Saraswati College of Engineering
Department- Information Technology
Semester- III
Scheme (R-16)

Subject- AMIII   **Subject Code- ITC301**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO1, PO2		1.1	1.1.2	1, 2	1	Use the knowledge of set theory to define and identify the different programs in the field of Engg. Problems related with information technology.
PO3, PO4, PO5		3.1	3.1.6	2,3	2	Select & choose appropriate relation and function to design the technology program & investigate the proper solution to recursive fun.
PO1, PO2, PO3, PO5		1.1	1.1.2	1,2	3	Classify formulate investigate & select the appropriate technique of Laplace transformation the solve information technology problems.
PO3, PO4, PO5, PO12		3.1	3.1.6	2,3	4	Select & apply the concept of inverse L.T. to design & generate the solution of boundary value problems. Identify the need of L.T. in day to day life as well as educational needs.
PO1, PO2, PO12		12.1	12.1.1	1, 2	5	Use the basic knowledge of maths formulate express & identify the solution of permutation combination problems, leads to valid conclusion & apply the knowledge in engineering as well as day to day life problems.
PO2, PO3, PO4		3.1	3.1.1	5,6	6	Analyze the complex function & use the concept of analytic function & conformal mapping to design the information technology problem as well as problem in changing world of technology.

Course Objectives

Sr. No.	Description
1	To Describe and distinguish between different type of sets by using definition & venn diagram.
2	To Express the concept of relation & function for defining the recursive function.
3	To Understand the concept of Laplace transformation
4	To Select & apply different methods of universe L.T. for solving the boundary value problems involving ODE.
5	To Analyze permutation combination and basic probability approach for solving examples
6	To familiarize with the concept of complex variables, C-R equations and conformal mapping with applications. □

Subject- Logic Design   Subject Code: ITC302

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO1		1.6	1.6.1	L3	CO1	Understand the concepts of various components to design stable analog circuits.
PO2		2.6	2.6.4	L2		Compare and contrast between all biasing circuits.
PO1		1.2	1.2.1	L2	CO2	Apply the knowledge of Number system conversion techniques to solve problems
PO1		1.6	1.6.1	L2		Apply basic engineering fundamentals to Demonstrate the fundamentals of Digital Logic Design
PO1		1.6	1.6.1	L3	CO3	Apply basic engineering fundamentals to Minimize the Boolean expression using Boolean algebra
PO1		1.6	1.6.1	L3		Design Boolean expression using logic gates
PO3		3.8	3.8.2	L4	CO4	Analyze combinational circuit to Able to implement and integrate the modules by designing combinational circuit.
PO3		3.8	3.8.2	L4	CO5	Analyze combinational circuit to Able to implement and integrate the modules by designing.
PO3		3.8	3.8.3	L6		Able to verify the functionalities and validate the design of sequential circuits by designing and developing it.
PO1		1.6	1.6.1	L3	CO6	Apply engineering fundamentals to explain Hardware description language to Translate real world problems into digital logic formulations using VHDL.

Course Objectives

Sr. No.	Description
1	Understand the concept of various components.
2	Understand the concepts that underpin the disciplines of Analog and digital electronic logic circuits.
3	Various Number system and Boolean algebra.
4	Design and implementation of combinational circuits
5	Design and implementation of Sequential circuits
6	Hardware description language

Subject: Data Structure & Analysis   Subject Code: ITC304
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, ADT & classification of Data Structures such as Linear-NonLinear DS.
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	**Identify & Discuss** the concept of Stack Linear Data Structure with parameters to perform numerous operations Push Pop on it.
1	2	1.7	1.7.1	4		**Apply and assess** Stack data structure with their application like reversing string, Polish notations needed to solve.
5	1	5.6	5.6.1	2,4	3	**Identify & Discuss** the concept of Queue with various types Linear , Circular Queue, Priority Queue, De-queue Data Structure with parameters to perform numerous operations EnQueue and DeQueue on it.
1	1	1.7	1.7.1	4		**Apply and assess** Queue data structure with their real life problem of scheduling of jobs for resource utilization needed to solve.
5	1	5.6	5.6.1	2,4	4	**Identify & Discuss** the need of Linked List Data Structure, concept of memory allocation, types of LL with parameters to perform numerous operations such as Insertion Deletion on it.
1	1	1.7	1.7.1	4		**Apply and assess** Linked List with their application like Addition of Polynomial Equation needed to solve
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.

5	1	5.6	5.6.1	2,4		**Discuss and Categorize** the concept of nonlinear data Structure such as trees&Graphs with advanced data structure often including threaded binary tree, expression Trees.
2	1	2.1	2.5.2	4	6	**Identify process** with parameters to perform numerous operations like creation, traversal deletion on Binary Tree and like traversal:Depth first search(DFS)&Breadth First search(BFS) on graph.
1	1	1.7	1.7.1	4		**Apply and assess** nonlinear data structure with their real life problem needed to solve are Searching from Tree, finding MinimumSpanning Tree from Graph.

Course Objectives

Sr. No	Description
1	**Understand and remember algorithms and its analysis procedure.**
2	**Introduce the concept of data structures through ADT including List, Stack, Queues .**
3	**Implement various data structure algorithms.**
4	**Summarize various techniques for representation of the data in the real world**
5	**Develop application using data structure algorithms.**
6	**Compute the complexity of various algorithms.**

Subject-Database Management System   Subject Code-ITC304

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
PO5	2	5.4 5.5	5.4.2 5.5.2	L6 L2	6	Create indexing mechanism for efficient retrieval of information form a database. Demonstrate physical design of a database system by implementing Database indexing techniques and storage techniques.

Course Objectives

Sr. No.	Description
1	To describe a sound introduction to the discipline of database management systems
2	To provide an overview of physical design of a database system, by discussing Database indexing techniques and storage techniques.
3	To introduce the concepts of basic SQL as a universal Database language
4	To enhance knowledge to advanced SQL topics like embedded SQL, procedures connectivity through JDBC
5	To demonstrate the principles behind systematic database design approaches by covering conceptual design, logical design through normalization
6	To provide an overview of physical design of a database system, by discussing Database indexing techniques and storage techniques.

Subject- Principle of Communications   Subject Code: ITC305

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		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		Apply the knowledge of friis formula to solve problems.
PO2		2.8	2.8.2	L4		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		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		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		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	Understand the basic principles and techniques used in analog and digital communications
2	Understand the concept of noise and Fourier transform for designing and analyzing communication system
3	Acquire the knowledge of different modulation techniques such as AM, FM and study the block diagrams of transmitter and receiver
4	Study the Sampling theorem and Pulse Analog Modulation techniques
5	Learn the concepts of Digital modulation techniques such as PCM, DM, ADM and multiplexing techniques
6	Gain the core idea of Electromagnetic Radiation and propagation of waves

Subject-Digital Design Lab   Subject Code: ITL301

LAB Outcomes

PO	PSO	Competancy	PI	Bloom's Level	LO	Description
PO1		1.6	1.6.1	L3	LO1	Apply engineering fundamentals to Minimize the Boolean algebra and design it using logic gates by verifying the truth table of logic gates and Realization of Boolean algebra .
PO3		3.6	3.6.2	L4,L6	LO2	Able to produce a variety of potential design solutions suited to meet functional requirements by Analysing and designing combinational circuit.
PO3		3.8	3.8.2	L6	LO3	Able to implement and integrate the modules/ given function using combinational circuit.
PO3		3.8	3.8.2	L6	LO4	Able to implement and integrate the design of sequential circuits
PO3		3.8	3.8.2	L6	LO5	Able to Implement digital systems using programmable logic devices &evaluate and observe Boolean expression using PALs and PLAs..
PO5		5.4	5.4.2	L2,L3	LO6	Create/adapt/modify/extend tools and techniques for Implementation of Logic Gates ,combinational circuits using VHDL tool to translate real world problems into digital logic formulations

LAB Objectives

Sr. No.	Description
1	Learn to minimize and design combinational logic
2	Understand the relationships between combination logic and Boolean algebra, and between sequential logic and finite state machines
3	Appreciate tradeoffs in complexity and speed of combinational designs
4	Understand how state can be stored in a digital logic circuit
5	Study how to design a simple finite state machine from a specification and be able to implement this in gates and edge triggered flip-flops
6	Learn to translate real world problems into digital logic formulations

Subject-DS Lab   **Subject Code-ITL302**

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 stacks to implement real time problem of Polish Notataion, recursion etc.
4	1	4.3	4.3.	L6	2	Understand the concepts and apply the methods of Queue, Circular, Priority Queue Linear Data structure to implement real time application of scheduling.
4	2	4.6 2.7	4.6.1 2.7.1	L2 L3	3	Use and identify the methods in Linked List to implement variousoperations like Creation, Insertion, Deletion etc. on it.
2	2	2.7 2.8	2.7.2 2.8.1	L3 L2	4	Understand the concepts and apply the methods of Binary Tress and demonstration of Binary Search Tree with various operation such as creation, different traversal and deletion.
3	1	4.5	4.5.1	L2	5	Understand the concepts and apply the methods of Graph Non Linear DS and demonstration of it with various operation such as creation, different traversal DFS & BFS.
2	2	4.5	4.5.3	L2	6	Understand the concepts and apply the techniques of searching, hashing and sorting

Course Objectives

Sr. No.	Description
1	Understand and remember algorithms and its analysis procedure.
2	Introduce the concept of data structures through ADT including List, Stack, Queues .
3	To design and implement various data structure algorithms.
4	To introduce various techniques for representation of the data in the real world.
5	To develop application using data structure algorithms.
6	Compute the complexity of various algorithms.

Subject-SQL Lab   **Subject Code-ITL303**

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 create appropriate model on the problem statement
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
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	2.7	2.7.1	L3	6	Able to apply indexes for a database using indexing techniques

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 enable students to be create indexes for databases for efficient retrieval.

Subject-Java Programming Lab **Subject Code-ITL304**

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 AWT.
3	2	3.6.2	3.6	6	CO6	Design and Develop GUI using swing.

Course Objectives

Sr. No.	Description
1	To understand how to design, implement, test, debug, and document programs that use basic data types and computation, simple I/O, conditional and control structures, string handling and functions.
2	To understand the importance of Classes & objects along with constructors, Arrays and Vectors.
3	Discuss the principles of inheritance, interface and packages and demonstrate though problem analysis assignments how they relate to the design of methods, abstract classes and interfaces and packages.
4	To understand importance of Multi-threading & different exception handling mechanisms
5	To learn experience of designing, implementing, testing, and debugging graphical user interfaces in Java using applet and AWT that respond to different user events.
6	To understand Java Swings for designing GUI applications based on MVC architecture.

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1,2		1.1	1.1.3	3	1	define and identify the different programs in the field of Engg. Problems related with information technology
1,2,4		1.3	1.3.1	3	2	Select & choose appropriate congruence relation theorem to design the technology program & investigate the proper solution of congruences.
1,2,3,4.12		2.1	2.1.2	3,4	3	Cassify and select the probability distribution to analyze & solve real time problem, in data srtucture and Artificial intelligence
1,2,12		2.1	2.1.2	2	4	Select the test of hypothesis for small & large samples by using various test like t-test, z- test & chi- square test.
1,2,3,5		3.3	3.3.1	3	5	Develop the basic knowledge of graph theoryand group concept to express & identify the solution of planer graph, graph coloring, trees ,isomorphism & apply the knowledge in engineering as well as day to day life problems.
1,2,4,12		4.3	4.3.1	4	6	Analyze the Lattices & use the concept of Boolean Algebra & coding theory in error detection problems,also apply the knowledge to design the information technology problem as well as problem in changing world of technology.

Course Objectives

Sr. No.	Description
1	To inculcate an ability to relate engineering problems to mathematical context using the concept of Number theory.□
2	To provide a solid foundation in mathematical fundamentals required to solve engineering problem. □
3	Apply probability distribution theory for solving engineering problems.□
4	To identify significance of sampling theory.□
5	To study the concept of graph theory and trees.
6	To identify significance of group and lattice theory.□

Subject- Computer Networks   Subject Code-ITC402

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	L1	CO2	List the data presentation techniques
1	1	1.7	1.7.1	L4		Illustrate the client server model in application layer protocols
1	1	1.7	1.7.1	L2	CO3	Explain data transportation issues and related protocols used for end-to-end data transmission
2	1	2.8	2.8.2	L4	CO4	Analyze the routing protocols
1	1	1.7	1.7.1	L2		Understand IPv4 , IPv6 header Formats and IPV4 addressing scheme
3	2	3.8	3.8.1	L6		Designing sub-nettings including detailed IPV4 addressing for an small netwroks
1	1	1.7	1.7.1	L2	CO5	Describes Switching techniques
1	1	1.7	1.7.2	L3		Understand Responsibilities and Protocols of data link layer
1	1	1.6	1.6.1	L4	CO6	Categorize the type of Transmission Media
1	1	1.7	1.7.1	L2		Undestand Multiplexing and Modulation Techniques

Course Objectives

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

Subject- Operating System   **Subject Code- ITC403**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO2	PSO1	2.6	2.6.2	Level 2 Understand	CO1	Understand the basic concepts and components related to Operating System
PO4	PSO1	4.4	4.4.1	Level 2 Understand	CO2	Describe the Process Management Policies and Illustrate scheduling of processes by CPU using Algorithms
PO3	PSO2	3.6	3.62	Level 5 Evaluate	CO3	Evaluate Deadlock Conditions as handled by Operating System.
PO4	PSO2	4.5	4.5.1	Level 4 Analyze	CO4	Explain and Analyze the memory allocation and management functions and techniques of Operating System.
PO4	PSO2	4.4	4.4.3	Level 4Analyze	CO5	Analyze and Evaluate the services provided by Operating System for Storage Management.
PO5	PSO1	5.4	5.4.1	Level 2 Understand	CO6	Compare the functions of various special-purpose Operating Systems

Course Objectives

Sr. No	Description
1	To understand the main components of an OS & their functions
2	To study the process management and scheduling
3	To understand various issues in Inter Process Communication (IPC) and the role of OS in IPC.
4	To understand the concepts and implementation Memory management policies and virtual memory
5	To understand the working of an OS as a resource manager, file system manager, process manager, memory manager and I/O manager and methods used to implement the different parts of OS
6	To study the need for special purpose operating system with the advent of new emerging technologies

Subject- Computer Organization and Architecture
Subject Code: ITC404
Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO1		1.6	1.6.1	L1	CO1	Apply basic engineering fundamentals to describe basic organization of computer,
PO2		2.6	2.6.4	L2		Differentiate basic organization and architecture of computer.
PO1		1.6	1.6.1	L1		Apply basic engineering fundamentals to describe the architecture of 8086 microprocessor
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		Compare and contrast the instructions of 8086 to select appropriate instructions as per given task.
PO2		2.8	2.8.2	L4		Analyze 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		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		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		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		Compare and contrast alternative methods of data transfer to select the best methods.

Course Objectives

Sr. No.	Description
1	Conceptualize the basics of organizational and architectural issues of a digital computer.
2	Analyze processor performance improvement using instruction level parallelism.
3	Learn the function of each element of a memory hierarchy.
4	Study various data transfer techniques in digital computer.
5	Articulate design issues in the development of processor or other components that satisfy design requirements and objectives.
6	Learn microprocessor architecture and study assembly language programming.

Subject-Automata Theory   **Subject Code: ITC405**

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, Closure Properties.
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 and designing functions FA, FSM, PDA, TM.

Course Objectives

Sr. No	Description
	At the end of course, student should be able to:
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- Network Lab   **Subject Code: ITL401**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	LO	Description
4	1	4.6	4.6.1	L3	LO1	Demonstratre Basic network administration commands to Investigate network.
3	1	3.6	3.6.2	L2	LO2	Installation and Implementation of network simulator (NS) and Implementsation of TCL scripting.
4	1	4.4	4.4.1	L3	LO3	Understand the network simulator environment. Investigate and examine Network performance
1	1	1.7	1.7.1	L4	LO4	Analyse the traffic flow and the contents of protocol frames.
3	2	3.6	3.6.1	L3	LO4	Design and Implement client-server socket Architecture
3	2	3.7	3.7.1	L6	LO6	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	Analyze the traffic flow of different protocols.
5	Implement the socket programming for client server architecture
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 4 Identify	CO1	Identify the Unix general purpose commands
PO2	PSO1	2.6	2.6.2	Level 2 Understand	CO2	Understand the architecture and functioning of Unix
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.
PO2	PSO2	2.6	2.6.2	Level 2 Understand	CO4	Demonstrate basic shell scripts for different applications.
PO5	PSO2	5.5	5.5.1	Level 3 Apply	CO5	Compute Unix commands for system administrative tasks such as process management and memory management
PO5	PSO2	5.6	5.6.1	Level 6 Create	CO6	Develop advanced scripts using awk & perl languages and grep, sed, etc. commandsfor performing various tasks.

Course Objectives

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

Subject- MPL (Lab)   **Subject Code- ITL403**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO1	1	1.7	1.7.1	L3	CO1	Apply the fundamentals of assembly level programming of microprocessors.
PO1	1	1.2	1.2.1	L4 L6	CO2	Simulate a program on a microprocessor using arithmetic & logical instruction set of 8086.
PO4	1	4.5	4.5.1	L6	CO3	Develop the assembly level programming using 8086 loop instruction set.
PO4	1	4.5	4.5.1	L1	CO4	Implement programs based on string and procedure for 8086 microprocessor.
PO4	1	4.5	4.5.1	L4	CO5	Analyze abstract problems and apply a combination of hardware and software to address the problem
PO5	1	5.4	5.4.1	L3	CO6	Use of standard test and measurement equipment to evaluate digital interfaces.

Course Objectives

Sr. No	Description
1	Learn assembling and disassembling of PC
2	Understand hands on experience with Assembly Language Programming.
3	Study interfacing of peripheral devices with 8086 microprocessor.
4	Understand techniques for faster execution of instructions and improve speed of operation and performance of microprocessors.
5	Provide fundamentals of designing embedded systems
6	Write and debug programs in TASM/MASM/hardware kits

Subject-Python Lab   **Subject Code-ITL404**

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** decision making statement and functions.
3	1	3.7.1	3.7	3	CO3	**Use** the OOPS concepts for finding solution to problems.
4	1	4.6.4	4.6	3	CO4	**Understanding** different file operations.
3	2	3.6.2	3.6	6	CO5	**Design and develop** GUI using tkinter.
1	2	1.2.2	1.2	3	CO6	**Applying** networking concepts for network programm.

Course Objectives

Sr. No	Description
1	Basics of Python programming
2	Decision Making and Functions in Python
3	Object Oriented Programming using Python
4	Files Handling in Python
5	GUI Programming and Databases operations in Python
6	Network Programming in Python

Semester V
Subject- Microcontroller and Embedded Programming
Subject Code:ITC501
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 architecture and design metrics of Embedded System.
PO1		1.6	1.6.1	L2		Apply basic engineering fundamentals to Classify the embedded systems.
PO1		1.6	1.6.1	L3	CO2	Apply basic engineering fundamentals to explain the architecture of 8051 microcontroller and the instructions of 8051 to implement the assembly language program.
PO2		2.6	2.6.4	L2		Compare and contrast the instructions of 8051 to select appropriate instructions as per given task.
PO2		2.8	2.8.2	L4		Analyse and interpret the result of ALP using integrated tool.
PO1		1.6	1.6.1	L6	CO3	Apply engineering fundamentals to design interfacing of 8051 with various Input/Output devices.
PO3		3.8	3.8.1	L3		Able to refine architecture design into detailed design using microcontroller, memory chip or different peripheral ICs within existing constraints.
PO1		1.6	1.6.1	L2	CO4	Apply basic engineering fundamentals to explain the architecture of ARM processor.
PO1		2.8	2.8.1	L3		Apply the instructions of ARM to implement the assembly language program.
PO2		2.8	2.8.2	L4		Analyse and interpret the result of ALP using integrated tool.
PO1		1.6	1.6.1	L2	CO5	Apply basic engineering fundamentals to explain the architecture of RTOS.
PO2		2.6	2.6.2	L4		Identify basic functionalities of RTOS and computing resources.
PO1	PSO 2	1.6	1.6.1	L3	CO6	Apply basic engineering fundamentals to explain various target boards of Embedded System.
PO2	PSO 2	2.6	2.6.4	L2		Compare and contrast the various target boards to select appropriate target board as per given application

Course Objectives

Sr. No.	Description
1	To learn different types of sensors from Motes families
2	To design the problem solution as per the requirement analysis done using Motes sensors
3	To study the basic concepts of programming/sensors/ emulator like cooja etc
4	To design and implement the mini project intended solution for project based learning
5	To build and test the mini project successfully
6	To improve the team building, communication and management skills of the students

Subject- Internet Programming   **Subject Code-ITC502**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO5	PSO1	5.6	5.6.1	L2	CO1	**Discuss** basic web designing concept for creating web pages using HTML and CSS and validate web pages using Javascript
PO5	PSO1	5.6	5.6.1	L2	CO2	**Discuss** programming concepts of HTML5 and CSS3.
PO4	PSO2	4.5	4.5.1	L6		**Design** responsive web pages
PO5	PSO1	5.5	5.5.1	L4	CO3	**Identify** the characteristics of rich internet appplications .
	PSO2	5.4	5.4.2	L6		**Create** website using rich internet applications
PO4	PSO1	4.6	4.6.1	L4	CO4	**Analyze** and access the dynamic web site data using server side PHP programming.
PO5	PSO2	5.4	5.4.2	L6		**Create** database connectivity for data
PO2	PSO1	2.6	2.6.4	L5	CO5	Explore, understand and **compare** different web services and extensions.
	PSO2	2.7	2.7.1	L3		**Apply** a web service as per website
PO3	PSO2	3.8	3.8.2	L6	CO6	**Integrate** web designing modules using python web framework Django

Course Objectives

Sr. No.	Description
1	To get familiar with basics of the Internet Programming.
2	To gain ability to develop responsive web applications
3	To learn characteristics of RIA –Web Mashup Eco System
4	To acquire knowledge and skills for creation of web site considering both client and server side programming
5	To explore different web extensions and web services standards
6	To be familiar with Python web framework-Django.

Subject- Advanced database management technology
Subject Code: ITC503

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
2	P1	2.5	2.5.2	L4	CO1	Analyze query processing and optimization techniques.
1	P1	1.7	1.7.1	L3		Apply algorithm to measure its cost and working to select best query execution plan
2	P1	2.1	2.5.2	L2	CO2	identify transaction processing and its properties
6	P1	6.3	6.3.1	L2	CO3	Identify sophisticated access control protocols
5	P1	5.4	5.4.1	L3		Apply different access contol protocols to the database
7	P1	7.3	7.3.2	L2		understand different applications using advanced models
2	P1	2.5	2.5.2	L2	CO4	identify different models of distributed database system
4	P1	4.6	4.6.1	L4		Analyze different architectures of distributed system
5	P1	5.5	5.5.1	L4	CO5	analyze enterprise data and use OLAP tools to take strategic decisions
3	P1	3.8	3.8.1	L6		design datawarehouse system using different OLAP operations
5	P1	5.4	5.4.1	L2	CO6	identify ETL process techniques to extract data from datawarehouse
12		12.6	12.6.2	L4		Analyze historical data from DW to take decisions

Course Objective

Sr. No.	Description
1	To impart knowledge related to query processing and query optimizer phases of a database management system
2	To introduce advanced concepts of transaction management and recovery technique
3	To introduce concepts of advanced access control techniques like role based and discretionary methods
4	To introduce advanced database models like distributed databases.
5	To create awareness of how enterprise can organize and analyze large amounts of data by creating a Data Warehouse.
6	To introduced concept of ETL process used for Dataware housing

Subject- Cryptography and Network Security   Subject Code: ITC504
Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	2.5	2.5.1	L2		Understand security objectives.
2	1	1.2	1.2.1	L3	CO1	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	CO3	Create, modify and extend techniques to provide security.
6	2	6.3	6.3.1	L5		Evaluate various techniques to provide protection of the public
4	1	4.6	4.6.1	L3 L4	CO4	Use appropriate procedures and techniques to analyse data authentication.
6	1	6.4	6.4.1	L6		Apply authentication schemes for protection of public.
7	1	7.4	7.4.2	L3	CO5	Apply principles of preventive engineering to prevent from various type of attacks in OSI model.
2	1	2.7	2.7.1	L5		Evaluate the performance and application of firewall and IDS in network security
3	2	3.5	3.5.5	L3 L6	CO6	Explore design issues and working principles of various secure communication standards including Kerberos, IPsec, and SSL/TLS and email and apply them to provide security for professional concern.

Course Objective

Sr. No.	Description
1	Classical encryption techniques and concepts of finite fields and number theory
2	Explore the working principles and utilities of various cryptographic algorithms including secret key cryptography, hashes and message digests, and public key
3	Explore the design issues and working principles of various authentication protocols, PKI standards.
4	Explore various secure communication standards including Kerberos, IPsec, and SSL/TLS and email.
5	To use existing cryptographic utilities to build programs for secure communication
6	Concepts of cryptographic utilities and authentication mechanisms to design secure applications

Subject-E-Commerce   **Subject Code-ITDLO5013**

Course Outcomes

PO	PSO	Competency	PI	Blooms Level	CO	Description
PO1	1	1.6	1.6.1	Level 3 Apply	CO1	Apply the knowledge of ecommerce concept to identify and analyse different ecommerce types
PO2	1	2.1	2.5.1	Level 4 analyze	CO2	Identify and analyze ecommerce website and select Hardware and Software Technologies
PO2	1	2.8	2.8.3	Level 4 analyze	CO3	Investigate complex ecommerce website and desing payment sytem
PO5	1	5.5	5.5.1	Level 1 Rememb er	CO4	Understand the process of Selling and Marketing on web and create appropriate marketing startegy
P02	1	2.8	2.8.4	Level 6 Creating	CO5	Models,identify and analyse different ebusiness model,create appropriate plan
PO3	1	3.8	3.8.2	Level 2 understan d	CO6	Understand Strategic planning process ,create SCM , CRM ,ERP for ebusiness website

Course Objectives

Sr. No.	Description
1	Understand concept of Ecommerce and its types
2	Learn different technologies for ecommerce
3	understand different mode of online paynent system and Learn SET protocol
4	Understand basic concept of Selling and marketing on web
5	Understand concept of E-business and its varoius Models
6	Understand various E-business Strategies

Subject- Business Communication and Ethics **Subject Code- MEL 506**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
10	1	10.1	10.1.1	6	1	Design a technical document using precise language, suitable vocabulary and apt style
10	1	10.2	10.2.1 & 10.2.2	1	2	Develop writing skills of business and technical proposals and documents
9	1	9.2	9.2.1 & 9.2.2	6	3	Develop the lifeskills/interpersonal skills to progress professionally by building strong relationships
9	2	9.3	9.3.1	3	4	Represent them as team members and leaders with well groomed, organized, social etiquettes in professional and social environment.
8	2	8.1	8.1.1	5	5	Demonstrate awareness of contemporary issues, knowledge of professional and ethical responsibilities
12	2	9.1 & 9.2	12.1	3	6	Apply the traits of suitable candidate for a job/ higher education upon being trained in the techniques of holding a group discussion, facing interview and writing resume/ SOP.

Course Objectives

Sr. No.	Description
1	To inculcate professional and ethical attitude at the workplace
2	To enhance effective communication and interpersonal skills
3	To build multidisciplinary approach towards all life tasks
4	To hone analytical and logical skills
5	To understand understand and demonstrate professional and personal values and work ethics
6	To understand the techniques of writing resumes, perform in group discussion, facing interviews and develop job related skills

Subject- Internet Programming Lab   **Subject Code- ITL501**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO3	PSO1	3.6	3.6.2	L2	CO1	Able to understand and produce a variety of potential responsive web design solutions using HTML5 and CSS3
PO3	PSO2	3.8	3.8.2	L3	CO2	Able to implement and integrate dynamic web pages with validation using JavaScript objects by applying different event handling mechanism
PO4	PSO2	4.5	4.5.1	L6	CO3	Design and develop Rich Internet Applications (API) based on the study objectives using AJAX programming
PO4	PSO2	4.5	4.5.1	L6	CO4	Design and develop simple web application using server side PHP programing and Database Connectivity using MySQL.
PO3	PSO1	3.5	3.5.2	L4	CO5	Able to identify and build well-formed XML document and implement Web Service using Java as per system requirements from stake holders
PO2	PSO2	2.7	2.7.1	L3	CO6	Able to apply computer engineering principles to demonstrate simple web application using Python Django Framework with required applicability and performance.

Course Objectives

Sr. No.	Description
1	**To Acquire knowledge and Skills for creation of Web Site considering both client- and server-side Programming.**
2	**To create Web application using tools and techniques used in industry.**
3	**To learn the characteristics of RIA**
4	**To Demonstrate Amazon/Google or Yahoo mashup**
5	**To be well versed with XML and web services Technologies.**
6	**To be familiarized with open source Frameworks for web development.**

Subject- Security lab   **Subject Code: ITL502**

Lab Outcomes

PO	PSO	Competancy	PI	Bloom's Level	LO	Description
1	1	1.6	1.6.1	L3	LO1	Apply Engineering Knowledge in symmetric cryptography to implement classical ciphers.
2	1	2.5	2.5.2	L6	LO2	Formulate public key algorithms like RSA and El Gamal
2	1	2.8	2.8.2	L4 L6	LO3	Formulate Hashing Algorithm like SHA, MD5 and analyse their performance.
5	1	5.4	5.4.1	L3	LO4	Apply appropriate techniques to explore the different network reconnaissance tools to gather information about networks.
5	1	5.4	5.4.2	L3 L4 L5	LO5	Select and apply appropriate tools like sniffers, port scanners and other related tools for analyzing packets in a network.
3	2	3.6	3.6.2	L1,L2	LO6	Desigh solution of complex engineering problem by set up firewalls and intrusion detection systems using open source technologies and to explore email security.

Lab Objectives

Sr. No.	Description
1	To apply the knowledge of symmetric cryptography to implement classical ciphers.
2	To be able to analyze and implement public key algorithms like RSA and El Gamal
3	To analyze and evaluate performance of hashing algorithms
4	To explore the different network reconnaissance tools to gather information about networks
5	To explore and use tools like sniffers, port scanners and other related tools for analyzing packets in a network.
6	To be able to set up firewalls and intrusion detection systems using open source technologies and to explore email security.

Subject- Online Analytical Processing Lab   **Subject Code: ITL503**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
3	P1	3.6	3.6.2	L6	CO1	Implement simple query optimizers and design alternate efficient paths for query execution
4	P1	4.5	4.5.1	L6	CO2	Simulate the working of concurrency protocols, recovery mechanisms in a database
4	P1	4.5	4.5.1	L6	CO3	Design applications using advanced models like mobile, spatial databases.
2	P1	2.5	2.5.2	L3, L2	CO4	Implement a distributed database and understand its query processing and transaction processing mechanism
3,4	P2	3.5 4.5	3.5.1 4.5.1	L6	CO5	Able to define a precise problem statement for real life applications. Design and create appropriate model on the problem statement
5	P2	5.5	5.5.1	L4	CO6	Analyze data using OLAP operations so as to take strategic decisions using ETL tool

Course Objective

Sr. No.	Description
1	To impart knowledge related to query processing and query optimizer phases of a database management system
2	To introduce advanced concepts of transaction management and recovery techniques
3	To impart an overview of emerging data models like temporal, mobile and spatial databases
4	To introduce advanced database models like distributed databases
5	To create awareness of how enterprise can organize and analyze large amounts of data by creating a Data Warehouse
6	To impart an overview of ETL tools use for datawarehousing

Subject- IOT Lab   **Subject Code- ITL504**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO3	PSO1	3.5	3.5.2	L4	CO1	Able to identify and document system requirements from stake- holders for the real world problem
PO12	PSO2	12.6	12.6.1	L3	CO2	Source and comprehend technical literature and other credible sources of information used in the preferred field of study
PO4	PSO1	4.4	4.4.3	L1	CO3	Able to study, understand and enhance software/ hardware skills and choose appropriate hardware/software tools to conduct the experiment
PO3	PSO2	3.8	3.8.2	L6	CO4	Able to implement and integrate the modules and build the project successfully by hardware requirements, coding, emulating and testing
PO2	PSO1	2.8	2.8.4	L2	CO5	Arrive at conclusions with respect to the objectives and represent the findings of the study conducted in the preferred domain
PO9	PSO2	9.6	9.6.1	L6	CO6	Present results as a team and manage the conduct of the research study with smooth integration of contributions from all individual efforts

Course Objectives

Sr. No.	Description
1	Address the real world problems and find the required solution
2	Design the problem solution as per the requirement analysis done.
3	Study the basic concepts of programming/ hardware/ emulator for Raspberry pi/Arduino/ ARM Cortex/ Intel Galileo etc.
4	Fabricate and implement the mini project intended solution for project based learning.
5	Build and test the mini project successfully.
6	Improve the team building, communication and management skills of the students.

Semester-VI

Subject-SEMP   **Subject Code-ITC601**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO1	1	1.6	1.6.1	L1	CO1	Apply the knowlgde to understand the nature of software development process model
PO3	1	3.5	3.5.2	L3	CO2	able to identify,capture,document software requirements
PO2	1	2.6	3.7.1	L6	co3	Able to produce user centric design solutions suited to meet functional requirements.
PO5	1	5.5	5.5.1	L1	Co4	choose testing methods and understanding concept of software quality assurance and software configuration management process.
Po9	1	9.6	9.6.1	L6	CO5	play role in project management life cycle and demonstrate effective communication skill
PO7	1	7.3	7.3.1	L6	CO6	Develop project scheduling concept and identify risk in software development life cycle

Course Objectives

Sr. No.	Description
1	Understand the different process model
2	Explain methods of capturing, specifying, visualizing and analyzing software requirements
3	Understand the basic concept of design
4	Understand the need to testing and its different types
5	understand need of project management and project management life cycle
6	understand the concept of project scheduling and RMMM sheet

Subject- Data mining and Business Intelligence   Subject Code: ITC602

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
2	2	2.6	2.6.3	L2	CO1	Understand and identify importance of data mining and the principles of business intelligence
4	2	4.6	4.6.1	L2	CO2	Understand and Analyze the data needed for data mining using preprocessing techniques
				L4		Perform exploratory analysis of the data to be used for mining
2	1	2.1	2.5.2	L2	CO3	Understand classification methods and identify algorithm for large data set to predict label
		2.7	2.7.1	L1		Define and apply metrics to measure the performance of data mining algorithms
2	1	2.1	2.5.2	L2	CO4	Understand and apply appropriate clustering method on data set to find different patterns
2		2.7	2.7.1	L3	CO5	Apply frequent patterns mining technique and identify its use in market basket analysis
4	1	4.6	4.6.1	L3	CO6	Apply BI tools to solve practical problems and analyze the problem domain.
5		5.4	5.4.2	L4		Apply the appropriate data mining techniques and provide decision support

Course Objective

Sr. No.	Description
1	To introduce the concept of data Mining as an important tool for enterprise data management and as a cutting edge technology for building competitive advantage.
2	To enable students to effectively identify sources of data and process it for data mining
3	To make students well versed in concept of classification algorithams, methods of evaluation
4	To make students well versed in concept of clustering algorithams and concept of outliers
5	To make studentsunderstand the concept of market basket analysis and its multivalued asocciation rules
6	To impart skills that can enable students to approach business problems analytically by identifying opportunities to derive business value from data

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO2	PSO1	2.6	2.6.3	Level 2 Understand	CO1	Understanding concept of cloud and its similar architecture with its different uses and advantages
	PSO2	2.6	2.6.2	Level 4 Analyze		Identify different services and deployment models used for implementation of cloud computing.
PO2	PSO1	2.6	2.6.4	Level 5 Evaluate	CO2	Compare and contrast different solutions available for virtualization.
PO5	PSO1	5.5	5.5.1	Level 4 Analyze	CO3	Analyze different cloud services and techniques required to work on cloud for application
PO3	PSO2	3.6	3.6.2	Level 6 Creating	CO4	Define different components of openstack and Design own cloud rules and policies using available cloud platforms.
PSO2	PSO2	2.6	2.6.3	Level 4 Analyze	CO5	Select different existing solutions and methods to work on AWS
PO5	PSO2	5.4	5.4.2	Level 6 Creating	CO6	Design & develop backup strategies for cloud data based on features.

Course Objectives

Sr. No	Description
1	To understand basics of cloud computing including different architecture service models and deployment model.
2	To learn different solutions of virtualization.
3	To analyse different services available in cloud for different purposes and applications.
4	To define Cloud Implementation, Programming and Mobile cloud computing.
5	To understand different solutions and applications available on AWS.
6	To learn design different methods to provide backup solitions for cloud data.

Subject-   Wireless Technology   **Subject Code: ITC604**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
2	1	2.6	2.6.2	L2 L3	CO1	Understand and Apply wireless Technology fundamentals as means of communication
2	1	2.6	2.6.4	L5		Comparison of Wireless generation
3	1	3.6	3.6.2	L2	CO2	Understand different Medium Access Techniques
5	1	5.4	5.4.1	L4		Analyse evolution of Different wireless Technologies
3	2	3.6	3.6.2	L2 L3 L6	CO3	Understand And Apply The knowledge of Ad-Hoc N/w in designing a wireless Sensor N/w
4	1	4.5	4.5.1	L2 L5	CO4	Understand and Evaluate Emerging wireless Technology
4	1	4.6	4.6.3	L5		Comparison of different Wireless Standard
3	2	3.8	3.8.1	L6	CO5	Designing of Unified Wireless Network using LAP, WLC, LWAPP
3	1	3.5	3.5.5	L3 L6	CO6	Analyse working principles of various secure communication standards including IPsec, and SSL/TLS and email
6	1	6.3	6.3.1	L3		Apply concept of Firewall and IDs provide security for professional concern.

Course Objective

Sr. No.	Description
1	Understand the fundamentals of wireless networks.
2	analyze the different wireless technologies
3	Evaluate Ad-hoc networks and wireless sensor networks.
4	evaluate emerging wireless technologies and standards
5	Understand design considerations for wireless networks
6	analyze and evaluate the security threats and related security standards

Subject-Digital Forensics   **Subject Code-ITDLO6023**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO1	PSO2	1.7	1.7.1	L3	CO1	Understand and **apply** theory and principles of computer science and engineering for techniques associated with the digital forensic practices and cyber crime
PO4	PSO1	4.4	4.4.1	L1	CO2	**Define** and analyze a problem for purposes of investigation, its scope and importance of evidence handling and storage for various devices
PO6	PSO1	6.3	6.3.1	L4	CO3	**Identify** and describe various engineering roles in understanding of current cyber security incident response and analyzing ways that exploits in securities.
PO4	PSO1	4.6	4.6.2	L4	CO4	Critically **analyzing** forensic duplicated data and investigating it for trends and correlations limitations
PO4	PSO2	4.6	4.6.1	L3	CO5	**Use** appropriate procedures, tools and techniques to collect data and investigate attacks, IDS .technical exploits , router attacks and "Trap and Trace" computer networks.
PO5	PSO1	5.5	5.5.1	L4	CO6	**Identify** the strengths and limitations of computer forensic tools and acquiring information for report writing

Course Objectives

Sr. No.	Description
1	To understand underlying principles and many of the techniques associated with the digital forensic practices and cyber crime
2	To explore practical knowledge about ethical hacking Methodology
3	To learn the importance of evidence handling and storage for various devices
4	To develop an excellent understanding of current cyber security issues (Computer Security Incident) and analyzed the ways that exploits in securities.
5	To investigate attacks, IDS .technical exploits and router attacks and "Trap and Trace" computer networks.
6	To apply digital forensic knowledge to use computer forensic tools and investigation report writing.

Subject-Multimedia System   Subject Code-ITDLO6024

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
5	1	5.5	5.5.1	1	CO1	Identify and understand technical aspect of MS.
2	1	2.6	2.6.2	1	CO2	Identify and understand various file formats.
3	2	3.8	3.8.2	6	CO3	Develop various multimedia systems modules,implement and integrate it
3	1	3.8	3.8.3	6	CO4	Design and validate interactive multimedia software.
1	1	1.2	1.2.2	3	CO5	Apply various networking protocols for multimedia applications.
4	1	4.6	4.6.1	3	CO6	Use and evaluate multimedia application for its optimum preference.

Course Objectives

Sr. No	Description
1	To learn and understand technical aspect of Multimedia Systems
2	To understand the standards available for different audio, video and text applications
3	To Design and develop various Multimedia Systems applicable in real time.
4	To learn various multimedia authoring systems.
5	To understand various networking aspects used for multimedia applications.
6	To develop multimedia application and analyze the performance of the same.

Subject-Software Design lab   **Subject Code-ITL601**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO3	1	3.6	3.6.2	L3	CO1	Sketch UML daigram for system and produce prototypy
PO3	1	3.5	3.5.2	L6	CO2	Plan and document timeline with the of Gnattchart
PO3	1	3.5	3.5.6	L6	co3	develop software requirement specifications (SRS)
PO4	1	4.6	4.6.3	L3	Co4	sketch DFD daigram and E-R daigram for representation of data
Po4	1	4.2	4.4.2	L6	CO5	able to choose appropriate testing method andd design backbox test cases for system
PO1	1	1.6	1.6.1	L1	CO6	able to choose software development process using tool.

Course Objectives

Sr. No.	Description
1	Learn basic concepts of UML with example
2	Understand concept of scheduling and tracking
3	understand and define SRS
4	Understand the basis concept of class and relationship
5	Learn the basic software testing methods
6	Select project development tool.

Subject- Business Intelligence Lab   Subject Code: ITL602

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
3,4	2	3.5 4.5	3.5.1 4.5.1	L2	CO1	Identify sources of Data for mining and perform data exploration for real life applications
4	1	4.6	4.6.1	L2	CO2	Understand the need of data mining algorithms in terms of attributes and class inputs, training, validating, and testing files.
2 , 5	1	2.1 , 5.4	2.5.2 5.4.1	L3	CO3	Demonstate classification method using open source tools like WEKA. Implement appropriate classification algorithm to solve define problem.
2 , 5	1	2.1 , 5.4	2.5.2 5.4.1	L2 L3	CO4	Understand Clustering method using open source tools like WEKA. Implement appropriate clustering algorithm to solve for any application
2 , 5	1	2.1 , 5.4	2.5.2 5.4.1	L3 L6	CO5	Implement association mining on large data sets using open source tools like WEKA. Design any market basket problem
3	2	3.6	3.6.2	L3 L4	CO6	Apply BI to solve practical problems : Analyze the problem domain, use the data collected in enterprise apply the appropriate data mining technique, interpret and visualize the results and provide decision support

Course Objective

Sr. No.	Description
1	To introduce the concept of data Mining as an important tool for enterprise data management and as a cutting edge technology for building competitive advantage.
2	To enable students to effectively identify sources of data and process it for data mining
3	To make students well versed in all data mining algorithms, methods, and tools.
4	To learn how to gather and analyze large sets of data to gain useful business understanding
5	To impart skills that can enable students to approach business problems analytically by identifying opportunities to derive business value from data.
6	To identify and compare the performance of business.

Subject- Cloud Service Design Lab   **Subject Code- ITL603**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO3		3.6	3.6.2	Level 2 Understand	CO1	Define & demonstrate Virtualization using different types of Hypervisors
PO2		2.6	2.6.2	Level 1 Remember	CO2	Describe steps to perform on demand Application delivery using Ulteo .
PO3		3.8	3.8.2	Level 3 Apply	CO3	Examine the installation and configuration of Open stack cloud
PO4		4.4	4.4.3	Level 4 Analyze	CO4	Analyze and understand the functioning of different components involved in Amazon web
PO5		5.4	5.4.1	Level 1 Remember	CO5	Describe the functioning of Platform as a Service
PO6		6.4	6.4.1	Level 6 Create	CO6	Design & Synthesize Storage as a service using own Cloud

Course Objectives

Sr. No	Description
1	**To understand key concepts of virtualization & different types of Hypervisors used in virtualization along with implementation**
2	**To learn concept of On demand Application Delivery like SaaS using Ulteo**
3	**To understand Open source cloud implementation and administration using Open Stack**
4	**To study various Cloud services provided by Amazon Web Services**
5	**To undestand programming on Platform as a Service cloud**
6	**To study implementation of Storage as a service using Own Cloud.**

Subject-Sensor Network lab   **Subject Code: ITL604**

LAB Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO2		2.6	2.6.2	L4	LO1	Identify functionalities and computing resources requirements for the real world problems.
P10		10.4	10.4.2	L6	LO2	Produce clear, well-constructed, and well-supported written engineering & conduct a survey of several available literatures in the preferred field of study.
PO4	PSO 1	4.4	4.4.3	L3	LO3	Able to choose appropriate hardware/software tools to conduct the experiment by Studying and enhancing software/ hardware skills.
PO3		3.7	3.7.1	L6	LO4	Able to perform systematic evaluation of the degree to which several design concepts meet the criteria by Demonstrating and building the project successfully by hardware/sensor requirements, coding, emulating and testing.
PO10		10.5	10.5.2	L1	LO5	Deliver effective oral presentations to technical and non-technical audiences by reporting the findings of the study conducted in the preferred domain
PO9		9.5	9.5.1	L2	LO6	Demonstrate effective communication, problem-solving, conflict resolution and leadership skills.
PO9		9.6	9.6.1	L2	LO6	Present results as a team, with smooth integration of contributions from all individual efforts &demonstrate an ability to work in teams and manage the conduct of the research study

LAB Objectives

Sr. No.	Description
1	To learn different types of sensors from Motes families
2	To design the problem solution as per the requirement analysis done using Motes sensors
3	To study the basic concepts of programming/sensors/ emulator like cooja etc
4	To design and implement the mini project intended solution for project based learning
5	To build and test the mini project successfully
6	To improve the team building, communication and management skills of the students

Subject- Mini Project   **Subject Code- ITM605**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO2	PSO1	2.1	2.5.1	L5	CO1	Evaluate problem statements and identifies potential research areas in the field of IT.
PO10	PSO1	10.4	10.4.1	L2	CO2	Read, understand and interpret technical and non-technical information from several available literature in the preferred field of study.
PO4	PSO1 PSO2	4.6	4.6.2	L6	CO3	Critically plan, select, investigate and analyze several existing solutions for trends and correlations, stating possible errors and limitations for research challenge
PO9	PSO2	9.5	9.5.1	L2	CO4	Demonstrate an ability to work and communicate effectively in teams , apply professional ethics in problem-solving, conflict resolution and manage the conduct of the research study.
PO2	PSO1 PSO2	2.7	2.7.1	L3	CO5	Able to apply computer engineering principles to formulate and propose a plan of a system with required applicability and performance and appropriately incorporate a solution for the research plan identified.
PO12	PSO1	12.6	12.6.1	L4	CO6	Source , identify and comprehend technical literature and other credible sources of information and communicate effectively the findings of the study conducted in the preferred domain.

Course Objectives

Sr. No.	Description
1	To offer students a glimpse into real world problems and challenges that need IT based solutions
2	To enable students to create very precise specifications of the IT solution to be designed.
3	To introduce students to the vast array of literature available of the various research challenges in the field of IT
4	To create awareness among the students of the characteristics of several domain areas where IT can be effectively used
5	To enable students to use all concepts of IT in creating a solution for a problem
6	To improve the team building, communication and management skills of the students.

Semester-VII

Subject- Enterprise Network Design   **Subject Code-ITC701**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
3	1	3.5	3.5.2	L4	CO1	Identify customer requirements for designing an enterprise network
2	1	2.6	2.6.3	L2		Understand methodology to design an Enterprise network.
2	1	2.1	2.5.2	L1	CO2	Recognize modules (functional areas) of Cisco Enterprise architecture
2	1	2.6	2.6.2	L2		Understand network services withing modular Enterprise network design.
5	1	3.8	3.8.2	L4		Identify network management tool to configure and monitor performance of an Enterprise Network
2	1	2.6	2.6.3	L2	CO3	Select transmission technologies and internet-working devices as per design requirements of Enterprise Campus module and an Enterprise data center module
3	2	3.8	3.8.2	L3		Apply the three hierarchical network layers in designing Enterprise Campus and data center
3	1	3.6	3.6.1	L4	CO4	Identify WAN transport technologies for designing remote connectivity between enterprise edge and enterprise branch /teleworker modules as per WAN application and technical requirements
3	2	3.8	3.8.1	L6	CO5	Designing sub-nets including detailed IP addressing for an enterprise network
2	1	2.1	2.5.2	L2		Selects Routing protocols for Enterprise networks.
2	1	2.6	2.6.2	L2	CO6	Understand software defined network architecture

Course Objectives

Sr. No.	Description
1	Understand the customer requirement and Apply a Methodology to Network Design.
2	Understand the structure of modularized network.
3	Understand and identify requirements and design of the campus and the data center networks
4	Understand enterprise edge WAN technologies and using it design remote connectivity.
5	Design IP addressing for enterprise network , identify and apply suitable routing protocol for data delivery across the enterprise networks.
6	Analyze and select open flow controller and switches for designing enterprise network.

Subject- Infrastructure Security   **Subject Code- ITC702**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO1	PSO1	1.6	1.6.1	Level 1 Remember	CO1	Explain security fundamentals like goals, vulnerabilities, attacks on Infrastructure.
	PSO2	1.7	1.7.1	Level 3 Apply		Use different security policies , methods and principles to provide infrastructure
PO2	PSO1	2.5	2.5.2	Level 4 Analyze	CO2	Identify software vulnerabilities and attacks and protection mechanisms to avoid problem
	PSO2	2.6	2.6.4	Level 5 Evaluate		Compare and contrast different solutions available for security of Operating System and Database Management.
PO5	PSO1	5.5	5.5.1	Level 4 Analyze	CO3	Analyze different tools and techniques to detect security issues in wireless network.
PO3	PSO1	3.6	3.6.2	Level 6 Creating	CO4	Define security risks to cloud and Design rules and policies for cloud data security
PO2	PSO1	2.6	2.6.3	Level 4 Analyze	CO5	Select different existing solutions and methods to provide security to web.
	PSO2	2.7	2.7.2	Level 4 Analyze		Detect different constraints in design of web application to increase performance.
PO7	PSO2	7.4	7.4.2	Level 3 Apply	CO6	Calculate preventive solutions ,plans and proposals based on financial

Course Objectives

Sr. No	Description
1	To understand underlying principles of infrastructure security
2	To explore software vulnerabilities, attacks and protection mechanisms To learn security aspects of wireless network infrastructure and protocols
3	To investigate web server vulnerabilities and their countermeasures
4	To develop policies for security management and mitigate security related risks in the organization
5	To Learn the different attacks on Open Web Applications and Web services
6	To Learn the different security policies.

Subject- Artificial Intelligence   Subject Code: ITC703

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
2	1	2.5	2.5.1	L2	CO1	To identify the impact of AI and its achievements
5	1	5.4	5.4.1	L3 L6	CO2	Identify different types of agent and rational agent designed to solve problems
2	1	2.5	2.5.2	L6	CO3	Identify different stages of development of AI field from human like behavior to rational agent
5	2	5.6	5.6.1	L5 L6	CO4	select appropriate real life problems to design state space representation
4	1	4.5	4.5.1	L2 L6	CO5	To understand the impact of various knowledge representation techniques to formulate Real time AI problems
5	1	5.4	5.4.2	L2	CO6	Identify advance techniques of AI like belief network, NLP and cognitive computing

Course Objective

Sr. No.	Description
1	achievements of AI and the theory underlying those achievements.
2	the concepts of a Rational Intelligent Agent and the different types of Agents that can be designed to solve problems
3	To review the different stages of development of the AI field from human like behavior to Rational Agents.
4	impart basic proficiency in representing difficult real life problems in a state space representation so as to solve them using AI techniques like searching and game playing
5	To create an understanding of the basic issues of knowledge representation and Logic and blind and heuristic search, as well as an understanding of other topics such as minimal, resolution, etc. that play an important role in AI programs.
6	introduce advanced topics of AI such as planning, Bayes networks, natural language processing and Cognitive Computing.

Subject-Management Information System   Subject Code-ILO7013

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
6	1	6.3	6.3.1	1	CO1	Identify how information system transforms business, gives its importance to Society.
4	1	4.6	4.6.4	5	CO2	Evaluate given information from databases to improve business performance .
8	1	8.4	8.4.2	3	CO3	Examining and applying Ethical issues and its security controls.
7	2	7.4	7.4.1	2	CO4	Understand the social computing using different forms of business.
5	1	5.4	5.4.1	1	CO5	Indifying different technology like cloud computing,wired and wireless technology
7	1	7.3	7.3.1	1	CO6	Identify pros/cons of life cycle of various system development.

Course Objectives

Sr. No.	Description
1	The course is blend of Management and Technical field.
2	Understand the principal tools and technologies for accessing information from databases to improve business performance and decision making
3	Define and analyze typical functional information systems and identify how they meet the needs of the firm to deliver efficiency and competitive advantage
4	Identify the types of systems used for enterprise-wide knowledge management and how they provide value for businesses
5	Describe IT infrastructure and its components and its current trends
6	Identify the basic steps in systems development

Subject-Software Testing and quality assurance Subject Code: ITDLO7034

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
2	1	2.6	2.6.3	L2	CO1	Understand software testing terminology and software life cycle
	1	2.7	2.7.1	L3		apply software testing methodology to prevent and remove bugs
3	1	3.6	3.6.2	L2	CO2	understand different testing techniques
	2	4.5	4.5.1	L6		design and devlop test plan and testcases based on different objectives
6	1	6.3	6.3.1	L4	CO3	Analyze test process management structure
2	1	2.7	2.7.1	L3		Apply testing metrics for monitoring and controlling test process
5	1	5.4	5.4.1	L4	CO4	select different automation tools and techniques for testing
7	1	7.3	7.3.1	L4	CO5	analyze test anvironment for specialized testing like agile testing web base system
	1	7.4	7.4.2	L3		
3	1	3.5	3.5.4	L3	CO6	Apply knowledge to test software in different environments
2	1	2.7	2.7.1			select different measures to improve software quality

Course Objective

Sr. No.	Description
1	To Introduced Basic software debugging methods and software testing life cycle
2	To impart knowledge of White box testing methods and techniques
3	To introduced knowledge of Black box testing methods and techniques
4	To Design test palns and test oragnization
5	To introduced Different testing tools
6	To introduced concept of Quality assurance models

Subject- Cyber Security & Laws   **Subject Code- IT_ILO7016**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO1	PSO1	1.7	1.7.1	L3	CO1	Apply theory and principles of computer science and engineering to identify different types of cyber crime and its effect on outside world.
PO1	PSO2	1.6	1.6.1	L3	CO2	Apply engineering fundamentals to identify various security challenges in mobile device for different types of attack and Distinguish different aspects of cyber law
PO4	PSO2	4.6	4.6.1	L3	CO3	Use of Different tools and methods in Cyber Security
PO6	PSO1	6.4	6.4.1	L2	CO4	Interpret legislation ,regulation, codes and standards relevant to E-Commerce , The Contract Aspects ,The Security Aspect ,The Intellectual Property Aspect in Cyber Law
PO6	PSO1	6.4	6.4.1	L2	CO5	Interpret legislation ,regulation, codes and standards relevant to cyber law and explain IT act 2000 and its latest amendments .
PO3	PSO2	3.5	3.5.4	L3	CO6	Able to choose appropriate information security standards during software design and development

Course Objectives

Sr. No.	Description
1	To understand and identify different types cybercrime and cyber law
2	To understand how criminal plan the attacks in system and mobile devices
3	To recognize various security challenges in mobile device for different types of attack.
4	To understand different tools and methods in Cyber Security.
5	To recognized Indian IT Act 2008 and its latest amendments
6	To learn various types of security standards compliances

Subject- Network Design Lab   **Subject Code-ITL701**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
2	1	2.6	2.6.3	L2	CO1	Understand the Enterprise Business goals , Busniess Constarints, Technical Goal , Technical Constraints, Applications and Services.
3	1	3.5	3.5.2	L4		Identify Customer Requirements
2	1	2.6	2.6.2	L4	CO2	Identify functional areas to construct high level modules for enterprise architecture using Hierarchical network model.
5	1	2.6	2.6.4	L2	CO3	Select the networking devices as per functionality requirements and budget constraints
4	1	1.7	1.7.1	L3		Apply knowledge of network design to configure the devices as per the Core, Access and Distribution layers
2	1	2.6	2.6.4	L4	CO4	Identify WAN technology for remote site connectivity
4	2	3.8	3.8.1	L6		Design the Remote branch office/ Server Farm for an enterprise network
4	2	3.8	3.8.1	L6	CO5	Designing sub-nets including detailed IP addressing for an enterprise network.
5	1	2.1	2.5.2	L2		Selects the most appropriate routing protocols to configure them on routers
5	2	3.8	3.8.3	L5		Test proposed desing of a nework using a simulation software tool.
9	1	9.6	9.6.1	L2	CO6	Undersatnd Team work effectiveness.

Course Objectives

Sr. No.	Description
1	Be familiarized with the requirements of an enterprise.
2	Address its major design areas.
3	Identify the networking devices and their configurations required for the design Entherprise network and also prepare a bill of materials.
4	Propose a design for the remote offices/Data center of an enterprise network.
5	Provide suitable IP addressing plan and best possible routing protocol for an enterprise network and Construct a suitable design for an enterprise network and test it using a tool.
6	Work effectively with a team

Subject-Advance Security Lab   **Subject Code- ITL702**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO2	PSO1	2.1	2.5.2	Level 2 Understand	CO1	Understand and identify the concept of vulnerabilities, attacks, protection and management mechanisms
PO2	PSO2	2.6	2.6.2	Level 4 Analyze	CO2	Analyze and identify software vulnerabilities and attacks on databases and operating systems and apply appropriate protection techniques for it.
PO3	PSO1	3.6	3.6.3	Level 4 Analyze	CO3	Identify security loopholes in wireless communication and design security protocols.
PO6	PSO2	6.3	6.3.1	Level 4 Analyze	CO4	Analyze Web and Cloud infrastructure , identify its vulnerabilities and understand its impact on social, cultural and legal
PO8	PSO2	8.3	8.3.1	Level 2 Understand	CO5	Identify different attacks on Open Web Applications and Web services and understand its impact on society.
PO5	PSO2	5.5	5.5.1	Level 6 Create	CO6	Design appropriate security policies, protocols, system and apply them to protect infrastructure components in a group and present your work.

Course Objectives

Sr. No.	Description
1	Understand and identify underlying different principles of infrastructure security
2	Analyze and identify software vulnerabilities, attacks and protection mechanisms for database and operating system.
3	Investigate security aspects of wireless network infrastructure and protocols
4	Investigate web and cloud vulnerabilities and their countermeasures
5	Learn the different attacks on Open Web Applications and Web services.
6	Identify and Use the different security policies in group.

Subject- Intelligent system Lab   **Subject Code: ITL703**

Lab Outcomes

PO	PSO	Competancy	PI	Bloom's Level	LO	Description
3	1	3.6	3.6.2	L2 L6	LO1	Understand the concepts of a Rational Intelligent Agent and the different types of Agents that can be used to Design the building blocks of an Intelligent Agent using PEAS representation.
3	1	3.6	3.6.1	L3	LO2	Represention of difficult real life problems in a state space representation and solve them using AI techniques.
5	1	5.4	5.4.1	L2 L3	LO3	Understand various AI methods like searching and game playing and apply them to solve real applications.
5	2	3.6	5.4.2	L3 L6	LO4	Use knowledge representation and Logic to design inference engines.
3	2	3.5	3.5.1	L6	LO5	Develop solution of problems with uncertain information using Bayesian approaches.
4	2	4.6	4.6.3	L3 L6	LO6	Apply concept Natural Language processing and cognitive computing for creation of domain specific ChatBots

Lab Objective

Sr. No.	Description
1	To gain knowledge building blocks of an Intelligent Agent using PEAS representation .
2	Analyze and formalize the problem as a state space, graph, design heuristics and select amongst different search or game based techniques to solve them
3	To Develop intelligent algorithms for constraint satisfaction problems and also design intelligent systems for Game Playing
4	To represent various real life problem domains using logic based techniques and use this to perform inference or planning.
5	To solve problems with uncertain information using Bayesian approaches.
6	To Apply concept Natural Language processing and cognitive computing for creation of domain specific ChatBots.

Subject- Android App Devlopment Lab   Subject Code: ITL704

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
3	1	3.6	3.6.2	L2	CO1	Understand Integrated Development Environment for Android Application Development.
3	2	3.6	3.6.1	L2 L6	CO2	Design and Implement User Interfaces and Layouts of Android App.
2	1	2.7	2.7.1	L3	CO3	Use Intents for activity and broadcasting data in Android App
3	2	3.6	36.1	L3 L6	CO4	Design and Implement Database Application and Content Providers
5	1	5.4	5.4.2	L3	CO5	Implement with Camera and Location Based service.
3	2	3.7	3.7.1	L6	CO6	Develop Android App with Security features for real time application

Course Objective

Sr. No.	Description
1	To gain knowledge of installing Android Studio and Cross Platform Integrated Development Environment
2	To learn designing of User Interface and Layouts for Android App.
3	To learn how to use intents to broadcast data within and between Applications.
4	To use Content providers and Handle Databases using SQLite
5	To introduce Android APIs for Camera and Location Based Service.
6	To discuss various security issues with Android Platform.

Subject- Project I   **Subject Code- ITM705**
Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO2	PSO1	2.1	2.5.1	L5	CO1	Evaluate problem statements and identifies potential research areas in the field of IT.
PO10	PSO1	10.4	10.4.1	L2	CO2	Read, understand and interpret technical and non-technical information from several available literature in the preferred field of study.
PO4	PSO1 PSO2	4.6	4.6.2	L6	CO3	Critically plan, select, investigate and analyze several existing solutions for trends and correlations, stating possible errors and limitations for research challenge
PO9	PSO2	9.5	9.5.1	L2	CO4	Demonstrate an ability to work and communicate effectively in teams , apply professional ethics in problem-solving, conflict resolution and manage the conduct of the research study.
PO2	PSO1 PSO2	2.7	2.7.1	L3	CO5	Able to apply computer engineering principles to formulate and propose a plan of a system with required applicability and performance and appropriately incorporate a solution for the research plan identified.
PO12	PSO1	12.6	12.6.1	L4	CO6	Source , identify and comprehend technical literature and other credible sources of information and communicate effectively the findings of the study conducted in the preferred domain.

Course Objectives

Sr. No.	Description
1	To offer students a glimpse into real world problems and challenges that need IT based solutions
2	To enable students to create very precise specifications of the IT solution to be designed.
3	To introduce students to the vast array of literature available of the various research challenges in the field of IT
4	To create awareness among the students of the characteristics of several domain areas where IT can be effectively used
5	To enable students to use all concepts of IT in creating a solution for a problem
6	To improve the team building, communication and management skills of the students.

Semester-VIII

Subject-Big Data   **Subject Code-ITC801**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
5	1	5.4	5.4.1	L4	1	Identify main sources of bigdata in real world
4	1	4.6	4.6.1	L2	2	Demonstrate an ability to use appropriate frameworks like Hadoop, NOSQL to efficiently store retrieve and process Big Data for Analytics
1	1	1.7	1.7.1	L3	3	Able to apply Map Reduce Paradigm
1	1	1.7	1.7.1	L3	4	Apply various algorithms for Clustering Classifying and finding associations in Big Data
4	2	4.5 4.6	4.5.1 4.6.2	L6 L4	5	Design algorithms for data analysis Critically analyze Big data like streams, Web Graphs and Social Media data
4	2	4.5	4.5.1	L6	6	Design and develop successful Recommendation engines for enterprises

Course Objectives

Sr. No.	Description
1	To provide an overview of an exciting growing field of Big Data analytics.
2	To discuss the challenges traditional data mining algorithms face when analyzing Big Data.
3	To introduce the tools required to manage and analyze big data like Hadoop, NoSql Map Reduce.
4	To teach the fundamental techniques and principles in achieving big data analytics with Clustering and classification.
5	To introduce to the students several types of big data like social media, web graphs and data streams.
6	To enable students to have skills that will help them to solve complex real-world problems for recommendation system.

Subject-IOE   **Subject Code-ITC802**

Course Outcomes

PO	PSO	Competency	PI	Blooms Level	CO	Description
PO2	2	2.1	2.5.1	Level 4 Analyze	CO1	Identify the objects in IoE
PO5	2	5.6	5.6.1	Level 4 Analyze		discuss IoE-enabling technology and
PO4	2	4.6	4.6.1	Level 2 Understand	CO2	apply the knowledge to solve wireless sytem with RFID
PO5	2	5.5	5.5.1	Level 1 Remember	CO3	Identify the application areas of an RFID system
PO2	2	2.5	2.5.2	Level 3 Apply		identify the algorithms for RFID anti-collision protocols
PO4	2	4.6	4.6.1	Level 4 Analyze	CO4	Analyze the WSN architecture
PO4	2	4.5	4.5.1	Level 1 Remember		List the various types of network topology in WSN
PO2	2	2.1	2.5.2	Level 3 Apply	CO5	Identify the various localization technique and examine the technology consideration and performance evaluation.
PO5	2	5.4	5.4.2	Level 6 create	CO6	evaluate the data received through sensors in IOT and Design and develop smart city in IOT

Course Objectives

Sr. No	Description
1	learn the concepts of IOT.
2	identify the different technology and learn basic components of RFID
3	Understand the different applications in IOT
4	Understand the need of different protocols used in IOT.
5	Learn the concept of localization and its types
6	learn how to analysis the data in IOT

Subject: UID   **Subject Code: ITDO8041**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	4.6	4.6.1	2,3	1	**Identify and criticize** bad features of interface designs and identify good interaction design interfaces for developing applications
3	2	5.6	5.6.1	2,4	2	**Discuss and predict** good features of interface designs and identify human schycology and social emotional aspects for good interaction design
4	1	3.6	3.6.1	4	3	**Illustrate and analyze** user needs and **formulate** user design specifications and identify appropriate techniques and languages for designing user interaction
4	2	5.6	5.6.1	4	4	**Interpret and evaluate** the data collected during the process and find resources which is used to design user interaction
4	1	3.6	3.6.2	4	5	**Evaluate** designs based on theoretical frameworks and methodological approaches and convert conceptual design to implementation in interaction design
3	2	3.6	3.6.1	3	6	**Cultivate/show** better techniques to improve the user interaction design interfaces and use innovative prototypes for designing applications

Course Objectives

Sr. No.	Description
1	To stress the importance of good interface design.
2	To understand the importance of human psychology as well as social and emotional aspect in designing good interfaces.
3	To learn the techniques of data gathering, establishing requirements, analysis and data interpretation.
4	To learn the techniques for prototyping and evaluating user experiences.
5	To understand interaction design process.
6	To bring out the creativity in each student – build innovative applications that are usable, effective and efficient for intended users.

Subject-Project Management   **Subject Code-ILO802**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO2		2.6	2.6.3	1	1	Identify and define Project life cycles and Role of project manager
PO1 PO11		1.5 11.5	1.5.1 11.5.1	3	2	Apply selection criteria and select an appropriate project from different options
PO3 P010 PO11		3.7 10.4 11.6	3.7.1 10.4.1 11.6.2	6	3	Develop a schedule for a project , based on work break down structure
PO7		7.3	7.3.1	3	4	predict opportunities and threats to the project and determine an approach to deal with them strategically
PO1 PO8		1.5 8.3	1.5.1 8.3.1	3	5	Use Earned value technique and determine status of the project.
PO5 PO9 PO10		5.4 9.5 10.6	5.4.1 9.5.1 10.6.1	4	6	analyze lessons learned during project phases and document them for future reference

Course Objectives

Sr. No.	Description
1	To Understand the students with utilizing project management concepts, project management life cycle ,tools and techniques.
2	Gain knowledge about the selection criteria and select an appropriate project from different options
3	To familiarize the students with the use of a structured methodology/WBS/approach for each and every unique project .
4	To appraise the students with the opportunities and threats to the project and select an approach to deal with them
5	To acquaint the student with the importance of Executing Project phase, Planning monitoring and controlling cycle
6	To recognized lessons learned about Project Leadership ,Ethics and document them for future reference

Subject-Environmental Management   **Course Code:ILOC8029**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
7		7.1	7.1.2	1	1	To Understand and identify environmental issues relevant to India and global concerns
7		7.2	7.2.1	2	2	To Study the needs for sustainable development
7		7.1	7.1.1	1	3	To Learn concepts of ecology
7		7.2	7.2.2	2	4	To Understand the Scope and implementation of Environment Management in corporates
7		7.1	7.1.1	3	5	To Learn Total Quality Environmental Management and its certification process
7		7.2	7.2.2	2	6	To Familiarize environment related legislations

Course Objectives

Sr. No.	Description
1	Understand the concept of environmental management
2	Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
3	Explain the concept of ecosystem its interdependence & food chain etc
4	Illustrate EQM and Corporate Environmental Responsibility
5	Apply the process of ISO-14000, EMS Certification to their respective companies
6	Understand and interpret environment related legislations

Subject-Big Data Lab   **Subject Code-ITL801**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
4	1	4.6	4.6.1	L2	1	Demonstrate an ability to use Big Data Frameworks like Hadoop
4	2	4.6	4.6.1	L3	2	Use appropriate tools like Hive, pig, , NO SQL and MongoDB for Big data Applications
1	1	1.7	1.7.1	L3	3	Apply scalable algorithms for large Datasets using Map Reduce techniques
1	1	1.7	1.7.1	L3	4	Apply algorithms for Clustering, Classification and finding associations in Big Data
4 4	2	4.5 4.6	4.5.1 4.6.2	L6	5	Design algorithms Big data like streams, Web Graphs and Social Media data and construct recommendation systems. analyze Big data like streams, Web Graphs and Social Media data and construct recommendation
1	1	1.7	1.7.1	L3	6	Apply the knowledge of Big Data gained to fully develop a BDA applications for real life applications.

Course Objectives

Sr. No.	Description
1	To introduce the tools required to manage and analyze big data like Hadoop, NoSql
2	To impart knowledge of Map reduce paradigm to solve complex problems Map-Reduce.
3	To introduce several new algorithms for big data mining like classification, clustering and finding frequent patterns.
4	To introduce to the students several types of big data like social media, web graphs and data streams.
5	To identify various sources of Big data
6	To enable students to have skills that will help them to solve complex real-world problems in for decision support.

Subject-IOE lab   **Subject Code-ITL802**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO3	2	4.4	4.4.1	L4	CO1	define the problem statement and scope of application
PO3	2	3.6	3.6.1	L6	CO2	design the problem solution as per the requirement analysis
PO4	2	4.3	4.4.3	L1	co3	choose appropriate hardware and software for system
PO3	2	3.6	3.6.2	L6	Co4	produce user interface using mobile/web application
Po5	2	5.6	5.6.1	L5	CO5	Demonstrate and validate mobile/web application
PO9	2	9.5	9.5.1	L2	CO6	Demonstrate an ability to work in teams

Course Objectives

Sr. No.	Description
1	Understand the basic concept of sensor and its types
2	Learn basic concept of wirless technology and its components
3	Understand the hardware and software concept for wireless
4	design the architecture of project
5	learn and select test criteria for mini project
6	understand the importance of communication ,teamwork etc.

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO4	PSO1	4.4	4.4.3	L1	CO1	Able to identify and choose appropriate devops tools used in software development life cycle
PO5	PSO1	5.5	5.5.1	L4	CO2	Identify the strengths and limitations of Jenkins tools to Build, Deploy and Test Software Applications
PO3	PSO2	3.8	3.8.2	L2	CO3	Able to select, implement and integrate Version Control strategies in the modules.
PO2	PSO1	2.8	2.8.2	L4	CO4	Analyze & Illustrate the Containerization of images and deployment of applications over Docker
PO5	PSO2	5.4	5.4.2	L6	CO5	Adapt and integrate Software Configuration Management tools and technique in DevOps to solve engineering problems
PO2	PSO1	2.6	2.6.4	L5	CO6	Compare, contrast, analyze and choose the best provisioning using Chef/Puppet/Ansible or Saltstack.

Course Objectives

Sr. No.	Description
1	To understand the concept of DevOps with associated technologies and methodologies
2	To be familiarized with Jenkins, which is used to build & test software Applications & Continuous integration in Devops environment.
3	To understand different Version Control tools like GIT, CVS or Mercurial
4	To understand Docker to build, ship and run containerized images
5	To use Docker to deploy and manage Software applications running on Container
6	To be familiarized with concept of Software Configuration Management & provisioning using tools like Puppet,Chef, Ansible or Saltstack.

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO3	PSO2	3.6	3.6.2	Level 3 Apply	CO1	Use R Programming Language in R Studio IDE to perform basic code
PO2	PSO1	2.6	2.6.2	Level 2 Understand	CO2	Extend the functionality of R by using add-on packages
PO3	PSO1	3.6	3.6.3	Level 4 Analyze	CO3	Identify data from files and other sources and perform various data manipulation tasks on them.
PO5	PSO2	5.4	5.4.2	Level 3 Apply	CO4	Define, calculate and implement code for statistical functions in R
PO4	PSO2	4.6	4.6.3	Level 3 Apply	CO5	Use R Graphics and Tables to visualize results of various statistical operations on
PO5	PSO2	5.6	5.6.2	Level 3 Apply	CO6	Apply the knowledge of R gained to data Analytics for real life applications.

Course Objectives

Sr. No	Description
1	To provide an overview of a new language R used for data science.
2	To introduce students to the R programming environment and related eco-system and thus provide them with an in-demand skill-set, in both the research and business
3	To introduce the extended R ecosystem of libraries and packages
4	To demonstrate usage of as standard Programming Language.
5	To familiarize students with how various statistics like mean median etc. can be collected for data exploration in R
6	To enable students to use R to conduct analytics on large real life datasets.

Subject- Project II   **Subject Code- ITM805**

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO2	PSO1	2.1	2.5.1	L5	CO1	Evaluate problem statements and identifies potential research areas in the field of IT.
PO10	PSO1	10.4	10.4.1	L5	CO2	Read, understand and interpret technical and non-technical information from several available literature in the preferred field of study.
PO4	PSO1 PSO2	4.6	4.6.2	L6	CO3	Critically plan, select, investigate and analyze several existing solutions for trends and correlations, stating possible errors and limitations for research challenge
PO9	PSO2	9.5	9.5.1	L2	CO4	Demonstrate an ability to work and communicate effectively in teams , apply professional ethics in problem-solving, conflict resolution and manage the conduct of the research study.
PO2	PSO1 PSO2	2.7	2.7.1	L3	CO5	Able to apply computer engineering principles to formulate and propose a plan of a system with required applicability and performance and appropriately incorporate a solution for the research plan identified.
PO12	PSO1	12.6	12.6.1	L4	CO6	Source , identify and comprehend technical literature and other credible sources of information and communicate effectively the findings of the study conducted in the preferred domain.

Course Objectives

Sr. No.	Description
1	To offer students a glimpse into real world problems and challenges that need IT based solutions
2	To enable students to create very precise specifications of the IT solution to be designed.
3	To introduce students to the vast array of literature available of the various research challenges
4	To create awareness among the students of the characteristics of several domain areas where IT
5	To enable students to use all concepts of IT in creating a solution for a problem
6	To improve the team building, communication and management skills of the students.