Course Outcome of A.Y. 2023-2024

Seme-ster	Subject	CO No.	Course Outcome.	BT level
III	Engineering Mathematics-III	CO 1	Student will be able to describe the concept of Laplace transform.	1
		CO 2	Student will be able to apply the concept of LT and ILT to solve differential equations.	3
		CO 3	Student will be able to solve problems related to Fourier transform to deep learning, signal & image processing.	3
		CO 4	Student will be able to apply the concepts of PDE in engineering concepts.	3
		CO 5	Student will be able to analyze function of complex variables.	4
III	Discrete mathematics	CO 1	Student will be able to determine representation and storage mechanisms of data structures.	3
		CO 2	Student will be able to describe basic fundamentals of data structures like array, skip list, linked list, stack, queue, tree, graph, hashing and their application.	3
		CO 3	Student will be able to illustrate operations like searching, insertion, deletion, traversing mechanism etc. on linked list data structures.	3
		CO 4	Student will be able to illustrate operations like searching, insertion, deletion, traversing mechanism etc. on trees and graph data structures.	3
		CO 5	Student will be able to determine appropriate sorting and searching technique for given problem.	3
III	Data Structures	CO.1	Student will be able to determine representation and storage mechanisms of data structures	1
		CO.2	Student will be able to describe basic fundamentals of data structures like array, skip list, linked list, stack, queue, tree, graph, hashing and their application	1
		CO.3	Student will be able to illustrate operations like searching, insertion, deletion, traversing mechanism etc. on linked list data structures	2
		CO.4	Student will be able to illustrate operations like searching, insertion, deletion, traversing mechanism etc. on trees and graph data structures	2
		CO.5	Student will be able to determine appropriate sorting and searching technique for given problem	3

III	Computer Architecture & Organization	CO.1	Student will be able to identify functional units of a digital computer system.	1
		CO.2	Student will be able to explain the basics of instructions sets, addressing modes & assembly language structure	2
		CO.3	Student will be able to manipulate representations of numbers stored in digital computers	3
		CO.4	Student will be able to determine various types of memories and its organization	3
		CO.5	Student will be able to describe basics of hardwired, pipelined architectures, i/o organization, dma and develop micro-operation using micro-programmed control unit	2
III	Elective –I (b) Object Oriented Programming in Java	CO.1	Student will be able to Discuss the fundamental concepts of Java programming language, including classes, objects, methods and the memory concepts.	2
		CO.2	Student will be able to Illustrate the use of control structures, methods, and Java API packages developing comprehensive Java programs.	3
		CO.3	Student will be able to Demonstrate the Java array concepts and the skills to develop Java applications	3
		CO.4	Student will be able to Use the concept of Object-Oriented Programming (OOP) concepts with a focus on inheritance, polymorphism, and interface in Java programming	3
		CO.5	Student will be able to Apply the exception handling techniques in Java and client-side scripting with JavaScript to develop high-quality web applications.	3
III	Data Structures Lab & Object Oriented Programming Lab	CO.1	Student will be able to determine the time and space efficiency of the data structure	3
		CO.2	Student will be able to identity the appropriate data structure for given problem	2
		CO.3	Student will be able to practice stack, Queue and their applications	3
		CO.4	Student will be able to develop various types of linked lists and their applications	3
		CO.5	Student will be able to develop sorting and searching algorithms	3
		CO1	Student will be able analyze and implement the basics of object-oriented programming using java	3
		CO2	Student will be able identify and apply the concept of classes, java, jdk components and develop simple java programs	3
		CO3	Student will be able to design simple java programs using inheritance and exception handling	3
		CO4	Student will be able design programming on interfaces	3
		CO5	Student will be able implement programs on dealing with arrays.	3

III	Seminar-I	CO.1	Student will be able to Survey a latest research papers of professional interest to understand new fields in the absence of a textbook, and synthesize summaries and reviews.	4
		CO.2	Student will be able to evaluate and identify promising new directions in various cutting-edge technologies	3
		CO.3	Student will be able to Enhance technical writing skills in preparing detailed reports describing results	3
		CO.4	Student will be able to effectively Communicate with professional technical presentation skills by making oral presentations.	4
IV	Design & Analysis of Algorithms	CO1	Students will be able to Explain the concept of algorithm writing and its performance analysis	2
		CO2	Students will be able to Use divide and conquer algorithm designing technique for algorithm writing.	3
		CO3	Students will be able to Demonstrate the Backtracking and Branch and Bound concepts for designing algorithms	2
		CO4	Student will be able to Apply the process of greedy technique to solve a variety of optimization problems	3
		CO5	Student will be able to Know various problem categories based on their complexity and to Apply dynamic programming approach for solving variety of complex problems.	3
IV	Operating Systems	CO1	Student will be able to describe FUNCTIONAL ARCHITECTURE OF AN OPERATING SYSTEM	1
		CO2	Student will be able to determine PROCESSES AND CPU SCHEDULING	3
		CO3	Student will be able to describe SYNCHRONIZATION TECHNIQUES TO ACHIEVE BETTER PERFORMANCE OF A COMPUTER SYSTEM	1
		CO4	Student will be able to APPLY SEGMENTATION AND PAGING TECHNIQUES	3
		CO5	Student will be able to explain FILE SYSTEM WORKING	2
IV	Basic Human Rights	CO1	Student will be able to explain the basic concepts of human rights and its origin	1
		CO2	Student will be able to describe the fundamental rights and social problems in society	1
		CO3	Student will be able to explore the concept of migrant workers, human rights violations, and various issues:	4
		CO4	Student will be able to acquire in-depth knowledge of the Constitution of India	1
		CO5	Student will be able to explore UDHR (Universal Declaration of Human Rights) and NHRC (National Human Rights Commission	4

IV	Probability and Statistics	CO1	Students will be able to apply fundamental concepts of probability, Bayes' theorem, and standard probability distributions to describe real-life phenomena	3
		CO2	Students will be able to utilize the basic concepts of probability distributions and random variables to solve engineering problems.	3
		CO3	Students will be able to apply the concepts of correlation and their applications in engineering disciplines.	2
		CO4	Students will be able to interpret the concepts of linear regression, including regression lines and coefficients, in practical scenarios.	2
		CO5	Students will be able to apply estimation techniques and hypothesis testing to draw conclusions and assess errors in statistical analyses	3
IV	DLD&M	CO1	Stuent will able to Convert different type of codes and number systems which are used in digital communication and computer systems.Familiar with basic gates.Understand Boolean algebra and basic properties of Boolean algebra.	2
		CO2	Students will be able to illustrate simple logic using Karnaugh maps, understand "don't care".Familiar with combinational digital circuit.	2
		CO3	Students will be able to develop sequential logic components: SR Latch, D Flip-Flop and their usage and able to analyze sequential logic circuits..	3
		CO4	Students will be able to describe internal archtecture of 8086 microprocessor with memory segmentation	2
		CO5	Students will be able to write 8086 instruction set and addressing modes.and explain Interrupts, memory and I/O interfacing in 8086	3
IV	Operating Systems & Python Programming Lab	CO1	Students will be able to Compare the performance of various CPU Scheduling Algorithms	2
		CO2	Students will be able to Solve Deadlock avoidance and Detection Algorithms.	3
		CO3	Students will be able to develop processes and IPC.	3
		CO4	Students will be able to Analyze the performance of the various Page Replacement Algorithms.	4
		CO1	Students will be able to analyze the fundamental python syntax and semantics and be fluent in the use of python control flow statements.	2
		CO2	Students will be able to design proficiency in the handling of strings and functions.	3
		CO3	Students will be able to implement the methods to create and manipulate python programs by utilizing the data structures like lists, dictionaries, tuples and sets.	3
		CO4	Students will be able to analyze how to design object? oriented programs with python class	3

		CO5	Students will be able to identify and perform how to use exception handling in python applications for error handling	3
IV	Seminar – II	CO.1	Student will be able to Survey a latest research papers of professional interest to understand new fields in the absence of a textbook, and synthesize summaries and reviews.	4
		CO.2	Student will be able to evaluate and identify promising new directions in various cutting-edge technologies	3
		CO.3	Student will be able to Enhance technical writing skills in preparing detailed reports describing results	3
		CO.4	Student will be able to effectively Communicate with professional technical presentation skills by making oral presentations.	4
V	Database Systems	CO1	Students will able to List and describe the key components of a database management system (DBMS).Create simple ER diagrams for given database application scenarios.	2
		CO2	Students will able to "Define and describe the key elements of an RDBMS, including tables, rows, columns, primary keys, and foreign keys.Use relational algebra operations to perform basic queries on a relational database schema. "	1
		CO3	Students will able to Write SQL queries to retrieve and manipulate data from a relational database for given business scenarios.Write code snippets in a chosen programming language to connect to a database, execute queries, and process the results.	3
		CO4	Students will able to Define and describe the different normal forms (1NF, 2NF, 3NF, BCNF, etc.) used in database normalization. Demonstrate how to apply the rules of normalization to a database schema to transform it into higher normal forms.Explain how file and page organizations work in databases, and describe the principles behind indexing methods like B-trees and hashing.	2
		CO5	Students will able to Define key concepts related to transaction processing, such as ACID properties (Atomicity, Consistency, Isolation, Durability), and basic concurrency control mechanisms.Explain how transaction processing ensures data integrity and consistency, and describe the role of concurrency control in managing simultaneous database access.	2
V	Theory of Computation	CO1	Student will be Able to design Finite Automata (FA) machines and generate a language and RE for given FA	4
		CO2	Student will be Able to understand the rules and simplification of context free grammars	2
		CO3	Student will be Able to produce the strings of a given context-free languages using its grammar	3

		CO4	Student will be Able to outline Pushdown Automata machine for given CF language(s)	4
		CO5	Student will be Able to design Turing machines for given any computational problem	4
V	Software Engineering	CO.1	Student will be able to differentiate the given project in various phases of software lifecycle.	2
		CO.2	Student will be able to describe Agile Methdology	1
		CO.3	Student will be able to illustrate various types of System Modelling	2
		CO.4	Student will be able to apply System Patterns in various scenarios	3
		CO.5	Student will be able to explain software testing concepts	3
V	Elective – II (A) Human computer Interaction	CO.1	Student will be able to explain the Interaction Process between Human & Computer	2
		CO.2	Student will be able to explain the Fundamentals of Design Process in HCI	2
		CO.3	Student will be able To discover the Concept of Implementation & Evaluation In HCI Process	2
		CO.4	Student will be able To explain in Depth Knowledge of the Models & Systems in HCI Process	3
		CO.5	Student will be able To Analyse Modern Systems in HCI process	4
V	Elective – III (B) Business Communication	CO.1	Students will be able to explain the need and importance of business communication	1
		CO.2	Students will be able to discuss intercultural, interpersonal and ethical communication aspects to make business communication effective	2
		CO.3	Students will be able to use non-verbal communication codes, various communication styles and avoid communication barriers while interaction	4
		CO.4	Student will be able to demonstrate group communication and negotiation tactics required to make business deals successful.	3
		CO.5	Student will be able to describe the leadership styles, business writing skills and skills adapting a new culture	2
V	Database Systems & Software Engineering Lab	CO1	Students able to Design Schema for any real time applications.	3
		CO2	Students able to apply SQL queries for CRUD operation	3
		CO3	Students able to write subquries , join operation and set operation using SQL	3
		CO4	Students able to Design given relation using Normalization.	3
		CO5	Students able to manipulate Transactions using SQL	3
		CO1	Student will be able To Discuss how to develop software requirements specifications for a given problem.	2

		CO2	Student will be able To Expain DFD models	2
		CO3	Student will be able To construct Use case diagram	3
		CO4	Student will be able To construct various structure and behavior UML diagrams.	3
		CO5	Student will be able To illustrate implementation and environmental view diagram and testing tools	4
V	Mini-project – I	CO1	Student will be able to identify complex problems, define project objectives, and scope effectively, developing the skills needed to recognize and address industry-specific challenges and issues.	4
		CO2	Student will be able to perform a comprehensive literature survey, critically evaluate sources, synthesize information, and contribute to knowledge in a specific field	4
		CO3	Student will be able to analyze intricate problems by conducting a comprehensive review of the current state of the art and then formulate practical and feasible solutions.	5
		CO4	Student will be able to create well-structured reports using elements of technical writing, engage in critical thinking to present information clearly and logically, and deliver compelling and well-organized presentations.	5
VI	Compiler Design	CO1	Student will be able To analyze and be able to know the various phase of compiler.	4
		CO2	Student will be able To design and implement a lexical analyzer.	4
		CO3	Student will be able To design and implement a parser.	4
		CO4	Student will be able To know about Intermediate code generation and syntax directed translation	1
		CO5	Student will be able To optimize and design code generator.	4
VI	Computer Networks	CO1	Student will be able to analyze the functioning of data communication and computer network	4
		CO2	Student will be able to understand different types of LAN technologies	1
		CO3	Student will be able to analyze the transmission errors in the data link layer	4
		CO4	Student will be able to analyze the network layer and congestion control	4
		CO5	Student will be able to configure different application protocols and analyze network security	4
VI	Machine Learning	CO.1	Students will implement machine learning algorithms to real-world problems, demonstrating proficiency in learning paradigms, evaluation methods, and model optimization and deployment.	3
		CO.2	Students will be able to solve Probability and Bayesian learning problem, and implement Logistic Regression and SVM, including the use of Kernel functions	3

		CO.3	Students will be implementing Perceptron, multilayer networks, backpropagation, and an introduction to deep neural networks	3
		CO.4	Students will be implementing computational learning theory, PAC learning model, sample complexity, VC dimension, and ensemble learning	3
		CO.5	Students will be implementing clustering techniques such as k-means, adaptive hierarchical clustering, and Gaussian mixture models.	3
VI	Elective – IV (A) Geographic Information System	CO1	Student will be able to describe GIS , name major GIS software available, know where to find more information.	1
		CO2	Student will be able to explain the components and functionality of a GIS and the difference between GIS and other information systems.	2
		CO3	Student will be able to discuss the nature of geographic information and explain in how it is stored in computer and the two types of GIS data structure.	2
		CO4	Student will be able to discover simple spatial analysis using GIS software.	3
		CO5	Student will be able to iIllustrate design and complete a GIS project from start to finish.	2
VI	Elective – V (A) Development Engineering	CO1	Student will be able to describe basic concepts in Development Engineering	1
		CO2	Student will be able to explain World Poverty and Sustainable Development	2
		CO3	Student will be able to explain the role of Social Justice in Religious & Secular Perspectives	2
		CO4	Student will be able to discover various Development Strategies in Development Engineering	3
		CO5	Student will be able to explain in depth Knowledge of Engineering for Sustainable Community Development & use of ICT for Development Engineering	2
VI	Competitive Programming & Machine Learning Lab	CO.1	Student will be able to Discuss the concepts of online Judges, feedback and the standard input output to solve the programming challenges.	2
		CO.2	Student will be able to develop the advanced programs of Arrays, Linked list, Strings, Dynamic Programming, Greedy method, Graph Algorithm etc on Hackerrank, Codechef websites	3
		CO.3	Student will be able to analyze the guidelines for designing the test cases for the programs.	4
		CO.4	Student will be able to practice in the programming challenges in competitive platforms like codechef.com, uva.onlinejudge.com. organization like TCS, INFOSYS.	3
		CO.5	Student will be able to Practice the challenging problems to succeed in the programming challenges of reputed recruiting	3

		CO.1	Student will be able to read and examine the real-world dataset	1
		CO.2	Student will be able to apply Machine Learning techniques of Regression, Classification, and Clustering	3
		CO.3	Student will be able to analyze the results of Machine Learning techniques	4
		CO.4	Student will be able to predict answers for given values from learned models or techniques	5
VI	Mini-project – II	CO1	Student will be able to identify complex problems, define project objectives, and scope effectively, developing the skills needed to recognize and address industry-specific challenges and issues.	4
		CO2	Student will be able to perform a comprehensive literature survey, critically evaluate sources, synthesize information, and contribute to knowledge in a specific field	4
		CO3	Student will be able to analyze intricate problems by conducting a comprehensive review of the current state of the art and then formulate practical and feasible solutions.	4
		CO4	Student will be able to create well-structured reports using elements of technical writing, engage in critical thinking to present information clearly and logically, and deliver compelling and well-organized presentations.	4
VII	Artificial Intelligence	CO1	Student will be able to Explain the basic concepts of artificial intelligence and the significance of intelligent systems	2
		CO2	Student will be able to describe the various serach based techniques to design intelligent systems.	2
		CO3	Student will be able to demonstrate various knowledge representation techniques and the application of resolution method to derive conclusions from a set of logical statements.	3
		CO4	Student will be able to discuss the probabilistic reasoning concepts useful for designing systems taking actions in uncertain situations.	2
		CO5	Student will be able to know how the systems with learning abilities are designed.	2
VII	Cloud Computing	CO1	Students will be able to interpret the concept of virtualization and how this has enabled the development of cloud computing	2
		CO2	Students will be able to illustrate the fundamentals of cloud, cloud architectures and types of services in cloud.	3
		CO3	Students will be able to examine scaling, cloud security and disaster management.	3

		CO4	Students will be able to analyse different applications in cloud.	4
		CO5	Students will be able to summarize some important cloud computing driven commercial systems	4
VII	Elective – VI (C) Big Data Analytics	CO1	Student will be able to illustrate and develop the basics of big data structures, Characteristics of big data, distribution packages.	2
		CO2	Student will be able to discover the knowledge of big data analytics and implement different file management task in Hadoop.	2
		CO3	Student will be able to describe Map Reduce Paradigm and develop data applications using variety of systems.	1
		CO4	Student will be able to analyze and examine different operations on data using Pig Latin scripts.	3
		CO5	Student will be able to illustrate and apply different operations on relations and databases using Hive.	2
VII	Open Elective – VII (C) Block chain Technology	CO1	Student will be able to identify the structure of a blockchain and Learn about Bitcoin, Cryptocurrency,Security	3
		CO2	Student will be able to explain the individual components of the Bitcoin,the peer-to-peer network,Consensus and PoW	2
		CO3	Student will be able to identify Permissioned Blockchain and different Consensus mechanism	3
		CO4	Student will be able to identify Enterprise application of Blockchain	3
		CO5	Student will be able to explain the architecture of Hyperledger Fabric, including its modular design, permissioned nature, and the concept of channels for data privacy along with Ripple and Corda	2
VII	Open Elective – VIII (A) (B) Deep Learning (C)	CO1	Students will be able to describe what is involved in deep learning models from data.	1
		CO2	Student will be able to Illustrate a wide variety of learning optimization and activation algorithms.	2
		CO3	Student will be able to apply how to preprocess and evaluate models generated from data.	3
		CO4	Students will be able to analyze models to solve real problems, optimize the learned models, and assess the expected accuracy of the models	4
		CO5	Student will be able to analyze and evaluate advanced deep machine learning algorithms.	4
VII	Artificial Intelligence & Cloud Computing Lab	CO1	Students will be able to apply the predicate logic to design reasoning based programs using Prolog.	3
		CO2	Students will be able implement constraint-bassed solutions using Prolog.	3
		CO3	Students will be able to design program using heuristic-based search strategies.	3
		CO4	Students will be able to demonstrate the use of state space and heuristic evaluation in the context of puzzles.	3

		CO5	Students will be able to know how to use planning and means-end analysis problem-solving strategies in Prolog	2
		CO1	Students will be able to illustrate the basic concepts of cloud computing	2
		CO2	Students will be able to create a virtual machine and perform virtualization.	3
		CO3	Students will be able to utilize Moodle to develop a warehouse application in Salesforce	3
		CO4	Students will be able to implement a scenario in WordPress	3
		CO5	Students will be able to analyze the architecture of Aneka and execute a scenario.	4
		CO6	Students will be able to evaluate and analyze the use of Planio.	4
VII	Project Phase – I	CO1	Student will be able to solve real-life problems by applying knowledge.	3
		CO2	Student will be able to implement alternative approaches, apply and use the most appropriate one for a feasible solution.	4
		CO3	Student will be able to write precise reports and technical documents concisely.	4
		CO4	Student will be able to participate effectively in multi-disciplinary and heterogeneous teams, exhibiting teamwork, interpersonal relationships, conflict management, and leadership qualities.	4
VIII	Project phase – II (In-house) / Internship and Project in Industry	CO1	Student will be able to engage in self-directed research to gather and synthesize relevant information	4
		CO2	Student will be able to assess the validity and significance of findings, providing a thorough analysis and interpretation	4
		CO3	Student will be able to structure and communicate research outcomes clearly, identifying and discussing unresolved issues	4
		CO4	Student will be able to connect existing methodologies and results with ongoing and prospective research efforts	3
		CO5	Student will be able to appreciate and articulate the real-world applications and constraints of the research area	1