

**DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING (IoT & CYBER SECURITY
INCLUDING BLOCKCHAIN TECHNOLOGY**

Course Outcomes

Second Year : III SEM (REV- 2019 'C' Scheme)

Course Code:	CSC 301
Course:	Applied Mathematics III
CO-1	Understand the concept of Laplace transform and its application to solve the real integrals in engineering problems.
CO-2	Understand the concept of inverse Laplace transform of various functions and its applications in engineering problems.
CO-3	Expand the periodic function by using the Fourier series for real-life problems and complex engineering problems
CO-4	Understand complex variable theory, application of harmonic conjugate to get orthogonal trajectories and analytic functions.
CO-5	Apply the concept of Correlation and Regression to the engineering problems in data science, machine learning, and AI.
CO-6	Understand the concepts of probability and expectation for getting the spread of the data and distribution of probabilities.

Course Code:	CSC 302
Course:	Discrete Structures and Graph Theory
CO-1	Understand the notion of mathematical thinking, mathematical proofs and to apply them in problem solving.
CO-2	Ability to reason logically .
CO-3	Ability to understand relations, functions, Diagraph and Lattice.
CO-4	Ability to understand and apply concepts of graph theory in solving real world problems
CO-5	Understand use of groups and codes in Encoding-Decoding
CO-6	Analyze a complex computing problem and apply principles of discrete mathematics to identify solutions.

Course Code:	CSC 303
Course:	Data Structures
CO-1	Students will be able to implement Linear and Non-Linear data structures
CO-2	Students will be able to handle various operations like searching, insertion, deletion and traversals on various data structures.
CO-3	Students will be able to explain various data structures, related terminologies and its types
CO-4	Students will be able to choose appropriate data structure and apply it to solve problems in various domains.
CO-5	Students will be able to analyze and implement appropriate searching techniques for a given problem.
CO-6	Students will be able to demonstrate the ability to analyze, design, apply and use data structures to solve engineering problems and evaluate their solutions.



Course Code:	CSC 304
Course:	Digital Logic and Computer Architecture
CO-1	To illustrate different number systems and basic structure of computer systems.
CO-2	To demonstrate the arithmetic algorithms.
CO-3	To articulate the basic concepts of digital components and processor organization.
CO-4	To indicate the generation of control signals of computers.
CO-5	To demonstrate the memory organization.
CO-6	To describe the concepts of parallel processing and different Buses.

Course Code:	CSC 305
Course:	Computer Graphics
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.

Course Code:	CSL 301
Course:	Data Structures Lab
CO-1	Students will be able to implement various linear and nonlinear data structures.
CO-2	Students will be able to handle operations like insertion, deletion, searching and traversing on various data structures.

Course Code:	CSL 302
Course:	Digital Logic and Computer Architecture Lab
CO-1	To discern the basics of digital components.
CO-2	Design the basic building blocks of a computer: ALU, registers, CPU and memory.
CO-3	To recognize the importance of digital systems in computer architecture.
CO-4	To implement various algorithms for arithmetic operations.



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Course Code:	CSL 303
Course:	Computer Graphics Lab
CO-1	Implement various output and filled area primitive algorithms
CO-2	Apply transformation, projection and clipping algorithms on graphical objects.
CO-3	Implementation of curve and fractal generation.
CO-4	Develop a Graphical application/Animation based on learned concept

Course Code:	CSL 304
Course:	Skill Lab : Object Oriented Programming Methodology
CO-1	To apply fundamental programming constructs.
CO-2	To illustrate the concept of packages, classes and objects.
CO-3	To elaborate the concept of strings, arrays and vectors.
CO-4	To implement the concept of inheritance and interfaces.
CO-5	To implement the concept of exception handling and multithreading
CO-6	To develop GUI based application

Course Code:	CSM 301
Course:	Mini Project -I A
CO-1	Identify problems based on societal /research needs.
CO-2	Apply Knowledge and skill to solve societal problems in a group.
CO-3	Develop interpersonal skills to work as member of a group or leader
CO-4	Draw the proper inferences from available results through theoretical/ experimental/simulations.
CO-5	Analyze the impact of solutions in societal and environmental context for sustainable development.
CO-6	Use standard norms of engineering practices
CO-7	Excel in written and oral communication.
CO-8	Demonstrate capabilities of self-learning in a group, which leads to lifelong learning.
CO-9	Demonstrate project management principles during project work.

Second Year : IV SEM (REV- 2019 'C' Scheme)

Course Code:	CSC 401
Course:	Engineering Mathematics – IV
CO-1	Apply the concepts of eigen values and eigen vectors in engineering problems
CO-2	Use the concepts of Complex Integration for evaluating integrals, computing residues & evaluate various contour integrals.
CO-3	Apply the concept of Z- transformation and its inverse in engineering problems
CO-4	Use the concept of probability distribution and sampling theory to engineering problems
CO-5	Apply the concept of Linear Programming Problems of optimization
CO-6	Solve Non-Linear Programming Problems for optimization of engineering problems

Course Code:	CSC 402
Course:	Analysis of Algorithms
CO-1	Analyze the running time and space complexity of algorithms .
CO-2	Describe, apply and analyze the complexity of divide and conquer strategy.
CO-3	Describe, apply and analyze the complexity of greedy strategy.
CO-4	Describe, apply and analyze the complexity of dynamic programming strategy
CO-5	Explain and apply backtracking, branch and bound.
CO-6	Explain and apply string matching technique.

Course Code:	CSC 403
Course:	Database Management Systems
CO-1	Students should be able to explain the fundamentals of a database system
CO-2	Students should be able to design and draw ER and EER diagram for the real life problem.
CO-3	Students should be able to convert conceptual model to relational model and formulate relational algebra queries.
CO-4	Students should be able to design and querying database using SQL.
CO-5	Students should be able to analyze and apply concepts of normalization to relational database design.
CO-6	Students should be able to describe the concept of transaction, concurrency and recovery .



Course Code:	CSC 404
Course:	Operating Systems
CO-1	Understand the objectives, functions and structure of OS
CO-2	Analyze the concept of process management and evaluate performance of process scheduling algorithms.
CO-3	Understand and apply the concepts of synchronization and deadlocks
CO-4	Evaluate performance of Memory allocation and replacement policies
CO-5	Understand the concepts of file management.
CO-6	Apply concepts of I/O management and analyze techniques of disk scheduling

Course Code:	CSC 405
Course:	Microprocessor
CO-1	Describe core concepts of 8086 microprocessor
CO-2	Interpret the instructions of 8086 and write assembly and mixed language programs
CO-3	Identify the specifications of peripheral chip
CO-4	Design 8086 based system using memory and peripheral chips
CO-5	Appraise the architecture of advanced processors
CO-6	Understanding hyperthreading technology

Course Code:	CSL 401
Course:	Analysis of Algorithms Lab
CO-1	To introduce the methods of designing and analyzing algorithms
CO-2	Design and implement efficient algorithms for a specified application
CO-3	Strengthen the ability to identify and apply the suitable algorithm for the given real-world problem.
CO-4	Analyze worst-case running time of algorithms and understand fundamental algorithmic problems

Course Code:	CSL 402
Course:	Database Management Systems Lab
CO-1	Design ER /EER diagram and convert to relational model for the realworld application. 2
CO-2	Apply DDL, DML, DCL and TCL commands 3
CO-3	Write simple and complex queries 4
CO-4	Use PL / SQL Constructs



Course Code:	CSL 403
Course:	Operating System Lab
CO-1	To gain practical experience with designing and implementing concepts of operating systems such as system calls, CPU scheduling, process management, memory management, file systems and deadlock handling using C language in Linux environment.
CO-2	To familiarize students with the architecture of Linux OS .
CO-3	To provide necessary skills for developing and debugging programs in Linux environment
CO-4	To learn programmatically to implement simple operation system mechanisms

Course Code:	CSL 404
Course:	Microprocessor Lab
CO-1	Use appropriate instructions to program microprocessor to perform various tasks
CO-2	Develop the program in assembly language for intel 8086 processor
CO-3	Demonstrate the execution and debugging of assembly and mixedlanguage program

Course Code:	CSL 405
Course:	Skill Lab : Python Programming
CO-1	To understand basic concepts in python .
CO-2	To explore contents of files, directories and text processing with python
CO-3	To develop program for data structure using built in functions in python.
CO-4	To explore django web framework for developing python-based web application,
CO-5	To understand Multithreading concepts using python.
CO-6	To explore numpy and pandas libraries

Course Code:	CSM 401
Course:	Mini Project I – B
CO-1	Identify problems based on societal /research needs.
CO-2	Apply Knowledge and skill to solve societal problems in a group.
CO-3	Develop interpersonal skills to work as member of a group or leader
CO-4	Draw the proper inferences from available results through theoretical/ experimental/simulations .
CO-5	Analyze the impact of solutions in societal and environmental context for sustainable development.
CO-6	Use standard norms of engineering practices
CO-7	Excel in written and oral communication.
CO-8	Demonstrate capabilities of self-learning in a group, which leads to lifelong learning.
CO-9	Demonstrate project management principles during project work .



Third Year : V SEM (REV- 2019 'C' Scheme)

Course Code:	IoTC501
Course:	Theoretical Computer Science
CO-1	Understand concepts of Theoretical Computer Science, difference and equivalence of DFA and NFA , languages described by finite automata and regular expressions.
CO-2	Design Context free grammer, pushdown automata to recognize the language.
CO-3	Develop an understanding of computation through Turing Machine.
CO-4	Acquire fundamental understanding of decidability and undecidability.

Course Code:	IoTC502
Course:	Software Engineering
CO-1	Identify requirements, analyze and prepare models
CO-2	Plan, schedule and track the progress of the projects
CO-3	Design the software projects
CO-4	Do testing of software project
CO-5	Identify risks, manage the change to assure quality in software projects

Course Code:	IoTC503
Course:	Computer Network
CO-1	Demonstrate the concepts of computer networks and compare OSI-ISO model with TCP-IP model.
CO-2	Explore different design issues at data link layer.
CO-3	Design the network using IP addressing and sub netting / supernetting schemes.
CO-4	Analyze transport layer protocols and congestion control algorithms
CO-5	Explore protocols at application layer

Course Code:	IoTC504
Course:	Data Warehouse and Mining
CO-1	Understand data warehouse fundamentals and design data warehouse with dimensional modelling and apply OLAP operations.
CO-2	Understand data mining principles and perform Data preprocessing and Visualization
CO-3	Identify appropriate data mining algorithms to solve real world problems
CO-4	Compare and evaluate different data mining techniques like classification, prediction, clustering and association rule mining



CO-5	Describe complex information and social networks with respect to web mining.
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Course Code:	IoTCSBCDLO5011
Course:	Probabilistic Graphical Model
CO-1	understand basic concepts of probabilistic graphical modelling.
CO-2	model and extract inference from various graphical models like Bayesian Networks, Markov Models.
CO-3	perform learning and take actions and decisions using probabilistic graphical models.
CO-4	represent real world problems using graphical models; design inference algorithms; and learn the structure of the graphical model from data.
CO-5	design real life applications using probabilistic graphical models.

Course Code:	IoTCSBCDLO5012
Course:	Internet Programming
CO-1	Implement interactive web page(s) using HTML and CSS .
CO-2	Design a responsive web site using JavaScript and demonstrate database connectivity using JDBC
CO-3	Demonstrate Rich Internet Application using Ajax and demonstrate and differentiate various Web Extensions
CO-4	Demonstrate web application using Reactive Js.

Course Code:	IoTCSBCDLO5013
Course:	Advanced Database Management Systems
CO-1	Design distributed database using the various techniques for query processing .
CO-2	Measure query cost and perform distributed transaction management
CO-3	Organize the data using XML and JSON database for better interoperability
CO-4	Compare different types of NoSQL databases
CO-5	Formulate NoSQL queries using Mongodb
CO-6	Describe various trends in advance databases through temporal, graph based and spatial based databases

Course Code:	IoTL501
Course:	Software Engineering Lab
CO-1	Identify requirements and apply software process model to selected case study .
CO-2	Develop architectural models for the selected case study.
CO-3	Use computer-aided software engineering (CASE) tools.
CO-4	Identify requirements and apply software process model to selected case study.



CO-5	Develop architectural models for the selected case study.
CO-6	Use computer-aided software engineering (CASE) tools.

Course Code:	IoTL502
Course:	Computer Network Lab
CO-1	Design and setup networking environment in Linux
CO-2	Use Network tools and simulators such as NS2, Wireshark etc. to explore networking algorithms and protocols.
CO-3	Implement programs using core programming APIs for understanding networking concepts

Course Code:	IoTL503
Course:	Data Warehouse and Mining Lab
CO-1	Design data warehouse and perform various OLAP operations
CO-2	Implement data mining algorithms like classification
CO-3	Implement clustering algorithms on a given set of data sample
CO-4	Implement Association rule mining & web mining algorithm.

Course Code:	IoTL504
Course:	Professional Comm. & Ethics II
CO-1	Plan and prepare effective business/ technical documents which will in turn provide solid foundation for their future managerial roles.
CO-2	Strategize their personal and professional skills to build a professional image and meet the demands of the industry.
CO-3	Emerge successful in group discussions, meetings and result-oriented agreeable solutions in group communication situations.
CO-4	Deliver persuasive and professional presentations.
CO-5	Develop creative thinking and interpersonal skills required for effective professional communication.
CO-6	Apply codes of ethical conduct, personal integrity and norms of organizational behaviour.



Course Code:	IoTM501
Course:	MiniProject – 2 A
CO-1	Identify societal/research/innovation/entrepreneurship problems through appropriate literature surveys
CO-2	Identify Methodology for solving above problem and apply engineering knowledge and skills to solve it
CO-3	Validate, Verify the results using test cases/benchmark data/theoretical/inferences/experiments/simulations
CO-4	Analyze and evaluate the impact of solution/product/research/innovation /entrepreneurship towards societal/environmental/sustainable development
CO-5	Use standard norms of engineering practices and project management principles during project work.
CO-6	Communicate through technical report writing and oral presentation. <ul style="list-style-type: none">● The work may result in research/white paper/ article/blog writing and publication● The work may result in business plan for entrepreneurship product created● The work may result in patent filing.
CO-7	Gain technical competency towards participation in Competitions, Hackathons, etc
CO-8	Demonstrate capabilities of self-learning, leading to lifelong learning
CO-9	Develop interpersonal skills to work as a member of a group or as leaders

