

Narayana Engineering College::Nellore

Manual

Of

PO, PEOs', PSOs' and COs'

(AY: 2019-20)

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POs - (Program Outcomes)

PO_1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO_2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO_3	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO_4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO_5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO_6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO_7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO_8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO_9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO_10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO_11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO_12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Electronics & Communication Engineering

PROGRAMME EDUCATIONAL OBJECTIVES

After 3-5 years of graduation, the student will be able

1. **PEO1:** Attain professional excellence /gain higher degree to face challenges posed by industry and society.
2. **PEO2:** Address complex problems in a responsive and innovative manner.
3. **PEO3:** Gain reputation by functioning effectively to address social and ethical responsibilities.

PSOs - (Program Specific Outcomes) for E.C.E

PSO_1	Domain Specific Knowledge: Implement electronic systems related to Electronics Devices & Circuits, VLSI, Signal processing, Microcomputers, Embedded and Communication Systems to fulfill the solutions to real world challenges
PSO_2	Hardware Product Development: Apply the software and hardware tools in Analog and Digital Electronic circuit design to address complex Electronics and Communication engineering problems.

COURSE OUTCOMES

Year-SEM	Course Title	Course Code	Course Outcome ID	Course Outcome
Electronics and Communication Engineering				
II-I	Electrical Technology	15A02306	15A02306.1	Explain the construction, operation, types and characteristics of DC Generators
			15A02306.2	Describe the operation ,characteristics ,speed control , losses & efficiency of DC motors
			15A02306.3	Explain the construction ,operation , load conditions, regulation & efficiency of Transformers
			15A02306.4	Explain the constructional details and torque - slip characteristics of Three phase induction motors.
			15A02306.5	Summarize the constructional features and operation of synchronous machines
II-I	Probability Theory and Stochastic Process	15A04304	15A04304.1	Find probabilities by using an appropriate sample spaces
			15A04304.2	Compute statistical averages for two random variables using probability density and distribution functions
			15A04304.3	Explain Power Spectrum Density & Cross Power Spectrum density related to temporal characteristics.
			15A04304.4	Explain Power Spectrum Density & Cross Power Spectrum density related to spectral characteristics.
			15A04304.5	Apply the principles of a random process in system.
II-I	ELECTRONIC DEVICES & CIRCUITS	15A04301	15A04301 .1	Explain the operating principles of P-N Diode & special purpose electronic devices.
			15A04301 .2	Illustrate the working principle of rectifiers & filters
			15A04301 .3	Explain the principles of transistors.
			15A04301 .4	Analyze the biasing techniques of BJT and FET
			15A04301 .5	Analyze BJT & FET amplifier circuits using small signal model.
II-I	Signals & Systems	15A04303	15A04303.1	Explain signals, systems and Fourier Series for Continuous time signals.
			15A04303.2	Apply Fourier transform and Sampling Theorem for Continuous time signals .
			15A04303.3	Find the response of LTI systems.
			15A04303.4	Apply DTFT for various discrete time signals.
			15A04303.5	Apply Laplace and Z-transform for continuous and discrete time systems.
II-I	Switching Theory and Logic Design	15A04302	15A04302.1	Translate the numeric information in to different forms.
			15A04302.2	Apply K-Map and Tabular methods to minimize Boolean functions

Year-SEM	Course Title	Course Code	Course Outcome ID	Course Outcome
			15A04302.3	Make use of standard combinational functions to build complex digital circuits.
			15A04302.4	Make use of standard sequential functions to build complex digital circuits.
			15A04302.5	Explain programmable logic devices.
II-I	CONTROL SYSTEMS ENGINEERING	15A02303	15A02303.1	Describe transfer function for various systems
			15A02303.2	Explain the Time-domain responses of first and second-order systems
			15A02303.3	Describe stability of a closed-loop control system by RH Criterion & Root Locus.
			15A02303.4	Explain the methods of frequency responses for stability.
			15A02303.5	Outline the system equations in state-variable form.
II-II	ELECTROMAGNETIC THEORY & TRANSMISSION LINES	15A04403	15A04403.1	Apply the Coulomb's law and Gauss law to different charge distributions
			15A04403.2	Apply Biot-Savart Law, Ampere's Circuit law to static current distributions
			15A04403.3	Determine electric and magnetic fields.
			15A04403.4	Describe the Characteristics of EM Wave.
			15A04403.5	Explain the transmission lines and their applications
II-II	ANALOG COMMUNICATION SYSTEMS	15A04402	15A04402.1	Explain the analog communication systems.
			15A04402.2	Explain the analog modulated and demodulated systems
			15A04402.3	Describe the effect of noise on the performance of communication
			15A04402.4	Explain modulators and demodulators
			15A04402.5	Explain information theory and encoding techniques.
II-II	DATA STRUCTURES	15A05201	15A05201.1	Explain asymptotic notations and linked lists.
			15A05201.1	Implement linear and non-linear data structures.
			15A05201.1	Explain trees and graphs.
			15A05201.1	Explain sorting techniques.
			15A05201.1	Explain operations on data structures.
II-II	ELECTRONIC CIRCUIT ANALYSIS	15A04401	15A04401.1	Explain the working principle of feedback amplifiers and oscillators.
			15A04401.2	Explain frequency response of amplifiers

Year-SEM	Course Title	Course Code	Course Outcome ID	Course Outcome
			15A04401.3	Derive the parameters of multi stage amplifiers
			15A04401.4	Find the parameters of various power amplifiers
			15A04401.5	Describe Tuned amplifiers
II-II	MATHEMATICS - IV	15A54401	15A54401.1	Derive improper integrals of differential equations.
			15A4401.2	Derive series solution of differential equations.
			15A4401.3	Apply variable techniques to systems.
			15A4401.4	Find Line integral of complex valued function and region of convergence.
			15A4401.5	Determine Zeros, poles residues of systems.
III-I	DIGITAL SYSTEM DESIGN	15A04504	15A04504.1	Construct different CMOS Logic circuits.
			15A04504.2	Model digital logic circuits using hardware description languages.
			15A04504.3	Construct Combinational Digital System using basic IC structures
			15A04504.4	Model sequential circuits using VHDL.
			15A04504.5	Write VHDL programs of Sequential logic integrated circuits.
III-I	DIGITAL COMMUNICATION SYSTEMS	15A04502	15A04502.1	Explain DCS and sampling theorem.
			15A04502.2	Analyse the performance of base band digital modulation and demodulation techniques.
			15A04503.3	Explain signal space analysis.
			15A04504.4	Explain Pass band digital modulation and demodulation techniques.
			15A04505.5	Apply digital communication coding techniques.
III-I	LINEAR IC APPLICATIONS	15A04503	15A04503.1	Explain Operational amplifier configurations.
			15A04503.2	Describe the feedback configurations, frequency response and compensation techniques.
			15A04503.3	Explain the applications AC , DC amplifiers and active filters
			15A04503.4	Analyze different waveform generators.
			15A04503.5	Explain DAC, ADC techniques and specifications.
III-I	MEMS& MICROSYSTEMS	15A04506	15A04506.1	Explain MEMs devices.
			15A04506.2	Illustrate fabrication techniques for MEMS

Year-SEM	Course Title	Course Code	Course Outcome ID	Course Outcome
			15A04506.3	Explain Microelectronic technology for MEMS micro sensors
			15A04506.4	Apply processing techniques for MEMS accelerometers
			15A04506.5	Describe MEMS in various fields.
III-I	computer Organization	15A05402	15A05402.1	Explain the organization of computer, different instruction formats and addressing modes.
			15A05402.2	Illustrate registers and arithmetic logic shift operations.
			15A05402.3	Explain multiplication and division algorithms.
			15A05402.4	Describe memory hierarchy and modes of data transfer.
			15A05402.5	Explain pipelining and inter connection structures of multi processors.
VI-I	Radar Systems	15A04705	15A04705.1	Explain the principles of operation of radar systems
			15A04705.2	Describe the design of radar signals and FM radar
			15A04705.3	Explain the performance of MTI radar systems & Its Applications
			15A04705.4	Analyse the performance of simple tracking radar systems
			15A04705.5	Apply the design equations to phased array antennas.
III-I	ANTENNAS & WAVE PROPAGATION	15A04501	15A04501-1	Explain different parameters to measure the performance of antennas.
			15A04501.2	Explain the VHF, UHF and Microwave Antennas-I operating at different frequencies.
			15A04501.3	Describe the VHF, UHF and Microwave Antennas-II operating at different frequencies.
			15A04501.4	Explain pattern multiplication principle for array antennas and techniques to measure the parameters.
			15A04501.5	Explain EM wave propagation through different layers of atmosphere.
III-II	VLSI DESIGN	15A04604	15A04604.1	Summarize VLSI technology.
			15A04604.2	Draw stick diagrams and layouts of logic circuits.
			15A04604.3	Design digital logics using different logics.
			15A04604.4	Explain various styles for designing subsystems.
			15A04604.5	Explain VHDL Synthesis and simulation.
III-II	Electronic Measurements & Instrumentation	15A04602	15A04602.1	Explain the principles involved in the Electronic meters.
			15A04602.2	Describe the operation of CRO.

Year-SEM	Course Title	Course Code	Course Outcome ID	Course Outcome
			15A04602.3	Measure pasive parameters using ac & dc bridges.
			15A04602.4	Explain the working of function generator, wave analyzers, logic analyzers and spectrum analyzers.
			15A04602.5	Explain the principle of transduction for measuring non-electrical quantities.
III-II	Digital Signal Processing	15A04603	15A04603.1	Find time response and frequency response of Discrete Fourier Transforms.
			15A04603.2	Compute Fast Fourier Transform Algorithms.
			15A04603.3	Explain the realization techniques of FIR&IIR filters.
			15A04603.4	Construct FIR filters and IIR filters.
			15A04603.5	Explain Multi rate Digital Signal Processing
III-II	micro processors amd micro controllers	15A04601	15A04601.1	Explain the architecture and memory system of 8086 processor
			15A04601.2	Explain the Instruction formats and addressing modes 8086 processor
			15A04601.3	Describe the features,architecture,addressing modes and instruction set of MSP 430
			15A04601.4	Explain the modes of MSP 430
			15A04601.5	Explain serial communication interfaces used with MSP 430
III-II	MATLAB PROGRAMMING	15A04603	15A04603 .1	Explain the matlab interactive programming environment with different windows.
			15A04603 .2	Apply basic knowledge to define,represent and process arrays and vectors.
			15A04603 .3	Describe the usage of inbuilt and user defined functions with good knowledge of data handling with files.
			15A04603 .4	Explain various programing constructs and variables along with data plotting commands.
			15A04603 .5	Solve the linear system of equations with various methods using Matlab Program.
III-II	MEFA	15A52301	15A52301.1	Outline the scope of Managerial Economics prediction of demand of products and services by using different methods.
			15A52301.2	Explain production functions and Break Even Point.
			15A52301.3	Summarize the business organizations, market structure, behavior of consumer and producer under competitive market situations.
			15A52301.4	Outline the sources of raising capital by business undertaking, process & principles of accounting.
			15A52301.5	Analyze the financial statements of a business enterprise by using liquidity leverage, coverage and turnover & profitability ratios.
IV-I	EMBEDDED SYSTEMS	15A04702	15A04702.1	Explain the Embedded Systems design process.

Year-SEM	Course Title	Course Code	Course Outcome ID	Course Outcome
			15A04702.2	Explain the architectures of ARM Processor and TM4C microcontrollers.
			15A04702.3	Explain hardware-interfacing concept for I/O Devices and Design metrics
			15A04702.4	Explain the modules of TM4C Microcontroller
			15A04702.5	Make use of Serial Communication Interfaces, Embedded Networking and IoT for embedded applications.
IV-I	Digital Image Processing	15A04708	15A04708.1	Relate Image processing for various fields of engineering.
			15A04708.2	Analyse images in the frequency domain using various transforms.
			15A04708.3	Apply the image processing techniques for image enhancement
			15A04708.4	Explain image restoration, image segmentation techniques.
			15A04708.5	Describe various image compression techniques and standards
IV-I	Optical Fiber Communication	15A04701	15A04701 .1	Explain the optical fiber communication system.
			15A04701 .2	Describe the mechanisms of signal degradation in optical fiber cables.
			15A04701 .3	Explain the constructional structure and operational characteristics of optical transmitters and power couplers.
			15A04701 .4	Explain the constructional structure and operational characteristics of optical receivers.
			15A04701 .5	Design an OFC system for given specifications.
IV-I	Data Communications and Networking	15A04704	C0.15A04704.1	Explain the fundamental of data communications and networking Layers
			15A04704.2	Explain data-link layer, its protocols and techniques.
			15A04704.3	Describe Media, Multiple Access Techniques & LANs
			15A04704.4	Explain the design issues and routing algorithms in network layer.
			15A04704.5	Outline the strategies for securing network applications
IV-I	MICROWAVE ENGINEERING	15A04703	15A04703.1	Explain Microwave Transmission phenomenon.
			15A04703.2	Determine Wave parameters relevant to Microwave transmissions in Waveguides.
			15A04703.3	Explain Principle of operation of Passive Microwave Components
			15A04703.4	Explain Principle of operation Active Microwave Devices
			15A04703.5	Determine Microwave measurements
IV-II	RFIC	13A04804	13A04804.1	Explain the architecture of RF system.

Year-SEM	Course Title	Course Code	Course Outcome ID	Course Outcome
			13A04804.2	Analyze MOSFET Amplifier for RF IC design
			13A04804.3	Describe RF receiver front end systems for wireless communication.
			13A04804.4	Describe RF power amplifiers, VCO and PLL.
			13A04804.5	Outline Modern RF transceiver architectures.
IV-II	pattern recognition and applications	13A04805	13A04805.1	Summarize the various techniques in pattern recognition.
			13A04805.2	Classify the Statistical Pattern recognition techniques.
			13A04805.3	Summarize the dimensionality problem and non-parametric pattern classification.
			13A04805.4	Describe linear discriminant functions and Neural Pattern recognition techniques.
			13A04805.5	Apply Maximum-likelihood parameter estimation.
IV-II	A3G&4G	13A04802	13A04802.1	Explain the terminology and concepts of wireless communications.
			13A04802.2	Explain channel modeling and cellular communications.
			13A04802.3	Describe multiple-access techniques for wireless communications.
			13A04802.4	Explain MIMO and UWB
			13A04802.5	Summarize the 3G and 4G wireless standards.

Computer Science and Engineering

Program Educational Objectives

- PEO 1: Procure gainful employment/progress toward higher degree and practice successfully in the CS/IT profession
- PEO 2: Gain respect and trust of others as effective and ethical team member by demonstrating professionalism and functioning effectively in team-orientated and open-ended activities in industry, business and society.
- PEO 3: Be considered as a resource by adapting to rapidly changing IT technologies to address complex problems

PSOs - (Program Specific Outcomes) for C.S.E

PSO_1	Domain Specific Knowledge: Apply the relevant techniques to develop solutions in the domains of algorithms, system software, computer programming, multimedia, web, data and networking.
PSO_2	Software Product Development: Apply the design and deployment principles to deliver a quality software product for the success of business of varying complexity.

COs - (Course Outcomes)

Year-SEM	Course Title	Course Code	Course Outcome ID	Course Outcome
Computer Science and Engineering				
II-I	DISCRETE MATHEMATICS	15A05302	15A05302.1	Translate the statements from common language to formal logic.
			15A05302.2	Find solutions using relations and set theory in the fields of computer science.
			15A05302.3	Translate algebraic system into algebraic structures .
			15A05302.4	Relate graph theory and trees to the fields of computer science
			15A05302.5	Find solutions using principles of counting, inclusion, exclusion and generating functions.
II-I	DATABASE MANAGEMENT SYSTEMS	15A05101	15A05101.1	Outline the database technologies and database design.
			15A05101.2	Illustrate relational algebra statements, SQL commands and querying data in relational DBMS.
			15A05101.3	Design a normalized database schema for a given problem using functional dependencies and normal forms.
			15A05101.4	Explain the implementation of acid properties on transactions and recovery techniques.
			15A05101.5	Explain different file organizations, storage structures and indexing methods.
II-I	BASIC ELECTRICAL ENGINEERING	15A99301	15A99301.1	Explain the circuit laws & Network reduction techniques.
			15A99301.2	Describe the principle, working, construction and types of DC Machines
			15A99301.3	Describe the principle, working, construction and types of AC Machines
			15A99301.4	Outline the operating principles of major electronic devices and the working principle of rectifiers & filters
			15A99301.5	Explain the operating principles of Transistor, its characteristics and applications.
			15A99301.6	Summarize operating principles of oscillators and OP Amps.
II-I	DIGITAL LOGIC DESIGN	15A04206	15A04206.1	Explain number systems & Boolean Algebra.
			15A04206.2	Apply theorems and postulates of Boolean algebra to minimize boolean expressions .

Year-SEM	Course Title	Course Code	Course Outcome ID	Course Outcome
			15A04206.3	Use standard combinational circuits to build complex digital circuits.
			15A04206.4	Use sequential circuits to build complex digital circuits.
			15A04206.5	Explain programmable logic devices.
II-I	MATHEMATICS III	15A54301	15A54301.1	Solve linear systems of equations.
			15A54301.2	Relate Algebraic and Transcendental Equations to engineering problems.
			15A54301.3	Calculate the intermediate value of intervals.
			15A54301.4	Describe forecasting methods.
			15A54301.5	Find numerical values for engineering applications using differential equations.
II-I	MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS	15A52301	15A52301.1	Outline the scope of Managerial Economics prediction of demand of products and services by using different methods.
			15A52301.2	Explain production functions and Break Even Point.
			15A52301.3	Summarize the business organizations, market structure, behavior of consumer and producer under competitive market situations.
			15A52301.4	Outline the sources of raising capital by business undertaking, process & principles of accounting.
			15A52301.5	Analyze the financial statements of a business enterprise by using liquidity leverage, coverage and turnover & profitability ratios.
II-II	Probability and Statistics	15A54401	15A54401.1	Solve the probability distributions.
			15A54401.2	Develop the statistical inferences using large samples.
			15A54401.3	Develop the statistical inferences using small samples.
			15A54401.4	Find the statistical quality control by using Mean, R, p and C charts
			15A54401.5	Find M/M/1, M/M/S solutions using queuing theory.
II-II	Software Engineering	15A05401	15A05401.1	Explain the process methodology for developing a quality software.
			15A05401.2	Sketch the requirement analysis model for a project using modeling diagrams.
			15A05401.3	Apply the standard design principles and architectural styles for given requirements.
			15A05401.4	Explain the Golden rules for developing the user interface.
			15A05401.5	Explain testing techniques for error identification and correction.

Year-SEM	Course Title	Course Code	Course Outcome ID	Course Outcome
II-II	Computer Organization	15A05402	15A05402.1	Explain the organization of computer, different instruction formats and addressing modes.
			15A05402.2	Illustrate the working of arithmetic operations and execution of instructions in a computer
			15A05402.3	Explain the types of memory, performance and memory management.
			15A05402.4	Explain I/O operations and the hardware details associated with buses and I/O interfaces
			15A05402.5	Classify substantiation, pipelining hazards, parallel structures, and interconnection network
II-II	Microprocessors & Interfacing	15A04407	15A04704.1	Define the terminology of Microprocessor systems.
			15A04704.2	Explain ALP Programs using the addressing modes of 8086.
			15A04704.3	Describe the Memory, Input and Output interfacing with 8086.
			15A04704.4	Explain the interfacing of the Programmable Devices for 8086 systems.
			15A04704.5	Explain 8051 microcontroller.
II-II	Object Oriented Programming using Java	15A05403	15A05403.1	Explain data types, variables and arrays.
			15A05403.2	Explain operators, control structures and classes.
			15A05403.3	Write programs using inheritance and packages for given requirements.
			15A05403.4	Develop programs using multithreading and applets for given requirements.
			15A05403.5	Build valid Awt controls, graphics using text, menus and layout managers.
II-II	FORMAL LANGUAGES AND AUTOMATA THEORY	15A05404	15A05404.1	Explain finite State Systems and finite automata.
			15A05404.2	Design finite automata, regular languages for given regular expressions.
			15A05404.3	Design context free grammars and languages for given expressions and their normal forms.
			15A05404.4	Design push down automata for context free grammar expressions.
			15A05404.5	Design Turing Machines for recursively enumerable languages.
III-I	OPERATING SYSTEM	15A05503	15A05703.1	Explain the structure of Operating System.
			15A05703.2	Explain the scheduling algorithms.
			15A05703.3	Explain the process of organizing the pages in memory using memory management techniques and handling deadlocks
			15A05703.4	Explain storage structure and file management.

Year-SEM	Course Title	Course Code	Course Outcome ID	Course Outcome
			15A05703.5	Describe I/O systems, protection and security issues.
III-I	COMPUTER NETWORKS	15A05502	15A05502.1	Explain OSI and TCP/IP reference models, network devices and their functions.
			15A05502.2	Explain data link layer protocols and their services.
			15A05502.3	Describe the protocols of network layer and routing algorithms.
			15A05502.4	Explain the principles of transport layer protocols.
			15A05502.5	Explain application layer protocols.
III-I	INTRODUCTION TO BIG DATA	15A05506	15A05506.1	Explain Distribute programming in Java.
			15A05506.2	Explain Hadoop with MapReduce.
			15A05506.3	Develop distribute file system in Hadoop Framework.
			15A05506.4	Write Map Reduce programs in Hadoop.
			15A05506.5	Describe Mahout.
III-I	PRINCIPLES OF PROGRAMMING LANGUAGES	15A05504	15A05504.1	Explain Software Development Process and features of Programming Languages.
			15A05504.2	Classify Data types, Type systems and type structures of representative programming languages.
			15A05504.3	Illustrate iterative and selection statements, routines, exceptions and Program structure.
			15A05504.4	Relate object oriented principles to representative programming languages
			15A05504.5	Compare the features of functional programming , logicbased and rulebased Languages.
III-I	OBJECT ORIENTED ANALYSIS AND DESIGN	15A05503	15A05503.1	Explain structure of complex software systems.
			15A05503.2	Describe classes and objects.
			15A05503.3	Explain models and UML architecture.
			15A05503.4	Draw structural UML models for given specifications.
			15A05503.5	Draw behavioural UML models for given specifications.
III-I	SOFTWARE TESTING	15A05505	15A05505.1	Explain testing procedures.
			15A05505.2	Compare Transaction Flow & Dataflow testing.
			15A05505.3	Explain types of domains and their testing.

Year-SEM	Course Title	Course Code	Course Outcome ID	Course Outcome
			15A05505.4	Summarize paths, regular expressions and logic based testing.
			15A05505.5	Explain state, state graphs, transition Testing and graph matrices.
III-II	Compiler Design	15A05601	15A05601.1	Explain the structure of language processor and lexical analysis.
			15A05601.2	Parse grammars using parsing methods.
			15A05601.3	Explain semantic analysis and intermediate code generation using various forms.
			15A05601.4	Describe storage allocation and symbol table generation.
			15A05601.5	Optimize the generated target code using optimization techniques.
III-II	Data Warehousing & Mining	15A05602	15A05602.1	Explain data mining, data ware housing and its functionality.
			15A05602.2	Describe OLAP technology for data mining and dimensional models for data warehouse.
			15A05602.3	Apply OLAP operations for analyzing the market needs.
			15A05602.4	Identify the patterns that can be extracted on application of data mining techniques in various domains
			15A05602.5	Explain various data mining techniques to identify patterns that evolve in various business domains
III-II	Design Patterns	15A05603	15A05603.1	Use design patterns for design problems.
			15A05603.2	Explain the process of creational patterns.
			15A05603.3	Describe structural patterns to solve design problems.
			15A05603.4	Explain behavioral patterns.
			15A05603.5	Identify the context in which the pattern can be applied.
III-II	Design and Analysis of Algorithms	15A05604	15A05604.1	Explain the complexity of Algorithms and Divide and Conquer method
			15A05604.2	Apply Greedy Method & Dynamic Programming techniques for solving dynamic problems.
			15A05604.3	Describe graph traversal and Backtracking techniques.
			15A05604.4	Explain branch & bound techniques for analysing algorithms.
			15A05604.5	Show that certain problems are NPComplete.
III-II	Web and Internet Technologies	15A05605	15A05605.1	Develop HTML documents with a variety of web page elements.
			15A05605.2	Develop dynamic webpages using java script.

Year-SEM	Course Title	Course Code	Course Outcome ID	Course Outcome
			15A05605.3	Construct server side programming with PHP using session and cookies.
			15A05605.4	Define the XSL transform and XML document using DOM API.
			15A05605.5	Explain the WSDL and SOAP documents using AJAX.
III-II	Linux Environment System	15A05607	15A05607.1	Compare Linux operating system with other operating systems.
			15A05607.2	Explain the procedure to configure Linux as a Server.
			15A05607.3	Manage users by installing different packages.
			15A05607.4	Describe shell and booting.
			15A05607.5	Explain file system, Core operating services and printing service.
IV-I	MANAGEMENT SCIENCE	15A52601	15A52601.1	Describe the functions of management, motivational theories, leadership styles, organizational structures.
			15A52601.2	Explain operations management, inventory management and marketing.
			15A52601.3	Explain human resource planning followed in organizations.
			15A52601.4	Explain strategic management and project management network.
			15A52601.5	Describe the contemporary management practices.
IV-I	GRID AND CLOUD COMPUTING	15A05701	15A05701.1	Explain Grid and Cloud Architectures.
			15A05701.2	Describe data intensive grid service models and grid computing
			15A05701.3	Summarize virtualization in cloud.
			15A05701.4	Configure programming model for Hadoop and globus toolkit
			15A05701.5	Explain security models in the grid and cloud environment
IV-I	INFORMATION SECURITY	15A05702	15A05702.1	Explain computer security, encryption and decryption techniques.
			15A05702.2	Relate number theory for resolving security issues.
			15A05702.3	Explain cryptographic algorithms.
			15A05702.4	Explain key management, user authentication and mail security.
			15A05702.5	Describe attacks and security mechanisms at transport layer.
IV-I	MOBILE APPLICATION DEVELOPMENT	15A05703	15A05703.1	Set up the development environment to run Android Applications.
			15A05703.2	Develop Android applications using Android components.

Year-SEM	Course Title	Course Code	Course Outcome ID	Course Outcome
			15A05703.3	Design Android applications using layouts, resources and media.
			15A05703.4	Develop Android applications using controls, dialogs and fragments.
			15A05703.5	Build android applications using menus, database storage SMS and email communication.
IV-I	SOFTWARE ARCHITECTURE	15A05704	15A05704.1	Describe software architectural styles.
			15A05704.2	Explain the designing of architecture with styles.
			15A05704.3	Interpret various Quality Attributes, Functional attributes and types of tactics for creating an architecture.
			15A05704.4	Review documents for the software architectures and their views.
			15A05704.5	Analyze the architectures using ATAM and CABM methods.
IV-I	SOFTWARE PROJECT MANAGEMENT	15A05707	15A05707.1	Explain the Conventional Software Management and software economics.
			15A05707.2	Show how to improve the various parameters of software economics.
			15A05707.3	Explain various artifacts of products in life cycle phases.
			15A05707.4	Explain work flow processes, project organization responsibilities and process automation.
			15A05707.5	Explain Project Control, Process instrumentation and Future Software Project Management
IV-II	MOBILE COMPUTING	13A05801	13A05801.1	Explain Wireless LANS, standards of PANS and Components of Wireless Internet
			13A05801.2	Outline the Issues in Ad Hoc Wireless Networks and design goals of a MAC protocol for Ad Hoc Wireless Networks
			13A05801.3	Summarize the Issues in Designing a Routing Protocol, Transport Layer Protocol and Security in Ad Hoc Wireless Networks
			13A05801.4	Summarize the Issues and Challenges in Providing Quality of Service and need for Energy Management in Ad Hoc Wireless Networks
			13A05801.5	Describe the Architecture, Protocols and evolving standards of wireless sensor networks
IV-II	REAL TIME SYSTEMS	13A05804	13A05804.1	Explain real time systems, reference model and approaches for real time scheduling.
			13A05804.2	Describe scheduling techniques for real time systems.
			13A05804.3	Explain Priority-Driven Scheduling of periodic Tasks in real time systems
			13A05804.4	Explain priority driven systems for scheduling jobs.
			13A05804.5	Summarize resource access control and multi processor scheduling.

Year-SEM	Course Title	Course Code	Course Outcome ID	Course Outcome
IV-II	Python Programming	13A05806	13A05806.1	Explain the integrals of python language.
			13A05806.2	Make use of operators, expressions and data structures in python.
			13A05806.3	Make use of control statements and functions in python.
			13A05806.4	Male use of modules, packeges and object oriented concepts in python language
			13A05806.5	Write programs using standard libraries.

Electrical & Electronics Engineering

Programme Educational Objectives (PEOs)

The educational objectives of Electrical and Electronics Engineering are:

- **PEO1:** To provide sound foundation in mathematical, scientific and engineering fundamentals, necessary to analyze, formulate and solve engineering problems.
- **PEO2:** To provide thorough knowledge in Electrical and Electronics Engineering subjects including theoretical knowledge and practical training for preparing physical models.
- **PEO3:** To enhance the communication skills and soft skills of the students by conducting sessions on verbal & arithmetic reasoning, comprehension, team building, inter- personal relationship, group discussions etc for obtaining placements.

PSOs - (Program Specific Outcomes) for E.E.E

PSO_1	Provide alternate solutions to address the problems with specific requirements in the field of Electrical Engineering.
PSO_2	be ready to work professionally in relevant industries like power systems, control systems and software industries

COURSE OUTCOMES

Year-SEM	Course Title	Course Code	Course Outcome ID	Course Outcome
Electrical and Electronics Engineering				
II-I	CONTROL SYSTEMS ENGINEERING	15A02303	15A02303.1	Describe transfer function for various systems
			15A02303.2	Explain the Time-domain responses of first and second-order systems
			15A02303.3	Describe stability of a closed-loop control system by RH Criterion & Root Locus.
			15A02303.4	Explain the methods of frequency responses for stability.
			15A02303.5	Outline the system equations in state-variable form.
II-I	ELECTRICAL MACHINES-I	15A02302	15A02302.1	Explain Electromagnetic fields, single and multi excited systems.
			15A02302.2	Describe the principle, working and construction of DC Generators.
			15A02302.3	Explain the characteristics and applications of DC Generators.
			15A02302.4	Describe the principle, working ,construction, characteristics and applications of DC Motors.
			15A02302.5	Explain the testing methods of motors.
II-I	Electronic Devices & Circuits	15A04301	15A04301.1	Explain the operating principles of P-N Diode, special purpose electronic devices and its characteristics
			15A04301.2	Illustrate the working principle of rectifiers and filters.
			15A04301.3	Explain operating principles of transistors and its characteristics
			15A04301.4	Describe the biasing techniques of BJT and FET
			15A04301.5	Outline BJT & FET amplifier circuits using small signal model.
II-I	ELECTRICAL CIRCUITS-2	15A02301	15A02301.1	Explain three phase balanced and unbalanced electrical circuits
			15A02301.2	Find the active and reactive power consumed by a given three phase circuit.
			15A02301.3	Find the transient response of R-L, R-C, R-L-C circuits for d.c and a.c excitations
			15A02301.4	Solve the electrical circuits using Fourier transforms.
			15A02301.5	Design types of filters.
II-I	DATA STRUCTURES	15A05201	15A05201.1	Explain arrays , linked lists, operations and their applications.

Year-SEM	Course Title	Course Code	Course Outcome ID	Course Outcome
			15A05201.2	Outline stack, Queue and its representation methods.
			15A05201.3	Explain trees, Graphs and their applications.
			15A05201.4	Differentiate internal and external sorting methods along with their time complexities.
			15A05201.5	Describe searching methods and their time complexities.
II-I	MATHEMATICS III	15A54301	15A54301.1	Relate matrices to engineering problems.
			15A54301.2	Solve the algebraic, transcendental equations and system of linear equations.
			15A54301.3	Estimate the intermediate value through interpolation methods.
			15A54301.4	Estimate the future values through curve fitting and finding the residuals.
			15A54301.5	Solve the ordinary differential equations by using iterative methods.
II-II	ELECTRICAL MACHINES-II	15A02401	15A02401.1	Describe the operation, construction, types and equivalent circuit of a single phase transformer.
			15A02401.2	Determine the regulation and efficiency of a transformer using O.C and S.C tests.
			15A02401.3	Explain the load shared by each transformer when several transformers operate in parallel.
			15A02401.4	Determine the performance characteristics of a three phase Induction motor using circle diagram.
			15A02401.5	Determine the starting torque, maximum torque, slip at maximum torque of three phase induction motor.
II-II	Electro Magnetic Fields	15A02403	15A02403.1	Determine the electric field intensity and potentials for different charge distributions.
			15A02403.2	Explain the behavior of conductors and dielectrics in an electric field & determine the capacitance associated with simple distributions of charge
			15A02403.3	Derive the magnetic field intensity for different current distributions using Biot-savat's law and Ampere circuital law.
			15A02403.4	Derive the magnetic potential for differnt current distributions
			15A02403.5	Derive Maxwell's equations in integral and differential forms to time-varying fields.
II-II	Electrical Power Generating Systems	15A02402	15A02402.1	Describe thermal power plant.
			15A02402.2	summarize the operation of hydro and nuclear power plants
			15A02402.3	outline the operation of Solar & Wind Energy Systems
			15A02402.4	Explain the operation of biomass, geothermal and ocean energy systems
			15A02402.5	Describe the economics of power generation and power tariff

Year-SEM	Course Title	Course Code	Course Outcome ID	Course Outcome
II-II	Analog Electronic Circuits	15A04409	15A04409.1	Describe BJT and FET RC coupled amplifier with frequency response.
			15A04409.2	Illustrate negative feedback amplifiers.
			15A04409.3	Explain the condition for oscillations in different oscillators.
			15A04409.4	Design power amplifiers for given specifications.
			15A04409.5	Explain Linear wave shaping circuits and multivibrators.
II-II	MATHEMATICS - IV	15A54402	15A54402.1	Derive improper integrals of differential equations.
			15A54402.2	Derive series solution of differential equations.
			15A54402.3	Apply variable techniques to systems.
			15A54402.3	Find Line integral of complex valued function and region of convergence.
			15A54402.5	Determine Zeros, poles residues of systems.
II-II	MEFA	15A52301	15A52301.1	Outline the scope of Managerial Economics prediction of demand of products and services by using different methods.
			15A52301.2	Explain production functions and Break Even Point.
			15A52301.3	Summarize the business organizations, market structure, behavior of consumer and producer under competitive market situations.
			15A52301.4	Outline the sources of raising capital by business undertaking, process & principles of accounting.
			15A52301.5	Analyze the financial statements of a business enterprise by using liquidity leverage, coverage and turnover & profitability ratios.
III-I	Electrical Power Transmission System	15A02502	15A02502.1	Find the transmission line parameters
			15A02502.2	Calculate the transmission line parameters for given model.
			15A02502.3	Estimate the performance of a given transmission lines
			15A02502.4	Find the effect of over voltages on transmission lines
			15A02502.5	Explain the construction, types,grading and performance of underground cables
III-I	Electrical Machines-III	15A02504	15A02504.1	Explain the principle of operation, types and windings in Synchronous Generator.
			15A02504.2	Predetermine the regulation of synchronous generators using different methods
			15A02504.3	Explain the parallel operation of synchronous generators.

Year-SEM	Course Title	Course Code	Course Outcome ID	Course Outcome
			15A02504.4	Explain the operation, power factor improvement and hunting methods of synchronous motor.
			15A02504.5	Choose specific 1-phase motor and special motors for a given application.
III-I	NETWORKS, SIGNALS & SYSTEMS	15A02505	15A02505.1	Find the equivalent resistance for series-parallel circuits.
			15A02505.2	Find the admittance of the network using two port network parameters.
			15A02505.3	Draw the Frequency response plots of electrical network using Laplace transform.
			15A02505.4	Synthesize the network using network functions.
			15A02505.5	Find circuit parameters using Fourier Analysis to electrical networks.
III-I	Electrical measurements	15A02501	15A02501.1	Explain electrical instruments for the measurement of voltage, current, power and energy.
			15A02501.2	Explain AC, DC bridges and their applications.
			15A02501.3	Explain the operation of single phase, three phase wattmeter and power factor meter.
			15A02501.4	Describe the ratio, phase angle error of current transformer and potential transformer.
			15A02501.5	Explain the construction and working of magnetic measurements.
III-I	POWER ELECTRONICS	15A02503	15A02503.1	Explain power semiconductor switches.
			15A02503.2	Describe the working of converters connected to various loads.
			15A02503.3	Explain the working of choppers connected to various loads.
			15A02503.4	Describe the working of inverters.
			15A02503.5	Explain the working of AC to AC converters connected to different loads.
III-I	Linear & Digital IC Applications	15A04509	15A04509.1	Explain the operation of Op-Amp and its applications.
			15A04509.2	Explain the operation and applications of IC 555, PLL, ADC and DAC.
			15A04509.3	Design active filters and oscillators using op-Amps.
			15A04509.4	Explain the TTL & CMOS logic families
			15A04509.5	Explain the operation of combinational and Sequential circuits.
III-II	POWER SYSTEM PROTECTION	15A02602	15A02602.1	Explain the operation of electromagnetic, Static and Microprocessor based relays.
			15A02602.2	Summarize the protection of generators.
			15A02602.3	Summarize the protection of transformers.

Year-SEM	Course Title	Course Code	Course Outcome ID	Course Outcome
			15A02602.4	Explain the use of relays in protecting Feeders, lines and bus bars.
			15A02602.5	Describe the protection of power system from overvoltages
III-II	Neural Networks & Fuzzy Logic	15A02604	15A02604.1	Explain the approaches of Artificial Intelligence.
			15A02604.2	Summarize the terminology and techniques of artificial neural networks .
			15A02604.3	Analyze the application of ANN to real time systems.
			15A02604.4	Outline classical set theory and fuzzy set theory.
			15A02604.5	Analyze the application of fuzzy logic control to real time systems
III-II	POWER SYSTEM ANALYSIS	15A02603	15A02603.1	Develop Z bus and Y bus for the given power system network.
			15A02603.2	Explain per unit systems, symmetrical faults and unsymmetrical faults for given power system network.
			15A02603.3	Determine Power Flow solutions using Gauss Seidel Method for given power system network
			15A02603.4	Determine Power Flow solutions using Newton Raphson & Fast Decoupled Methods for given power system network
			15A02603.5	Describe types of stabilities and its improvements of given power system.
III-II	Micro processors and micro controllers	15A04601	15A04601.1	Explain the architecture registers and memory system of 8086 processor.
			15A04601.2	Explain the Instruction formats and addressing modes 8086 processor.
			15A04601.3	Summarize the features,architecture,addressing modes and instruction set of MSP 430
			15A04601.4	Explain different modes RTC,ADC,Comparator of MSP 430
			15A04601.5	Describe serial communication interfaces used with MSP 430
III-II	MANAGEMENT SCIENCE	15A52601	15A52601.1	Describe the functions of management,motivational theories,leadership styles,organizational structures.
			15A52601.2	Explain operations management, inventory management and marketing.
			15A52601.3	Explain human resource planing followed in organizations.
			15A52601.4	Explain strategic management and project management network.
			15A52601.5	Describe the contemporary management prtactices.
III-II	power semi conductor drives	15A05101	15A05101.1	Identify the choice of electric drive system by analyzing single phase and three phase rectifiers.
			15A05101.2	Explain the operation of single and multi quadrant electric drives.

Year-SEM	Course Title	Course Code	Course Outcome ID	Course Outcome
			15A05101.3	Describe chopper fed DC motors.
			15A05101.4	Explain the speed control methods for AC-AC and DC-AC converters fed to induction motors.
			15A05101.5	Explain the speed control methods of synchronous motors with closed loop and open loop operations.
IV-I	UTILISATION OF ELECTRICAL ENERGY	15A02703	15A02703.1	Summarise the laws of illumination and types of lamps.
			15A02703.2	Describe the types of electric heating, electric welding and laws of electrolysis .
			15A02703.3	Outline the electric traction system, locomotive wheel arrangement, riding qualities and characteristics of traction motor.
			15A02703.4	Derive the mechanism of train movement, speed time curves, tractive effort and specific energy consumption.
			15A02703.5	Explain the power factor improvement methods, load factor, pit head generation, private and public power plants..
IV-I	Power systems operation and control	15A02702	15A02702.1	Explain the optimum generation allocation of thermal generating units with and without Transmission losses.
			15A02702.2	Describe the optimum generation allocation of hydro thermal generating units with and without Transmission losses.
			15A02702.3	Summarise the Load frequency control problems for single area and two area systems.
			15A02702.4	Describe reactive power control methods.
			15A02702.5	Explain the issues of power system operation in competitive environment.
IV-I	ELECTRICAL DISTRIBUTION SYSTEMS	15A02701	15A02701.1	Describe the factors associated with power distribution.
			15A02701.2	Summarize AC and DC voltage drop of a distribution network.
			15A02701.3	Analyze Technical issues of substations such as location, ratings and bus bar Arrangements
			15A02701.4	Explain causes of low power factor and methods to improve power factor, power loss calculations in non 3 phase systems
			15A02701.5	Explain the SCADA, AMR and CIS for a distribution automation.
IV-I	ENERGY AUDITING & DEMAND SIDE MANAGEMENT	15A02706	15A02706.1	Explain the energy consumption and energy auditing.
			15A02706.2	Explain the methods for power factor improvement using energy efficient motors.
			15A02706.3	Explain the good lighting system and energy Measuring Instruments.

Year-SEM	Course Title	Course Code	Course Outcome ID	Course Outcome
			15A02706.4	Describe the demand side management.
			15A02706.5	Expalin economic analysis and cost effective test of demand side management programs.
IV-I	FLEXIBLE AC TRANSMISSION SYSTEMS	15A02708	15A02708.1	Identify the scope and selection of specific FACTS controllers.
			15A02708.2	Describe the Voltage source converter and Current Source Converter.
			15A02708.3	Summarise the shunt compensation for real and reactive power flow control.
			15A02708.4	outline series compensation for real and reactive powerb flow control.
			15A02708.5	Describe power flow controllers.
IV-I	DIGITAL SIGNAL PROCESSING	15A04603	15A04603.1	Find time response and frequency response of Discrete Fourier Transforms.
			15A04603.2	Compute Fast Fourier Transform Algorithms.
			15A04603.3	Explain the realization techniques of FIR&IIR filters.
			15A04603.4	Construct FIR filters and IIR filters.
			15A04603.5	Explain Multi rate Digital Signal Processing
IV-II	HIGH VOLTAGE DIRECT CURRENT TRANSMISSION	13A02803	13A02803.1	Differentiate HVAC and HVDC Transmission systems.
			13A02803.2	Explain. the operation of various converters used in HVDC Transmission systems
			13A02803.3	Discribe the control techniques in HVDC converter system
			13A02803.4	Describe the generation of harmonics and mitigating methods of A.C and D.C sides of HVDC system.
			13A02803.5	Identify the faults and protection of HVDC Transmission systems.
IV-II	EMBEDDED SYSTEMS	13A04703	13A04703.1	Explain the Embedded Systems design process.
			13A04703.2	Explain the architectures of ARM Processor and TM4C microcontrollers.
			13A04703.3	Apply hardware-interfacing to connect I/O Devices and Design metrics
			13A04703.4	Explain the modules of TM4C Microcontroller
			13A04703.5	Make use of Serial Communication Interfaces, Embedded Networking and IoT for embeded applications.
IV-II	INSTRUMENTATION	13A02801	13A02801.1	Identify the types of errors occuring in measurement systems.
			13A02801.2	Explain data transmission and modulation techniques.

Year-SEM	Course Title	Course Code	Course Outcome ID	Course Outcome
			13A02801.3	Describe the digital techniques to measure voltage, frequency and speed.
			13A02801.4	Explain displacement, velocity and temperature transducers.
			13A02801.4	Describe Acceleration, Force, Torque, Pressure, Flow, Liquid level transducers.

Civil Engineering

Programme Educational Objectives (PEOs):

PEO 1: Apply knowledge in emerging areas of Civil Engineering to handle the realistic problems.

PEO 2: Relate engineering issues to broader social and human context, in which their engineering contributions will be utilized.

PEO 3: Graduates will exhibit managerial skills and social responsibility in their profession and adapt to current trends.

PSOs - (Program Specific Outcomes) for C.E

PSO_1	Domain Techniques: Adopt Codalprovisions and relevant techniques to plan, analyses and design the Civil structure.
PSO_2	Resource Identification: Identify and utilize the latest materials and technologies for sustainable and environmentally friendly construction.

COURSE OUTCOMES

Year-SEM	Course Title	Course Code	Course Outcome ID	Course Outcome
Civil Engineering				
II-I	Building Materials and Construction	15A01302	15A01302.1	Explain the quality of various construction materials and various stages of constructional activities.
			15A01302.2	Describe the mechanical behavior of construction materials and their microstructural effects.
			15A01302.3	Describe traditional thermal building insulation materials for given requirements.
			15A01302.4	Explain various construction related activities.
			15A01302.5	Describe the material properties, mechanical tests and quality control tests for wood and various finishes in buildings.
II-I	SURVEYING-I	15A01301	15A01301.1	Explain surveying and Linear measurements.
			15A01301.2	Explain bearings and its effects.
			15A01301.3	Illustrate the levelling
			15A01301.4	Explain theodolite and its uses.
			15A01301.5	Plot the areas of irregular boundaries.
II-I	ELECTRICAL TECHNOLOGY	15A01301	15A01301.1	Explain the dc and ac circuits.
			15A01301.2	Describe transformers and three phase induction motors .
			15A01301.4	Summarize the welding Technologies and applications
			15A01301.5	Describe the working of turbines , IC engines and various power transmission methods
			15A01301.6	Explain the working of Refrigeration and Air conditioning, earth moving Machinery and Material Handling Equipments.
II-I	Strength of Materials-I	15A01303	15A01303.1	Explain the behaviour of materials under different stress and strain conditions.
			15A01303.2	Draw bending moment, shear force diagrams of beams under various loadings.
			15A01303.3	Explain bending stress and shear stress distribution for beams under the different conditions of loading.
			15A01303.4	Describe Slope, deflections of beams, columns under various loading conditions using different analysis methods
			15A01303.5	Explain Stresses under the combined action of direct loading and bending moment.
II-I	Fluid Mechanics	15A01305	15A01305.1	Explain the properties of fluids.
			15A01305.2	Describe buoyancy.
			15A01305.3	Explain the dynamics of fluid flow and flow measurements in pipes.

Year-SEM	Course Title	Course Code	Course Outcome ID	Course Outcome
			15A01305.4	Describe the flow through orifices, mouthpieces, notches and weirs.
			15A01305.5	Analyze laminar and turbulent flow in pipes.
II-I	MATHEMATICS - III	15A54301	15A54301.1	Solve linear systems of equations.
			15A54301.2	Relate Algebraic and Transcendental Equations to engineering problems.
			15A54301.3	Calculate the intermediate value of intervals.
			15A54301.4	Describe forecasting methods.
			15A54301.5	Find numerical values for engineering applications using differential equations.
II-II	STRENGTH OF MATERIALS - II	15A01401	15A01401.1	Explain stress and strain relationship.
			15A01401.2	Describe thick and thin cylinders
			15A01401.3	Explain torsion and shafts
			15A01401.4	Explain buckling phenomenon in columns and struts.
			15A01401.5	Summarize unsymmetrical bending.
II-II	STRUCTURAL ANALYSIS - I	15A01403	15A01403.1	Describe various energy theorems and deflection of beams, frames and trusses.
			15A01403.2	Analyze various statically indeterminate structures.
			15A01403.3	Analyze the fixed beams and continuous beams for various loading conditions.
			15A01403.4	Explain shear force and bending moment diagrams of continuous beams and frames by slope deflection method.
			15A01403.5	Explain shear force and bending moment diagrams of continuous beams and frames by moment distribution method.
II-II	HYDRAULICS AND HYDRAULIC MACHINERY	15A01404	15A01404.1	Describe flow in a pipe, flow measurement through orifices, mouth pieces, notches and weirs
			15A01404.2	Analyse the open channel flows of gradually and rapidly varied flow.
			15A01404.3	Summarise the impact of jet on vanes and turbines.
			15A01404.4	Apply the working principles of Impulse and Reaction turbines
			15A01404.5	Explain the boundary layer theory and dimensional analysis.
II-II	SURVEYING-II	15A01601	15A01601.1	Explain Trigonometric levelling for various conditions
			15A01601.2	Define terms used in Tachometric survey.
			15A01601.3	Explain the principles of triangulation and Setout works

Year-SEM	Course Title	Course Code	Course Outcome ID	Course Outcome
			15A01601.4	Illustrate Curves and their methods of setting.
			15A01601.5	Explain Electromagnetic Deflection instruments used in Surveying.
II-II	Managerial Economics and Financial Analysis	15A52301	15A52301.1	Outline the scope of Managerial Economics prediction of demand of products and services by using different methods.
			15A52301.2	Explain production functions and Break Even Point.
			15A52301.3	Summarize the business organizations, market structure, behavior of consumer and producer under competitive market situations.
			15A52301.4	Outline the sources of raising capital by business undertaking, process & principles of accounting.
			15A52301.5	Analyze the financial statements of a business enterprise by using liquidity leverage, coverage and turnover & profitability ratios.
II-II	PROBABILITY AND STATISTICS	15A54401	15A54401.1	Solve the probability distributions.
			15A54401.2	Develop the statistical inferences using large samples.
			15A54401.3	Develop the statistical inferences using small samples.
			15A54401.4	Find the statistical quality control by using Mean, R, p and C charts
			15A54401.5	Find M/M/1, M/M/S solutions using queuing theory.
III-I	GEOTECHNICAL ENGINEERING-I	15A01503	15A01503.1	Explain the I.S. classification of soils.
			15A01503.2	Explain properties and factors of permeability, effective stress, seepage through soils.
			15A01503.3	Analyze stress distribution of soils, Newmark's influence chart for irregular area, effects and factors of compaction.
			15A01503.4	Explain the consolidation of soil.
			15A01503.5	Describe shear strength of soil.
III-I	ENGINEERING GEOLOGY	15A01504	15A01504.1	Explain the principles of engineering geology, forming and properties of various rocks and minerals.
			15A01504.2	Describe the classification of rocks, structure and textures and the geological structure of ground.
			15A01504.3	Outline the control of groundwater, earthquakes and landslides.
			15A01504.4	Explain the various investigations involved in construction site.
			15A01504.5	Describe dams, reservoirs and tunnels.
III-I	STRUCTURAL ANALYSIS - II	15A01505	15A01505.1	Explain Arches and its behaviour under different loading and support conditions.
			15A01505.2	Utilize the slope deflection & Moment Distribution Methodologies for analyzing the continuous beams and portal frames.

Year-SEM	Course Title	Course Code	Course Outcome ID	Course Outcome
			15A01505.3	Find bending moments and shear forces in beams and frames under dynamic conditions using Kani's Iteration Process
			15A01505.4	Analyze the Structural Beams using Flexibility & Stiffness Matrix Methods.
			15A01505.5	Explain the Idealized Stress-Strain diagram, Moment Curvature relationship, Shape factors.
III-I	COST EFFECTIVE HOUSING TECHNIQUES	15A01506	15A01506.1	Outline various policies and authorities related to low cost housing.
			15A01506.2	Summarize the different types of housing programmes and related communities
			15A01506.3	Describe the prefabrication techniques in outdoor constructions.
			15A01506.4	Explain alternative methods of infrastructure of buildings by adoption of low cost techniques.
			15A01506.5	Summarize the disaster prone areas.
III-II	Design and Drawing of Reinforced Concrete Structures	15A01501	15A01501.1	Apply clauses of I.S.456-2000 code design specifications for different structural designs
			15A01501.2	Design the beams with different end conditions for shear, torsion and bond
			15A01501.3	Design one way slabs and two way slabs with different end conditions
			15A01501.4	Design the RCC columns with combined bending and compression
			15A01501.5	Design foundations, stair case and portico.
III-II	Estimation Costing and Valuation	15A01502	15A01502.1	Explain the general itmes of building works.
			15A01502.2	Estimate the details of residential buildings
			15A01502.3	Describe earthwork of roads and canals.
			15A01502.4	Explain types of contracts and documents
			15A01502.5	Outline the types of valuations, rate analysis for different items.
III-II	CONCRETE TECHNOLOGY	15A01601	15A01601.1	Explain the types of cements and their manufacturing process.
			15A01601.2	Explain testing of fresh and hardened concrete.
			15A01601.3	Summarize the speciall concretes.
			15A01601.4	Describe the elasticity, creep and shrinkage of the concrete.
			15A01601.5	Apply the ACI and IS 10262 methods to design the mix proportions of concrete.
III-II	DESIGN AND DRAWING OF STEEL STRUCTURES	15A01602	15A01602.1	Apply the IS code of practice for the design of steel structural elements
			15A01602.2	Design compression and tension members.

Year-SEM	Course Title	Course Code	Course Outcome ID	Course Outcome
			15A01602.3	Explain the behavior and modes of failure in tension members under different end connections.
			15A01602.4	Design tension members, bolted connections, welded connections, compression members and beams.
			15A01602.5	Design welded connections for both axial and eccentric forces
III-II	GEOTECHNICAL ENGINEERING-II	15A01603	15A01603.1	Describe the geological features and construction of underground openings in rock and/or soil.
			15A01603.2	Explain the behavior of soils in slopes and behind retaining structures.
			15A01603.3	Analyze lateral earth pressures under at-rest, active and passive conditions.
			15A01603.4	Evaluate the Bearing capacity of foundation
			15A01603.5	Explain pile load and insitu tests.
III-II	WATER RESOURCES ENGINEERING - I	15A01605	15A01605.1	Describe hydrology.
			15A01605.2	Analyse the hydrographs.
			15A01605.3	Explains the types of irrigation systems.
			15A01605.4	Explains the channels and the silt theories involved in the channel design.
			15A01605.5	Summarize the different aspects of hydraulic structures.
III-II	DISASTER MANAGEMENT AND MITIGATION	15A01607	15A01607.1	Summarize the disasters and their effects on environment
			15A01607.2	Explain the types of Environmental hazards and disasters
			15A01607.3	Describe the Endogenous hazards
			15A01607.4	Explain the Exogenous hazards and soil Erosion
			15A01607.5	Summarize disaster management through engineering applications
III-II	TRANSPORTATION ENGINEERING - I	15A01803	15A01803.1	Describe Highway Engineering, Historical Development.
			15A01803.2	Explain the Highway alignment and components of a railway line.
			15A01803.3	Summarize Air port Engineering.
			15A01803.4	Explain Traffic signal and signaling systems for Highway
			15A01803.5	Describe At-Grade Intersection and Grade separated intersection
IV-I	ENVIRONMENTAL ENGINEERING	15A01703	15A01703.1	Explain the sources of water and their demand per day including quality analysis.
			15A01703.2	Summarize the water treatment and design methods

Year-SEM	Course Title	Course Code	Course Outcome ID	Course Outcome
			15A01703.3	Explain the daily needsof sanitation, hygiene maintenance and decomposition of sewage.
			15A01703.4	Describe the maintenance of waste water treatment plants.
			15A01703.5	Summarize solid waste, noise and air pollution
IV-I	FINITE ELEMENT METHODS	15A01701	15A01701.1	Describe Finite Element Method, Constitutive relation between stresses,Strains and Energy Principles.
			15A01701.2	Solve 1D & 2D Structural Problems using FEM.
			15A01701.3	Generate element stiffness and nodal force matrices for triangular and rectangular elements.
			15A01701.4	Formulate the isoparametric constant strain triangular and quadrilateral elements with 4 and 8 Nodes.
			15A01701.5	Solve structural Integral functions using Numerical Solution Techniques.
IV-I	TRANSPORTATION ENGINEERING - II	15A01703	15A01703.1	Describe Railway engineering system.
			15A01703.2	Explain the alignment of new railway line.
			15A01703.3	Describe the Air port Engineering
			15A01703.4	Explain the alignment of Runway and Taxiway
			15A01703.5	Describe Harbours, Ports and docks.
IV-I	WATER RESOURCES ENGINEERING - II	15A01704	15A01704.1	Describe canal structures and their functions.
			15A01704.2	Describe the discharge, depth, velocity and river training works of a stream.
			15A01704.3	Summarize the various types of dams and their uses.
			15A01704.4	Explain gravity dam and earth dam.
			15A01704.5	Explain spillways and the implementation of turbines in hydroelectric plants.
IV-I	AIR POLLUTION AND QUALITY CONTROL	15A01707	15A01707.1	Explain the parameters of air pollution
			15A01707.2	Explain the properties of air pollutants.
			15A01707.3	Describe the chemical components, reactions and factors responsible for air pollution.
			15A01707.4	Implement the methods for monitoring and modeling spatial and temporal patterns.
			15A01707.5	Assess the environmental impacts of atmospheric pollution.
IV-I	Rehabilitation & Retrofitting of Structures	15A01710	15A01710.1	Summarize the mechanical behavior of reinforced concrete along with defects and deterioration in buildings.
			15A01710.2	Describe the process of corrosion in concrete and its effects.
			15A01710.3	Interpret the results for concrete structures using non-destructive testing.

Year-SEM	Course Title	Course Code	Course Outcome ID	Course Outcome
			15A01710.4	List repair materials and their methods of applications.
			15A01710.5	Summarize the Structural health monitoring for damage detection in reinforced concrete structures.
IV-II	ADVANCED STRUCTURAL ENGINEERING	13A01804	13A01804.1	Design a flat slab system.
			13A01804.2	Design bunkers.
			13A01804.3	Design a chimney for the given requirements.
			13A01804.4	Design watertanks for the given specifications.
			13A01804.5	Design retaining wall and counterfort retaining wall
IV-II	COST EFFECTIVE HOUSING TECHNIQUES	13A01806	13A01806.1	Explain the policies and authorities related to low cost housing.
			13A01806.2	Summarize the types of housing programmes and related communities
			13A01806.3	Describe the prefabrication techniques in outdoor constructions.
			13A01806.4	Explain alternative methods for infrastructural development using low cost techniques.
			13A01806.5	Explain disaster prone areas.
IV-II	ENVIRONEMNTAL IMPACT ASSESSMENT AND MANAGEMENT	15A01804	15A01804.1	Explains the elements, factors and classification of EIA
			15A01804.2	Describe the methodologies of EIA
			15A01804.3	Explain the impacts of EIA in Soil and Surface water
			15A01804.4	Explain the impacts of EIA on vegetation and wild life
			15A01804.5	Summarize environmental objectives, types and audits

Mechanical Engineering

Programme Educational Objectives (PEOs)

PEO_1	Gain higher positions in chosen profession and/or excel in higher studies.
PEO_2	Exhibit innovative approaches for addressing various engineering problems to meet the needs of industry & academia.
PEO_3	Contribute for the substantial growth of organization by leading multi-disciplinary teams.

PSOs - (Program Specific Outcomes) for M.E

PSO_1	Implement the relevant methodologies for solving problems in various domains of mechanical engineering such as manufacturing, design, thermal, CAD/CAM, Robotics engineering etc.
PSO_2	Formulate the strategies to develop an effective prototype model and authenticate it for production.

COURSE OUTCOMES

Year-SEM	Course Title	Course Code	Course Outcome ID	Course Outcome
Mechanical Engineering				
II-I	MECHANICS OF SOLIDS	15A01308	15A01308.1	Find the strength of materials.
			15A01308.2	Draw shear force and bending moment diagrams.
			15A01308.3	Explain the methods for calculating the strength of the beams with different sections.
			15A01308.4	Calculate the shear strength of solid and hallow shafts.
			15A01308.5	Calculate different stresses and strains for the thin and thick cylinders
II-I	THERMODYNAMICS	15A03303	15A03303.1	Explain the terminology of work and heat transfer.
			15A03303.2	Apply steady flow energy equation to all engineering devices and problems
			15A03303.3	Calculate efficiencies of a heat engine, refrigerator and heat pump.
			15A03303.4	Solve the problems of pure substances using steam tables and mollier diagrams.
			15A03303.5	Calculate work output, efficiency, mean effective pressure for various air standard cycles.
II-I	ENGINEERING MECHANICS	15A03302	15A03302.1	Outline the system of forces.
			15A03302.2	Calculate frictional forces.
			15A03302.3	Determine the centroids and moments of inertia.
			15A03302.4	Analyze the motion of a particle.
			15A03302.5	Find the forces in trusses.
II-I	EDME	15A03301	15A03301.1	Draw the sectional views and development of surfaces..
			15A03301.2	Construct isometric views of various sectional planes and sectional solids.
			15A03301.3	Convert isometric views into orthographic views.
			15A03301.4	Draw the intersection of solids.
			15A03301.5	Draw perspective views of planes and solids.
II-I	MEFA	15A52301	15A52301-1	Outline the scope of Managerial Economics prediction of demand of products and services by using different methods.
			15A52301-2	Explain production functions and Break Even Point.

Year-SEM	Course Title	Course Code	Course Outcome ID	Course Outcome
			15A52301-3	Summarize the business organizations, market structure, behavior of consumer and producer under competitive market situations.
			15A52301-4	Outline the sources of raising capital by business undertaking, process & principles of accounting.
			15A52301-5	Analyze the financial statements of a business enterprise by using liquidity leverage, coverage and turnover & profitability ratios.
II-I	MATHEMATICS - III	15A54301	15A54301.1	Relate matrices to engineering problems.
			15A54301.2	Solve the algebraic, transcendental equations and system of linear equations.
			15A54301.3	Estimate the intermediate value through interpolation methods.
			15A54301.4	Estimate the future values through curve fitting and finding the residuals.
			15A54301.5	Solve the ordinary differential equations by using iterative methods.
II-II	KINEMATICS OF MACHINES	15A03402	15A03402.1	Describe mechanisms and inversions of kinematic chains.
			15A03402.2	Explain Hooke's joint, steering mechanisms , belt and rope drives.
			15A03402.3	Draw velocity and acceleration diagrams of mechanisms using relative velocity and instantaneous center methods.
			15A03402.4	Outline gears.
			15A03402.5	Draw displacement diagrams and cam profile for different motions of the follower.
II-II	BASIC ELECTRICAL & ELECTRONICS ENGINEERING	15A99301	15A99301.1	Explain circuit laws & Network reduction techniques.
			15A99301.2	Describe the principle, working, construction and types of DC Machines
			15A99301.3	Describe the principle, working, construction and types of AC Machines
			15A99301.4	Explain semiconductors, PN junction diode and its applications
			15A99301.5	Explain the construction, operation and characteristics of Transistors
II-II	BASIC ELECTRICAL & ELECTRONICS ENGINEERING	15A99301	15A99301.6	Explain the construction and operation of oscillators using BJT and applications of Op-Amps
II-II	MACHINE DRAWING	15A03401	15A03401.1	Explain I.S. conventions of lines, machine parts, materials and methods of dimensioning.
			15A03401.2	Draw the machine elements and parts.
			15A03401.3	Construct machine elements, machine joints, couplings and bearing.
			15A03401.4	Draw the assembling of engine parts and their sectional views
II-II	THERMAL ENGINEERING - I	15A03403	15A03403.1	Explain the working principle of I.C. Engines

Year-SEM	Course Title	Course Code	Course Outcome ID	Course Outcome
			15A03403.2	Explain engine auxiliary systems.
			15A03403.3	Describe combustion in SI and CI engines.
			15A03403.4	Find the performance of IC engines.
			15A03403.5	Explain types of compressors.
II-II	MANUFACTURING TECHNOLOGY	15A03404	15A03404.1	Explain types of moulding systems.
			15A03404.2	Explain the types of special casting methods and their applications
			15A03404.3	Describe the types of welding processes.
			15A03404.4	Describe welding processes.
			15A03404.5	Explain surface treatment methods.
II-II	PROBABILITY AND STATISTICS	15A54401	15A54401.1	Solve the probability distributions.
			15A54401.2	Develop the statistical inferences using large samples.
			15A54401.3	Develop the statistical inferences using small samples.
			15A54401.4	Find the statistical quality control by using Mean, R, p and C charts
			15A54401.5	Find M/M/1, M/M/S solutions using queuing theory.
III-I	THERMAL ENGINEERING - II	15A03501	15A03501.1	Explain Rankine cycle and its performance improvement methods.
			15A03501.2	Outline different boilers.
			15A03501.3	Find the efficiency of nozzle flows.
			15A03501.4	Calculate the performance of steam turbines.
			15A03501.5	Calculate the performance of gas turbines.
III-I	DESIGN OF MACHINE MEMBERS - I	15A03504	15A03504.1	Explain the General considerations of design, design process. Selection of Engineering Materials - properties
			15A03504.2	Explain Design components under cyclic loading using Goodman's, Soderberg's criteria AND GERBER criteria
			15A03504.3	Explain the Design riveted joints and bolted joints.
			15A03504.4	Explain the Design cotter joint, knuckle joint and shafts.
			15A03504.5	Explain the Design rigid and flexible shaft couplings.
III-I	FLUID MECHANICS & HYDRAULIC MACHINERY	15A01510	15A01510.1	Explain fluid statics, fluid kinematics and fluid dynamics

Year-SEM	Course Title	Course Code	Course Outcome ID	Course Outcome
			15A01510.2	Calculate the discharge through pipes using flow measuring devices.
			15A01510.3	Analyze the impact of jets on vanes.
			15A01510.4	Calculate the efficiencies of hydraulic turbines.
			15A01510.5	Explain functions and efficiencies of centrifugal pumps.
III-I	ENTREPRENEURSHIP	15A3505	15A3505.1	Determine The Objectives And Entrepreneurial Traits, Ethics And Social Responsibility Of Entrepreneurs,
			15A3505.2	Examine Nature And Scope Of Business Plan And Implementing Business Plans.
			15A3505.3	Summarize Sources of capital, recruitment, motivating and leading teams, e-Commerce, Entrepreneurship and Internet advertising.
			15A3505.4	Outline new venture expansion strategies and issues.
			15A3505-5	Explain selection of production techniques, global aspects of entrepreneurship.
III-I	DYNAMICS OF MACHINERY	15A03503	15A03503.1	Calculate the efficiencies of brakes, clutches and dynamometers.
			15A03503.2	Design a flywheel for IC engine.
			15A03503.3	Calculate the performance of governors.
			15A03503.4	Estimate the balancing of rotating masses and reciprocating masses.
			15A03503.5	Find the response of one degree of freedom systems with free and forced vibrations.
III-I	MACHINE TOOLS	15A03503	15A03503.1	Explain the philosophy of metal cutting and the mechanism of chip formation.
			15A03503.2	Explain the operations of lathe machine.
			15A03503.3	Describe the operations of drilling, shaping and planing machines.
			15A03503.4	Describe the operations of milling and grinding.
			15A03503.5	Explain the design of Jigs and fixtures.
III-II	OPERATIONS RESEARCH	15A03601	15A03601.1	Find the optimized solutions for industrial problems using graphical method and simplex method.
			15A03601.2	Apply duality for simplifying the solution for certain LPPs.
			15A03601.3	Select best strategy using game theory for decision making.
			15A03601.4	Estimate the completion time, cost and optimum duration of the project and probabilities for completing projects.
			15A03601.5	Find the optimum route using dynamic programming technique.
III-	FINITE ELEMENT METHODS			Identify the deflection and bending moment of the beams using integration principles.

Year-SEM	Course Title	Course Code	Course Outcome ID	Course Outcome
II		15A03604	15A03604.1	
			15A03604.2	Find the displacements, forces and stresses in beams, trusses, frames and bars.
			15A03604.3	Use interpolation functions to higher order isoperimetric elements
			15A03604.4	Calculate the nodal displacements for Axi-symmetric elements and solutions for gauss quadrature.
			15A03604.5	Find the temperature distribution in elements using finite element method.
III-II	NON CONVENTIONAL SOURCES OF ENERGY	15A03606	15A03607.1	Explain renewable energy sources.
			15A03607.2	Describe different collectors and their efficiencies.
			15A03607.3	Summarize wind energy and biomass energy systems.
			15A03607.4	Explain bio-gas digesters and geothermal energy conversion techniques.
			15A03607.5	Describe the functioning of tidal plants, mini hydel plants and direct energy conversionsystems.
III-II	DESIGN OF MACHINE ELEMENTS-II	15A03602	15A03602.1	Explain stresses in curved beams and design flat belt drives.
			15A03602.2	Explain the helical springs for two wheel vehicles and laminated springs for trucks .
			15A03602.3	Design bearings.
			15A03602.4	Design spur and helical bearings for different input conditions.
			15A03602.5	Interpret forces acting on IC Engine parts.
III-II	HEAT TRANSFER	15A03603	15A03603.1	Explain steady state conduction.
			15A03603.2	Calculate the heat transfer in transient heat conduction.
			15A03603.3	Transform the physical system into a mathematical model through convection.
			15A03603.4	Calculate heat transfer rate in heat exchangers.
			15A03603.5	Calculate radiation of various bodies.
III-II	METAL FORMING PROCESS	15A03605	15A03605.1	Explain one, two and three dimensional stress analysis.
			15A03605.2	Describe the principles of rolling and forging processes.
			15A03605.3	Outline the extrusion process and wire drawing processes.
			15A03605.4	Explain press working processes.
			15A03605.5	Outline the plastic manufacturing process.

Year-SEM	Course Title	Course Code	Course Outcome ID	Course Outcome
IV-I	METROLOGY AND MEASUREMENTS	15A03703	15A03703.1	Explain limits, fits and tolerances.
			15A03703.2	Explain types of comparators and optical measuring instruments.
			15A03703.3	Outline screw thread elements, gear tooth profile and alignment tests.
			15A03703.4	Summarize the working of displacement, temperature and pressure measuring instruments.
			15A03703.5	Summarize the working of flow, speed, stress, strain, vibration and torque measuring instruments.
IV-I	MODERN MANUFACTURING METHODS	15A03706	15A03706.1	Explain advanced and additive manufacturing.
			15A03706.2	Outline USM, AJM, WJM, AWJM.
			15A03706.3	Describe ECM, ECG & CM with process variables and applications.
			15A03706.4	Explain EDM, Wire cut EDM, EDG, Plasma Machining with thermal metal removal process.
			15A03706.5	Outline EBM, LBM with thermal and non thermal processes.
IV-I	AUTOMATION & ROBOTICS	15A03708	15A03708.1	Explain automation.
			15A03708.2	summarize the flow lines in automation.
			15A03708.3	Describe anatomy of robot.
			15A03708.4	Explain the kinematics of robots.
			15A03708.5	Explain the dynamics of robots.
IV-I	AUTOMOBILE ENGINEERING	15A03701	15A03701.1	Describe the parts of an automobile.
			15A03701.2	Explain the parts of engine and transmission system.
			15A03701.3	Describe the steering mechanism.
			15A03701.4	Explain the operation of suspension & braking system.
			15A03701.5	outline the environmental implications of automobile emissions.
IV-I	CAD/CAM	15A04303	15A04303.1	Explain the components of CAD/CAM system.
			15A04303.2	Explain the geometric model of the component in CAD technology of computer graphics.
			15A04303.3	Summarize the principle of NC, CNC, machining centre and methods of part programming.
			15A04303.4	Describe the need of computers in QC and applications of FMS.
			15A04303.5	Summarize CAPP Techniques and computerized manufacturing methods.
IV-II	POWER PLANT ENGINEERING	13A03802	13A03803.1	Outline the power plants and its economics.

Year-SEM	Course Title	Course Code	Course Outcome ID	Course Outcome
			13A03803.2	Explain high pressure boilers in power plants.
			13A03803.3	Describe the working of diesel power plant and gas turbine plants.
			13A03803.4	Summarize the methods of storing water, constructions of dams and spill ways.
			13A03803.5	Explain the methods of dumping radiation waste and can discern the impact of radiation effect on human living.
IV-II	INDUSTRIAL ENGINEERING & MANAGEMENT	13A03801	13A03801.1	Outline management, administration and organization.
			13A03801.2	Design plant layouts and locations in order to meet desired needs.
			13A03801.3	Apply statistical tools and technology to enhance productivity.
			13A03801.4	Explain material handling to maintain industrial machines.
			13A03801.5	Describe inventory models for materials management.
IV-I	Managment Science	15A52601	15A52601.1	Describe the functions of management,motivational theories,leadership styles,organizational structures.
			15A52601.2	Explain operations management, inventory management and marketing.
			15A52601.3	Explain human resource planing followed in organizations.
			15A52601.4	Explain strategic management and project management network.
			15A52601.5	Describe the contemporary management practices.

Freshmen Engineering Department

Course outcomes

Year-SEM	Course Title	Course Code	Course Outcome ID	Course Outcome
Freshmen Engineering Department				
I-I	COMPUTER PROGRAMMING	15A05101	15A05101.1	Explain the basic terminology of computer systems, problem solving methods and C programming language.
			15A05101.2	Explain flow control statements and arrays in C with examples
			15A05101.3	Illustrate pointers, dynamic memory allocation and scope of functions.
			15A05101.4	Describe user defined data types like structures, unions and bit fields with examples.
			15A05101.5	Write well documented and indented programs using formatted I/O and file I/O.
I-I	ENGINEERING DRAWING	15A03101	15A03101.1	Construct the engineering curves as per the principles of engineering drawing and BIS conventions.
			15A03101.2	Draw scales and projections of points.
			15A03101.3	Draw projections of lines and planes.
			15A03101.4	Draw the development of surfaces of solids.
			15A03101.5	Convert isometric views into orthographic views.
I-I	ENGINEERING PHYSICS	15A56101	15A56101.1	Describe optical phenomena, lasers, optical fibers and their applications.
			15A56101.2	Explain crystal systems, x-ray powder diffraction method, production and detection of ultrasonic waves.
			15A56101.3	Describe quantum mechanics and free electron theory of metals.
			15A56101.4	Explain semiconductors and properties of magnetic materials.
			15A56101.5	Summarize super conducting materials and nano materials along with their engineering applications.
I-I	ENGINEERING CHEMISTRY	15A51101	15A51101.1	Explain the methods to produce soft water.
			15A51101.2	Outline the advanced polymer materials and their industrial applications.
			15A51101.3	Describe the function of batteries, electrochemical reactions and corrosion process.
			15A51101.4	Summarise conventional fuels and combustion.
			15A51101.5	Describe lubricants and building materials for various purposes.

Year-SEM	Course Title	Course Code	Course Outcome ID	Course Outcome
I-I	Mathematics-I	15A54101	15A54101.1	Relate ordinary differential equations of first and higher order to engineering problems..
			15A54101.2	Solve engineering problems using second and higher order differential equations.
			15A54101.3	Relate Taylor's and Maclaurin's series, Jacobian, Maxima and Minima ,Radius of curvature to engineering problems.
			15A54101.4	Find Multiple Integrals for given specifications.
			15A54101.5	Find the solutions using vector calculus..
I-I	Mathematics-I	15A54101	15A54101.1	Relate ordinary differential equations of first and higher order to engineering problems..
			15A54101.2	Find the solutions of System of Homogeneous and Non Homogeneous Linear equations.
			15A54101.3	Relate Taylor's and Maclaurin's series, Jacobian, Maxima and Minima ,Radius of curvature to engineering problems.
			15A54101.4	Find the double and triple integrals and its applications to find irregular areas and volumes.
			15A54101.5	Find the solutions using vector calculus..
I-I	FUNCTIONAL ENGLISH	15A52101	15A52101_1	Explain environmental consciousness, write letters and design posters.
			15A52101_2	Describe the Emerging Technologies and communicate effectively.
			15A52101_3	Explain global issues and communicate through email.
			15A52101_4	Describe space track and review films and books.
			15A52101_5	Explain evolution and role of media.
I-I	ENVIRONMENTAL SCIENCE	15A01101	15A01101.1	Outline the compounds and reactions in inorganic and biochemical systems.
			15A01101.2	Explain biodiversity and ecosystem.
			15A01101.3	Explain pollution control strategies and remediation techniques.
			15A01101.4	Illustrate social problems and possible solutions.
			15A01101.5	Describe population explosion.
I-I	Mathematics-I	15A54101	15A54101.1	Relate ordinary differential equations of first and higher order to engineering problems..
			15A54101.2	Solve engineering problems using second and higher order differential equations.
			15A54101.3	Relate Taylor's and Maclaurin's series, Jacobian, Maxima and Minima ,Radius of curvature to engineering problems.
			15A54101.4	Find Multiple Integrals for given specifications.
			15A54101.5	Find the solutions using vector calculus..

Year-SEM	Course Title	Course Code	Course Outcome ID	Course Outcome
I-II	DATA STRUCTURES	15A05201	15A05201.1	Explain arrays , linked list and their applications
			15A05201.2	Describe stack , queue and their applications
			15A05201.3	Explain trees, graphs and their applications
			15A05201.4	summarize various sorting techniques and their applications
			15A05201.5	Explain searching, hashing and collision resolution methods
I-II	ENGINEERING CHEMISTRY	15A51101	15A51101.1	Explain the methods to produce soft water.
			15A51101.2	Outline the advanced polymer materials and their industrial applications.
			15A51101.3	Describe the function of batteries, electrochemical reactions and corrosion process.
			15A51101.4	Summarise conventional fuels and combustion.
			15A51101.5	Describe lubricants and building materials for various purposes.
I-II	Electrical Circuit-1	15A02201	15A02201.1	Analyze the KCL,KVL, Network reduction techniques, star to delta and delta to star transformations.
			15A02201.2	Analyze ac circuits, containing resistors, inductors and capacitors using complex notation.
			15A02201.3	Analyze the frequency response for a given electrical circuits
			15A02201.4	Analyze the given circuit with various theorems and methods.
			15A02201.5	Compute two port network parameters.
I-II	ENGINEERING DRAWING	15A03101	15A03101.1	Construct the Engineering Curves as per the principles of Engineering Drawing and BIS conventions
			15A03101.2	Draw scales & Projections of Points
			15A03101.3	Draw Projections of lines and planes
			15A03101.4	Draw Projections of solids and development of surfaces
			15A03101.5	Draw the Isometric views of various solids and Conversion of Pictorial views into orthographic views.
I-II	ENVIRONMENTAL SCIENCE	15A01101	15A01101.1	outline the basic concepts, compounds and reactions in organic and biochemical systems.
			15A01101.2	Explain the biodiversity and ecosystem services concepts and their relevance for management of natural resources and a sustainable development
			15A01101.3	Explain about different pollution control strategies and remediation techniques.
			15A01101.4	Illustrate concepts of social problems and considerations of possible solutions.
			15A01101.5	Describe about the population explosion and develop an awareness among the common people .

Year-SEM	Course Title	Course Code	Course Outcome ID	Course Outcome
I-II	ENGINEERING PHYSICS	15A56101	15A56101.1	Describe Optical phenomena like interference, diffraction and their applications, the basic laser physics, working of lasers, and principle of propagation of light in optical fibers
			15A56101.2	Explain crystal systems, x-ray powder diffraction method, production and detection of ultrasonic waves
			15A56101.3	Explain the knowledge of basic quantum mechanics and importance of free electrons in determining the properties of metals.
			15A56101.4	Explain semiconductors, different phenomena in semiconductors, and properties of various magnetic materials
			15A56101.5	Elucidate the importance of superconducting materials and nano materials along with their engineering applications
I-II	NETWORK ANALYSIS	15A04201	15A04201.1	Explain network theorems with examples.
			15A04201.2	Develop DC Transient Circuits with excitations.
			15A04201.3	Analyze the Sinusoidal steady state response.
			15A04201.4	Describe series resonance, parallel resonance and magnetically coupled circuits
			15A04201.5	Derive two port networks and design filters.
I-II	MATERIAL SCIENCE AND ENGINEERING	15A03201	15A03201.1	Explain metal structures and constitution of alloys.
			15A03201.2	Explain the Equilibrium of diagrams.
			15A03201.3	Summarize cast iron, steels, non ferrous metals and alloys.
			15A03201.4	Describe heat treatment of alloys.
			15A03201.5	Outline Composite materials.
I-II	ENGLISH FOR PROFESSIONAL COMMUNICATION	15A52201	15A52201.1	Explain the Lessons from the past and write essays and conditional sentences
			15A52201.2	Describe Renewable and Non Renewable Energy sources and prepare summaries and Role Plays
			15A52201.3	Explain Engineering ethics in different fields and write Reports and creative writings
			15A52201.4	Explain tourism in India and interpret charts and tables
			15A52201.5	Explain SWOT analysis and write curriculum vitae.
I-II	MATERIAL SCIENCE AND ENGINEERING	15A03201	15A03201.1	Explain the concepts of metal structure and constitution of alloys
			15A03201.2	Outline the Equilibrium of diagrams

Year-SEM	Course Title	Course Code	Course Outcome ID	Course Outcome
			15A03201.3	Summarize the knowledge on cast iron and steels, non ferrous metals and alloys
			15A03201.4	Summarize heat treatment of alloys
			15A03201.5	Summarize the Composite materials like ceramic materials.
I-I	ENGINEERING CHEMISTRY	15A51101	15A51101.1	Explain the methods to produce soft water.
			15A51101.2	Outline the advanced polymer materials and their industrial applications.
			15A51101.3	Describe the function of batteries, electrochemical reactions and corrosion process.
			15A51101.4	Summarise conventional fuels and combustion.
			15A51101.5	Describe lubricants and building materials for various purposes.