



Department of Computer Science & Engineering

Course Outcomes (CO)

Semester III

3KS01 ENGINEERING MATHEMATICS-III

After successfully completing the course, the students will be able to:

- CO 1. Demonstrate the knowledge of differential equations and linear differential equations.
- CO 2. Apply Laplace transform to solve differential equations.
- CO 3. Demonstrate the use of Fourier Transform to connect the time domain and frequency domain.
- CO 4. Demonstrate the basic concepts of probability and statistics.
- CO 5. Apply the knowledge of Complex Analysis.
- CO 6. Apply the knowledge of vector calculus to solve physical problems.

3KS02 DISCRETE STRUCTURE AND GRAPH THEORY

After successfully completing the course, the students will be able to:

- CO 1. Demonstrate the knowledge of differential equations and linear differential equations.
- CO 2. Apply Laplace transform to solve differential equations.
- CO 3. Demonstrate the use of Fourier Transform to connect the time domain and frequency domain.
- CO 4. Demonstrate the basic concepts of probability and statistics.
- CO 5. Apply the knowledge of Complex Analysis.
- CO 6. Apply the knowledge of vector calculus to solve physical problems.



3KS03 OBJECT ORIENTED PROGRAMMING

After successfully completing the course, the students will be able to:

- CO 1. Apply Object Oriented approach to design software.
- CO 2. Implement programs using classes and objects.
- CO 3. Specify the forms of inheritance and use them in programs.
- CO 4. Analyze polymorphic behaviour of objects.
- CO 5. Design and develop GUI programs.
- CO 6. Develop Applets for web applications

3KS04 DATA STRUCTURES

After successfully completing the course, the students will be able to:

- CO 1. Apply various linear and nonlinear data structures
- CO 2. Demonstrate operations like insertion, deletion, searching and traversing on various data structures
- CO 3. Examine the usage of various structures in approaching the problem solution.
- CO 4. Choose appropriate data structure for specified problem domain

3KS05 ANALOG & DIGITAL ELECTRONICS

After successfully completing the course, the students will be able to:

- CO 1. Explain basic concepts of semiconductor devices and its application.
- CO 2. Compare different Number System and basics of conversion of number systems.
- CO 3. Realize different minimization technique to obtain minimized expression.
- CO 4. Design Combinational Circuits.
- CO 5. Design and Develop Sequential Circuits.

3KS06 OBJECT ORIENTED PROGRAMMING – LAB

After successfully completing the course, the students will be able to:

- CO 1. Design, implement, test, and debug simple programs in an object-oriented programming language.



CO 2. Interpret the basics of object-oriented design and the concepts of encapsulation, abstraction, inheritance, and polymorphism

CO 3. Build applications in Java by applying concepts like interfaces, packages and exception handling.

CO 4. Make use of Java concepts like API, Applets, and AWT.

3KS07 DATA STRUCTURE – LAB

After successfully completing the course, the students will be able to:

CO 1. Apply various linear and nonlinear data structure.

CO 2. Demonstrate operations like insertion, deletion, searching and traversing on various data structures

CO 3. Examine the usage of various structures in approaching the problem solution.

CO 4. Choose appropriate data structure for specified problem domain

3KS08 ANALOG & DIGITAL ELECTRONICS – LAB

After successfully completing the lab, the students will be able to

CO 1. Apply practically the concepts of analog and digital electronics.

CO 2. Explain the operation and characteristics of semiconductor devices.

CO 3. Illustrate the operation of various logic gates and their implementation using digital IC's.

CO 4. Design and implement various combinational logic circuits.

CO 5. Design and implement various sequential logic circuits

3KS09 C SKILL - LAB – I

After successfully completing the course, the students will be able to:

CO 1. Describe the Numbers, Math functions, Strings, List, Tuples and Dictionaries in Python



CO 2. Interpret different Decision Making statements, Functions, Object oriented programming in Python

CO 3. Summarize different File handling operations

CO 4. Explain how to design GUI Applications in Python and evaluate different database operations

CO 5. Develop applications using Django framework or Flask

Semester IV

4KS01 ARTIFICIAL INTELLIGENCE

After successfully completing the course, the students will be able to:

CO 1. Explain concepts of Artificial Intelligence and different types of intelligent agents and their architecture.

CO 2. Formulate problems as state space search problem & efficiently solve them.

CO 3. Summarize the various searching techniques, constraint satisfaction problem and example problems - game playing techniques.

4KS02 DATA COMMUNICATION AND NETWORKING

After successfully completing the course, the students will be able to:

CO 1. Describe data communication Components, Networks, Protocols and various topology based network architecture

CO 2. Design and Test different encoding and modulating techniques to change digital –to-digital conversion, analog-to-digital conversion, digital to analog conversion, analog to analog conversion,

CO 3. Explain the various multiplexing methods and evaluate the different error detection & correction Techniques.



CO 4. Illustrate and realize the data link control and data link protocols.

CO 5. Describe and demonstrate the various Local area networks and the IEEE standards.

4KS03 OPERATING SYSTEM

After successfully completing the course, the students will be able to:

CO 1. Explain memory management issues like external fragmentation, internal fragmentation.

CO 2. Illustrate multithreading and its significance.

CO 3. List various protection and security mechanisms of OS.

CO 4. Analyze and solve the scheduling algorithms.

CO 5. Analyze the deadlock situation and resolve it.

CO 6. Compare various types of operating systems.

4KS04 MICROPROCESSOR & ASSEMBLY LANGUAGE PROGRAMMING

After successfully completing the course, the students will be able to:

CO 1. Describe 8086 microprocessor and its architecture; also understand instruction processing during the fetch-decode-execute cycle.

CO 2. Design and Test assembly language programs using 8086 microprocessor instruction set.

CO 3. Demonstrate the implementation of standard programming constructs, including control structures And functions, in assembly language.

CO 4. Illustrate and realize the Interfacing of memory & various I/O devices with 8086 microprocessor.

CO 5. Explain the basic concepts of Internet of Things.

4KS05 THEORY OF COMPUTATION

After successfully completing the course, the students will be able to:

CO 1. To construct finite state machines to solve problems in computing.

CO 2. To write regular expressions for the formal languages.



- CO 3. To construct and apply well defined rules for parsing techniques in compiler
- CO 4. To construct and analyze Push Down, Turing Machine for formal languages
- CO 5. To express the understanding of the Chomsky Hierarchy.
- CO 6. To express the understanding of the decidability and un-decidability problems.

4KS06 DATA COMMUNICATION & NETWORKING LAB

After successfully completing the course, the students will be able to:

- CO 1. Analyze performance of various communication protocols
- CO 2. Implement Configure various network protocols.
- CO 3. Compare IP Address classes of networks

4KS07 OPERATING SYSTEM – LAB

After successfully completing the course, the students will be able to:

- CO 1. Explain memory management issues like external fragmentation, internal fragmentation.
- CO 2. Illustrate multithreading and its significance.
- CO 3. List various protection and security mechanisms of OS.
- CO 4. Analyze and solve the scheduling algorithms.
- CO 5. Analyze the deadlock situation and resolve it.
- CO 6. Compare various types of operating systems

4KS08 MICROPROCESSOR & ASSEMBLY LANG. PROG. – LAB

After successfully completing the course, the students will be able to:

- CO 1. Analyze the internal workings of the microprocessor
- CO 2. Design and develop programs in Assembly Language Programming
- CO 3. Describe 8086 microprocessor and its architecture; also understand instruction processing during the fetch-decode-execute cycle.
- CO 4. Design and Test assembly language programs using 8086 microprocessor instruction set.



CO 5. Demonstrate the implementation of standard programming constructs, including control structures and functions, in assembly language

CO 6. Illustrate and realize the Interfacing of memory & various I/O devices with 8086 microprocessor.

4KS09 C-SKILL-LAB II

After successfully completing the course, the students will be able to:

CO 1. Develop client server program and web applications

CO 2. Make use of project-based experience for web application development.

CO 3. Create embedded systems using Raspberry Pi/Ardino

Semester V

5KS01 DATABASE MANAGEMENT SYSTEMS

After successfully completing the course, the students will be able to:

CO 1. Model, design and normalize databases for real life applications.

CO 2. Discuss data models, conceptualize and depict a database system using ER diagram.

CO 3. Query Database applications using Query Languages like SQL.

CO 4. Design & develop transaction processing approach for relational databases.

CO 5. Understand validation framework like integrity constraints, triggers and assertions.

5KS02 COMPILER DESIGN

After successfully completing the course, the students will be able to:

CO 1. Describe the fundamentals of compiler and various phases of compilers.

CO 2. Design and implement LL and LR parsers



- CO 3. Solve the various parsing techniques like SLR,CLR,LALR.
- CO 4. Examine the concept of Syntax-Directed Definition and translation.
- CO 5. Assess the concept of Intermediate-Code Generation and run-time environment
- CO 6. Explain the concept code generation and code optimization.

5KS03 COMPUTER ARCHITECTURE & ORGANIZATION

After successfully completing the course, the students will be able to:

- CO 1. Discuss basic structure of computer.
- CO 2. Understand the basic operation of CPU.
- CO 3. Compare and select various Memory and I/O devices as per requirement.
- CO 4. Solve the concepts of number representation and their operation.
- CO 5. Explain the concept of parallel processing and pipelining.

5KS04 INTERNET OF THINGS (PE-I)

After successfully completing the course, the students will be able to:

- CO 1. Understand the basics of IoT .
- CO 2. Understand design methodology and platforms involved in IoT
- CO 3. Apply the knowledge to interface various sensors with IoT development
- CO 4. Design and Implement IoT system for real time application



5KS06 DATABASE MANAGEMENT SYSTEMS LAB

After successfully completing the course, the students will be able to:

CO 1. Design ER model for any kind of application.

CO 2. Design and develop database.

CO 3. Apply normalization.

CO 4. Query the database.

CO 5. Apply various integrity constraints

CO 6. Build indices, views

5KS07 COMPILER DESIGN – LAB

After successfully completing the course, the students will be able to:

CO 1. Identify the fundamentals of compiler and its phases.

CO 2. Use the powerful compiler generation tools such as Lex and Yacc.

CO 3. Write a lexical scanner, either from scratch or using Lex.

CO 4. Develop program for solving parser problems.

CO 5. Examine the various optimization techniques.

5KS08 EMERGING TECHNOLOGY LAB I

After successfully completing the course, the students will be able to:

CO 1. To study & understand the use of Arduino Uno board .

CO 2. To learn how to control digital pin output with LED.

CO 3. To learn how to connect & use potentiometer .

CO 4. To learn how to connect & use different sensors.



CO 5. To learn how to connect Bluetooth module with Arduino.

CO 6. To learn how to detect gas using sensor.

5KS09 C-SKILL LAB - III

After successfully completing the course, the students will be able to:

CO 1. Explain the various tools, packages and modules required for Web Development.

CO 2. Discuss the workings of web server, cookies, routes, etc.

CO 3. Develop a mobile application using JS Framework.

CO 4. Design GUI using JS framework and/or Libraries.

CO 5. Create applications using Angular, React, Node and Express.

Semester VI

6KS01 SECURITY POLICY & GOVERNANCE

After successfully completing the course, the students will be able to:

CO 1. List and discuss the key characteristics of Information Security, Leadership and Management

CO 2. Differentiate between Law and Ethics

CO 3. Describe why ethical codes of conduct are important to Information Security

CO 4. Discuss the importance, benefits and desired outcomes of Information Security Governance

CO 5. Discuss the process of developing, implementing and maintaining various types of Information Security Policies.

CO 6. Define Risk Management and its role in the organization.



6KS02 DESIGN AND ANALYSIS OF ALGORITHMS

After successfully completing the course, the students will be able to:

- CO 1. Carry out the analysis of various Algorithms for mainly Time complexity.
- CO 2. Apply design principles and concepts to algorithm design.
- CO 3. Understand different algorithmic design strategies.
- CO 4. Analyze the efficiency of algorithms using time complexity.
- CO 5. Apply the standard sorting algorithms.

6KS03 SOFTWARE ENGINEERING

After successfully completing the course, the students will be able to:

- CO 1. Decide on a process model for a developing a software project
- CO 2. Classify software applications and identify unique features of various domains
- CO 3. Design test cases of a software system.
- CO 4. Understand basics of Project management.
- CO 5. Plan, schedule and execute a project considering the risk management.
- CO 6. Apply quality attributes in software development life cycle.
- CO 7. Understand quality control and to ensure good quality software

6KS05 NATURAL LANGUAGE PROCESSING(PE-II)

After successfully completing the course, the students will be able to:

- CO 1. Understand how to tag a given text with basic Language features
- CO 2. Design an innovative application using NLP components
- CO 3. Implement a rule-based system to tackle morphology/syntax of a language



- CO 4. Design a tag set to be used for statistical processing for real-time applications
- CO 5. Compare and contrast the use of different statistical approaches for different types of NLP applications.
- CO 6. Understand how to extract information from text

6KS06 DESIGN AND ANALYSIS OF ALGORITHMS – LAB

After successfully completing the course, the students will be able to:

- CO 1. Carry out the analysis of various Algorithms for mainly Time complexity.
- CO 2. Apply design principles and concepts to algorithm design.
- CO 3. Understand different algorithmic design strategies.
- CO 4. Analyze the efficiency of algorithms using time complexity.
- CO 5. Apply the standard sorting algorithms.

6KS07 SOFTWARE ENGINEERING LAB

After successfully completing the course, the students will be able to:

- CO 1. Understand basic Software engineering methods and practices, and their appropriate application.
- CO 2. Describe software process models such as the waterfall and evolutionary models.
- CO 3. Discuss role of project management including planning, scheduling and, risk management.
- CO 4. Explain data models, object models, context models and behavioral models.
- CO 5. Understand of different software architectural styles and Process frame work.

6KS09C Skill Lab IV– LAB

After successfully completing the course, the students will be able to:

- CO 1. Install and setup of Jenkins on your systems
- CO 2. Create and run jobs in Jenkins
- CO 3. Add and manage plugins. Use plugins in jobs



CO 4. Create and run pipelines in Jenkins

CO 5. Setup, configure, deploy jobs

Semester VII

7KS01 SOCIAL SCIENCES AND ENGINEERING ECONOMICS

After successfully completing the course, the students will be able to:

CO 1. An ability to understand the importance of social science and economics in professional life.

CO 2. An ability to utilize high-level interpersonal skills to negotiate with stakeholders and maintain cordial relationships with them reflecting the professional ethics and responsibilities.

CO 3. Understanding of professional responsibility with socioeconomic constraints and norms

CO 4. An ability to understand the need of society and design the system to fulfil it with deep analysis.

CO 5. An ability to understand the social science and engage in a lifelong learning process performing better in the group as well as individually.

CO 6. An ability to understand the various culture activities in the society.

7KS02 COMPUTER GRAPHICS

After successfully completing the course, the students will be able to:

CO 1. Describe the basic concepts of Computer Graphics.

CO 2. Demonstrate various algorithms for basic graphics primitives.

CO 3. Apply 2-D geometric transformations on graphical objects.

CO 4. Use various Clipping algorithms on graphical objects



CO 5. Explore 3-D geometric transformations, curve representation techniques and projections methods

CO 6. Explain visible surface detection techniques and Animation

7KS03 CLOUD COMPUTING

After successfully completing the course, the students will be able to:

CO 1. Describe the fundamental concept, architecture and applications of Cloud Computing.

CO 2. Discuss the problems related to cloud deployment model.

CO 3. Examine the concept of virtualization.

CO 4. Identify the role of network connectivity in the cloud.

CO 5. Assess different Cloud service providers.

CO 6. Inspect the security issues in cloud service models.

7KS04 DATA WAREHOUSE AND MINING (PE-IV)

After successfully completing the course, the students will be able to:

CO 1. Explain the basics of data mining techniques.

CO 2. Identify the similarity and dissimilarity between the data sets.

CO 3. Apply Data Preprocessing to techniques.

CO 4. Describe Data Warehouse fundamentals, Data Mining Principles.

CO 5. Illustrate Multidimensional Data Analysis in Cube Space

CO 6. Assess Mining Frequent Patterns, Associations, and Correlations

7KS05 BLOCK CHAIN FUNDAMENTALS (PE-V)

After successfully completing the course, the students will be able to:

CO 1. Understand the concept of decentralization of the block chain with different layers of blockchain

CO 2. Apply basic cryptographic primitives with encryption standards.



CO 3. Analyse & Design Consensus Algorithms.

CO 4. Examine fundamentals of Bitcoin, how Bitcoin transactions are constructed and used with Bitcoin addresses, accounts, and mining

CO 5. Understand foundation, architecture, and use of the Ethereum blockchain.

CO 6. Execute & build block chain application/ transaction

7KS06 COMPUTER GRAPHICS – LAB.

After successfully completing the course, the students will be able to:

CO 1. Describe the basic concepts of Computer Graphics.

CO 2. Demonstrate various algorithms for basic graphics primitives.

CO 3. Apply 2-D geometric transformations on graphical objects.

CO 4. Use various Clipping algorithms on graphical objects.

CO 5. Explore 3-D geometric transformations, curve representation techniques and projections methods

CO 6. Explain visible surface detection techniques and Animation.

7KS07 EMERGING TECHNOLOGY LAB III

After successfully completing the course, the students will be able to:

CO 1. To understand use of Pandas for data science.

CO 2. To define the structure and components of a Pandas program.

CO 3. To learn how to apply different operations on pandas series.

CO 4. To learn how to use different index properties in pandas dataframe.

CO 5. To learn different operations on string values in pandas.

CO 6. To learn how to split the dataframe & get mean, min & max value.



7KS08 EMERGING TECHNOLOGY LAB IV

After successfully completing the course, the students will be able to:

- CO 1. Understand the concept of Hash Function and Cryptographic primitives with practical.
- CO 2. Study the ledger Metamask Practically storing and sending the bitcoin.
- CO 3. Study and understand the Performance of Blockchain And how the chain get created.
- CO 4. Learning the ethereum virtual machine practically and analysis.
- CO 5. study, How we can create smart contract and how we can add the contract into the blockchain
- CO 6. Understanding the concept of how we can create our own private local blockchain network and for that installing plugins and creating an environment.

7KS09 PROJECT AND SEMINAR

After successfully completing the course, the students will be able to:

- CO 1. Identify emerging technologies/current trends to gather relevant information through independent or collaborative study.
- CO 2. Analyse related work and literature in the identified field of study.
- CO 3. Summarize related work and literature in the identified field of study.
- CO 4. Design a clear, well-constructed document that represents both technical and non-technical information using engineering-standard figures, reports and drawings.
- CO 5. Demonstrate effective oral presentations in given time constraints, using a variety of presentation media.
- CO 6. Develop the listening skills and comprehend information, instructions, and viewpoints either as a presenter or as an audience.



Semester VIII

8KS01 OBJECT ORIENTED ANALYSIS AND DESIGN

After successfully completing the course, the students will be able to:

- CO 1. Describe Object Oriented principles, for performing object-oriented analysis and design.
- CO 2. Explain the basic concepts of UML, Software Development Processes and Design pattern.
- CO 3. Illustrate requirements for developing a software.
- CO 4. Create initial domain model & system sequence diagram for use case scenario.
- CO 5. Design static and dynamic objects for modeling.
- CO 6. Construct UML and Design Patterns for developing object-oriented software

8KS02 PROFESSIONAL ETHICS AND MANAGEMENT

After successfully completing the course, the students will be able to:

- CO 1. Relate ethical and non-ethical situations
- CO 2. Outline ethics in the society & environment
- CO 3. Examine the moral judgment & correlate the concepts in addressing the ethical dilemmas
- CO 4. Identify risk and safety measures in various engineering fields
- CO 5. Justify ethical issues related to engineering responsibilities and rights
- CO 6. Synthesize cognitive skills in solving social problems

8KS03 SYSTEM & SOFTWARE SECURITY

After successfully completing the course, the students will be able to:

- CO 1. Relate malicious and non-malicious attacks.



CO 2. Outline web common vulnerabilities, attack mechanisms and methods against computer and information systems.

CO 3. Apply relevant methods for security modeling and analysis of Operating System.

CO 4. Investigate a secure network by monitoring and analyzing the nature of attacks.

CO 5. Explain cryptography, intrusion detection and firewall system

CO 6. Implement different security solutions at various levels such as operating systems, databases and clouds.

8KS04 MODELLING & SIMULATION

After successfully completing the course, the students will be able to:

CO 1. Describe System models & system modelling.

CO 2. Explain continuous system methods of obtaining solutions.

CO 3. Illustrate the need of simulation and mathematical modeling

CO 4. Examine simulation of Queuing System and PERT network.

CO 5. Inspect experimentation of Simulation.

CO 6. List different special purpose languages use for continuous and discrete systems

8KS05 EMERGING TECHNOLOGY LAB V

After successfully completing the course, the students will be able to:

CO 1. Analyze the various networking protocols working.

CO 2. Analyze the effect of various threats in the system.

CO 3. Understanding the effects of network vulnerabilities.

CO 4. Understanding the working of various tools used in network analysis.

CO 5. Analyzing the case study of Attack.

CO 6. Understanding and analyzing the network vulnerabilities.



8KS06 EMERGING TECHNOLOGY LAB VI

After successfully completing the course, the students will be able to:

- CO 1. To study basic concept of modelling & stimulation
- CO 2. To study monte-carlo stimulation.
- CO 3. To study serving queuing system.
- CO 4. To understands forecasting & regression analysis.
- CO 5. To study various reduction techniques
- CO 6. To study the decay models.

8KS07 PROJECT & SEMINAR

After successfully completing the course, the students will be able to:

- CO 1. Competence in applying the software engineering principles in planning, formulating an innovative design/ approach and computing the requirements appropriate to solve the problem within the context of legal, global and environment constraint.
- CO 2. Capability to develop/implement the design with appropriate techniques, resources and contemporary tools exhibiting integrity and ethical behaviour in engineering practice.
- CO 3. Ability to plan, monitor, and manage project schedule, resources, and work assignments to ensure timely completion.
- CO 4. Ability to test and defend performance of the implemented project and understand the Implication of the solution.
- CO 5. Perform professionally as a team member, accepting responsibility, taking initiative, and providing leadership necessary to ensure Project success.
- CO 6. Ability to use formal and informal Communication with team members and guide, make presentation and prepare technical document.