POs:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
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.
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.
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.
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.
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.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

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.

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.

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.

Class: SE COMP (2019Pattern)

Course Code	Course Name	Course Outcomes
207003	Engineering Mathematics III	**Course Objectives:** 1. Linear differential equations of higher order applicable to Control systems, Computer vision and Robotics. 2. Transform techniques such as Fourier transform, Z-transform and applications to Image processing. 3. Statistical methods such as correlation, regression analysis and probability theory to analyze data and to make predictions applicable to machine intelligence. **4.** Vector calculus necessary to analyze and design complex electrical and electronic devices as appropriate to Computer engineering. **Program- Outcomes:** 1. Solve Linear differential equations, essential in modelling and design of computer-based systems. 2. Apply concept of Fourier transform and Z-transform and its applications to continuous and discrete systems and image processing. 3. Apply Statistical methods like correlation and regression analysis and probability theory for data analysis and predictions in machine learning. 4. Solve Algebraic and Transcendental equations and System of linear equations using numerical techniques. 5. Obtain Interpolating polynomials, numerical differentiation and integration, numerical solutions of ordinary differential equations used in modern scientific computing.
210252	Data Structures and Algorithms	**Course-Objectives :** 1. To develop a logic for graphical modeling of the real life problems. 2. To suggest appropriate data structure and algorithm for graphical solutions of the problems. 3. To understand advanced data structures to solve complex problems in various domains. 4. To operate on the various structured data 5. To build the logic to use appropriate data structure in logical and computational solutions. 6. To understand various algorithmic strategies to approach the problem solution. **Program-Outcomes :** 1. Identify and articulate the complexity goals and benefits of a good hashing scheme for real-world applications. 2. Apply non-linear data structures for solving problems of various domain. 3. Design and specify the operations of a nonlinear-based abstract data type and implement them in a high-level programming language. 4. Analyze the algorithmic solutions for resource requirements and optimization 5. Use efficient indexing methods and multiway search techniques to store and maintain data. 6. Use appropriate modern tools to understand and analyze the functionalities confined to the secondary storage.

210253	Software Engineering	**Course Objectives:** 1. To learn and understand the principles of Software Engineering. 2. To be acquainted with methods of capturing, specifying, visualizing and analyzing software requirements. 3. To apply design and testing principles to software project development. 4. To understand project management through life cycle of the project. **Course Outcomes:** 1. Analyze software requirements and formulate design solution for a software. 2. Design applicable solutions in one or more application domains using software engineering approaches that integrate ethical, social, legal and economic concerns. 3. Apply new software models, techniques and technologies to bring out innovative and novelistic solutions for the growth of the society in all aspects and evolving into their continuous professional development. 4. Model and design User interface and component-level. 5. Identify and handle risk management and software configuration management. 6. Utilize knowledge of software testing approaches, approaches to verification and validation. 7. Construct software of high quality – software that is reliable, and that is reasonably easy to understand, modify and maintain efficient, reliable, robust and cost-effective software solutions.
210254	Microprocessor	**Course-Objectives :** 1. To learn and distinguish the architecture and programmer‘s model of advanced processor. 2. To identify the system level features and processes of advanced processors. 3. To acquaint the learner with application instruction set and logic to build assembly language programs. **Program-Outcomes :** 1. Exhibit skill of assembly language programming for the application. 2. Classify Processor architectures. 3. Illustrate advanced features of 80386 Microprocessor. 4. Compare and contrast different processor modes. 5. Use interrupts mechanism in applications 6. Differentiate between Microprocessors and Microcontrollers. 7. Identify and analyze the tools and techniques used to design, implement, and debug microprocessor-based systems.

210255:	Principles of Programming Languages	**Course Objectives:** 1. To learn basic principles of programming languages and programming paradigms. 2. To learn structuring the data and manipulation of data, computation and program structure. 3. To learn Object Oriented Programming (OOP) principles using Java Programming Language. 4. To learn basic concepts of logical and functional programming language. **Course Outcomes:** 1. Make use of basic principles of programming languages. 2. Develop a program with Data representation and Computations. 3. Develop programs using Object Oriented Programming language : Java. 4. Develop application using inheritance, encapsulation, and polymorphism. 5. Demonstrate Multithreading for robust application development. 6. Develop a simple program using basic concepts of Functional and Logical programming paradigm.
207005	Engineering Mathematics - III	**Course Objectives:** 1. To make the students familiarize with concepts and techniques in Ordinary differential equations, Fourier Transform, Z-Transform, Numerical methods, Vector calculus and functions of a Complex variable. 2. The aim is to equip them with the techniques to understand advanced level mathematics and its applications that would enhance analytical thinking power, useful in their disciplines. **Course Outcomes:** **On completion of the course, learner will be able to –** 1. CO1: Solve higher order linear differential equation using appropriate techniques for modell electrical circuits and control systems. 2. CO2: Apply concept of Fourier transform & Z-transform and its applications to continuous signal & image processing and communication systems. 3. CO3: Obtain Interpolating polynomials, numerically differentiate and integrate functions, nu of differential equations using single step and multi-step iterative methods used in modern s computing. 4. CO4: Perform vector differentiation & integration, analyze the vector fields and apply to ele fields & wave theory. 5. CO5: Analyze Complex functions, Conformal mappings, Contour integration applicable to e digital filters, signal and image processing.

204181	Electronic Circuits	Course Objectives: To make the students understand 1. Semiconductor device MOSFET, its characteristics, parameters & applications. 2. Concepts of feedbacks in amplifiers & oscillators. 3. Operational amplifier, concept, parameters & applications. 4. ADC, DAC as an interface between analog & digital domains. 5. Voltage to current and current to voltage converters. 6. Concepts, characteristics & applications of PLL. Course Outcomes: On completion of the course, learner will be able to - 1. CO1: Assimilate the physics, characteristics and parameters of MOSFET towards its application as amplifier. 2. CO2: Design MOSFET amplifiers, with and without feedback, & MOSFET oscillators, for given specifications. 3. CO3: Analyze and assess the performance of linear and switching regulators, with their variants, towards applications in regulated power supplies. 4. CO4: Explain internal schematic of Op-Amp and define its performance parameters. 5. CO5: Design, Build and test Op-amp based analog signal processing and conditioning circuits towards various real time applications. 6. CO6: Understand and compare the principles of various data conversion techniques and PLL with their
204182	**Digital Circuits**	**Course Objectives:** To make the students understand 1. The fundamental principles of two-valued logic and various devices used to implement logical operations on variables. 2. Boolean algebra, Karnaugh maps and its application to the design and characterization of digital circuits. 3. To analyze logic processes and implement logical operations using combinational logic circuits. 4. The principles of logic design and use of simple memory devices, flip-flops, and sequential circuits. 5. Concepts of sequential circuits and to analyze sequential systems in terms of state machines. 6. System design approach using programmable logic devices.

		Course Outcomes: On completion of the course, learner will be able to - 1. CO1: Identify and prevent various hazards and timing problems in a digital design. 2. CO2: Use the basic logic gates and various reduction techniques of digital logic circuit. 3. CO3: Analyze, design and implement combinational logic circuits. 4. CO4: Analyze, design and implement sequential circuits. 5. CO5: Differentiate between Mealy and Moore machines. 6. CO6: Analyze digital system design using PLD.
204183	Electrical Circuits	**Course Objectives:** 1. To analyze simple DC and AC circuits with circuit simplification techniques. 2. To formulate and analyze driven and source free RL and RC circuits. 3. To formulate & determine network parameters for given network. 4. To understand the constructional details, characteristics, features and application ar electric motors. **Course Outcomes:** On completion of the course, learner will be able to - 1. CO1: Analyze the simple DC and AC circuit with circuit simplification techniques. 2. CO2: Formulate and analyze driven and source free RL and RC circuits. 3. CO3: Formulate & determine network parameters for given network and analyze th Laplace Transform to find the network transfer function. 4. CO4: Explain construction, working and applications of DC Machines / Single Phas Motors. 5. CO5: Explain construction, working and applications of special purpose motors & u electrical vehicles. 6. CO6: Analyze and select a suitable motor for different applications.
204184	Data structures	**Course Objectives:** To learn basic concepts of C Programming language. 1. To learn different sorting and searching algorithms and their analysis. 2. To learn linear data structures: Stack and Queue, Linked List and their applications. 3. To learn nonlinear data structures: Tree, Graph and their applications. 4. To study the systematic ways of solving problem, various methods of organizing lar data. 5. To solve problems using data structures such as binary tree, binary search tree, and programs. **Course Outcomes:** On completion of the course, learner will be able to - 1. CO1: Solve mathematical problems using C programming language. 2. CO2: Implement sorting and searching algorithms and calculate their complexity. 3. CO3: Develop applications of stack and queue using array. 4. CO4: Demonstrate applicability of Linked List. 5. CO5: Demonstrate applicability of nonlinear data structures - Binary Tree with resp complexity. 6. CO6: Apply the knowledge of graph for solving the problems of spanning tree and s algorithm.

204191	Signals & Systems	**Course Objectives:** 1. To understand the mathematical representation of continuous and discrete time sign 2. To classify signals and systems into different categories. 3. To analyze Linear Time Invariant (LTI) systems in time and transform domains. 4. To build basics for understanding of courses such as signal processing, control syste communication. 5. To develop basis of probability and random variables. **Course Outcomes:** On completion of the course, learner will be able to - 1. CO1: Identify, classify basic signals and perform operations on signals. 2. CO2: Identify, Classify the systems based on their properties in terms of input outpu terms of impulse response and will be able to determine the convolution between to 3. CO3: Analyze and resolve the signals in frequency domain using Fourier series and Transform. 4. CO4: Resolve the signals in complex frequency domain using Laplace Transform, a apply and analyze the LTI systems using Laplace Transforms. 5. CO5: Define and Describe the probability, random variables and random signals. C probability of a given event, model, compute the CDF and PDF. 6. CO6: Compute the mean, mean square, variance and standard deviation for given ra using PDF.
204192	Control Systems	**Course Objectives:** 1. To Introduce elements of control system and their modeling using various Techniqu 2. To get acquainted with the methods for analyzing the time response and Stability of 3. To Introduce and analyze the frequency response and Stability of System 4. To Introduce concept of root locus, Bode plots, Nyquist plots. 5. To Introduce State Variable Analysis method. 6. To get acquainted with Concepts of PID controllers and IoT based Industrial Au **Course Outcomes:** On completion of the course, learner will be able to - 1. CO1: Determine and use models of physical systems in forms suitable for use in the of control systems. 2. CO2: Determine the (absolute) stability of a closed-loop control system. 3. CO3: Perform time domain analysis of control systems required for stability analysi 4. CO4: Perform frequency domain analysis of control systems required for stability a 5. CO5: Apply root-locus, Frequency Plots technique to analyze control systems. 6. CO6: Express and solve system equations in state variable form. 7. CO7: Differentiate between various digital controllers and understand the role of th Industrial automation.
204193	Principles of Communicatio n Systems	**Course Objectives:** 1. To equip/ familiarize students with basic mathematical tools for time and frequency of communication signal and systems. 2. To acquaint the students with the fundamental principles of modulation process and amplitude and angle modulation systems. 3. To introduce the students with the concept of Sampling theorem and pulse modulati PAM, PWM, PPM. 4. To impart pre-requisites of digital communication systems and explore digital repre techniques like PCM, DPCM, DM and ADM. 5. To highlight the issues in baseband digital transmission such as data representation, multiplexing and ISI.

		Course Outcomes: On completion of the course, learner will be able to - 1. CO1: To compute & compare the bandwidth and transmission power requirements and frequency domain spectra of signal required for modulation schemes under stud 2. CO2: Describe and analyze the techniques of generation, transmission and reception Modulation Systems. 3. CO3: Explain generation and detection of FM systems and compare with AM syste 4. CO4: Exhibit the importance of Sampling Theorem and correlate with Pulse Modul (PAM, PWM, and PPM). 5. CO5: Characterize the quantization process and elaborate digital representation tech DPCM, DM and ADM). 6. CO6: Illustrate waveform coding, multiplexing and synchronization techniques and importance in baseband digital transmission
204194	Object Oriented Programming	**Course Objectives:** 1. Make the students familiar with basic concepts and techniques of object oriented pr C++ To acquaint the students with the fundamental principles of modulation proces amplitude and angle modulation systems. 2. Develop an ability to write programs in C++ for problem solving. **Course Outcomes:** On completion of the course, learner will be able to - 1. CO1: Describe the principles of object oriented programming. 2. CO2: Apply the concepts of data encapsulation, inheritance in C++. 3. CO3: Understand Operator overloading and friend functions in C++. 4. CO4: Apply the concepts of classes, methods inheritance and polymorphism to writ 5. CO5: Apply Templates, Namespaces and Exception Handling concepts to write pro 6. CO6: Describe and use of File handling in C++.