementation of Java programming concepts
Electronic Devices and Circuits - Lab	3ETC06.1	Acquiring basics of parameters and operation of various semiconductor devices.
	3ETC06.2	Implementation of basic circuits using electronic devices.
	3ETC06.3	Verification and analysis of performance of electronic circuits.
Digital System Design - Lab	3ETC07.1	Apply practically the concepts of digital electronics.
	3ETC07.2	Explain the operation and characteristics of various digital logic families.
	3ETC07.3	Understand the operation of various logic gates and their implementation using digital IC's.
	3ETC07.4	Design and implement various combinational logic circuits.
	3ETC07.5	Design and implement various sequential logic circuits.
	3ETC07.6	Design and mapping of various types of memories.
Object Oriented Programming -Lab	3ETC08.1	Justify the basics of object-oriented design and the concepts of encapsulation, abstraction, inheritance, and polymorphism.
	3ETC08.2	Design, implement, test, and debug simple programs in an object-oriented programming language.
	3ETC08.3	Describe how the class mechanism supports encapsulation and information hiding.
	3ETC08.4	Design and test the implementation of C++ and java programming concepts.
Electronic Workshop	3ETC09.1	Able to enhance the knowledge of different Electronics component.
	3ETC09.2	Able to understand the basic concept of Layout Creation
	3ETC09.3	Able to design and implement different Electronics Ckt.
	3ETC09.4	Able to analyze the circuit and troubleshoot errors if any.
Analog and Digital Communication	4ETC01.1	Understand the necessity of modulation and identify the various components of analog and Digital communicationsystems.
	4ETC01.2	Understand different modulation and demodulation schemes in analog communication systems.
	4ETC01.3	Compare and contrast the strengths and weaknesses of various communication systems.
	4ETC01.4	Apply the concepts of Probability theory in communication systems.
	4ETC01.5	Analyze the performance of various pulse modulation scheme

Course	CO	Statements
	4ETC01.6	Understand basic building blocks of digital communication system and formatting of digital signal.
	4ETC01.6	Understand concepts of information theory and analyze information transmission over communication channel.
	4ETC01.7	Analyze performance of different digital modulation techniques
Analog Circuits	4ETC02.1	Perform evaluation of the switching behavior of semiconductor devices.
	4ETC02.2	Comprehend the knowledge of basic concepts and performance parameters of Op-Amp.
	4ETC02.3	Use Op-Amp for implementation of linear and non-linear applications.
	4ETC02.4	Comprehend the knowledge of PLL, its applications and data converters.
Network Theory	4ETC03.1	Analyze electrical circuits using Mesh and Node analysis.
	4ETC03.2	Apply suitable Network Theorem to analyze electrical circuits.
	4ETC03.3	Draw oriented Graph of the network to determine their currents and voltages.
	4ETC03.4	To implement the concept of Laplace Transform for electrical circuit analysis.
	4ETC03.5	To apply Two-Port network theory for electrical network analysis.
	4ETC03.6	To evaluate different Network Functions.
Signals and Systems	4ETC04.1	Understand the continuous time signals and systems mathematically and their classification along with the mathematical operations that can be performed on them.
	4ETC04.2	Understand the spectral characteristics of continuous-time periodic signals using Fourier series.
	4ETC04.3	Analyze the spectral characteristics of continuous-time aperiodic signals and systems using Fourier Transform.
	4ETC04.4	Apply the Laplace transform for analysis of continuous-time systems.
	4ETC04.5	Understand the Discrete Time signals and systems mathematically and understand their classification along with the mathematical operations that can be performed on them.
	4ETC04.6	Analyze the spectral characteristics of Discrete Time signals and systems using Discrete Time Fourier Transform.
Values & Ethics (HS)	4ETC05.1	By the end of the course, students are expected to become more aware of themselves, and their surroundings (family, society, nature); they would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind. They would have better critical ability. They would also become sensitive to their commitment towards what they have understood (human values, human relationship, and human society). It is hoped that they would be able to apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction.

Course	CO	Statements
Environmental Science	4ES06.1	Acquiring values and attitudes towards understanding complex environmental economic-social challenges, and participating actively in solving current environmental problems and preventing the future ones.
	4ES06.2	Predicting the consequences of human actions on the web of life, global economy and quality of human life.
	4ES06.3	Adopting sustainability as a practice in life, society and industry.
Analog and Digital Communication Lab	4ETC06.1	Understand the concepts of modulation and demodulation in communication system.
	4ETC06.2	Analyze performance characteristics of AM/FM receiver
	4ETC06.3	Describe various line codes used for representation of digital waveforms.
	4ETC06.4	Demonstrate different working blocks of digital communication system.
	4ETC06.5	Analyze the performance of digital communication system.
	4ETC06.6	Apply various MATLAB functions for digital Communication Systems.
Analog Circuits Lab	4ETC07.1	Implement wave shaping circuits using passive components, diode and BJT and perform their analysis.
	4ETC07.2	Demonstrate linear and non-linear applications of Op-Amp.
	4ETC07.3	Implement PLL in certain applications.
Network Theory Lab	3ETC08.1	To apply knowledge of Mesh and Node analysis for a given network.
	3ETC08.2	To apply various network theorems to solve networks.
	3ETC08.3	To apply knowledge of Two Port network and Network Functions to analyze given network.
Signals and Systems - Lab	4ETC09.1	Generate different plots and explore results to draw valid conclusions and inferences in Signal Processing.
	4ETC09.2	Enable on how to approach for requirement of signal processing and system design using simulation tools.
	4ETC09.3	Familiarize with the concepts of sampling.
Microcontroller	5ETC01.1	Attain the knowledge of Microprocessor 8085
	5ETC01.2	Understand the Interfacing of various peripheral devices with Microprocessor 8085
	5ETC01.3	Attain the knowledge of Microcontroller 8051
	5ETC01.4	Understand assembly language & C Programming for Microcontrollers
	5ETC01.5	Understand the Interfacing of various peripheral devices with Microcontroller 8051
	5ETC01.6	Gain knowledge of advance Microcontrollers
Control System	5ETC02.1	Understand mathematical models of electrical, mechanical and electromechanical systems.
	5ETC02.2	Determine transfer functions from block diagrams and signal flow graph.
	5ETC02.3	Evaluate transient response and steady state response parameters.
	5ETC02.4	Analyze stability of the LTI system using Routh criterion and root locus
	5ETC02.5	Analyze stability of the LTI system using bode plot and Nyquist criterion

Course	CO	Statements
	5ETC02.6	Create the state model and Evaluate response of the system using state variable method.
Digital Signal Processing	5ETC03.1	Manipulate the discrete time signals and identify the type system.
	5ETC03.2	Compute the Z-transform of a sequence, identify its region of convergence , and compute the inverse Z-transform.
	5ETC03.3	Evaluate the Fourier transform of a signal.
	5ETC03.4	Design FIR and IIR filters.
	5ETC03.5	Understand the concepts of Multirate Digital Signal Processing and need of Filter banks.
	5ETC03.6	Understand the application of Digital Signal Processing
Professional Elective - I (PE-I) Power Electronics	5ETC04.1	Analyze the characteristics of various power electronics devices.
	5ETC04.2	Understand SCR firing circuits, commutation techniques.
	5ETC04.3	Analyze and design controlled rectifiers and dual converters
	5ETC04.4	Analyze and design DC to DC, AC to AC converters and DC to AC inverters,
	5ETC04.5	Design and develop power electronic circuits for various applications.
	5ETC04.6	Know various applications of power converters in DC drives.
Professional Elective - I (PE-I) Fiber Optics Communication	5ETC04.1	Understand the principles fiber-optic communication, the components and Losses and dispersion in fiber.
	5ETC04.2	Understand the properties of the optical fibers and optical components in sources.
	5ETC04.3	Understand operation of lasers, LEDs, and detectors in fiber
	5ETC04.4	Analyze system performance of optical communication systems in networks
	5ETC04.5	Understand the block diagram of FOC System with Power budgeting parameters.
	5ETC04.6	To apply the knowledge of fiber optical components, links, and systems.
Professional Elective - I (PE-I) Speech and Audio Processing	5ETC04.1	Illustrate how the speech production is modeled
	5ETC04.2	Summarize the techniques involved in collecting the features from the speech signal in time and frequency domain.
	5ETC04.3	Summarize the various speech coding techniques.
	5ETC04.4	Understand the process Speech Synthesis.
	5ETC04.5	Apply techniques/methods used for speech enhancement.
	5ETC04.6	Apply techniques/methods used for speech recognition.
Open Elective - I (OE-I): Sensors and Transducers	5ETC05.1	Understand the basic aspect of transducers and sensors
	5ETC05.2	Gain knowledge of statistical characteristic and Errors of system.
	5ETC05.3	Realize the fundamental concept about temperature and Velocity measurement
	5ETC05.4	Acquire knowledge of measurement of displacement and Humidity.
	5ETC05.5	Familiarize the basic information about measurement of Pressure, Flow, Level
	5ETC05.6	Aware about the basics of Strain gauge and smart sensors
Open Elective - I (OE-I): Data Structure	5ETC05.1	Able to understand basics and applications of different linear and nonlinear data structures
	5ETC05.2	Able to design and implement various data structure algorithms and analyze the efficiency of an algorithm.
	5ETC05.3	Able to understand Linked List and implement algorithm.

Course	CO	Statements
Data Structure	5ETC05.4	Able to understand the working principle and Implementation of stacks and queues.
	5ETC05.5	Able to implement learn Trees, Graph and their applications
	5ETC05.6	Able to write an algorithm on different sorting methods and analyze the complexities of algorithms.
Open Elective - I (OE-I): Introduction To Java	5ETC05.1	Fundamentals of Object Oriented Programming and can build & run a basic application at their own
	5ETC05.2	Use of selection & repetition statements in Java Program, dealing with methods and playing with classes and objects in real world
	5ETC05.3	To create and process single dimensional & multidimensional arrays, to handle strings in Java
	5ETC05.4	To create interactive graphical user interface in a desktop application using AWT and/or SWING Components.
	5ETC05.5	To handle exceptions and create user defined exception, also learns file handling in Java.
	5ETC05.6	To learn concept of multithreading; create, manage threads; and purpose of synchronization.
Microcontroller Lab	5ETC06.1	Attain the knowledge of Microprocessor 8085
	5ETC06.1	Understand the Interfacing of various peripheral devices with Microprocessor 8085
	5ETC06.1	Attain the knowledge of Microcontroller 8051
	5ETC06.1	Understand assembly language & C Programming for Microcontrollers
Digital Signal Processing LAB	5ETC07.1	Manipulate the discrete time signals and identify the type system.
	5ETC07.2	Compute the z-transform of a sequence, identify its region of convergence, and compute the inverse z-transform.
	5ETC07.3	Evaluate the Fourier transform of a signal.
	5ETC07.4	Understand the architecture of DSP processor TMS320C54XX.
Power Electronics LAB	5ETC08.1	Analyze the characteristics of various power electronics devices.
	5ETC08.2	Understand SCR firing circuits
	5ETC08.3	Analyze and design controlled rectifiers
	5ETC08.4	Analyze and design DC to DC, AC to AC converters and DC to AC inverters
	5ETC08.5	Design and develop power electronic circuits for various applications.
Electronic Lab based on Instrumentation	5ETC09.1	Learn about various Sensors
	5ETC09.2	Examine the measurement of various physical quantities using transducers
	5ETC09.3	be aware of statistical data analysis of different transducers
	5ETC09.4	Understand computerized data acquisition
Communication Network	6ETC01.1	Identify different types of network devices and their functions within a network.
	6ETC01.2	Understand the basic functions of data logical link control and media access control and protocol used in this layers.
	6ETC01.3	Distinguish between the layers of the OSI and TCP/IP model.
	6ETC01.4	Analyze, specify and design routing strategies for an IP based networking infrastructure

Course	CO	Statements
	6ETC01.5	Understand the concept of reliable and unreliable transfer protocol of data and how TCP and UDP implement these concepts.
	6ETC01.6	Understand various Application layer Protocols.
Computer Architecture	6ETC02.1	Learn how computers work
	6ETC02.2	Analyse the performance of computers
	6ETC02.3	Perform floating point arithmetic operations and design ALU as per the requirement
	6ETC02.4	Know how computers are designed & built
	6ETC02.5	Understand and design different types of memory systems
	6ETC02.6	Understand issues affecting recent processors
Professional Elective - II (PE-II): (I) CMOS Design	6ETC03.1	To understand the concept of CMOS circuit.
	6ETC03.2	To draw Layout, Stick diagrams of CMOS Circuits.
	6ETC03.3	To analyses the CMOS circuit performance parameter
	6ETC03.4	To implement combinational CMOS circuit design using CMOS logic families.
	6ETC03.5	To design sequential CMOS circuit.
	6ETC03.6	To design the CMOS circuit using dynamic CMOS logic
Professional Elective - II (PE-II): (II) Satellite Communication	6ETC03.1	Visualizethearchitectureof satellitesystems as ameansof highspeed,highrange communicationsystem.
	6ETC03.2	Statevariousaspectsrelatedtosatellitesystemssuchas orbitalequations,sub-systemsin asatellite
	6ETC03.3	Solvenumerical problemsrelatedtoorbitalmotionanddesignoflinkbudgetforthe given parametersandconditions.
	6ETC03.4	Learnadvancedtechniquesandregulatoryaspectsofsatellitecommunication
	6ETC03.5	Understand role of satellite in variousapplications
	6ETC03.6	Understand VSAT and GPS
Professional Elective - II (PE-II): (III) Adaptive Signal Processing	6ETC03.1	Comprehend adaptive system and functions.
	6ETC03.2	Evaluate the performance of various methods for designing adaptive filters through estimation of different parameters.
	6ETC03.3	Understand the concepts of gradient and mean square error performance in adaptive systems
	6ETC03.4	Analyse convergence and stability issues associated with adaptive filter design and come up with optimum solutions.
	6ETC03.5	Apply an adaptive filter algorithm that recursively finds the coefficients that minimize a weighted linear least squares cost function.
	6ETC03.6	Implement applications of adaptive signal processing.
Open Elective - II (OE-II): (i) Introduction To PYTHON Programming	6ETC04.1	Interpret the fundamental Python syntax and semantics
	6ETC04.2	Be fluent in the use of Python control flow statements
	6ETC04.3	Perform basic CRUD operations on Mongo DB using Python.
	6ETC04.4	Determine the methods to create and manipulate Python programs by utilizing the data structures like lists, tuples and sets.
	6ETC04.5	Identify the commonly used operations involving file systems and regular expressions.
	6ETC04.5	To learn and use operators

Course	CO	Statements
Open Elective - II (OE-II): (ii) Database Management System	6ETC04.1	Differentiate database systems from file systems by enumerating the features provided by database systems and describe each in both function and benefit.
	6ETC04.2	Define the terminology, features, classifications, and characteristics embodied in database systems.
	6ETC04.2	Analyze an information storage problem and derive an information model expressed in the form of an entity relation diagram and other optional analysis forms, such as a data dictionary.
	6ETC04.3	Demonstrate an understanding of normalization theory and apply such knowledge to the normalization of a database.
	6ETC04.4	Understand the basic issues of transaction processing
	6ETC04.5	Understanding the basic issues of concurrency control and dead lock in database.
Open Elective - II (OE-II): (iii) Renewable Energy Sources (Solar & Electric Vehicles)	6ETC04.1	Understand the concept of Solar cell and estimate solar energy availability
	6ETC04.2	Learn Solar cell Technologies
	6ETC04.3	Understand the concept of Power Electronic Converters
	6ETC04.4	Learn about Hybrid Electric Vehicles
	6ETC04.5	Learn Electric drives
	6ETC04.6	Learn about electric storage
Engineering Economics	6ETC05.1	Learn basics of Engineering Economics
	6ETC05.2	Understand and compute the production cost
	6ETC05.3	Study different cash flow methods
	6ETC05.4	to evaluate Engineering alternatives
	6ETC05.5	Understand depreciation analysis
	6ETC05.6	Understand Indian Banking System
Communication Network Lab	6ETC06.1	Identify different types of network devices and their functions within a network.
	6ETC06.2	Understand the basic functions of data logical link control and media access control and protocol used in this layers.
	6ETC06.3	Distinguish between the layers of the OSI and TCP/IP model.
	6ETC06.4	Analyze, specify and design routing strategies for an IP based networking infrastructure
	6ETC06.4	Understand the concept of reliable and unreliable transfer protocol of data and how TCP and UDP implement these concepts.
	6ETC06.5	Understand various Application layer Protocols.
Electronic Circuit Design Lab (Hardware/Software)	6ETC07.1	Analyse the characteristics of amplifiers.
	6ETC07.2	Analyse the characteristics of Oscillators.
	6ETC07.3	Analyse the characteristics of Multivibrators.
	6ETC07.4	Analyse the characteristics of tuned amplifiers.
Python Programming Lab	6ETC08.1	Interpret the fundamental Python syntax and semantics
	6ETC08.2	Be fluent in the use of Python control flow statements
	6ETC08.3	Perform basic CRUD operations on Mongo DB using Python.
	6ETC08.4	Determine the methods to create and manipulate Python programs by utilizing the data structures like lists, tuples and sets.
	6ETC08.5	Identify the commonly used operations involving file systems and regular expressions.

Course	CO	Statements
	6ETC08.6	To learn and use operators
Mini Project	6ETC09.1	Identify problems based on societal /research needs.
	6ETC09.2	Apply Knowledge and skill to solve societal problems in a group.
	6ETC09.3	Develop interpersonal skills to work as member of a group or leader.
	6ETC09.4	Analyze the impact of solutions in societal and environmental context for sustainable development.
	6ETC09.5	Excel in written and oral communication.
	6ETC09.6	Demonstrate project management principles during project work.
Cryptography and network security lab	7ETC01.1	Understand basic cryptographic algorithms
	7ETC01.2	Attain the knowledge of message and web authentication and security issues.
	7ETC01.3	Identify information system requirements
	7ETC01.4	Understand the current legal issues towards information security
	7ETC01.5	Discuss the fundamental ideas of public-key cryptography
	7ETC01.6	Understand Intrusions and intrusion detection.
Digital image and video processing	7ETC02.1	Comprehend fundamentals of digital image processing.
	7ETC02.2	Understand & apply knowledge of spatial domain and frequency domain filtering to digital images.
	7ETC02.3	Analysis of image segmentation and morphological techniques.
	7ETC02.4	Understand image degradation model and its restoration; analyze various image compression techniques based on redundancy features.
	7ETC02.5	Understand the Fundamentals of digital video processing
	7ETC02.6	Comprehend motion estimation and video processing applications.
Project management entrepreneurship	7ETC03.1	Understand basic concept of Project management
	7ETC03.2	Attain the knowledge of cost estimation & working capital
	7ETC03.3	Prepare Cost Sheets, balance sheets and Cash Flow statements
	7ETC03.4	Understand the Entrepreneurial competencies & traits
	7ETC03.5	Discuss the Management skills for Entrepreneurs
	7ETC03.6	Understand Social Entrepreneurship
Professional elective - III (PE-III) (i) high speed electronics	7ETC04.1	Explain significance and the areas of application of high-speed electronics circuits.
	7ETC04.2	Analyze effect of noise in high speed application
	7ETC04.3	Summarize the properties of various components used in high speed electronics
	7ETC04.4	Design the various type of RF amplifier for high speed application
	7ETC04.5	Explain the operation of the Mixer, Oscillator and PLL transceiver
	7ETC04.6	Design the various types of PCB using CAD tool
Professional Elective - III (PE-III) (ii) mobile communication and network	7ETC04.1	Explain basic concept of Cellular systems and standards
	7ETC04.2	Demonstrate knowledge of Signal propagation model
	7ETC04.3	Compare different multiple access techniques in mobile communication.
	7ETC04.4	Summarise the concept of rake receiver
	7ETC04.5	Demonstrate advance knowledge of MIMO
	7ETC04.6	Compare different Mobile Communication Systems and standards
Professional elective - III (PE-III)	7ETC04.1	Expand knowledge of the CMOS Process, and op-amp design
	7ETC04.2	Devise appropriate switch capacitor circuits
	7ETC04.3	Analyze phase lock loop circuits

Course	CO	Statements
(iii)mixed signal design	7ETC04.4	Use desired data converters in various applications.
	7ETC04.5	Explain Various types of A/D Converters
	7ETC04.6	Understand D/A converters.
Professional elective - IV (PE-IV) (i) introduction to mems	7ETC05.1	Demonstrate skills to select appropriate material for MEMS devices
	7ETC05.2	Understand fabrication process of MEMS
	7ETC05.3	Select appropriate sensor and actuator in a given application.
Professional elective - IV (PE-IV) (ii) errorcorrecting codes	7ETC05.1	Understand the error sources
	7ETC05.2	Understand error control coding applied in digital communication
	7ETC05.3	Able to transmit and store reliable data and detect errors in data through coding
	7ETC05.4	Able to understand the designing of various codes like block codes, cyclic codes, convolution codes, turbo codes and space codes.
Professional elective - IV (PE-IV) (iii) antenna and propagation	7ETC05.1	Describe the basic concepts and applications of Antenna systems.
	7ETC05.2	Determine the radiation pattern and directivity of antenna arrays.
	7ETC05.3	Describe the concept of Huygens Principle & Babinet's Principle.
	7ETC05.4	Understated the properties of broadband antennas and micro strip antennas.
	7ETC05.5	Describe the basic principles of smart antenna systems.
	7ETC05.6	Understand different ways of propagation of radio waves.
Cryptography and network security lab	7ETC06.1	Understand basic cryptographic algorithms
	7ETC06.2	Attain the knowledge of message and web authentication and security issues.
	7ETC06.3	Identify information system requirements
	7ETC06.4	Understand the current legal issues towards information security
	7ETC06.5	Discuss the fundamental ideas of public-key cryptography
	7ETC06.6	Understand Intrusions and intrusion detection.
Digital image and video processing – lab	7ETC07.1	Comprehend fundamentals of digital image processing.
	7ETC07.2	Understand & apply knowledge of spatial domain and frequency domain filtering to digital images.
	7ETC07.3	Analysis of image segmentation and morphological techniques.
	7ETC07.4	Understand image degradation model and its restoration; analyze various image compression techniques based on redundancy features.
	7ETC07.5	Understand the Fundamentals of digital video processing
	7ETC07.6	Comprehend motion estimation and video processing applications.
Project management entrepreneurship – lab	7ETC08.1	Understand basic concept of Project management
	7ETC08.2	Attain the knowledge of cost estimation & working capital
	7ETC08.3	Prepare Cost Sheets, balance sheets and Cash Flow statements
	7ETC08.4	Understand the Entrepreneurial competencies & traits
	7ETC08.5	Discuss the Management skills for Entrepreneurs
	7ETC08.6	Understand Social Entrepreneurship
Project stage-I (seminar)	7ETC09.1	Undertake problem identification, formulation and solution.
	7ETC09.2	Communicate with engineers and the community at large in written and oral forms.
Embedded systems lab	8ETC01.1	Recognize the concept of Embedded Systems
	8ETC01.2	Summarize the quality attributes of Embedded System
	8ETC01.3	Articulate the architecture and inbuilt peripherals of AVR Microcontroller

Course	CO	Statements
	8ETC01.4	Evaluate the programming of AVR Microcontroller in C
	8ETC01.5	Compare task, process & threads in Real Time Embedded System
	8ETC01.6	Assess validation and debugging of Embedded System
Microwave theory and techniques lab	8ETC02.1	Understand operations of microwave active and passive devices.
	8ETC02.2	Understand operations of Semiconductor Microwave Devices.
	8ETC02.3	Describe characteristics of microwave propagation through waveguide and parallel microstrip line
	8ETC02.4	Understand Operations of Microwave resonators.
	8ETC02.5	Use S-parameters for characterization of microwave devices.
	8ETC02.6	Measure various parameters of microwave system.
PROFESSIONAL ELECTIVE V (PE-V) (i) NANO ELECTRONICS	8ETC03.1	Understand various aspects of nano-technology and the processes involved in making nano components and material.
	8ETC03.2	Leverage advantages of the nano-materials and appropriate use in solving practical problems.
	8ETC03.3	Understand various aspects of nano-technology and the processes involved in making nano components and material.
	8ETC03.4	Leverage advantages of the nano-materials and appropriate use in solving practical problems.
	8ETC03.5	Students will understand the divers electronic device fabrication.
	8ETC03.6	Students will have in-depth technical knowledge in one or more areas of specialization.
Professional elective V (PE-V) (ii) wireless sensor networks	8ETC03.1	Understand the basis of Sensors with its applications
	8ETC03.2	To learn the architecture and placement strategies of Sensors
	8ETC03.3	To analyze routing and congestion algorithms
	8ETC03.4	To design, develop , and carry out performance analysis of sensors on specific applications
	8ETC03.5	To explore and implement solutions to real world problems using sensor devices, enumerating its principles of working
	8ETC03.6	To understand the working through the case study on WSN.
Professional elective V (PE-V) (iii) wavelets	8ETC03.1	Comprehend the fundamentals of wavelets.
	8ETC03.2	Explain the concepts, theory, and algorithms related with wavelet transform.
	8ETC03.3	Understand the modern signal processing tools using signal spaces, bases, operators etc.
	8ETC03.4	Analyse wavelets, filter banks, and multiresolution techniques.
	8ETC03.5	Understand data compression techniques using wavelets.
	8ETC03.6	Comprehend projects ideas based on wavelet transform.
Professional elective V (PE-V) (iv) bio medical electronics	8ETC03.1	Understand fundamentals of Medical Instrumentation, Biomedical Signals and Electrode.
	8ETC03.2	Identify and classify various Biomedical Transducers.
	8ETC03.3	Illustrate the significance of human signals and recording techniques
	8ETC03.4	Familiarize with Modern medical imaging systems.
	8ETC03.5	Conceptualize requirements and importance of Patient Care and Monitoring and Safety.
	8ETC03.6	Describe the function and necessity of Physiological and electrotherapy equipments.

Course	CO	Statements
Professional elective VI (PE-VI) (i) 5G-6G mobile communication	8ETC04.1	Illustrate the evolution of mobile communication leading to the introduction of 5G.
	8ETC04.2	Explain the key innovations in radio and network.
	8ETC04.3	Elaborate the standardization process and timeline for 5G
	8ETC04.4	Identify the spectrum requirements.
	8ETC04.5	Discuss key issues and challenges in 5G deployment.
	8ETC04.6	Understand the concept of 6G
Professional elective VI (PE-VI) (ii) information theory and coding	8ETC04.1	Understand the concept of information and entropy
	8ETC04.2	Understand Shannon's theorem for coding
	8ETC04.3	Calculation of channel capacity
	8ETC04.4	Discuss the various capacity reduction based coding techniques for text, audio and speech type of data
	8ETC04.5	Compare various capacity reduction based coding techniques for image and video type of data.
	8ETC04.6	Implement various error control techniques for Convolutional codes
Professional elective VI (PE-VI) (iii) scientific computing	8ETC04.1	View scientific computing as the point of intersection between computer science, numerical mathematics, and modeling.
	8ETC04.2	Introduce to numerical mathematics and prepares them for the scientific computing part.
	8ETC04.3	Learn to solve Nonlinear equations useful for computer models
	8ETC04.4	Learn to solve Numerical differentiation useful for computer models
	8ETC04.5	Learn to use MATLAB
	8ETC04.6	Learn to use python for the applications in scientific computing
Embedded systems lab	8ETC05.1	Recognize the concept of Embedded Systems
	8ETC05.2	Summarize the quality attributes of Embedded System
	8ETC05.3	Articulate the architecture and inbuilt peripherals of AVR Microcontroller
	8ETC05.4	Evaluate the programming of AVR Microcontroller in C
	8ETC05.5	Compare task, process & threads in Real Time Embedded System
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Microwave theory and techniques lab	8ETC06.1	Understand operations of microwave active and passive devices.
	8ETC06.2	Understand operations of Semiconductor Microwave Devices.
	8ETC06.3	Describe characteristics of microwave propagation through waveguide and parallel microstrip line
	8ETC06.4	Understand Operations of Microwave resonators.
	8ETC06.5	Use S-parameters for characterization of microwave devices.
	8ETC06.6	Measure various parameters of microwave system.
Project stage-II	8ETC07.1	Demonstrate a sound technical knowledge of their selected project topic.
	8ETC07.2	Undertake problem identification, formulation and solution.
	8ETC07.3	Design engineering solutions to complex problems utilising a systems approach.
	8ETC07.4	Conduct an engineering project.
	8ETC07.5	Communicate with engineers and the community at large in written and oral forms.
	8ETC07.6	Demonstrate the knowledge, skills and attitudes of a professional engineer.
Department of Electrical Engineering		

Course	CO	Statements
Engineering mathematics- III	3EP01.1	Demonstrate the knowledge of differential equations and partial differential equations, applied to electrical engineering systems.
	3EP01.2	Apply Laplace transform to solve differential equations.
	3EP01.3	Demonstrate the use of Fourier Transform to connect the time domain and frequency domain.
	3EP01.4	Apply Z Transform to solve of various Linear Difference equations with constant coefficients.
	3EP01.5	Apply the knowledge of vector calculus to solve physical problems.
	3EP01.6	Demonstrate the basic concepts of probability and statistics.
Electrical circuit analysis	3EP02.1	Analyze electric and magnetic circuits using basic circuit laws
	3EP02.2	Analyze the circuit using Network simplification theorems.
	3EP02.3	Solve circuit problems using concepts of electric network topology.
	3EP02.4	Evaluate transient response of different circuits using Laplace transform
	3EP02.5	Evaluate two-port network parameters and network functions
Electrical machine- I	3EP03.1	Explain the construction and working of DC Machines.
	3EP03.2	Illustrate the different Characteristics, types, their applications and parallel Operation of D.C. Generators.
	3EP03.3	Demonstrate the various characteristics, starting, speed control and braking operation on DC motors
	3EP03.4	Analyze the performance of DC machines by conducting the various tests on it.
	3EP03.5	Determine the parameters of equivalent circuits, performance parameters of single phase transformer and merits & demerits of autotransformer
	3EP03.6	Explain the construction, working, different connections, applications and testing of three phase transformer.
Energy resources and generation	3EP04.1	Explain the operation of Thermal, Hydro, Nuclear and Diesel power plants.
	3EP04.2	Summarize solar energy conversion, solar radiation measuring instruments, wind energy conversion and their applications.
	3EP04.3	Outline the principle and operation of fuel cells, ocean & tidal energy conversion, and other nonconventional energy resources.
	3EP04.4	Determine the various factors and curves related to electrical load & generating plant.
Electronic devices and circuits lab	3EP05.1	Demonstrate the knowledge of semiconductor physics and PN Junction Diode
	3EP05.2	Analyze the rectifier and regulator circuits.
	3EP05.3	Analyze the operational parameters of BJT
	3EP05.4	Analyze various multistage amplifier circuits
	3EP05.5	Demonstrate the knowledge of JFET, MOSFET, UJT and their operational parameters
Electromagnetic fields	4EP01.1	Demonstrate the basic mathematical concepts related to electromagnetic vector fields.
	4EP01.2	Apply the principles of electrostatics to the solutions of problems relating to electric field and electric potential, boundary conditions and electric energy density.

Course	CO	Statements
	4EP01.3	Apply the principles of magneto statics to the solutions of problems relating to magnetic field.
	4EP01.4	Apply Maxwell's equation in different forms (differential and integral) to diverse engineering problems.
Electrical measurements & instrumentation	4EP02.1	Classify the various measuring instruments like PMMC, MI, Electrodynamometer, and Induction type instruments for measurement of current, voltage, power, and energy.
	4EP02.2	Demonstrate the construction & working of Instrument Transformers and special purpose meters.
	4EP02.3	Analyze various methods for measurement of resistance, inductance, and capacitance using AC/DC bridges.
	4EP02.4	Explain the working of various Digital measuring instruments.
	4EP02.5	Explain the generalized Instrumentation system & working of different transducers.
Control system	4EP03.1	Demonstrate the fundamental concepts of automatic Control and mathematical modeling of the Systems.
	4EP03.2	Determine the transfer function of control system components.
	4EP03.3	Analyze the time response of various systems and performance of controllers.
	4EP03.4	Evaluate the stability of linear systems using various methods.
Numerical methods & optimization techniques	4EP04.1	Solve linear and Simultaneous Equations with the help of Numerical Methods.
	4EP04.2	Apply various Numerical methods to fit the curve.
	4EP04.3	Solve Numerical differentiation, integration, and Differential Equations.
	4EP04.4	Solve linear, non linear and dynamic optimization problem by various methods.
	4EP04.5	Determine the optimum scheduling by using CPM and PERT.
Analog and digital circuits	4EP05.1	Explain the principles of operational amplifiers, parameters of op-amp
	4EP05.2	Illustrate the linear and nonlinear applications of op-amp
	4EP05.3	Demonstrate the knowledge of Voltage regulator and Timer ICs
	4EP05.4	Describe the working of Logic families and their applications.
	4EP05.5	Demonstrate the knowledge of combinational and sequential circuits and its application
Power system I	5EP01.1	Determine the parameters of transmission lines.
	5EP01.2	Evaluate the performance of transmission line
	5EP01.3	Describe transmission lines voltage control and power factor improvement methods.
	5EP01.4	Explain representation of power system, Ferranti effect and corona phenomenon.
	5EP01.5	Demonstrate various Insulators , its string efficiency & underground cables
Microprocessor and Microcontroller	5EP02.1	Recite Fundamentals and Architecture of Microprocessor 8085
	5EP02.2	Interpret Assembly Language Programming of Microprocessor 8085
	5EP02.3	Illustrate interfacing of programmable devices with Microprocessor 8085
	5EP02.4	Apply knowledge of Microprocessor 8085 for measurement of Electrical quantities

Course	CO	Statements
	5EP02.5	Discuss Fundamentals and Architecture of Microprocessor 8086
	5EP02.6	Explain Fundamentals and Architecture of Microcontroller 8051
Electrical Machine- II	5EP03.1	Design the Armature windings for AC machines.
	5EP03.2	Demonstrate the construction, working operation & performance characteristics of synchronous machine.
	5EP03.3	Explain the effects of excitation and mechanical input on the operation of synchronous machines.
	5EP03.4	Describe the construction, working operation & performance characteristics of three phase & Single-phase Induction motor.
	5EP03.5	Analyze the starting, braking and speed control of three phase induction motors by various methods.
	5EP03.6	Explain the construction & working of special motors.
Professional Elective-II Signal and System	5EP04.1	Demonstrate knowledge of continuous-time and discrete-time signals and systems.
	5EP04.2	Analyze the continuous-time systems using continuous Time Fourier transform.
	5EP04.3	Explain the concept of sampling, the Sampling Theorem, aliasing and the Nyquist rate.
	5EP04.4	Analyze DT systems & their realization using Z-transforms.
	5EP04.5	Analyze the discrete time systems using DTFT and DFT
Open Elective-I Basics Of Building Construction	5CE05.1	To understand load bearing & frame structure with their foundations.
	5CE05.2	To recognize various types of construction material & its suitability.
	5CE05.3	To recognize the various levels in building & its need.
	5CE05.4	To know types of openings, doors, windows & other related fixtures.
	5CE05.5	To recognize types of rock & minerals & its construction properties .
	5CE05.6	To understand the basics concept of DPC, fireproof, soundproof & expansion joints in structure.
Open Elective-I Manufacturing Techniques	5ME05.1	Apply the knowledge of various manufacturing techniques & its applications in engineering.
	5ME05.2	Understand the knowledge of machining operations, sheet metal working & processes.
	5ME05.3	Student will show the ability to apply various joining methods in practice.
	5ME05.4	Student will exhibit the knowledge of powder metallurgy.
Power Electronics	6EP01.1	Explain the concepts and techniques used in power electronics
	6EP01.2	Apply the knowledge of series and parallel connection of SCRs in power control applications
	6EP01.3	Analyze various single phase and three phase power converter circuits
	6EP01.4	Analyze the operation single phase and three phase Inverter circuits
	6EP01.5	Analyze the operation of DC/DC and AC/AC converter circuits
	6EP01.6	Demonstrate the applications of power electronic circuits.
Electrical Energy Distribution and Utilization	6EP02.1	Demonstrate the knowledge of distribution substation
	6EP02.2	Compare different power distribution systems
	6EP02.3	Describe elements of distribution Automation system
	6EP02.4	Select proper electrical drive for industrial applications
	6EP02.5	Explain the working of electric traction system

Course	CO	Statements
	6EP02.6	Describe an illumination system & electric heating
Computer aided electrical	6EP03.1	Explain the Basics of Computer aided machine design & material selection.
	6EP03.2	Derive the design parameters of single & three phase transformer core.
	6EP03.3	Calculate the winding & cooling system parameters of the transformer
	6EP03.4	Determine the stator core dimensions of three phase Induction motor
	6EP03.5	Design the squirrel cage & wound type rotor for three phase Induction motor
Professional elective-II industrial electrical system	6EP04.1	Understand the electrical wiring systems for residential, commercial and industrial consumers, representing the systems with standard symbols and drawings, SLD.
	6EP04.2	Understand various components of industrial electrical systems.
	6EP04.3	Analyze and select the proper size of various electrical system components.
Open elective-II automobile engineering & e vehicle	6ME05.1	Understand the basics of Automobile Engineering & its components.
	6ME05.2	Analyze & develop about the cooling system & its function.
	6ME05.3	Understand basic concept of transmission system and types of gear box, basic concept of electrical system & ignition system.
	6ME05.4	Apply the knowledge of suspension & lubrication.
Power system - II	7EP01.1	Explain the basic Concept of Fault Analysis in Electrical systems.
	7EP01.2	Analyze the different types of symmetrical and Unsymmetrical Faults in Electric Power System.
	7EP01.3	Explain the concept of Power System Stability and synchronous machine parameter determination.
	7EP01.4	Analyze the steady state stability of system.
	7EP01.5	Assess transient state stability of two machine system.
Digital system processing	7EP02.1	Analyze the discrete time signals in time domain.
	7EP02.2	Analyze the discrete time systems using DTFT and DFT.
	7EP02.3	Apply the concept of Band pass sampling.
	7EP02.4	Design the structures of different types of digital filters.
	7EP02.5	Analyze the frequency response of various digital filters.
	7EP02.6	Apply the knowledge of multi-rate signal processing.
Entrepreneurship and project management	7EP03.1	Understand the concept of entrepreneurship and its role in economic development.
	7EP03.2	Compare the various business model and select the most suitable.
	7EP03.3	Identify & formulate the project report and Source of finance for a project.
	7EP03.4	Estimate the cost, time & resources for the project work.
Professional elective III-wind system and solar system	7EP04.1	Understand the energy scenario and the consequent growth of the power generation from renewable energy sources.
	7EP04.2	Understand the basic physics of wind and solar power generation.
	7EP04.3	Understand the power electronic interfaces for wind and solar generation.
	7EP04.4	Understand the issues related to the grid-integration of solar and wind energy systems.
	7EP05.1	Summarize distribution system planning and automation.

Course	CO	Statements
Professional elective – IV- distribution automation	7EP05.2	Select appropriate communication technology for SCADA applied to distribution automation.
	7EP05.3	Demonstrate the knowledge of substation automation.
	7EP05.4	Improve the voltage profile of distribution feeder using distribution automation.
	7EP05.5	Explain the concept of remote metering.
	7EP05.6	Choose the appropriate type of energy management.
Project & seminar	7EP06.1	Each one of the students will be assigned a Seminar Topic in the current and frontier areas.
	7EP06.2	The student has to conduct a detailed study/survey on the assigned topic and prepare a report.
	7EP06.3	The student will make an oral presentation followed by a brief question and answer session.
	7EP06.4	The Seminar (presentation and report) will be evaluated by an internal assessment committee for 50 marks.
Power system protection	8EP01.1	Explain the need, desirable features & main components of protection system.
	8EP01.2	Design the various protection scheme for transmission line
	8EP01.3	Develop the protection scheme for Alternator, Transformer, Motors & Busbar
	8EP01.4	Demonstrate the knowledge of static relays & Numerical relays
	8EP01.5	Select the proper type & rating of circuit breaker and fuses for various application.
Computer methodes in power system analysis	8EP02.1	Develop mathematical model to represent the power system components for computerized analysis.
	8EP02.2	Demonstrate the topology of electrical power system.
	8EP02.3	Formulate Zbus& Ybus by algorithm.
	8EP02.4	Analyze short circuit studies of electrical power system.
	8EP02.5	Analyze load flow studies of electrical power system.
	8EP02.6	Examine stability studies of electrical power system.
Professional elective-V- high voltage engineering	8EP03.1	Explain the breakdown mechanism in solid, liquid, and gaseous dielectrics.
	8EP03.2	Select an appropriate protective device to protect the power system against overvoltage's caused by internal and external causes.
	8EP03.3	Utilize different circuits used for the generation of high AC, DC, and impulse voltages.
	8EP03.4	Measure high AC, DC, and impulse voltages.
	8EP03.5	Test the insulation of various high voltage apparatus used in the power system.
Professional elective - VI- power quality	8EP04.1	Illustrate the concept, need, and standards of Power Quality.
	8EP04.2	Classify Power quality characteristics.
	8EP04.3	Select power conditioning device for mitigation of power quality problem.
	8EP04.4	Make use of measurement tools for power quality survey.
	8EP05.1	The objective of the project is to enable the students to work in groups of not more than six members in each group on a project involving analytical, experimental, design or combination of these in the area of Electrical Engineering.

Course	CO	Statements
Project & seminar	8EP05.2	Each project shall have a guide.
	8EP05.3	The student is required to do literature survey, formulate the problem and form a methodology of arriving at the solution of the problem.
	8EP05.4	On completion of the work, a project report should be prepared and submitted to the department.
	8EP05.5	The evaluation is based on continuous internal assessment by an internal assessment committee for 75 marks.
	8EP05.6	The university examination, which carries a total of 75 marks, will be a Viva Voce examination at the end of VIII Semester, conducted by a committee of one external examiner appointed by the University and one internal examiner/Guide.
Department of Applied Science and Humanities		
Engineering Mathematics I	1A1.1	Able to understand Rolle's Theorem and its applications to Engineering Problems.
	1A1.2	Able to understand maxima minima concept.
	1A1.3	Able to apply Demoiver's Theorem in various concepts of complex number.
	1A1.4	Able to solve differential equations of certain types that they might encounter in the same or higher semester.
Engineering Physics	1A2.1	At the end of the course the students would be exposed to fundamental, knowledge in: - Electromagnetic phenomena and wave propagation
	1A2.2	Interferometric techniques in metrology, communication.
	1A2.3	Application of quantum physics to optical & electrical phenomena.
	1A2.4	Application of lasers and Fiber Optics in Engineering and Technology.
	1A2.5	Conducting, superconducting and dielectric materials.
Engineering Mechanics	1A3.1	Compose and resolve the forces along with its effect.
	1A3.2	Apply principles of statics to the system of rigid bodies and analyse simple structures.
	1A3.3	Calculate frictional forces for simple contact, wedges and belt friction.
	1A3.4	Locate centroid and calculate moment of inertia.
	1A3.5	Calculate various kinematic quantities.
	1A3.6	Solve the problems using different kinetic equations related to direct and interconnected particles.
	1A3.7	Apply principle of conservation of momentum and laws of impact.
Computer Programming	1A4.1	To explain fundamental concepts of computer and computing.
	1A4.2	To test and execute the programs and correct syntax and logical errors.
	1A4.3	To implement conditional branching, iteration and recursion.
	1A4.4	To use arrays, pointers and structures to formulate algorithms and programs.
	1A4.5	To recognize various problem solving techniques and computer applications.
	1A4.6	To apply programming concepts to solve real life problems.
	1A5.1	To give students 'hands on experience' of craftsmanship.
	1A5.2	To make students familiar with different work trades.

Course	CO	Statements
Workshop Practice	1A5.3	To develop quality & safety consciousness amongst the students.
	1A5.4	To develop awareness of fire safety amongst the students.
	1A5.5	To develop respect towards labor work amongst the students.
	1A5.6	To develop skill sets for creating entities from primitive engineering materials
	1A5.7	To develop skill sets for establish in connections through wires and cables.
	1A5.8	This exercise also aims at inculcating respect for physical work and hard labor in addition to
Engineering Mathematics-II	1B1.1	The essential tool of matrices and linear Algebra in a comprehensive Manner.
	1B1.2	Evaluation of Integrals by Reduction Formulae, Gamma and Beta Function
	1B1.3	Use the tool of Fourier series for learning advanced engineering mathematics.
	1B1.4	Use new techniques DUIS to evaluate Integrals and Tracing of Curves
	1B1.5	The Mathematical tools needed in evaluating Multiple Integrals and their usage.
Engineering Chemistry	1B2.1	To provide the fundamental background required for industrial setups.
	1B2.2	To provide the exposure for conducting the experiments in view of engineering aspects.
	1B2.3	To provide the knowledge about properties of materials and their applications.
	1B2.4	To utilize the knowledge about polymer and engineering materials towards different applications
	1B2.5	To provide the knowledge about importance of fuels and lubricants
	1B2.6	To provide the knowledge about analytical techniques.
Basics Electrical Engineering	1B3.1	Explain the basic concepts of electric and magnetic circuits.
	1B3.2	The students will be able to solve problems on AC fundamentals & three phase circuits
	1B3.3	Explain the operating principles of various electrical machines and describe the working
Engineering Graphics	1B4.1	Students will able to read/prepare/understand the engineering drawings
	1B4.2	Students will able to create the projections and sectional views of 3D objects
	1B4.3	Students will able to draw the orthographic and isometric views of 3D objects
	1B4.4	Students will able to use graphics software to create Engineering drawings and represent engineering



Principal
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