

Program Outcomes (POs)

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

PO2-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.

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 the public health and safety, and the cultural, societal, and environmental considerations.

PO4-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.

PO5-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.

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 a member or leader in diverse teams, and in multidisciplinary settings.

PO10-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.

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 (PSOs):

- PSO-1:** Design and develop computer programs/computer-based systems in the areas related to algorithms, networking, web design, cloud computing, IoT and data analytics of varying complexity.
- PSO-2:** Acquaint with the contemporary trends in industrial/research settings and thereby innovate novel solutions to existing problems.
- PSO-3:** Apply standard Software Engineering practices and strategies in real-time software project development using open-source programming environment or commercial environment to deliver quality product for the organization success.

Program Educational Objectives (PEOs):

- PEO-1:** Graduates will be successful in foundational and modern computing practices, integrate into the local and global workforce, promote growth and prosperity of the regional economy in the state and national level, and have passion for the profession and its growth.
- PEO-2:** Graduates will continue to demonstrate the professional skills and communicative abilities necessary to be competent employees, assume leadership roles, and have career success and satisfaction.
- PEO-3:** Graduates will become productive members of society with high ethical and professional standards, who make sound technical or managerial decisions.

Course Outcomes (CO)

Course Code: CS301

Course Title: Data Structure and Algorithm

- CO-1:** Ability to select the data structures that efficiently model the information in a problem.
- CO-2:** Ability to assess efficiency trade-offs among different data structure implementations or combinations.
- CO-3:** Implement and know the application of algorithms for sorting and pattern matching.
- CO-4:** Design programs using a variety of data structures, including hash tables, binary and general tree structures, search trees, tries, heaps, graphs, and AVL-trees.

Course Code: IT301

Course Title: Object Oriented Programming

- CO-1:** Understand the concept of OOP as well as the purpose and usage principles of inheritance, polymorphism, encapsulation and method overloading.
- CO-2:** Identify classes, abstract classes, objects, members of a class and the Relationships among them needed for a specific problem.
- CO-3:** Create Java application programs using sound OOP practices (e.g., interfaces and APIs) and proper program structuring (e.g., by using access control identifies, automatic documentation through comments, error exception handling multithreaded applications with Synchronization).
- CO-4:** Develop programs using the Java Collection API as well as the Java standard class library.
- CO-5:** Develop the skills to apply java programming in problem solving and design GUI based applications.

Course Code: EC301

Course Title: Basic Electronics

- CO-1:** Apply the concepts of PN junction and special purpose diode to describe operation of basic diode circuits and to draw input-output waveforms.
- CO-2:** Explain configuration, biasing, characteristics, parameters and application of transistor.
- CO-3:** Describe modes, parameter, feedback and applications of operational amplifier.
- CO-4:** Design digital circuits using logics gates with precise output and optimum use of logic gates.
- CO-5:** Classify power devices and transducers with respect to applications and state applications of transducer.
- CO-6:** List basic components of electronics communication system, distinguish between transmission medias, describe need of modulation and draw architecture of GSM.

Course Code: EC302

Course Title: Digital Electronics & Logic Design

- CO-1:** Develop the understanding of number system and its application in digital electronics and compare different types of logic families which are the basic unit of different types of logic gates in the domain of economy, performance and efficiency.
- CO-2:** Develop and analyze of K-map to solve the Boolean function to the simplest form for the implementation of compact digital circuits and Design various combinational circuits using gates.
- CO-3:** Design various sequential circuits using various metrics: switching speed, throughput/latency, gate count and area, energy dissipation and power.

CO-4: Apply the fundamental knowledge of analog and digital electronics to get different types analog to digitalized signal and vice-versa converters in real world with different changing circumstances.

CO-5: Assess the nomenclature and technology in the area of memory devices and apply the memory devices in different types of digital circuits for real world application.

Course Code: BSC301

Course Title: Mathematics-III

CO-1: Understand and apply the concepts in Laplace Transform.

CO-2: Understand and apply the concepts in Fourier Transform.

CO-3: Understand and apply the concepts in Z-transform

Course Code: BSC302

Course Title: Environmental Science

CO-1: Gain knowledge about environment and ecosystem.

CO-2: Students will learn about natural resource, its importance and environmental impacts of human activities on natural resource.

CO-3: Gain knowledge about the conservation of biodiversity and its importance.

CO-4: Aware students about problems of environmental pollution, its impact on human and ecosystem and control measures.

CO-5: Students will learn about increase in population growth and its impact on environment

Course Code: CS401

Course Title: Operating System

CO-1: Outline various concepts and features of Operating systems.

CO-2: Compare various operating systems with respect to characteristics and features.

CO-3: Implement algorithm of CPU Scheduling, Memory Management and disk scheduling.

CO-4: Make changes in the OS configurations as per need.

Course Code: CS402

Course Title: Design & Analysis of Algorithms

- CO-1:** Ability to analyze the performance of algorithms.
- CO-2:** Ability to choose appropriate algorithm design techniques for solving problems.
- CO-3:** Ability to understand how the choice of data structures and the algorithm design methods impact the performance of programs.

Course Code: CS403

Course Title: Formal Language and Automata Theory

- CO-1:** Design finite automata without output like DFA, NFA, ϵ -NFA and finite automata with output like Moore and mealy machines and also conversions among them like (NFA to DFA). (Synthesis).
- CO-2:** Recognize about regular expressions, pumping lemma for regular languages and closure properties of regular languages. (Knowledge).
- CO-3:** Define CFG, derivations (Leftmost & Rightmost) and draw parse trees and gain Knowledge on Ambiguity in Grammars. (Knowledge).
- CO-4:** Define and design a PDA for a given CFL. Prove the equivalence of CFG and PDA and their inter-conversions. (Knowledge).
- CO-5:** Illustrate CFG normal forms, Use pumping lemma to prove that a language is not a CFL and Define and design TM for a given computation. (Comprehension).
- CO-6:** Differentiate between decidability and undecidability, Generalize Turing Machines into universal TMs (Analysis)

Course Code: BSC401

Course Title: Discrete Mathematics

- CO-1:** Ability to apply mathematical logic to solve problems.
- CO-2:** Understand sets, relations, functions and discrete structures.
- CO-3:** Able to use logical notations to define and reason about fundamental mathematical concepts such as sets relations and functions.
- CO-4:** Able to formulate problems and solve recurrence relations.
- CO-5:** Able to model and solve real world problems using graphs and trees.

Course Code: IT401

Course Title: Database Management System

- CO-1:** Gain knowledge of fundamentals of DBMS, database design and normal forms.
- CO-2:** Master the basics of SQL for retrieval and management of data.
- CO-3:** Be acquainted with the basics of transaction processing and concurrency control.
- CO-4:** Familiarity with database storage structures and access techniques.

Course Code: IT402

Course Title: Cyber Security

- CO-1:** Understand the various tools and methods used in cybercrime.
- CO-2:** Identify risk management processes, risk treatment methods, organization of information security.
- CO-3:** Classify cyber security solutions and information assurance.
- CO-4:** Examine software vulnerabilities and security solutions to reduce risk of exploitation.
- CO-5:** Analyze the cyber security needs of an organization.

Course Code: CSC501

Course Title: Computer Organization & Architecture

- CO-1:** Ability to describe the organization of computer and machine instructions and programs.
- CO-2:** Ability to analyze Input / Output Organization.
- CO-3:** Analyze the working of the memory system and basic processing unit.
- CO-4:** Ability to solve problems of multi cores, multiprocessors and clusters.
- CO-5:** Choose optical storage media suitable for multimedia applications.

Course Code: CSC502

Course Title: Compiler Design

- CO-1:** Identify the issue that arises in the design and construction of translator for programming language.
- CO-2:** Analyze RE and CFG to specify the lexical and syntactic structure of programming language.
- CO-3:** Design different parsers from given specification.

CO-4: Assess the various program transformations.

CO-5: Design a compiler for a programming language.

Course Code: CSC503

Course Title: Computer Graphics

CO-1: Understand the basics of computer graphics, different graphics systems and applications of computer graphics.

CO-2: Discuss various algorithms for scan conversion and filling of basic objects and their comparative analysis.

CO-3: Use of geometric transformations on graphics objects and their application in composite form.

CO-4: Extract scene with different clipping methods and its transformation to graphics display device.

CO-5: Render projected objects to naturalize the scene in 2D view and use of illumination models for this.

Course Code: ITP501

Course Title: Web Technology

CO-1: Describe various web technology and application development issues and trends.

CO-2: Design static and dynamic web pages using HTML, CSS and Java Script.

CO-3: Design and implement web services from the server and client side.

CO-4: Build interactive Web applications using JSP and Servlet.

CO-5: Identify the engineering structural design of XML and parse construction tree model.

Course Code: ITO502

Course Title: Data Communication

CO-1: Understand the importance of data communication, the Layered architecture of Open System Interconnection (OSI) and Transmission Control Protocol / Internet Protocol (TCP/IP) models.

CO-2: Understand conversion of signals from Digital to Digital, Analog to Digital & Digital to Analog conversion, bandwidth utilization techniques.

CO-3: Understand Error detection and correction techniques, Flow control & error control and DLC services.

CO-4: Understand operations of Channelization protocols, Random Access protocols and Wired & Wireless LAN.

CO-5: Understand the working of 802.11, Cellular Telephony, Bluetooth, IPv4 and IPv6 Addresses.

Course Code: CSC601

Course Title: Computer Network

CO-1: Describe and analyze the importance of data communications and the layered protocol model.

CO-2: Describe, analyze and evaluate a number of data link, network, and transport layer protocols and network devices.

CO-3: Have a basic knowledge of the use of cryptography and network security.

CO-4: Explain concepts and theories of networking and apply them to various situations, classifying networks, analyzing performance and implementing new technologies.

Course Code: CSC602

Course Title: Data Science

CO-1: To enable students with data analytics skill.

CO-2: To develop knowledge of fundamentals of data science.

CO-3: To empower students with hands-on for data science.

CO-4: To make students experience with theoretical data science and programming.

Course Code: CSC603

Course Title: Image Processing

CO-1: To study the image fundamentals and image transforms necessary for image processing.

CO-2: To study the image enhancement techniques.

CO-3: To study the image restoration procedures and segmentation tools.

CO-4: To study the wavelet tools and the image compression procedures.

Course Code: CSC605

Course Title: System Software

- CO-1:** Explain the organization of basic computer, its design and the design of control unit.
- CO-2:** Understand the organization of memory and memory management hardware.
- CO-3:** Distinguish between Operating Systems software and Application Systems software.
- CO-4:** Identify the primary functions of an Operating System.
- CO-5:** Master attributes and assessment of quality, reliability and security of software.

Course Code: ITO602

Course Title: Internet of Things

- CO-1:** Explain the concept of IoT.
- CO-2:** Illustrate key technology, protocols and standard of IoT.
- CO-3:** Analyze tradeoff in interconnected wireless embedded device networks.
- CO-4:** Understand application of IoT in automation of commercial and real-world examples.
- CO-5:** Design a simple IoT system comprising sensors, edge devices and wireless networks involving prototyping, programming and data analytics.

Course Code: CSC701

Course Title: Artificial Intelligence

- CO-1:** Design basic concept of artificial intelligence, AI principles, AI task domain and application.
- CO-2:** Explain various searching techniques, constraint satisfaction problem, game playing techniques and Apply these techniques in applications which involve perception, reasoning and learning.
- CO-3:** Explain working of uncertainty management, decision making and learning methods.
- CO-4:** Apply different knowledge representation, reasoning, and learning techniques to real-world problems.

Course Code: CSP702

Course Title: Machine Learning

- CO-1:** Discuss fundamental of machine learning, design and its application.
- CO-2:** Differentiate various learning approaches, and to interpret the concepts of different learning.

- CO-3:** Illustrate and apply clustering algorithms and identify its applicability in real life problems.
- CO-4:** Discuss basics of neural network and its different model.
- CO-5:** Describe different optimizations algorithm.

Course Code: ITP706

Course Title: Information Security

- CO-1:** Recognize propensity of errors and remedies in processes involving information technology.
- CO-2:** Consummate knowledge of risk and controls in IT operation in industry.
- CO-3:** Determine IT security guidelines for various type of industries.
- CO-4:** Evaluate asset safeguarding, data integrity, system effectiveness and system efficiency.
- CO-5:** Understand software security auditing including database security audit, network security audit, and micro computer security audit.

Course Code: ITO708

Course Title: Information Security

- CO-1:** Ability to identify the minimum requirements for the development of application.
- CO-2:** Ability to develop, maintain, efficient, reliable and cost effective software solutions.
- CO-3:** Ability to critically thinking and evaluate assumptions and arguments.

Course Code: CSO712

Course Title: Cryptography

- CO-1:** Explain the basics of network security and compare various encryption techniques.
- CO-2:** Summarize the functionality of public key cryptography.
- CO-3:** Apply various message authentication functions and secure algorithms.
- CO-4:** Demonstrate different types of security systems and describe different levels of security and services.