Vision:

To be a valuable resource for industry and society through quality education and research in Computer Engineering.

Mission:

M1: To impart knowledge and inculcate skills by nurturing a conducive learning environment.

M2: To promote research and development in collaboration with industry.

M3: To build a conducive environment for R & D based innovation to serve emerging needs of society.

M4: To develop attitude and inculcate values for character building and holistic development.

Programme Educational Objectives (PEO's):

PEO1: To develop core competencies in the field of Artificial Intelligence & Data Science

PEO2: To inculcate technical and professional skills

PEO3: To develop ability for professional growth

PEO4:

PEO5:

Program Outcomes:

PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization for the solution of complex engineering problems.

PO2: Problem analysis: Identify, formulate, research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: 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 public health and safety, and cultural, societal, and environmental considerations.

PO4: Conduct investigations of complex problems: Use research based knowledge and research methods including design of experiments, analysis & interpretation of data and synthesis of the information to provide valid conclusions.

PO5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling to complex engineering activities, with an understanding of the limitations.

PO6: 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.

PO7: 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.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and team work: Function effectively as an individual, and as member or leader in diverse teams, and in multidisciplinary settings.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with t h e 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.

PO11: 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.

PO12: 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.

Program Specific Outcomes

PSO 1: Interpret data, use software tools to conduct experiments, and apply AI & machine learning techniques to solve multi-disciplinary problems

PSO 2: Apply standard practices, strategies and use appropriate models of data analytics to discover knowledge

PSO 3:

Course Outcomes:

SE – Sem I

Subject 1: Discrete Mathematics (210241)

At the end of this course, Students will be able to

CO210241.1. Formulate problems precisely, solve the problems, apply formal proof techniques, and explain the reasoning clearly.

CO210241.2. **Apply** appropriate mathematical concept sand skills to solve problems in both familiar and unfamiliar situations including those in real-life contexts

CO210241.3.**Design and analyze** real world engineering problems by applying set theory, propositional logic and to construct proofs using mathematical induction

CO214441.4. Specify, manipulate and apply equivalence relations; construct and use functions and apply these concepts to solve new problems

CO210241.5. Calculate numbers of possible outcomes using permutations and combinations; to model and analyze computational processes using combinatorics

CO210241.6. **Model and solve** computing problem using tree and graph and solve problems using appropriate algorithms

CO210241.7. Analyze the properties of binary operations, apply abstract algebra in coding theory and evaluate the algebraic structures.

Subject 2: Fundamentals of Data Structures

At the end of this course, Students will be able to

CO210242.1 CO1: Design the algorithms to solve the programming problems, identify appropriate algorithmic strategy for specific application, and analyze the time and space complexity.

CO210242.2 Discriminate the usage of various structures, **Design**/**Program/Implement** the appropriate data structures; use them in implementations of abstract data types and Identity the appropriate data structure in approaching the problem solution.

CO210242.3 Demonstrate use of sequential data structures- Array and Linked lists to store and process data.

CO210242.4 Understand the computational efficiency of the principal algorithms for searching and sorting and choose the most efficient one for the application

CO210242.5 Compare and **contrast** different implementations of data structures (dynamic and static).

CO210242.6 Understand, Implement and apply principles of data structures-stack and queue to solve computational problems.

Subject 3: Object Oriented Programming

At the end of this course, Students will be able to

CO210243.1 Apply constructs- sequence, selection and iteration; classes and objects, inheritance, use of predefined classes from libraries while developing software

CO210243.2 Design object-oriented solutions for small systems involving multiple objects

CO210243.3 Use virtual and pure virtual function and complex programming situations

CO210243.4 Apply object-oriented software principles in problem solving

CO210243.5 Analyze the strengths of object-oriented programming

CO210243.6 Develop the application using object oriented programming language is (C++)

Subject 4: Computer Graphics

At the end of this course, Students will be able to

CO210244.1. IdentifythebasicterminologiesofComputerGraphicsandinterpretthemathematical foundation of the concepts of computer graphics

CO210244.2. Apply mathematics to develop Computer programs for elementary graphic operations

CO210244.3. Illustrate the concepts of windowing and clipping and **apply** various algorithms to fill and clip polygons

CO210244.4. Understand and **apply** the core concepts of computer graphics, including transformation in two and three dimensions, viewing and projection

CO210244.5. Understand the concepts of color models, lighting, shading models and hidden surface elimination

CO210244.6. Create effective programs using concepts of curves, fractals, animation and gaming

Subject 5: Operating Systems (217521)

On completion of the course, learner will be able to–

CO217521.1 Enlist functions of OS and types of system calls

CO217521.2 Apply process scheduling algorithms to solve a given problem

CO217521.3 Illustrate deadlock prevention, avoidance and recovery

CO217521.4 Explain memory management technique

CO217521.5 Illustrate I/O and file management policies

CO217521.6 Describe Linux process management

SE – Sem II

Subject 1: Statistics (217528)

On completion of the course, learner will be able to–

CO217528.1 Identify the use of appropriate statistical terms to describe data

CO217528.2 Use appropriate statistical methods to collect, organize, display, and analyze relevant data.

CO217528.3 Use distribution functions for random variables

CO217528.4 Distinguish between correlation coefficient and regression

CO217528.5 Understand tests for hypothesis and its significance

Subject 2: Internet of Things (217529)

On completion of the course, learner will be able to–

CO217529.1 Have a thorough understanding of the structure, function and characteristics of computer systems and Understand the structure of various number systems and its application in digital design.

CO217529.2 Develop the skill set to build IoT systems and sensor interfacing.

CO217529.3 Explain the concept of Internet of Things and identify the technologies that make up the internet of things

CO217529.4 Analyze trade-offs in interconnected wireless embedded device networks. Select Appropriate Protocols for IoT Solutions

CO217529.5 Design a simple IoT system comprising sensors by analyzing the requirements of IoT Application

CO217529.6 Identify the Application of IoT in automation of Commercial and Real World examples

Subject 3: Data Structures and Algorithms(210252)

On completion of the course, learner will be able to–

CO210252.1 Identify and articulate the complexity goals and benefits of a good hashing scheme for real-world applications.

CO210252.2 Apply non-linear data structures for solving problems of various domains.

CO210252.3 Design and specify the operations of a nonlinear-based abstract data type and implement them in a high-level programming language.

CO210252.4 Analyze the algorithmic solutions for resource requirements and optimization

CO210252.5 Use efficient indexing methods and multiway search techniques to store and maintain data.

CO210252.6 Use appropriate modern tools to understand and analyze the functionalities confined to the secondary storage.

Subject 4: Software Engineering(210253)

On completion of the course, learner will be able to-

CO210253.1 Analyze software requirements and formulate design solutions for a software.

CO210253.2 Design applicable solutions in one or more application domains using software engineering approaches that integrate ethical, social, legal and economic concerns.

CO210253.3 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.

CO210253.4 Model and design User interface and component-level.

CO210253.5 Identify and handle risk management and software configuration management.

CO210253.6 Utilize knowledge of software testing approaches, approaches to verification and validation.

CO210253.7 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.

Subject 5: Management Information Systems (217530)

On completion of the course, learners will be able to–

CO217530.1: Explain the concepts of Management Information System and Business intelligence for MIS.

CO217530.2: Illustrates the need of information systems in global business and ethical issues.

CO217530.3: List the IT infrastructure components and explain security in the Information System.

CO217530.4: Demonstrate the importance of project management and extend its use in the international information system.

CO217530.5: Illustrate the concepts of decision support systems for business applications.

CO217530.6: Relate artificial intelligence and data science for Management Information System

TE – Sem I

Subject 1: 310241: Database Management Systems

On completion of the course, learners should be able to

CO310241.1: Analyze and design Database Management System using ER model

CO310241.2: Implement database queries using database languages

CO310241.3: Normalize the database design using normal forms

CO310241.4: Apply Transaction Management concepts in real-time situations

CO310241.5: Use NoSQL databases for processing unstructured data

CO310241.6: Differentiate between Complex Data Types and analyze the use of appropriate data types

Subject 2: Computer Networks (317521)

On completion of the course, learner will be able to

CO317521.1: Summarize fundamental concepts of Computer Networks, architectures, protocols and technologies

CO317521.2: Analyze the working of physical layer protocols.

CO317521.3: Analyze the working of different routing protocols and mechanisms

CO317521.4: Implement Client-server applications using sockets

CO317521.5: Illustrate role of application layer with its protocols, client-server architectures

CO317521.6:Summarize Concepts of MAC and ethernet.

Subject 3: Web Technology (310252)

On completion of the course, learners should be able to

CO310252.1: Implement and analyze behavior of web pages using HTML and CSS

CO310252.2: Apply the client side technologies for web development

CO310252.3: Analyze the concepts of Servlet and JSP

CO310252.4: Analyze the Web services and frameworks

CO310252.5: Apply the server side technologies for web development

CO310252.6: Create the effective web applications for business functionalities using latest web development platforms

Subject 4: Artificial Intelligence (310253)

After completion of the course, students should be able to

CO310253.1: Identify and apply suitable intelligent agents for various AI applications

CO310253.2: Build smart system using different informed search / uninformed search or heuristic approaches

CO310253.3: Identify knowledge associated and represent it by ontological engineering to plan a strategy to solve given problem

CO310253.4: Apply the suitable algorithms to solve AI problems

CO310253.5: Implement ideas underlying modern logical inference systems

CO310253.6: Represent complex problems with expressive yet carefully constrained language of representation

Subject 5: Elective I : Embedded Systems and Security(317522(A))

On completion of the course, learner will be able to–

CO317522(A).1: Differentiate between Embedded System & general computing systems

CO317522(A).2: Describe ARM MCU Architecture and its features

CO317522(A).3: Design Embedded firmware using Embedded C

CO317522(A).4: Apply the fundamentals of RTOS to design Embedded Systems

CO317522(A).5: Build the Embedded Linux based Embedded System

CO317522(A).6: Summarize Embedded system security threats and solutions

Subject 5: Elective I : Design Thinking(314445 (C))

On completion of the course, learner will be able to–

CO314445 (C) .1: Identify needs and features of design thinking.

CO314445 (C) .2: Identify the opportunities and challenges for design thinking innovation.

CO314445 (C) .3: Learn the process of design thinking using various tools.

CO314445 (C) .4: Summarize and learn the various prototyping techniques.

CO314445 (C) .5: Enlist the activities carried out in Test and reflect phase of design thinking.

CO**314445 (C) .**6: Interpret the design thinking of disruptive innovations through case studies.

Subject 5: Elective I : Pattern Recognition 317522(B)

On completion of the course, learner will be able to–

CO317522(B).1: Distinguish variety of pattern recognition, classification and combination techniques.
CO317522(B).2: Apply statistical pattern recognition approaches in a variety of problems.
CO317522(B).3: Elaborate different approaches of syntactic pattern recognition.
CO317522(B).4: Differentiate graphical approach and grammatical inferences in syntactic pattern recognition.
CO317522(B).5: Illustrate the artificial neural network-based pattern recognition
CO317522(B).6: Apply unsupervised learning in pattern recognition

Subject 5 : Elective I : Human Computer Interface 310245(B)

On completion of the course, learners should be able to

CO310245(B).1: Design effective Human-Computer-Interfaces for all kinds of users
CO310245(B).2: Apply and analyze the user-interface with respect to golden rules of interface
CO310245(B).3: Analyze and evaluate the effectiveness of a user-interface design
CO310245(B).4: Implement the interactive designs for feasible data search and retrieval
CO310245(B).5: Analyze the scope of HCI in various paradigms like ubiquitous computing, virtual reality ,multimedia, World wide web related environments
CO310245(B).6: Analyze and identify user models, user support, and stakeholder requirements of HCI systems

TE – Sem II

Subject 1: Data Science 317529

On completion of the course, learner will be able to–

CO317529.1: Analyze needs and challenges for Data Science

CO317529.2: Apply statistics for Data Analytics

CO317529.3: Apply the lifecycle of Data analytics to real world problems

CO317529.4: Implement Data Analytics using Python programming

CO317529.5: Implement data visualization using visualization tools in Python programming

CO317529.6: Design and implement Big Databases using the Hadoop ecosystem

Subject 2: Cyber Security 317530

On completion of the course, learner will be able to–

CO317530.1: Gauge the security protections and limitations provided by today's technology.

CO317530.2: Identify cyber security threats.

CO317530.3: Analyze threats in order to protect or defend it in cyberspace from cyber-attacks.

CO317530.4: Build appropriate security solutions against cyber-attacks

Subject 3: Artificial Neural Network 317531

On completion of the course, the learner will be able to–

CO317531.1: Understand the basic features of neural systems and be able to build the neural model.

CO317531.2: Perform the training of neural networks using various learning rules.

CO317531.3: Grasping the use of Associative learning Neural Network

CO317531.4: Describe the concept of Competitive Neural Networks

CO317531.5: Implement the concept of Convolutional Neural Networks and its models

CO317531.6: Use a new tool /tools to solve a wide variety of real-world problems

Subject 4: Elective II : Robotics and Automation 317532(A)

On completion of this course, the learner will be able to –

CO317532(A).1 – Demonstrate the Sensors, actuators, End effectors,

CO317532(A). 2 – Analyze Robot Kinematics and Dynamics with simulation

CO317532(A).3 – Summarize control laws for simple robot

CO317532(A).4 – Develop robot program for robot application

Subject 5: Elective II : Natural Language Processing 317532(B)

On completion of the course, learner will be able to–

CO317532(B).1: Understand the fundamental concepts in field of NLP

CO317532(B).2: Understand morphological aspect and processing in NLP

CO317532(B).3: Distinguish among various techniques of syntax parsing

CO317532(B).4: Understand use of various parsing techniques to parse sentences and extract meaning from its structure.

CO317532(B).5: Apply different Machine translation techniques for translating a source to target language(s)

CO317532(B).6: Design and implement different application using NLP

Subject 6: Elective II : Cloud Computing 310254(C)

On completion of the course, learners should be able to

CO310254(C).1: Understand the different Cloud Computing environment

CO310254(C).2: Use appropriate data storage technique on Cloud, based on Cloud application

CO310254(C).3: Analyze virtualization technology and install virtualization software

CO310254(C).4: Develop and deploy applications on Cloud

CO310254(C).5: Apply security in cloud applications

CO310254(C).6: Use advance techniques in Cloud Computing

Subject 7: Elective II : Software Modeling and Architecture 310254(D)

On completion of the course, learners should be able to

CO310254(D).1: Analyze the problem statement (SRS) and choose proper design technique for designing web-based/ desktop application

CO310254(D).2: Design and analyze an application using UML modeling as fundamental tool

CO310254(D).3: Evaluate software architectures

CO310254(D).4: Use appropriate architectural styles and software design patterns

CO310254(D).5: Apply appropriate modern tool for designing and modeling