



Saraswati College of Engineering
Department-INFORMATION TECHNOLOGY
Semester-III
Scheme R-19

Subject-Engineering Mathematics-III

Subject Code-ITC301

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO1. 2,5	-	1.6	1.6.1	3	CO1	Apply the concept of Laplace transforms and use to solve real integrals in engineering problems
PO2, 3	-	2.5	2.5.2	3,5	CO2	Identify the concept of inverse laplace transform and compare to various functions and its applications
PO3, 4	-	3.5	3.5.6	3,6	CO3	Develop and determine Fourier series for real life problems and applications.
PO1, 2	-	2.8	2.8.1	3,4	CO4	Apply the properties of Complex analysis and select the application to orthogonal trajectories.
PO2. 3,5	-	5.4	5.4.2	3	CO5	Use the concept of statistical techniques to solve problems in data science,machine learning and AI.
PO1, 2,12		1.2	1.2.2	3	CO6	Apply the concept of probability,expectation to determine the spread of data and probability distribution.

Course Objectives

Sr. No.	Description
1	To familiarize with the Laplace transform and its properties.
2	To study the Inverse Laplace transform of various functions , theorem and its applications.
3	To understand the concept of fourier series ,its complex form and enhance the problem.
4	To familiarize the concept of complex variables , C-R equations with applications.
5	To understand the basic techniques of statistics like correlation , regression and curve fitting for data analysis,machine learning and AI.
6	To study some advanced topic of probability , random variables with their distributions and expectations.

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
5	1	5.6	5.6.1	2	1	Discuss the data structure principles such stacks, queues and linked list, Static-Dynamic Implementation.
2	1	2.1	2.5.2	4		Identify algorithms with parameters in tackling problems using various data structures.
5	2	5.6	5.6.1	2,4	2	Discuss and Categorize the concept of nonlinear data Structure such as trees with advanced data structure often including threaded binary tree, AVL Trees.
2		2.1	2.5.2	4		Identify process with parameters to perform numerous operations on nonlinear data structure
1	2	1.7	1.7.1	4		Apply and assess nonlinear data structure with their real life problem needed to solve.
5	1	5.6	5.6.1	2	3	Discuss the concepts of graph.
2		2.1	2.5.2	4		Illustrate Graph with its various operations.
1	1	1.7	1.7.1	4		Apply Graph traversal with their inputs for resolution of problems in real life.
5	1	5.6	5.6.1	2,3	4	Discuss Use and interpret the core values of recursion
2	1	2.1	2.5.2	2		Discuss and identify a need for storage management process with its techniques of handling fragmentation and garbage collection, and its comprehensiveness in solving problems in real life.
3	2	3.6	3.6.1	1, 2	5	List, investigate and explore the principles behind the concepts of sorting, searching and hashing with its collision handling methods
2	2	2.7	2.7.1	4		Analyze its adequacy in real life problem solving.
4	1	3.6	3.6.2	4	6	Scrutinize and recognise the appropriate data structure viz. stack, queue, linked list, trees and graph for various applications to design data

Course Objectives

Sr. No.	Description
1	To learn the basics and understand the need of data structure & algorithm analysis.
2	The programming knowledge which can be applied to sophisticated data structures.
3	The fundamental knowledge of stacks queue, linked list etc.
4	The fundamental knowledge of Trees, Graphs etc.
5	The fundamental knowledge of different sorting, searching, hashing and recursion techniques
6	The real time applications for stacks, queue, linked list, trees, graphs etc.

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO2	1	2.5 2.6	2.5.2 2.6.6	L4 L4	1	Identify the need of Database Management System.
PO1 PO3	2	1.7 3.8	1.7.1 3.8.2	L3 L5	2	Apply the theory of database systems. Able to design a database/solve a real time database problem
PO2	1	2.7 2.8	2.7.2 2.8.1	L4 L3	3	Identify relational model constraints for the database
PO2	1	2.7	2.7.2	L3	4	Apply the knowledge SQL to formulate queries
PO2 PO1	1	2.7 1.7	2.7.2 1.7.1	L4 L3	5	Identify design constraints. Apply the principles of normalization to normalize the database to the highest normalization level
PO2	1	2.5	2.5.2	L2	6	Demonstrate and identify the concept of transaction, concurrency and recovery

Course Objectives

Sr. No.	Description
1	To learn the basics and understand the need of database management system.
2	To construct conceptual data model for real world applications
3	To Build Relational Model from ER/EER.
4	To introduce the concept of SQL to store and retrieve data efficiently.
5	To demonstrate notions of normalization for database design
6	To understand the concepts of transaction processing- concurrency control & recovery procedures

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO1		1.6	1.6.1	L3	CO1	Apply basic engineering fundamentals to explain the basic of Analog and Digital Communication Systems.
PO2		2.6	2.6.4	L2	CO1	Compare and contrast between Analog and Digital Communication Systems to select best communication system as per application.
PO1		1.6	1.6.1	L2	CO2	Apply engineering fundamentals to differentiate types of noise.
PO1		1.2	1.2.1	L3	CO2	Apply the knowledge of Friis formula to solve problems.
PO2		2.8	2.8.2	4	CO2	Analyses the Fourier transform of time and frequency domain and interpret the result.
PO1		1.6	1.6.1	L3	CO3	Apply engineering fundamentals to explain Amplitude and Frequency modulation techniques.
PO1		1.6	1.6.1	L3	CO3	Apply engineering fundamentals to sketch Transmitter and receiver of AM, DSB, SSB and FM.
PO1		1.6	1.6.1	L3	CO4	Apply engineering fundamentals to explain Pulse analog and digital modulation techniques.
PO2		2.6	2.6.4	L2	CO4	Compare and contrast between Pulse digital modulation techniques to select best modulation technique.
PO1		1.6	1.6.1	L3	CO5	Apply engineering fundamentals to explain ASK, FSK, PSK modulation techniques.
PO2		2.6	2.6.4	L2	CO5	Compare and contrast between ASK, FSK, PSK modulation techniques to select best modulation technique.
PO1		1.6	1.6.1	L3	CO6	Apply engineering fundamentals to explain Electromagnetic radiation and propagation.

Course Objectives

Sr. No.	Description
1	Study the basic of Analog and Digital Communication Systems.
2	Describe the concept of Noise and Fourier Transform for analysing communication systems.
3	Acquire the knowledge of different modulation techniques such as AM, FM and study the block diagram of transmitter and receiver.
4	Study the Sampling theorem and Pulse Analog and digital modulation techniques.
5	Learn the concept of multiplexing and digital band pass modulation techniques.
6	Gain the core idea of electromagnetic radiation and propagation of waves.

Course Outcomes

PO	PSO	Competency	PI	Blooms Level	CO	Description
PO1	1	1.6	1.6.1	Level 4 Analyze	CO1	able to apply knowledge to Compare different programming paradigm
PO1	1	1.6	1.6.1	Level 1 Remember	Co2	able to apply knowledge understand the basic concept of object oriented
PO1	1	1.6	1.6.1	Level 1 Remember	CO3	apply knowledge to understand the concepts of declarative programming paradigms through functional and logic programming
PO3	1	3.8	3.8.2	Level 6 Creating	CO4	able to implement programs based on declarative programming paradigm using functional and/or logic programming.
PO2	1	2.5	2.5.2	Level 3 Apply	CO5	Apply the knowledge to identify programming for developing application
PO2	1	2.6	2.6.1	Level 6 Creating	CO6	Develop and reframe website for client-server

Course Objectives

Sr. No.	Description
1	introduce various programming paradigms and understand the basic concept of programming language
2	understand data abstraction and object orientation
3	introduce the basic concepts of declarative programming paradigms
4	design solutions using declarative programming paradigms
5	Learn the concept of parallel and distributed programming
6	understand use of scripting language

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	LO	Description
1	1	4.5	4.5.1	L1 L6	1	Understand and use the basic concepts and principles of various linked lists, stacks and queues.
4	1	4.3	4.3.	L6	2	Understand the concepts and apply the methods in basic trees.
4	2	4.6 2.7	4.6.1 2.7.1	L2 L3	3	Use and identify the methods in advanced trees.
2	2	2.7 2.8	2.7.2 2.8.1	L3 L2	4	Understand the concepts and apply the methods in graphs.
3	1	4.5	4.5.1	L2	5	Understand the concepts and apply the techniques of searching, hashing and sorting
2	1	4.5	4.5.3	L2	6	Illustrate and examine the methods of linked lists, stacks, queues, trees and graphs to various real time problems

Course Objectives

Sr. No.	Description
1	To use data structures as the introductory foundation for computer automation to engineering problems.
2	To use the basic principles of programming as applied to complex data structures.
3	To learn the principles of stack, queue, linked lists and its various operations.
4	To learn fundamentals of binary search tree, implementation and use of advanced tree like AVL, B trees and graphs.
5	To learn about searching, hashing and sorting.
6	To learn the applications of linked lists, stacks, queues, trees and graphs.

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
3 4	2	3.5 4.5	3.5.1 4.5.1	L1 L6	1	Able to define a precise problem statement for real life applications. Design and
4	2	4.5	4.5.1	L6	2	Design and develop RDBMS using SQL
4 2	1	4.6 2.7	4.6.1 2.7.1	L2 L3	3	Demonstrate an ability to retrieve data and analyze data Apply SQL concepts to formulate SQL queries
2 2	2	2.7 2.8	2.7.1 2.8.1	L3 L2	4	Able to apply view triggers and procedures Demonstrate specific event handling
4	1	4.5	4.5.1	L2	5	Demonstrate database connectivity using JDBC.
4	1	4.5	4.5.1	L2	6	Demonstrate the concept of concurrent transactions

Course Objectives

Sr. No.	Description
1	To identify and define problem statements for real life applications
2	To construct conceptual data model for real life applications
3	To Apply SQL to store and retrieve data efficiently
4	To apply view ,triggers and event handling
5	To implement database connectivity using JDBC
6	To understand the concepts of transaction processing- concurrency control & recovery procedures

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO1	1	1.6	1.6.1	L3	CO1	understand and apply different loops in c++
PO1	1	1.6	1.6.1	L3	CO2	Aply knowldge of Object Oriented concepts in C++ program
PO2	1	2.6	2.6.2	L1	CO3	Understand the multithreaded programs in Java and C++ and implement solution for concurrency as solution
PO1	1	1.6.1	1.6.1	L3	CO4	Aply knowldge use of exception handling and garbage collection in C++ and JAVA
Po3	1	3.7	3.7.1	L6	CO5	Design solution based on declarative programming paradigm using functional and logic programming using Haskell.
PO2	1	2.6	2.6.4	L5	CO6	Compare the implementations in multiple paradigms at coding and execution level teams

Course Objectives

Sr. No.	Description
1	Understand the basic concept of different loops in C++
2	Understand the basic concept of object oriented programming
3	learn concepts of concurrent program execution
4	Understand run time program management
5	Understand the declarative programs in functional and logic programming languages
6	understand the different programming paradigms.

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.6.1	1.6	2	CO1	Understand and explain Basic programming concepts
3	1	3.7.1	3.7	3	CO2	Use the basic concepts like class, Objects, methods, Array, String for finding solution to problems.
3	1	3.7.1	3.7	3	CO3	Demonstrate how to use inheritance, interface and packages for development.
3	1	3.8.1	3.8	3	CO4	Use multithreading, exceptional handling and IO streams concepts for better development.
3	2	3.6.2	3.6	6	CO5	Design and Develop GUI using Swing and AWT.
3	2	3.6.2	3.6	6	CO6	Design and Develop GUI using JavaFX.

Course Objectives

Sr. No.	Description
1	To understand the concept of Object-oriented paradigm in the Java programming Language
2	To understand the importance of classes & Objects along with Constructors, Arrays, String and vectors.
3	To learn the principles of Inheritance, Interface and packages and demonstrate the concept of reusability for faster development.
4	To recognize usage of Exception Handling, Multithreading, Input Output streams in various applications
5	To learn designing, implementing, testing, and debugging graphical user interfaces in Java using Swings and AWT components that can react to different user events.
6	To develop graphical user interfaces using JavaFX controls.

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO2	PSO2	2.1	2.5.1	L5	CO1	Evaluate problems based on societal /research needs and apply Knowledge and skill to solve it in a group
PO9	PSO1	9.5	9.5.1	L2	CO2	Demonstrate effective communication, problem-solving, conflict resolution and leadership skills to work as member of a group or leader.
PO4	PSO1	4.6	4.6.2	L4	CO3	Critically analyze results through theoretical/ experimental/simulations for trends and correlations, stating possible errors and limitations
PO7	PSO1	7.3	7.3.1	L4	CO4	Identify and analyse the impacts of solutions in societal and environmental context for sustainable development.
PO10	PSO2	10.5	10.5.2	L3	CO5	Deliver effective oral presentations and use standard norms of engineering practices to technical and non-technical audiences
PO12	PSO1	12.5	12.5.2	L2	CO6	Recognize the need and demonstrate capabilities of self-learning in a group to keep current regarding new developments in IT field for life long learning
PO11	PSO1 PSO2	11.5	11.5.1	L5		Analyze, evaluate and select the most appropriate proposal based on economic and financial considerations and thus demonstrate project management principles during project work.

Course Objectives

Sr. No.	Description
1	To acquaint with the process of identifying the needs and converting it into the problem.
2	To familiarize the process of solving the problem in a group.
3	To acquaint with the process of applying basic engineering fundamentals to attempt solutions to the
4	To inculcate the process of self-learning and research.

Semester- IV

Subject-Engineering Mathematics-IV

Subject Code-ITC401

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO1, 2,3	-	1.7	1.7.1	3	CO1	Apply the concept of eigen values and eigen vectors in engineering problems
PO2, 4,5	-	2.8	2.8.1	3,5	CO2	Use the concepts of Complex integration for evaluating integrals ,computing residues and evaluate various contour integrals.
PO1, 5	-	5.4	5.4.2	3	CO3	Apply the concept of Z-transformation and inverse in engineering problem.
PO1, 2,12	-	2.8	2.8.4	3,2	CO4	Illustrate understanding the concept of probability distribution and sampling theory to engineering problem.
PO1, 2,4	-	4.5	4.5.1	3	CO5	Apply the concept of Linear programming problems to optimization.
PO1, 2.4	-	2.6	2.6.3	3	CO6	Solve Non linear programming problem for optimization of engineering problem.

Course Objectives

Sr. No	Description
1	To understand matrix algebra for engineering problems.
2	To study line and contour integrals and expansion of a complex valued function in a power series.
3	To understand the concept of Z-Transform and iverse Z-Transform with its properties..
4	To familiarize the concept of probability distributions and sampling theory for small samples.
5	To study the basic techniques of LPP for optimization.
6	To apply the concept of NLPP to understand the optimization of engineering problem.

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
2	1	2.6	2.6.2	L2	CO1	Understand the functionality of each layer of communication model
2	1	2.6	2.6.4	L5		Compare the OSI & TCP/IP Communication Models
1	1	1.6	1.6.1	L4	CO2	Categorize the type of Transmission Media
1	1	1.7	1.7.1	L2		Describes Switching techniques
1	1	1.7	1.7.1	L2		Understand Responsibilities and Protocols of data link layer
2	1	2.8	2.8.2	L4	CO3	Analyze the routing protocols
1	1	1.7	1.7.1	L2		Understand IPv4 and IPv6 header Formats
4	1	4.4	4.2.2	L3		Apply knowledge of IPV4 Addressing to choose a block of IP Address for a Network
1	1	1.7	1.7.1	L2	CO4	Explain data transportation issues and related protocols used for end-to-end data transmission
1	1	1.6	1.6.1	L1	CO5	List the data presentation techniques
1	1	1.7	1.7.1	L4		Illustrate the client server model in application layer protocols
4	2	4.4	4.2.2	L3	CO6	apply the concepts of IP address, Routing and Application service to design a network for an organization

Course Objectives

Sr. No.	Description
1	Study basics of Computer Network Hardware, Software and Communication Models.
2	Describe data link layer concepts, design issues and protocols and Learn the fundamentals and basics of Physical layer .
3	Gain core knowledge of Network layer routing protocols and IP addressing.
4	Study session layer design issues, transport layer services and protocols.
5	Acquire knowledge of Application layer and presentation layer paradigm and protocols.
6	Design of a small network

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO2	PSO1	2.6	2.6.2	Level L2 Understand	CO1	Understand the basic concepts related to Operating System.
PO4	PSO1	4.4	4.4.1	Level L2 Understand	CO2	Describe the process management policies and illustrate scheduling of processes by CPU.
PO3	PSO2	3.6	3.62	Level 3 Apply	CO3	Explain and apply synchronization primitives and evaluate deadlock conditions as handled by Operating System.
PO4	PSO2	4.5	4.5.1	level 4 Analyze	CO4	Describe and analyze the memory allocation and management functions of Operating System.
PO4	PSO2	4.4	4.4.3	level 4 Analyze	CO5	Analyze and evaluate the services provided by Operating System for storage management.
PO5	PSO1	5.4	5.4.1	level 4 Analyze	CO6	Compare the functions of various special-purpose Operating Systems.

Course Objectives

Sr. No	Description
1	To understand the major components of Operating System & its functions.
2	To introduce the concept of a process and its management like transition, scheduling, etc.
3	To understand basic concepts related to Inter-process Communication (IPC) like mutual exclusion, deadlock, etc. and role of an Operating System in IPC
4	To understand the concepts and implementation of memory management policies and virtual memory.
5	To understand functions of Operating System for storage management and device management.
6	To study the need and fundamentals of special-purpose operating system with the advent of new emerging technologies.

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
2	1	3.6	3.6.1	2,4,6	1	Explain, analyze and design Regular languages, Expression and Grammars.
1	2	2.1	2.5.3	6	2	Design and Apply different types of Finite Automata and Machines as Acceptor, Verifier and Translator.
2	1	3.6	3.6.1	4, 6	3	Analyze and design Context Free languages and Grammars.
4	1	2.1	2.5.2	6	4	Design different types of Push down Automata as Simple Parser.
4	1	1.7	1.7.1	6	5	Design different types of Turing Machines as Acceptor, Verifier, Translator and Basic computing machine.
3	2	3.6	3.6.2	6	6	Investigate and Develop understanding of applications of various Automata.

Course Objectives

Sr. No.	Description
1	Learn fundamentals of Regular and Context Free Grammars and Languages
2	Summarize the relation between Regular Language and Finite Automata and machines.
3	Design Automata's and machines as Acceptors, Verifiers and Translators.
4	Represent the relation between Contexts free Languages, PDA and TM.
5	Make PDA as acceptor and TM as Calculators.
6	Co-relate Automata's with Programs and Functions.

Subject- Computer Organization and Architecture**Subject Code: ITC405****Course Outcomes**

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO1		1.2	1.2.1	L1	CO1	Apply the knowledge of Number system conversion techniques to solve problems
PO1		1.6	1.6.1	L2	CO1	Apply basic engineering fundamentals to Demonstrate the fundamentals of Digital Logic Design
PO1		1.6	1.6.1	L1	CO2	Apply basic engineering fundamentals to describe and differentiate basic organization of computer, the architecture of 8086 microprocessor and to implement assembly language programming for 8086 microprocessors.
PO2		2.6	2.6.4	L2	CO2	Compare and contrast the instructions of 8086 to select appropriate instructions as per given task.
PO2		2.8	2.8.2	L4	CO2	Analyse and interpret the result of ALP using integrated tool.
PO1		1.6	1.6.1	L2	CO3	Apply engineering fundamentals to demonstrate control unit operations and conceptualize instruction level parallelism.
PO1		1.6	1.6.1	L1	CO3	Apply engineering fundamentals to Describe Soft wired (Microprogrammed) and hardwired control unit design methods. Microinstruction sequencing and execution
PO2		2.1	2.5.2	L4	CO4	List and Identify integers and real numbers and perform computer arithmetic operations on integers.
PO2		2.1	2.5.3	L3	CO4	Identify mathematical algorithmic knowledge that applies to solve a given problem
PO1		1.6	1.6.1	L4	CO5	Apply basic engineering fundamentals to Categorize memory organization.
PO2		2.6	2.6.2	L4	CO5	Identify basic functionalities of each element of a memory hierarchy.

PO1		1.6	1.6.1	L3	CO6	Apply basic engineering fundamentals to examine the different methods for computer I/O mechanism.
PO2		2.6	2.6.4	L2	CO6	Compare and contrast alternative methods of data transfer to select the best methods.

Course Objectives

Sr. No.	Description
1	Learn the fundamentals of Digital Logic Design.
2	Conceptualize the basics of organizational and features of a digital computer.
3	Study microprocessor architecture and assembly language programming.
4	Study processor organization and parameters influencing performance of a processor.
5	Analyse various algorithms used for arithmetic operations.
6	Study the function of each element of memory hierarchy and various data transfer techniques used in digital computer.

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
4	1	4.6	4.6.1	L3	CO1	Demonstrate Basic network administration commands to Investigate network.
3	1	3.6	3.6.2	L2	CO2	Installation and Implementation of network simulator (NS) and Implementation of TCL
4	1	4.4	4.4.1	L3	CO3	Understand the network simulator environment. Investigate and examine Network performance
3	2	3.6	3.6.1	L3	CO4	Design and Implement client-server socket Architecture.
1	1	1.7	1.7.1	L4	CO5	Analyse the traffic flow and the contents of protocol frames.
3	2	3.7	3.7.1	L6	CO6	Design and configure a network for an organization.

Course Objective

Sr. No.	Description
1	Execute and evaluate network administration commands and demonstrate their use in different network scenarios
2	Demonstrate the installation and configuration of network simulator
3	Demonstrate and measure different network scenarios and their performance behaviour.
4	Implement the socket programming for client server architecture.
5	Analyze the traffic flow of different protocols.
6	Design a network for an organization using a network design tool

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO2	PSO1	2.6	2.6.2	Level 2 Understand	CO1	Understand the architecture and functioning of Unix
PO2	PSO1	2.6	2.6.2	Level 4 Identify	CO2	Identify the Unix general purpose commands
PO4	PSO1	4.6	4.6.1	Level 3 Apply	CO3	Apply Unix commands for system administrative tasks such as file system management and user management.
PO5	PSO2	5.5	5.5.1	Level 3 Apply	CO4	Compute Unix commands for system administrative tasks such as process management and memory management
PO2	PSO2	2.6	2.6.2	Level 2 Understand	CO5	Demonstrate basic shell scripts for different applications.
PO5	PSO2	5.6	5.6.1	Level 6 Create	CO6	Develop advanced scripts using awk & perl languages and grep, sed, etc. commands for performing various tasks.

Course Objectives

Sr. No	Description
1	To understand architecture and installation of Unix Operating System
2	To learn Unix general purpose commands and programming in Unix editor environment
3	To understand file system management and user management commands in Unix.
4	To understand process management and memory management commands in Unix
5	To learn basic shell scripting.
6	To learn scripting using awk and perl languages.

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO1	1	1.7	1.7.1	L3	CO1	Demonstrate various components and peripheral of computer system
PO1	1	1.2	1.2.1	L4 L6	CO2	Analyze and design combinational circuits
PO4	1	4.5	4.5.1	L3	CO3	Simulate a program on a microprocessor using arithmetic & logical instruction
PO4	1	4.5	4.5.1	L6	CO4	Develop the assembly level programming using 8086 loop instruction set
PO4	1	4.5	4.5.1	L1	CO5	Implement programs based on string and procedure for 8086 microprocessor.
PO5	1	5.4	5.4.1	L6	CO6	Design interfacing of peripheral devices with 8086 microprocessor.

Course Objectives

Sr. No.	Description
1	Learn assembling and disassembling of PC
2	Design, simulate and implement different digital circuits
3	Get hands on experience with Assembly Language Programming.
4	Study interfacing of peripheral devices with 8086 microprocessor.
5	Realize techniques for faster execution of instructions and improve speed of operation and performance of microprocessors.
6	Write and debug programs in TASM/MASM/hardware kits

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.6.1	1.6	2	CO1	Understand and explain Basic programming concepts
1	1	1.6.1	1.6	2	CO2	Understand and explain Advance data types and function.
3	1	3.7.1	3.7	3	CO3	Use the OOPS concepts for finding solution to problems.
3	1	3.8.1	3.8	3	CO4	Use multithreading,exceptional handling ,modules and packages concepts for better
3	2	3.6.2	3.6	6	CO5	Design and develop GUI using tkinter.
4	2	4.6.3	4.6	6	CO6	Design and develop application using matplotlib,pandas and flask.

Course Objectives

Sr. No.	Description
1	Basics of python including data types, operator, conditional statements, looping statements, input and output functions in Python
2	List, tuple, set, dictionary, string, array and functions
3	Object Oriented Programming concepts in python
4	Concepts of modules, packages, multithreading and exception handling
5	File handling, GUI & database programming
6	Data visualization using Matplotlib, Data analysis using Pandas and Web programming using Flask

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO2	PSO2	2.1	2.5.1	L5	CO1	Evaluate problems based on societal /research needs and apply Knowledge and skill to solve it in a group
PO9	PSO1	9.5	9.5.1	L2	CO2	Demonstrate effective communication, problem-solving, conflict resolution and leadership skills to work as member of a group or leader.
PO4	PSO1	4.6	4.6.2	L4	CO3	Critically analyze results through theoretical/ experimental/simulations for trends and correlations, stating possible errors and limitations
PO7	PSO1	7.3	7.3.1	L4	CO4	Identify and analyse the impacts of solutions in societal and environmental context for sustainable development.
PO10	PSO2	10.5	10.5.2	L3	CO5	Deliver effective oral presentations and use standard norms of engineering practices to technical and non-technical audiences
PO12	PSO1	12.5	12.5.2	L2	CO6	Recognize the need and demonstrate capabilities of self-learning in a group to keep current regarding new developments in IT field for life long learning
PO11	PSO1 PSO2	11.5	11.5.1	L5		Analyze, evaluate and select the most appropriate proposal based on economic and financial considerations and thus demonstrate project management principles during project work.

Course Objectives

Sr. No.	Description
1	To acquaint with the process of identifying the needs and converting it into the problem.
2	To familiarize the process of solving the problem in a group.
3	To acquaint with the process of applying basic engineering fundamentals to attempt solutions to the
4	To inculcate the process of self-learning and research.

Semester- V

Subject- Internet Programming

Subject Code- ITC501

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO5	PSO1	5.4	5.4.1	L4	CO1	Identify modern engineering technologies or protocols required for various web applications.
PO4	PSO2	4.4	4.4.3	L3	CO2	Able to choose and apply appropriate JavaScript to add functionality to web pages.
PO2	PSO1	2.6	2.6.4	L5		Compare, contrast and analyze ES6 and ES5 standards
PO4	PSO2	4.5	4.5.1	L6	CO3	Design and develop appropriate front end application using methodologies of basic React
PO3	PSO2	3.6	3.6.2	L6	CO4	Able to produce or design a variety of potential front end application using functional components of React.
PO4	PSO2	4.5	4.5.1	L6	CO5	Design and develop appropriate back-end applications using Node.js
PO3	PSO2	3.8	3.8.2	L6	CO6	Able to implement and integrate web based Node.js applications using Express

Course Objectives

Sr. No.	Description
1	To orient students to Web Programming fundamental.
2	To expose students to JavaScript to develop interactive web page development
3	To orient students to Basics of REACT along with installation
4	To expose students to Advanced concepts in REACT
5	To orient students to Fundamentals of node.js
6	To expose students to node.js applications using express framework.

Subject- Computer and Network Security**Subject Code: ITC502****Course Outcomes**

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	2.5	2.5.1	L2	CO1	Understand security objectives.
2	1	1.2	1.2.1	L3		Apply the knowledge of mathematical concepts, matrix and numerical techniques
3	1	3.6	3.6.1	L4		Analyse various encryption techniques.
1	1	1.7	1.7.1	L2 L3	CO2	Understand and Apply theory and principles of computer science and engineering.
3	2	3.6	3.6.2	L6		Design various secure cryptographic applications.
5	2	5.4	5.4.2	L2 L6		Create, modify and extend techniques to provide security
6	1	6.3	6.3.1	L5		Evaluate various techniques to provide protection of the public.
8	1	8.3	8.1	L1	CO3	Identify Different types of malicious Software and its effect on the security.
3	1	3.5	3.5.5	L3 L6	CO4	Explore design issues and working principles of various secure communication standards including IPsec, and SSL/TLS and email and apply them to provide security for professional concern.
5	2	5.4	5.4.2	L3	CO5	Design Network management security architecture and Apply Network Access Control techniques to provide Computer Security.
2	1	2.7	2.7.1	L5	CO6	Evaluate the performance and application of firewall and IDS in network security.

Course Objective

Sr. No.	Description
1	Classical encryption techniques and concepts of finite fields and number theory
2	Various cryptographic algorithms including secret key management and different authentication techniques.
3	Different types of malicious Software and its effect on the security
4	Various secure communication standards including IPsec, SSL/TLS and email.
5	Network management Security and Network Access Control techniques in Computer Security.
6	Different attacks on networks and infer the use of firewalls and security protocols.

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO1		1.6	1.6.1	L1, L2	CO1	Apply engineering fundamentals to understand the concept of entrepreneurship and its close relationship with enterprise and owner-management
PO 7		7.3	7.3.2	L2	CO1	Understand the relationship between the technical, socio-economic and environmental dimensions of sustainability
PO1		1.6	1.6.1	L1, L2	CO2	Apply engineering fundamentals to Understand the nature of business development in the context of existing organizations and of new business start-ups.
PO 10		10.4	10.4.1	L1, L2	CO3	Comprehended important factors for starting a new venture and business development.
PO11		11.4	11.4.1	L1	CO4	Describe various economic and financial costs/benefits of a business start-up
PO11		11.4	11.4.2	L2	CO4	Analyze different forms of financial statements to evaluate the financial status of a business start-up and Know issues and decisions involved in financing and resourcing a business start-up
PO5		2.5	2.5.2	L1,L4	CO5	Identify processes/modules/Models of a E-business and Describe various E-business Models and parameters.
PO5		5.4	5.4.1	L1	CO6	Identify modern E-business tools, techniques and resources for various E-business
PO5		5.4	5.4.2	L2	CO6	Discuss various E-business Strategies and Create/adapt/modify/extend tools and techniques to solve E-business problems.

Course Objectives

Sr. No.	Description
1	To distinguish Entrepreneur and Entrepreneurship starting and feasibility study.
2	To realize the skills required to be an entrepreneur
3	To acquaint the students with challenges of starting new ventures
4	To identify the right sources of fund for starting a new business
5	To be familiarized with concept of E-business Models.
6	To understand various E-business Strategies.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1	1	1.6	1.6.1	Level 1 Remember	CO1	Understand the nature of software development life cycle
PO3	1	3.5	3.5.1	Level 3 Apply	CO2	Select methods of capturing, specifying, visualizing and analyzing software requirements
PO3	1	3.5	3.5.6	Level 6 Creating		develop software requirement specifications (SRS)
PO7	1	7.3	7.3.1	Level 6 Creating	CO3	Plan, schedule and track the progress of the projects.
PO3	1	3.7	3.7.1	Level 6 Creating	CO4	Design software solution and user-centric approach and principles of effective user interfaces.
PO7	1	7.3	7.3.1	Level 6 Creating	CO5	Prepare the RMMM sheet
PO3	1	3.5	3.5.1	Level 3 Apply	CO6	choose testing methods and understanding concept of software quality assurance

Course Objectives

Sr. No.	Description
1	provide the knowledge of software engineering discipline and understand to process model
2	understand the importance of Requirement gathering and analyze it
3	introduce the basic concepts of scheduling and its importance
4	learn design concept and develop UI
5	Understand the software risk and learn SCM process
6	understand need of teststing and its various tyapes

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
3		3.5	5.1 & 3.5	6	1	Design a technical document using precise language, suitable vocabulary and apt style
3		3.5	5.4.1	6	2	Develop writing skills of a cover letter and a CV/resume/SOP
4		4.5	4.5.1	6	3	Develop interpersonal skills to progress professionally by building strong relationships with peers
4		4.5	4.5.1	6	4	Develop effective presentation skills and an impressive body language
1		1.5	1.5.1	3	5	Apply codes of personal integrity, values, aptitudes and skills
1		1.5	1.5.1	2	6	Demonstrate awareness of contemporary issues, knowledge of professional and ethical responsibilities

Course Objectives

Sr. No.	Description
1	To discern and develop an effective style of writing important technical/business documents.
2	To investigate possible resources and plan a successful job campaign.
3	To understand the dynamics of professional communication in the form of group discussions, meetings etc. required for career enhancement.
4	To develop creative and impactful presentation skills.
5	To analyze personal traits, interests, values, aptitudes and skills.
6	To understand the importance of integrity and develop a personal code of ethics.

Subject- Advanced database management technologies**Subject Code: ITDLO5012****Course Outcomes**

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
2	1	2.5	2.5.2	L4	CO1	Analyze query processing and optimization techniques.
1	1	1.7	1.7.1	L3		Apply algorithm to measure its cost and working to select best query execution plan
6	1	6.3	6.3.1	L2	CO2	Identify sophisticated access control protocols
5	1	5.4	5.4.1	L3		Apply different access control protocols to the database
7	1	7.3	7.3.2	L2		understand different applications using advanced models
2	1	2.5	2.5.2	L2	CO3	identify different models of distributed database system
4	1	4.6	4.6.1	L4		Analyze different architectures of distributed system
5	1	5.5	5.5.1	L4	CO4	analyze enterprise data and use OLAP tools to take strategic decisions
3	2	3.8	3.8.1	L6		design datawarehouse system using different OLAP operations
5	1	5.4	5.4.1	L2	CO5	identify ETL process techniques to extract data from datawarehouse
12	1	12.6	12.6.2	L4		Analyze historical data from DW to take decisions
2	1	2.1	2.5.2	L2	CO6	understand the concept of big data and no sql databases
4	1	4.6	4.6.1	L4		Analyze their different characteristics

Course Objective

Sr. No.	Description
1	To impart knowledge related to query processing and query optimization phases of a database management system
2	To learn advanced techniques for data management and to overview emerging data models like Temporal, Mobile, and Spatial database
3	To introduce advanced database models like distributed databases
4	To create awareness of how enterprise can organize and analyze large amounts of data by creating a Data Warehouse
5	To understand the process of data extraction, transformation and loading.
6	To understand the concept of Big data and NoSQL databases.

Subject: ADS Advanced Data structure and Analysis**Subject Code:ITDO6014****Course Outcomes**

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
2	1	3.6	3.6.1	2,3	1	Understand explore and analyze Analysis of Algorithm principles with their mathematical aspect.
5	1	2.1	2.5.3	3		Identify, Select and apply various methods of algorithmic designing in tackling engineering problems.
5	2	5.6	5.6.1	2,4	2	Discuss and Categorize the core values of advanced data Structure often including RBT Trees, B/B+ Tree, Heaps etc.
2	2	2.1	2.5.2	4		Identify process with parameters to perform numerous operations on advanced data structure
1	2	1.7	1.7.1	4		Apply and assess advanced data structure with their real life problem needed to solve.
5	1	5.6	5.6.1	2	3	Discuss the principles behind Divide and Conquer and Greedy Algorithmic design
2	1	2.1	2.5.2	4		Illustrate various methods uses Divide and Conquer and Greedy Strategy.
1	1	1.7	1.7.1	4		Apply Divide and Conquer and Greedy Algorithmic design strategy with their inputs for resolution of problems in real life.
5	2	5.6	5.6.1	2	4	Discuss Represent the concept of Dynamic Algorithmic design strategy.
2	2	2.1	2.5.2	4		Illustrate various methods uses Dynamic Algorithmic Strategy.
1	2	2.1	2.5.2	4		Apply comprehensiveness of Dynamic Algorithmic design strategy in solving various problems in real life.
4	2	3.6	3.6.2	4	5	Scrutinize, recognise and use the appropriate string matching methods viz. the naïve string matching, Rabin Karp to design various pattern matching applications/ process .
3	2	3.6	3.6.1	2		Investigate and explore the principles behind the concepts of Optimization, Approximation, Parallel Computing algorithms and NP-Hard and NP-Complete.

2	2	2.1	2.5.2	4	6	Illustrate various methods uses Optimization, Approximation and Parallel Computing algorithms Strategy.
1	2	1.7	1.7.1	4		Apply adequacy of Optimization, Approximation and Parallel Computing algorithms in real life problem solving.

Sr. No	Description
1	To learn mathematical background for analysis of algorithm
2	To learn various advanced data structures.
3	To understand the different design approaches of algorithm.
4	To learn dynamic programming methods.
5	To understand the concept of pattern matching
6	To learn advanced algorithms.

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO2	PSO1	2.6	2.6.2	L4	CO1	Identify functionalities and apply appropriate HTML tags to develop a webpage
PO2	PSO1	2.6	2.6.2	L3	CO2	Identify functionalities and apply CSS tags to format data on webpage
PO3	PSO1	3.6	3.6.2	L2	CO3	Able to understand and produce responsive websites using Bootstrap suited to meet functional requirements.
PO4	PSO2	4.5	4.5.1	L6	CO4	Design and develop interactive web pages using JavaScript
PO3	PSO2	3.8	3.8.2	L6	CO5	Able to construct and implement front end applications using React
PO3	PSO2	3.8	3.8.2	L6	CO6	Able to implement and integrate back end applications using Node.js/Express

Course Objectives

Sr. No.	Description
1	To orient students to HTML for making webpages
2	To expose students to CSS for formatting web pages
3	To expose students to developing responsive layout
4	To expose students to JavaScript to make web pages interactive
5	To orient students to React for developing front end applications
6	To orient students to Node.js for developing backend applications

LAB Outcomes

PO	PSO	Competancy	PI	Bloom's Level	LO	Description
PO1	PSO 2	1.6	1.6.1	L1,L2	LO1	Apply engineering fundamentals to apply the knowledge of symmetric cryptography to implement classical ciphers.
PO2	PSO 2	2.5	2.5.3	L1,L2	LO2	Identify mathematical algorithmic knowledge that applies to a given problem to analyze and implement public key encryption algorithms, hashing and digital signature algorithms.
PO5	PSO 2	5.4	5.4.2	L1,L2, L3	LO3	Create/adapt/modify/extend tools and techniques to solve engineering problems by exploring the different network reconnaissance tools to gather information about networks
PO5	PSO 2	5.4	5.4.2	L1,L2,L3	LO4	Create/adapt/modify/extend tools and techniques to solve engineering problems by Using tools like sniffers, port scanners and other related tools for analyzing packets in a network
PO5	PSO 2	5.4	5.4.1	L1,L2,L3	LO5	Identify modern engineering tools, techniques and resources for engineering activities by Using open-source tools to scan the network for vulnerabilities and simulate attacks
PO5	PSO 2	5.5	5.5.2	L1,L2	LO6	Demonstrate proficiency in using discipline-specific tools by Demonstrating the network security system using open source tools

LAB Objectives

Sr. No.	Description
1	To apply the knowledge of symmetric cryptography to implement classical ciphers.
2	To analyze and implement public key encryption algorithms, hashing and digital signature algorithms.
3	To explore the different network reconnaissance tools to gather information about networks.
4	To explore the tools like sniffers, port scanners and other related tools for analyzing.
5	To Scan the network for vulnerabilities and simulate attacks.
6	To set up intrusion detection systems using open-source technologies and to explore email security.

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO4	PSO2	4.4	4.4.3	L1	CO1	Able to choose appropriate devops tools used in software development life cycle
PO3	PSO2	3.8	3.8.2	L2	CO2	Able to select, implement and integrate Git Version Control strategies in the modules.
PO5	PSO1	5.5	5.5.1	L4	CO3	Identify the strengths and limitations of Jenkins tools to Build, Deploy and Test Software Applications
PO2	PSO1	2.6	2.6.3	L4	CO4	Identify and understand the importance of Selenium and Jenkins to test Software Applications
PO2	PSO1	2.8	2.8.2	L4	CO5	Analyze & Illustrate the Containerization of images and deployment of applications over Docker
PO5	PSO2	5.4	5.4.2	L6	CO6	Adapt and integrate Software Configuration Management tool Ansible for provisioning

Course Objectives

Sr. No.	Description
1	To understand DevOps practices which aims to simplify Software Development Life Cycle
2	To be aware of different Version Control tools like GIT, CVS or Mercurial
3	To Integrate and deploy tools like Jenkins and Maven, which is used to build, test and deploy applications in DevOps environment
4	To be familiarized with selenium tool, which is used for continuous testing of applications deployed.
5	To use Docker to Build, ship and manage applications using containerization
6	To understand the concept of Infrastructure as a code and install and configure Ansible tool.

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO2	PSO1	2.6	2.6.3	Level 2 Understand	CO1	To understand the fundamentals of Cloud Computing and be fully proficient with Cloud based DevOps solution deployment options to meet your business requirements
PO2	PSO2	2.7	2.7.1	Level 6 Create	CO2	To create single and multiple container applications and manage application deployments with rollouts in Kubernetes
PO3	PSO2	3.6	3.6.2	Level 3 Apply	CO3	infrastructure as code environments and use terraform to define and deploy cloud infrastructure.
PO4	PSO2	4.4	4.4.1	Level 4 Analyze	CO4	To identify and remediate application vulnerabilities earlier and help integrate security in the development process using SAST Techniques.
PO4	PSO2	4.6	4.6.4	Level 3 Apply	CO5	To use Continuous Monitoring Tools to resolve any system errors (low memory, unreachable server etc.) before they have any negative impact on the business productivity.
PO5	PSO1	5.4	5.4.1	Level 4 Analyze	CO6	To identify a composition of nano services using AWS Lambda and Step Functions with the Serverless Framework

Course Objectives

Sr. No.	Description
1	To understand DevOps practices and cloud native environments to achieve continuous software delivery pipelines and automated operations that address the gap between IT resources and growing cloud complexity.
2	To Use Kubernetes services to structure N-tier applications.
3	To be familiarized with Infrastructure as code for provisioning, compliance, and management of any cloud infrastructure, and service.
4	To understand that security and speed in software development are not inversely-related objectives Internalizing the contribution of tools and automation in DevSecOps
5	To understand various troubleshooting techniques by monitoring your entire infrastructure and business processes
6	To understand how software and software-defined hardware are provisioned dynamically.

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO2	PSO2	2.1	2.5.1	L5	CO1	Evaluate problems based on societal /research needs and apply Knowledge and skill to solve it in a group
PO9	PSO1	9.5	9.5.1	L2	CO2	Demonstrate effective communication, problem-solving, conflict resolution and leadership skills to work as member of a group or leader.
PO4	PSO1	4.6	4.6.2	L4	CO3	Critically analyze results through theoretical/ experimental/simulations for trends and correlations, stating possible errors and limitations
PO7	PSO1	7.3	7.3.1	L4	CO4	Identify and analyse the impacts of solutions in societal and environmental context for sustainable development.
PO10	PSO2	10.5	10.5.2	L3	CO5	Deliver effective oral presentations and use standard norms of engineering practices to technical and non-technical audiences
PO12	PSO1	12.5	12.5.2	L2	CO6	Recognize the need and demonstrate capabilities of self-learning in a group to keep current regarding new developments in IT field for life long learning
PO11	PSO1 PSO2	11.5	11.5.1	L5		Analyze, evaluate and select the most appropriate proposal based on economic and financial considerations and thus demonstrate project management principles during project work.

Course Objectives

Sr. No.	Description
1	To acquaint with the process of identifying the needs and converting it into the problem.
2	To familiarize the process of solving the problem in a group.
3	To acquaint with the process of applying basic engineering fundamentals to attempt solutions to the
4	To inculcate the process of self-learning and research.