

Automobile Engineering

Program outcomes

- Apply knowledge of Mathematics, Science, Engineering fundamentals to solve complex Automobile Engineering problems.
- Identify, formulate & analyze Automobile Engineering problems in order to reach substantial conclusion using laws of engineering science.
- Able to investigate complex automobile problems and find appropriate solution leading to valid conclusion.
- Design automobile system, components, process to meet specified needs with appropriate attention to health, safety, standards, economy, environmental, social considerations.
- Create, select, apply appropriate techniques resources and advanced engineering and software tools necessary to analyze and design automobile engineering problems.
- Understand the impact of automobile engineering solution on society and environment for sustainable development.
- Understand society, health, safety, legal and cultural issues and responsibilities relevant to engineering profession.
- Apply professional ethics, accountability and equity in engineering profession.
- Able to work in multidisciplinary team and leader for common goals.
- Communicate effectively within profession and society at large.
- Able to appropriate incorporate principles of management and finance in one's own work.
- Identify educational needs and engage in life long learning in a changing world of technology.

Program specific outcomes

- Identify, Understand, Formulate, and analyze complex engineering problems in Automobile, design, thermal and manufacturing.
- Plan and execute efficient, sustainable, safe and cost-effective manufacturing of automobile components in ICE, AS, CBE through CAD/CAM/CAE tools ethically.

Civil Engineering

Program outcomes

At the end of the program, a student will be able:

- Apply the knowledge of mathematics, science and engineering fundamentals to solve complex civil engineering problems.
- Identify, formulate and analyse civil engineering problems and derive conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- Investigate complex civil engineering problems and find appropriate solution leading to valid conclusions.
- Design a civil engineering system, component, or process to meet specified needs with appropriate attention to health, safety, standards, environmental and societal considerations.
- Create, select and apply appropriate techniques, resources, and advanced engineering and software tools necessary to analyse and design civil engineering problems.
- Understand the impact of Civil engineering solutions on society and environment for sustainable development.
- Understand societal, health, safety, cultural and legal issues and responsibilities relevant to engineering profession.
- Apply professional ethics, accountability and equity in engineering profession.
- Work effectively as a member and leader in multidisciplinary teams for a common goal.
- Communicate effectively with in a profession and society at large.
- Appropriately incorporate principles of management and finance to one's own work.
- Identify educational needs and engage in lifelong learning in a changing world of technology.

Program specific outcomes

- Identify, understand, formulate and analyze complex engineering problems in Civil Engineering such as Structural, Environmental and Water Resources Engineering.
- Plan, design and execute efficient safe, sustainable and cost effective high-rise structures, bridges, expressways, offshore structures and dams using modern construction tools and techniques ethically.

Computer Engineering

Program outcomes

At the end of the program, a student will be able to:

1. Apply the knowledge of Mathematics, Science and Engineering Fundamentals to solve complex Computer Engineering Problems.
2. Identify, formulate and analyze Computer Engineering Problems and derive conclusion using First Principle of Mathematics, Engineering Science and Computer Science.
3. Investigate Complex Computer Engineering problems to find appropriate solution leading to valid conclusion.
4. Design a software System, components, Process to meet specified needs with appropriate attention to health and Safety Standards, Environmental and Societal Considerations.
5. Create, select and apply appropriate techniques, resources and advance Engineering software to analyze tools and design for Computer Engineering Problems.
6. Understand the Impact of Computer Engineering solution on society and environment for Sustainable development.
7. Understand Societal, health, Safety, cultural, Legal issues and Responsibilities relevant to Engineering Profession.
8. Apply Professional ethics, accountability and equity in Engineering Profession.
9. Work effectively as a member and leader in multidisciplinary team for a common goal.
10. Communicate effectively within a Profession and Society at large.
11. Appropriately incorporate principles of Management and Finance in one's own Work.
12. Identify educational needs and engage in lifelong learning in a Changing World of Technology.

Program specific outcomes

- Formulate and analyze complex engineering problems in computer engineering (Networking/Big data/ Intelligent Systems/Cloud Computing/Real time systems)
- Plan and develop efficient, reliable and secure system and customized application software using cost effective emerging software tools ethically

Electronics and Telecommunication Engineering

Program outcomes

At the end of the program, a student will be able to:

- Apply the knowledge of Mathematics, Science and Engineering fundamentals to solve complex Electronics and telecommunication engineering Problems.
- Identify, formulate and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics and engineering sciences.
- Investigate complex Electronics and telecommunication engineering problems and find appropriate solution leading to valid conclusion.
- Design an electronic system or process to meet specified needs with appropriate attention to health, safety, standards, environmental and societal considerations.
- Create, select and apply appropriate techniques, resources, advanced engineering and software tools necessary to analyze and design telecommunication engineering problems.
- Understand the impact of Electronics and telecommunication Engineering solutions on society and environment for sustainable development.
- Understand societal, health, safety, cultural and legal issues and responsibilities relevant to engineering profession.
- Apply professional ethics, accountability and equity in engineering profession.
- Work effectively as a member and leader in multidisciplinary team for a common goal.
- Communicate effectively within a profession and society at large.
- Appropriately incorporate principles of management and finance in one's own work.
- Identify educational needs and engage in lifelong learning in a changing world of technology.

Program specific outcomes

1. Identify, understand, formulate and analyze the complex engineering problems in communication engineering, signal processing, Embedded systems and electronics engineering.
2. Plan and execute efficient, safe, sustainable and cost-effective development of Electronic circuits, Antennas, televisions, RADAR, satellite and optical fiber systems using modern tools ethically.

Information Technology

Program outcomes

At the end of the program, a student will be able to:

- Apply the knowledge of Mathematics, Science, Engineering fundamentals to solve complex Information Technology Engineering Problems.
- Identify, formulate and analyze Information Technology Engineering problems to derive conclusion using first principles of mathematics and Computer Science.
- Investigate complex Information Technology engineering problems and find appropriate solution leading to valid conclusion.
- Design IT systems, components or processes to meet specified needs with appropriate attention to health, safety, standards, environmental and societal consideration.
- To create select & apply appropriate techniques, resources advance engineering & software tools necessary to analyze & design Information Technology Problems.
- Understand the impact of IT Solutions on society and environment for sustainable development.
- Understand social, safety, culture and legal issues and responsibilities relevant to engineering profession.
- Apply professional ethics, accountability and equity in engineering profession.
- Work effectively as a member and leader in multidisciplinary team for a common goal.
- Communicate effectively within a profession and with society at large.
- Appropriately incorporate principles of Management & Finance to one's own work.
- To identify Educational needs & engage in lifelong learning in a changing word of technology.

Program specific outcomes

1. Identify, understand, formulate and analyze complex engineering problems in the field of Network system, Database management, Web communication, Computer programming and software development.
2. Plan, design, develop and manage software in the field of artificial intelligence , data mining, network management and security, cloud based services and Internet of Things applications through use of secure, reliable and cost effective state of art IT tools efficiently

Mechanical Engineering

Program outcomes

At the end of the program, a student will be able to:

- Apply Knowledge of mathematics, science and Engineering fundamentals to solve complex mechanical engineering problems
- Identity, formulate and analyze and mechanical engineering problems and derive conclusion using first principle of mathematics and engineering sciences.
- Able to investigate of complex mechanical engineering problems & find appropriate solution leading to valid conclusion
- Design Mechanical system, component and process to meet specified needs with appropriate attention to health, safety, standards, environmental and societal considerations.
- Create, select, apply an appropriate techniques, resource and advance engineering software tools to analyze& design mechanical engineering problems
- Understand the input of mechanical engineering solution on socially and environment for sustainable development.
- Able to understand societal, safely, cultural and legal issues & responsibilities relevant to engineering profession.
- Apply professional ethics, accountability and equity in engineering profession.
- Work effectively as a member and leader in multi-disciplinary team for common goal
- Communicate effectively within profession and society at large
- Appropriately incorporate principals of management and finance in one's own work
- Identify educational needs and engage in lifelong learning in changing world of technology

Program specific outcomes

1. Identify, understand, formulate and analyze complex engineering problems in Design, Thermal, Management and Manufacturing of Mechanical System.
2. Plan and Execute efficient, safe, sustainable and cost effective manufacturing of IC Engines, Turbomachines, Air Conditioning systems by the use of CAD/CAM/CAE tools ethically.

Department-COMPUTER ENGINEERING

Semester-III

Scheme R-19

Subject- Engineering Mathematics-III

Subject Code-CSC301

Course Outcomes

PO	PSO	Competency	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	Competency	PI	Bloom's Level	CO	Description
PO2	PSO1	2.5	2.5.3	3-Apply	CO1	Apply clear thinking for problem solving using laws of logic and mathematical induction.
PO1	PSO1	1.2	1.2.1	3-Apply	CO2	Apply the knowledge of Discrete Structure to solve complex relations and functions to find appropriate solution
PO2	PSO1	2.7	2.7.1	4-Analyze	CO3	Analyze complex relations and design Hasse diagram and Lattice
PO1	PSO1	1.2	1.2.2	3-Apply	CO4	Apply formulate and analyze permutation and combination using principle of mathematics.
PO1	PSO1	1.7	1.7.1	3-Apply	CO5	Apply the knowledge of mathematics to solve algebraic structure and detecting and correcting code in the transmitted data.
PO3	PSO1	3.6	3.6.1	3-Apply	CO6	Apply concepts of graph theory in solving real world problems.

Course Objectives

Sr. No.	Description
1	Apply clear thinking and creative problem solving using laws of logic and mathematical Induction.
2	Understand the concepts of relation and functions.
3	Understand the designing of Hasse diagram and Lattice
4	Understand the permutation and combination.
5	Understand the technique for detecting and correcting code in transmitted data.
6	Understand the basic concept in graph theory and their properties.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
2		2.6 2.1	2.6.1 2.1.2	1	1	Identify functionalities of Data structure of a computer-based system to solve a engineering problem
3		3.6	3.6.2	1	2	Able to produce a variety of potential design solutions suited to meet functional requirements for implementation of stack and queue
5		5.4	5.4.1	1	3	Identify different Linked list techniques for engineering activities
4		4.5	4.4.3	1	4	Able to choose appropriate tree traversal method to conduct the experiment.
5		5.4	5.4.2	6	5	Adapt graph traversal techniques to solve engineering problems
1		1	1.7.1	3	6	Apply theory and principles searching techniques of computer science and engineering to solve an engineering problem

Course Objectives

Sr. No.	Description
1	Understand the basic concepts of Data Structure and efficient storage mechanism of data for an easy access.
2	Design and implementation of various Operations data structure.
3	Identify the various techniques for representation of the data in linked list.
4	Learn the different tree techniques.
5	Investigate the logical ability and understand the generic principles of graph as applied to sophisticated data structure.
6	Understand different searching techniques

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1		1.3	1.3.1	Level 1 Remember	CO 1	Describe the basic concepts of Computer Graphics.
PO2		2.1	2.1.3	Level 2 Understand	CO 2	Demonstrate various algorithms for basic graphics primitives.
PO 1		1.1	1.1.1	Level 3 Apply	CO 3	Apply 2-D geometric transformations on graphical objects Matrix multiplication.
PO 4		4.2	4.2.1	Level 3 Apply	CO 4	Use various Clipping algorithms on graphical objects
PO2		2.3	2.3.2	Level 4 Analyze	CO 5	Explore 3-D geometric transformations, curve representation techniques and projections methods
PO 3		3.1	3.1.1	Level 2 understand	CO 6	Explain visible surface detection techniques and Animation.

Course Objectives

Sr. No.	Description
1	To equip students with the fundamental knowledge and basic technical competence in the field of Computer Graphics.
2	To emphasize on implementation aspect of Computer Graphics Algorithms.
3	Understand the concept of 2-D geometric transformations on graphical objects.
4	Understand the concept 3-D geometric transformations, curve representation techniques and projections methods
5	Discuss the windows and view coordinate system and Develop understanding of Clipping algorithms on graphical objects
6	To prepare the student for advance areas and professional avenues in the field of Computer Graphics

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
3		3.6	3.6.2	1	1	Able to produce a variety of potential design solutions suited to meet functional requirements for implementation of stack
3		3.6	3.6.2	6	2	Design potential solutions suited to meet functional requirements for implementation of queue
5		5.4	5.4.1	3	3	illustrate and apply different Linked list techniques for engineering activities
4		4.5	4.4.3	1	4	Able to choose appropriate tree traversal method to conduct the experiment.
5		5.4	5.4.2	6	5	Adapt graph traversal techniques to solve engineering problems
1	PSO1	1	1.7.1	3	6	Apply theory and principles searching techniques of computer science and engineering to solve an engineering problem

Course Objectives

Sr.No.	Description
1	To implement basic data structures such as arrays, stacks
2	To implement basic data structures such as queue
3	To implement basic data structures such as linked list
4	Compute the complexity of various Tree algorithms.
5	Investigate the logical ability and understand the generic principles of graph as applied to sophisticated data structure.
6	Understand different searching techniques

Subject: DLCOA LAB

Subject Code: CSL302

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO2 PO3	PSO1	2.8 3.6	2.8.1 3.6.1	2- Understand 5-Evaluate	CO1	Understand the basics implementation of gates.
PO4	PSO2	4.4	4.4.2	5-Evaluate 6-Create	CO2	Implement arithmetic operations using Multiplexer/demultiplexer.
PO3 PO5	PSO1	3.6 5.4	3.6.2 5.4.1	2- Understand 3-Apply	CO3	Understand and learn about basics of counters.
PO2 PO5	PSO2	2.8 5.4	2.8.1 5.4.2	3-Apply 5-Evaluate	CO4	Implement arithmetic operations using various algorithms.
PO4	PSO1	4.4	4.4.3	2- Understand 6-Evaluate	CO5	Understand and implement the processor designing.
PO 5	PSO1	5.4	5.4.1	3-Apply 5-Evaluate	CO6	Implement the operation of memory and caches.

Course Objectives

Sr. No.	Description
1	To understand the basics implementation of gates.
2	To Implement arithmetic operations using Multiplexer/demultiplexer.
3	To understand and learn basics of counters.
4	To implement arithmetic operations using various algorithms.
5	To understand and implement the processor designing.
6	To implement the operation of memory and caches.

Subject: Computer Graphics Lab

Subject Code: CSL303

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1		1.3	1.3.1	Level 2 Understand	CO 1	Implement various algorithms for basic graphics primitives
PO2		2.1	2.1.3	Level 2 Understand	CO 2	Implement various filled area primitive algorithms
PO 1		1.1	1.1.1	Level 3 Apply	CO 3	Apply transformation on graphical objects
PO 4		4.2	4.2.1	Level 3 Apply	CO 4	Apply clipping algorithms on graphical objects
PO2		2.3	2.3.2	Level 4 Analyze	CO 5	Perform curve and fractal generation methods.
PO 3		3.1	3.1.1	Level 6 Create	CO 6	Develop a Graphical application/Animation based on learned concept

Course Objectives

Sr. No.	Description
1	Understand the need of developing graphics application.
2	Learn algorithmic development of graphics primitives like line, circle, polygon etc.
3	Learn the 2-D geometric transformations on graphical objects.
4	Understand the concept 3-D geometric transformations, curve representation techniques and projections methods
5	Learn the Clipping algorithms on graphical objects
6	To prepare the student for advance areas and professional avenues in the field of Computer Graphics

Subject: OOPM

Subject Code: CSL304

Course Outcomes

PO	PSO	Competency Level	PI	Bloom's Level	CO	Description
PO1	PSO1	1.6	1.6.1	Level 2 Understand	CO1	Understanding fundamental programming constructs
PO3	PSO1	3.6	3.6.2	Level 4 Analyze	CO2	Illustrate the concept of packages, classes and objects.
PO5	PSO1 PSO2	5.4	5.4.2	Level 3 Apply	CO3	Extending the concept of strings, arrays and vectors.
PO3	PSO2	3.6	3.6.1	Level 4 Analyze	CO4	Implement the concept of inheritance and interfaces
PO4	PSO1	4.5	4.5.1	Level 2 Understand	CO5	Deep understanding of handling exceptions and threads in JAVA Programming
PO4	PSO2	4.4	4.4.3	Level 3 Apply	CO6	Illustrating GUI based application.

Course Objectives

Sr. No.	Description
1	To understand fundamental programming constructs
2	To illustrate the concept of packages, classes and objects
3	To extend the concept of strings, arrays and vectors
4	To implement the concept of inheritance and interfaces in JAVA
5	To deep understand the exception handling and threads in JAVA programming
6	To illustrate the GUI based application

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1 PO2	PSO1	1.7 2.5	1.7.1 2.5.2	2- Understand 3- Apply	CO1	Understand problems and use knowledge and skills to interpret societal/research problems in a group
PO9	PSO2	9.5	9.5.2 9.5.4	6-Create	CO2	Build interpersonal skills to work as member of a group or leader
PO5 PO7	PSO1	5.5 7.3	5.5.1 7.3.1 7.3.2	4-Analyze 6-Create	CO3	Design the proper inference through theoretical/experimental/simulation and illustrate the impact of solution in social, environmental context for sustainable development
PO8	PSO1	8.4	8.4.1 8.4.2	3-Apply	CO4	Apply standard norms of engineering practices
PO10	PSO1	10.4 10.5	10.4.1 10.4.2 10.5.2	6-Create	CO5	Develop in written and oral communication
PO11 PO12	PSO2	11.6 12.5	11.6.2 12.5.2	3 Apply	CO6	Apply project management principles and capabilities of self-learning in a group for a lifelong learning

Course Objectives

Sr. No.	Description
1	To understand problems and use knowledge and skills to interpret societal/research problems in a group
2	To build interpersonal skills to work as member of a group or leader
3	To design the proper inference through theoretical/experimental/simulation and illustrate the impact of solution in social, environmental context for sustainable development
4	To apply standard norms of engineering practices
5	To develop in written and oral communication
6	To apply project management principles and capabilities of self-learning in a group for a lifelong learning

Semester- IV

Subject: Applied Mathematics-IV

Subject Code: CSC401

Course Outcomes

PO	PSO	Competency	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.

Subject: AOA

Subject Code: CSC402

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1 PO4	1	1.2	1.2.1	2- Understand, 3-Apply 4-Analyze	CO1	Analyze the running time and space complexity of algorithms.
PO2	1	2.1	2.5.2	2- Understand, 3-Apply 4-Analyze	CO2	Describe, apply and analyze the complexity of divide and conquer strategy.
PO2	1	3.7	3.7.1 3.7.2	2- Understand, 3-Apply 4-Analyze	CO3	Describe, apply and analyze the complexity of greedy strategy.
PO2	1	1.2	1.2.2	2- Understand, 3-Apply 4-Analyze	CO4	Describe, apply and analyze the complexity of dynamic programming strategy.
PO2 PO3		4.6	4.6.1	2- Understand, 3-Apply	CO5	Explain and apply backtracking, branch and bound.
PO2 PO5		2.6	2.6.5	2- Understand, 3-Apply	CO6	Explain and apply string matching techniques.

Course Objectives

Sr. No.	Description
1	To analyze the running time and space complexity of algorithms.
2	To describe, apply and analyze the complexity of divide and conquer strategy.
3	To describe, apply and analyze the complexity of greedy strategy.
4	To describe, apply and analyze the complexity of dynamic programming strategy.
5	To explain and apply backtracking, branch and bound.
6	To explain and apply the string matching techniques.

Subject: DBMS

Subject Code: CSC403

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO2	PSO1	2.6	2.6.3	4-Analyze 2-Understand	CO1	Identify and analyze the roles and responsibilities of different types of user and investigate the different architecture to find appropriate solution.
PO4	PSO1	4.5	4.5.1	6-Create 2-Understand	CO2	Understand and Design data modeling using ER and Extended ER features to meet the specified needs.
PO3	PSO1	3.6	3.6.2	3-Apply 6-Create	CO3	Investigate and apply different relational algebra operators to find appropriate solution leading to valid conclusion.
PO5	PSO1	5.4	5.4.2	6-Create	CO4	Investigate and formulate SQL queries to find appropriate solution to complex problems.
PO4	PSO1	4.6	4.6.4	4-Analyze 3-Apply	CO5	Analyze and apply different normalization techniques to process and meet the specified needs with appropriate solution
PO5	PSO1	5.5	5.5.1	2-Understand	CO6	Identify the strength and limitation of tools for concept of transaction, concurrency and recovery.

Course Objectives

Sr. No.	Description
1	Understand the role of database management system in an organization.
2	Design data modeling using the entity-relationship and developing database designs.
3	Understand the relational algebra operators.
4	Understand the use of Structured Query Language (SQL) and learn SQL syntax.
5	Understand the normalization techniques to normalize the database.
6	Understand the needs of database processing and learn techniques for controlling the consequences of concurrent data access.

Subject: OS

Subject Code: CSC404

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO7	PSO1	2.1	2.1.2	Level 2 Understand	CO1	Understand the objectives, functions and structure of Operating system.
PO2	PSO1	2.1 2.2	2.1.2 2.2.4	Level 4 Analyze	CO2	Analyse the concept of process management and evaluate performance of process scheduling algorithms
PO2	PSO1	2.6	2.6.3 2.6.4	Level 3 Apply	CO3	Understand and apply the concepts of synchronization and deadlocks.
PO2	PSO1	2.6	2.6.2	Level 4 Analyze	CO4	Evaluate performance of memory allocation and replacement policies
PO2	PSO1	2.7	2.7.2	Level 2 Understand	CO5	Understand the concepts of file management.
PO1	PSO1	1.7	1.7.1	Level 3 Apply	CO6	Apply concepts of I/O management and analyze techniques of disk scheduling

Course Objectives

Sr. No.	Description
1	To understand the objective, structure and function of operating system
2	To analyze and evaluate the process of scheduling algorithm
3	To understand and apply the concept of synchronization and deadlock
4	To evaluate the performance of memory allocation and replacement policies
5	To understand the concept of file management
6	To apply the concepts of I/O management and analyze techniques of disk scheduling

Subject: MP

Subject Code: CSC405

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1	PSO1	1.3	1.3.1	3-Apply	CO-1	Apply basic engineering fundamentals to describe the architecture of 8086 processor. Apply engineering fundamentals to describe DOS and BIOS interrupts.
PO2	PSO1	2.4	2.4.1 2.4.2	3-Apply 4-Analyze	CO-2	Apply the instructions of 8086 to implement the assembly language program. Analyse and interpret the result of ALP using integrated tool.
PO3	PSO2	3.4	3.4.1	3-Apply	CO-3	Able to refine architecture design into detailed design using processor, memory chip or different peripheral ICs within existing constraints
PO3	PSO1	3.1	3.1.5	3-Apply	CO-4	Explore and synthesize 80386 system requirements from larger social and professional concerns
PO3	PSO1	3.3	3.3.5	3-Apply	CO-5	Able to perform systematic evaluation of degree of microprocessor from 8086 to Pentium to which several design concepts meet the criteria.
PO1	PSO1	1.3	1.3.1	3-Apply	CO-6	Apply basic engineering fundamentals to describe the hyperthreading technology in higher processors

Course Objectives

Sr. No.	Description
1	To understand basic concepts of microprocessor & Understand the concepts of interrupts
2	Apply background knowledge and create the appropriate logic for building assembly language programs for 8086.
3	Explain various peripheral devices and their interfacing to 8086 and to apply it to design Microprocessor based system.
4	Prepare students for higher processor architecture and understand different modes of execution and extend the importance of protected mode of 80386.
5	Discuss Pentium i.e multicore processor architecture and its organization.
6	To Understand hyperthreading technology

Subject: AOA LAB

Subject Code: CSL401

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO2 PO4	1	2.8 4.6	2.8.2 4.6.1	4-Analyze	CO1	Analyze the complexities of various problems in different domains.
PO2 PO1 PO4	1	2.1 1.7 4.6	2.5.2 1.7.1 2.8.2	2-Understand, 3-Apply 4-Analyze	CO2	Describe, apply and analyze the running time of the basic algorithms for those classic problems in various domains using divide and conquer strategy.
PO2 PO1	1	2.1 1.7	2.5.2 1.7.1	2-Understand, 3-Apply 4-Analyze	CO3	Define and apply the efficient algorithms for the effective problem solving with the help of different strategies like greedy method.
PO1	1	1.7	1.7.1	3-Apply	CO4	Apply dynamic programming strategy to solve different problems effectively.
PO2 PO1	1	2.1 1.7	2.5.3 1.7.1	2-Understand, 3-Apply	CO5	Recognize and apply backtracking, branch and bound and to deal with some hard problems.
PO1 PO4	1	1.7 4.6	1.7.1 4.6.1	3-Apply 4-Analyze	CO6	Apply and analyze the string-matching algorithms to find the pattern.

Course Objectives

Sr. No.	Description
1	To analyze the complexities of various problems in different domains.
2	To Describe, apply and analyze the running time of the basic algorithms for those classic problems in various domains using divide and conquer strategy.
3	To Define and apply the efficient algorithms for the effective problem solving with the help of different strategies like greedy method.
4	To apply dynamic programming strategy to solve different problems effectively.
5	To Recognize and apply backtracking, branch and bound and string matching techniques to deal with some hard problems.
6	To apply and analyze the string matching algorithms to find the pattern.

Subject: DBMS LAB

Subject Code: CSL402

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO3	PSO1	3.5	3.5.1	4-Analyze	CO1	Identify and investigate the reallife problem to find appropriate solution and design and draw ER and EER diagram with software tool
PO4	PSO2	4.6	4.6.3	6-Create	CO2	Design, Create and update database and tables with different DDL and DML statements
P05	PSO2	5.6	5.6.1	3-Apply	CO3	Apply appropriate integrity constraints and provide security to data.
P04	PSO2	4.4	4.4.2	4-Analyze	CO4	Investigate and formulate SQL queries to find appropriate solution to complex problems.
P04	PSO1	4.5	4.5.1	4-Analyze 3-Apply	CO5	Identify and apply triggers and procedures for specific module to meet the specified needs with appropriate solution to safety standards and societal consideration.
P05	PSO2	5.6	5.6.2	3-Apply	CO3	Use PL / SQL Constructs.

Course Objectives

Sr. No.	Description
1	Develop entity relationship data model and its mapping to relational model
2	Learn relational algebra and Formulate SQL queries
3	Learn integrity Constraints
4	Apply normalization techniques to normalize the database
5	Understand concept of transaction, concurrency control and recovery techniques
6	understand concept of PL/SQL

Subject: OS LAB

Subject Code: CSL403

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1	PSO1	1.7	1.7.1	Level 2 Understand	CO1	Demonstrate basic operating sysytem commands, shell scripts, system calls and API wrt Linux.
PO2	PSO1	2.5	2.5.2	Level 5 Evaluate	CO2	Determine various process scheduling algorithms.
O2	PSO1	2.5	2.5.2	Level 4 Analyze	CO3	Analyze the concept of synchronization and deadlocks.
PO2	PSO1	2.5	2.5.2	Level 5 Evaluate	CO4	Determine various memory management techniquees and evaluate their performance.
PO2	PSO1	2.6	2.6.2 2.6.3	Level 4 Analyze	CO5	Identify the concept of virtual memory.
PO1 PO2	PSO1	1.7 2.5	1.7.1 2.5.2	Level 2 Understand Level 4 Analyze	CO6	Demonstrate and analyze concept of file management and I/O management techniques.

Course Objectives

Sr. No.	Description
1	To demonstrate basic operating sysytem commands, shell scripts, system calls and API wrt Linux.
2	To determine various process scheduling algorithms.
3	To analyze the concept of synchronization and deadlocks.
4	To determine various memory management techniquees and evaluate their performance.
5	To identify the concept of virtual memory.
6	To demonstrate and analyze concept of file management and I/O management techniques.

Subject: MP LAB

Subject Code: CSL404

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1	PSO1	1.7	1.7.1	3-Apply	CO-1	Explain basic engineering fundamentals to describe the architecture of 8086 processor.
PO3 PO5	PSO2	3.8 5.4	3.8.2 5.4.1 5.4.2	3-Apply 4-Analyze	CO-2	Explain the instructions of 8086 to implement the assembly language program. Identify and interpret the result of ALP using integrated tool.
PO3	PSO2	3.6	3.6.2	6- Create	CO-3	Design 8086 based system using Memory and peripheral chip.
PO2	PSO1	2.5	2.5.2	5- Evaluate	CO-4	Appraise the architecture of 80386 DX processor.
PO4	PSO1	4.6	4.6.1	5- Evaluate	CO-5	Determine the degree of microprocessor from 8086 to Pentium to which several design concepts meet the criteria.
PO1	PSO1	1.7	1.7.1	2- Understand	CO-6	Explain the hyperthreading technology in higher processors

Course Objectives

Sr. No.	Description
1	To explain basic engineering fundamentals to describe the architecture of 8086 processor.
2	To explain the instructions of 8086 to implement the assembly language program. Identify and interpret the result of ALP using integrated tool.
3	To design 8086 based system using Memory and peripheral chip.
4	To appraise the architecture of 80386 DX processor.
5	To determine the degree of microprocessor from 8086 to Pentium to which several design concepts meet the criteria.
6	To Understand hyperthreading technology.

Subject: Python Programming

Subject Code: CSL405

Course Outcomes

PO	PSO	Competency Level	PI	Bloom's Level	CO	Description
PO1	PSO1	1.6	1.6.1	Level 2 Understand	CO1	Understand basic concepts in python
PO3	PSO1 PSO2	3.6	3.6.2	Level 3 Analyze	CO2	Exploring contents of files, directories and text processing with python
PO4	PSO2	4.5	4.5.1	Level 6 Create	CO3	Develop program for data structure using built in functions in python.
PO5	PSO1	5.4	5.4.2	Level 3 Apply	CO4	To explore django web framework for developing python-based web application.
PO3	PSO1	3.6	3.6.1	Level 3 Analyze	CO2	Able to explore design alternatives
PO1	PSO2	1.6	1.6.1	Level 2 Understand	CO6	Understand the concept of numpy and pandas

Course Objectives

Sr. No.	Description
1	To understand fundamental of Python programming
2	To develop the files, directories and text processing in python
3	To explore the data structure in python using function
4	To develop the django web framework
5	To use design alternatives
6	To understand the concept of numpy and pandas

Subject: Mini Project- 1 B

Subject Code: CSM401

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1 PO2	PSO1	1.7 2.5	1.7.1 2.5.2	2- Understand 3- Apply	CO1	Understand problems and use knowledge and skills to interpret societal/research problems in a group
PO9	PSO2	9.5	9.5.2 9.5.4	6-Create	CO2	Build interpersonal skills to work as member of a group or leader
PO5 PO7	PSO1	5.5 7.3	5.5.1 7.3.1 7.3.2	4-Analyze 6-Create	CO3	Design the proper inference through theoretical/experimental/simulation and illustrate the impact of solution in social, environmental context for sustainable development
PO8	PSO1	8.4	8.4.1 8.4.2	3-Apply	CO4	Apply standard norms of engineering practices
PO10	PSO1	10.4 10.5	10.4.1 10.4.2 10.5.2	6-Create	CO5	Develop in written and oral communication
PO11 PO12	PSO2	11.6 12.5	11.6.2 12.5.2	3 Apply	CO6	Apply project management principles and capabilities of self-learning in a group for a lifelong learning

Course Objectives

Sr. No.	Description
1	To understand problems and use knowledge and skills to interpret societal/research problems in a group
2	To build interpersonal skills to work as member of a group or leader
3	To design the proper inference through theoretical/experimental/simulation and illustrate the impact of solution in social, environmental context for sustainable development
4	To apply standard norms of engineering practices
5	To develop in written and oral communication
6	To apply project management principles and capabilities of self-learning in a group for a lifelong learning

Semester- V

Subject: TCS

Subject Code: CSC501

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1		1.3	1.3.1	Level 4 Analyze	CO 1	Identify the central concepts in theory of computation and analyse differentiate between deterministic and nondeterministic automata, apply formulate knowledge to obtain equivalence of NFA and DFA.
PO2		2.4	2.4.1	Level 4 Analyze	CO 2	Investigate the equivalence of languages described by finite automata and regular expressions.
PO5		5.1	5.1.2	Level 6 Create	CO 3	Create and apply regular, context free grammars while recognizing the strings and tokens.
PO2		2.4	2.4.2	Level 6 Create	CO 4	Design pushdown automata model to recognize the language.
PO2		2.4	2.4.2	Level 6 Create	CO 5	Develop an understanding of computation through Turing Machine
PO1		1.3	1.3.1	Level 2 understand	CO 6	Acquire fundamental understanding of decidability and undecidability and apply the knowledge to solve computer engineering problem.

Course Objectives

Sr. No.	Description
1	To identify the central concepts in theory of computation and analyse differentiate between deterministic and nondeterministic automata, apply formulate knowledge to obtain equivalence of NFA and DFA.
2	To investigate the equivalence of languages described by finite automata and regular expressions.
3	To create and apply regular, context free grammars while recognizing the strings and tokens.
4	To design pushdown automata model to recognize the language.
5	To develop an understanding of computation through Turing Machine
6	To acquire fundamental understanding of decidability and undecidability and apply the knowledge to solve computer engineering problem.

Subject: SE

Subject Code: CSC502

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1	PSO1	1.7	1.7.1	2 - Understand 4- Analyze	CO1	Understand Software Engineering and analyze Process Models.
PO2 PO3	PSO1	2.5 3.5	2.5.1 3.5.2 3.5.6	2 - Understand 4- Analyze	CO2	Identify, Analyze Requirements in Software and develop Software Requirement Specification (SRS) document.
PO4	PSO1	4.4	4.4.2	2- Understand 3-Apply	CO3	Classify and execute the process of the project using project estimation techniques and tracking and scheduling the project.
PO4	PSO1	4.5	4.5.1	6-Create	CO4	Design of Software Project using basic Principles and concepts.
PO5	PSO1	5.4 5.5	5.4.2 5.5.1	5-Evaluate	CO5	Evaluate the Software by using various Testing Approaches.
PO5	PSO1	5.5 5.6	5.5.2 5.6.1 5.6.2	2- Understand	CO6	Identify Risk in software to assure Quality in software project.

Course Objectives

Sr. No.	Description
1	To understand Software Engineering and analyze Process Models.
2	To identify, Analyze Requirements in Software and develop Software Requirement Specification (SRS) document.
3	To classify and execute the process of the project using project estimation techniques and tracking and scheduling the project.
4	To design of Software Project using basic Principles and concepts.
5	To evaluate the Software by using various Testing Approaches.
6	To identify Risk in software to assure Quality in software project.

Subject: CN

Subject Code: CSC503

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1 PO2		1.3 2.2	1.3.1 2.2.4	2 Understand 3 Apply 4 Analyze	CO-1	Apply the knowledge of fundamentals of data communication to identify the differences between ISO - OSI model, TCP/IP model and connection oriented and connectionless services.
PO1 PO2		1.4 2.2, 2.4	1.4.1 2.2.2, 2.4.3	2 3 4	CO-2	Apply the knowledge of data communication fundamentals to identify & analyze different types of media i.e., guided media used at physical layer.
PO2 PO3	PSO1	2.2, 2.4 3.2	2.2.4, 2.4.3 3.2.2	2 3 4	CO-3	Apply the knowledge of different protocols used at data link layer to investigate appropriate protocol for system. Identify and analyze the differences in protocols.
PO2 PO5 PO6		2.3 5.2 6.2	2.3.1 5.2.1 6.2.1	2 3 4	CO-4	Select and apply appropriate concepts of subnetting / supernetting of IP addressing. Analyze various routing algorithms and protocols at network layer. Realize the impact of protocol on system.
PO2 PO3		2.3 3.2, 3.3	2.3.1 3.2.2, 3.3.1	2 3 4	CO-5	Classify and compare transport layer protocols. Relate connection management with real time communication. Investigate congestion and apply appropriate congestion control algorithm.
PO2 PO6		2.1, 2.2 6.1	2.1.2, 2.2.2 6.1.1	3 4	CO-6	Identify the protocols used at application layer. Analyze the protocols in terms of organization need, its impact.

Course Objectives

Sr. No.	Description
1	To explain and introduce concepts and fundamentals of data communication and computer networks.
2	To interrelate the inter-working of various layers of OSI. To distinguish between different media used for communication.
3	To discuss the issues and challenges of protocols design while delivering packet in network.
4	To study different protocols used for packet delivery in network layer. To assess the strengths and weaknesses of various routing algorithms.
5	To understand how process to process communication occurs i.e. transport layer and protocols used in this layer.
6	To understand various application layer protocols.

Subject: DWM

Subject Code: CSC504

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1	PSO1	1.7	1.7.1	2-Understand 4-Analyze 6-Create	CO1	Understand, design data warehouse with dimensional modelling and analyze different OLAP operations.
PO1	PSO1	1.7	1.7.1	2-Understand 3-Apply	CO2	Understand data mining principles and use data preprocessing and data exploration.
PO2	PSO1	2.5	2.5.2	2-Understand 5-Evaluate	CO3	Classify and evaluate appropriate data mining algorithm
PO4	PSO1	4.6	4.6.1	4-Analyze 5-Evaluate	CO4	Analyze and evaluate clustering technique
PO5	PSO1	5.4	5.4.1	2-Understand 3-Apply	CO5	Identify and apply associate rule mining technique for real time applications.
PO4 PO5	PSO1	4.6 5.4	4.6.1 5.4.1	2-Understand 3-Apply	CO6	Understand and apply the concept of web mining

Course Objectives

Sr. No.	Description
1	To understand, design data warehouse with dimensional modelling with analyzing different OLAP operations.
2	To understand data mining principles with data preprocessing and data exploration.
3	To classify and evaluate appropriate data mining algorithm
4	To analyze and evaluate clustering technique
5	To identify and apply associate rule mining technique for real time applications.
6	To understand and apply the concept of web mining

Subject: IP

Subject Code: CSDO501

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1, PO4		1.1, 4.5	1.1.2, 4.5.1	3,6	CO1	Apply the concept of web technology for solving the problem of web application & Design & develop web pages using HTML5 and CSS3
PO4		4.5	4.5.1	6	CO2	Design & Develop web pages using JavaScript
PO4		4.6	4.6.1	4	CO3	Use JDBC for database connectivity to collect & analyze data
PO4		4.5	4.5.1	6	CO4	Design rich internet application using AJAX
PO2		2.6	2.6.4	4	CO5	Compare & contrast alternative methods of web extension to select best method.
PO1, PO4		1.1, 4.5	1.1.2, 4.5.1	3,6	CO6	Apply the concept of REACT JS for solving the problem of web application & Design & develop web application using JSX

Course Objectives

Sr. No.	Description
1	To Understand basic concept of Internet Programming
2	To acquire knowledge & skills for creation of web site considering both client & server side programming
3	To develop responsive web applications.
4	To explore different web extensions & web services standards
5	To understand characteristics of RIA
6	To learn react JS

Subject: SE LAB

Subject Code: CSL501

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO2	PSO1	2.7	2.7.2	4- Analyze	CO1	Identify traditional and agile process Models.
PO3	PSO2	3.7	3.7.1	6-Create	CO2	Develop Software Requirement Specification (SRS) document and Data Flow Diagram (DFD).
PO4	PSO1	4.6	4.6.1	3-Apply	CO3	Calculate project estimation techniques and Show tracking and scheduling of the project.
PO3	PSO1	3.6	3.6.1 3.6.3	2- Understand	CO4	Explain and classify the design of Software Project using basic Principles and concepts.
PO5	PSO1	5.4	5.4.2	5-Evaluate	CO5	Test the Software by using various Testing Approaches.
PO4 PO5	PSO2	4.5 5.6	4.5.1 5.6.1	3- Apply 6- Create	CO6	Prepare Risk Mitigation plan and Construct Version Control.

Course Objectives

Sr. No.	Description
1	To identify and study traditional and agile process Models.
2	To develop Software Requirement Specification (SRS) document and Data Flow Diagram (DFD).
3	To Calculate project estimation techniques and Show tracking and scheduling of the project.
4	To explain and classify the design of Software Project using Principles and concepts.
5	To test the Software by using various Testing Approaches.
6	To prepare Risk Mitigation plan and Construct Version Control.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1 PO2	PSO2	1.3 2.2	1.3.1 2.2.4	3 Apply 4 Analyze 6 Create	CO-1	Apply the knowledge to design a network and configure it for IP addressing, subnetting. Apply appropriate technique for routing in different network system. Analyze its results. (Using Packet Tracer)
PO1 PO2	PSO1	1.3 2.2	1.3.1 2.2.4	2, 3	CO-2	Identify different network commands in Linux. Apply it to find solution for different network problems.
PO1		1.3	1.3.1	3	CO-3	Apply knowledge to understand the operation of TCP/IP layers using Wireshark.
PO1 PO2	PSO2	1.3 2.2	1.3.1 2.2.4	3, 4, 6	CO-4	Apply the knowledge to design chat application using TCP, UDP. Analyze the difference in working.
PO1 PO2		1.3 2.2	1.3.1 2.2.4	2 3	CO-5	Demonstrate working of different application layer protocols using packet tracer.
PO1 PO2		1.3 2.2	1.3.1 2.2.4	2 4	CO-6	Understand and compare working of different physical media used in Networks.L33

Course Objectives

Sr. No.	Description
1	To discuss the issues and challenges of protocols design while delivering packet in network. To assess the strengths and weaknesses of various routing algorithms.
2	To identify different network commands in Linux. Apply it to find solution for different network problems.
3	To apply knowledge to understand the operation of TCP/IP layers using Wireshark.
4	To understand how process to process communication occurs i.e. transport layer and protocols used in this layer.
5	To understand various application layer protocols.
6	To Understand different types of physical media used in Networks.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO2 PO3	PSO1	2.4 3.2 3.3	2.4.1 3.2.2 3.3.1 3.3.2	5-Evaluate 6-Create	CO1	Design data warehouse with dimensional modelling and Determine different OLAP operations.
PO5	PSO2	5.4 5.6	5.4.2 5.6.2	5- Evaluate	CO2	Determine data preprocessing and data exploration using data mining tool (WEKA/R TOOL)
PO4	PSO1	4.6	4.6.1 4.6.3	4- Analyze	CO3	Classify appropriate data mining algorithm.
PO4 PO5	PSO2	4.6 5.6	4.6.1 4.6.3 5.6.2	5-Evaluate 6-Create	CO4	Measure and generate clustering algorithms.
PO5	PSO1	5.4	5.4.2	3-Apply 4-Analyze	CO5	Identify and solve associate rule mining technique for real time applications.
PO5	PSO1	5.4	5.4.1 5.4.2	2- Understand 3-Apply	CO6	Explain and use the concept of web mining

Course Objectives

Sr. No.	Description
1	To design data warehouse with dimensional modelling and Determine different OLAP operations.
2	To determine data preprocessing and data exploration using data mining tool (WEKA/R TOOL)
3	To classify appropriate data mining algorithm.
4	To measure and generate clustering algorithms.
5	To Identify and solve associate rule mining technique for real time applications.
6	To explain and use the concept of web mining

Subject: PCE-II

Subject Code: CSL504

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
3		3.5	3.5.1 & 3.5.2	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: Mini Project

Subject Code: CSM501

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO2,PO3		2.1,3.5	2.1.2,3.5.1	3	CO1	Define problem statement with objective & scope & identify methodologies/algorithms to solve problem
PO3		3.8	3.8.3	4	CO2	Verify & validate results, functionalities & design of project
PO7		7.3	7.3.1,7.3.2	3	CO3	Identify impact of engineering products & understand relationship between the technical, socio-economics & environmental dimensions of sustainabilities.
PO9,PO11		9.4,11.6	9.4.2,11.6.2	3	CO4	Use project management tools to schedule an engineering project, so it is completed on time & on budget & implement norms of practice.
PO10		10.4, 10.6	10.4.2, 10.6.2	3.4	CO5	Produce clear, well structured & well supported written engineering document & use variety of media effectively to convey a message in a document or presentation
PO9		9.5	9.5.1	6	CO6	Demonstrate effective communication, problem-solving, conflict resolution & leadership skill

Course Objectives

Sr. No.	Description
1	To define problem statement with objective & scope & identify methodologies/algorithms to solve problem
2	To verify & validate results, functionalities & design of project
3	To identify impact of engineering products & understand relationship between the technical, socio-economics & environmental dimensions of sustainabilities.
4	To use project management tools to schedule an engineering project, so it is completed on time & on budget & implement norms of practice
5	To produce clear, well structured & well supported written engineering document & use variety of media effectively to convey a message in a document or presentation
6	To demonstrate effective communication, problem-solving, conflict resolution & leadership skill

Semester-III

Scheme R-16

Subject- Engineering Mathematics-III

Subject Code-CSC301

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1,2	-	1.6	1.6.1	3	CO1	Apply the concept of Laplace transforms and use to solve real integrals in engineering problems
PO1,2,3	-	2.5	2.5.2	3,5	CO2	Identify the concept of inverse laplace transform and compare to various functions and its applications
PO1,2,3,4	-	4.5	4.5.1	3,6	CO3	Develop and determine Fourier series for real life problems and applications.
PO1,2,4	-	2.8	2.8.1	3,4	CO4	Apply the properties of Complex analysis and select the application to orthogonal trajectories and mapping.
PO1,3	-	1.2	1.2.1	3	CO5	Apply the concept of Z-transformation and inverse in engineering problem.
PO1,2,3,1 2		1.2	1.2.2	3	CO6	Apply the concept of Correlation,Regression and Curve fitting to engineering problems on data science.

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 with the concept of complex variables, C-R equations with applications and mapping.
5	To understand the concept of Z-Transform and inverse Z-Transform with its properties.
6	To acquaint with the basic techniques of statistics like correlation, regression and curve fitting for data analysis, machine learning and AI.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO 1	PSO 1	1.2	1.2.1	2- Understand 3- Demonstrate	CO 1	Understand the conversion of different type of codes and number systems used in digital communication and computer systems.
PO 1	PSO 1	2.1	2.5.3	2- Understand 4-Analyze	CO 2	Identify and describe the minimization techniques of digital circuits.
PO 2	PSO 2	2.6	2.6.3 2.8.1	3-Apply 6-Create	CO 3	Understand the working mechanism of different combinational circuits and their role in the digital system design.
PO 2	PSO 2	2.6 2.8	2.6.3 2.8.1	3-Apply 6-Create	CO 4	Understand the working mechanism of different sequential circuits and their role in the digital system design.
PO 5	PSO 1	5.4 5.5	5.4.1 5.6.1	2- Understand	CO 5	Illustrate and describe the basic concepts of VHDL
PO 5	PSO 2	5.4 5.6	5.4.2 5.5.2	2- Understand	CO 6	Illustrate and describe the technology in the area of memory devices in different types of digital circuits.

Course Objectives

Sr. No.	Description
1	To understand the conversion of different type of codes and number systems used in digital communication and computer systems.
2	To Identify and describe the minimization techniques of digital circuits.
3	To understand the working mechanism of different combinational circuits and their role in the digital system design.
4	To understand the working mechanism of different sequential circuits and their role in the digital system design.
5	To illustrate and describe the basic concepts of VHDL
6	To illustrate and describe the technology in the area of memory devices in different types of digital circuits.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO2	PSO 1	2.5	2.5.3	3-Apply	CO 1	Apply the knowledge of Discrete Mathematics to solve complex engineering problem.
PO1	PSO 1	1.2	1.2.1	4-Analyze 3-Apply	CO 2	Identify, select and apply clear thinking for problem solving using laws of logic and mathematical induction.
PO2	PSO 1	2.7	2.7.1	4-Analyze	CO 3	Analyze complex relations and functions to find appropriate solution leading to a valid conclusion.
PO1	PSO 1	1.2	1.2.2	4-Analyze	CO 4	Identify formulate and analyze permutation and combination using principle of mathematics.
PO1	PSO 1	1.7	1.7.1	3-Apply	CO 5	Apply the background knowledge of Discrete Mathematics to identify type of graph.
PO3	PSO 1	3.6	3.6.1	3-Apply	CO 6	Apply the knowledge of mathematics to solve algebraic structure and detecting and correcting code in the transmitted data.

Course Objectives

Sr. No.	Description
1	Understand the Discrete Mathematics Concept.
2	Apply clear thinking and creative problem-solving using laws of logic and mathematical Induction.
3	Understand the concepts of relation and functions.
4	Understand the permutation and combination.
5	Understand the basic concept in graph theory and their properties.
6	Understand the technique for detecting and correcting code in transmitted data.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
1	2	1.3	1.3.1	1	1	Define the use of semiconductor devices in circuits and analyze them
2	2	2.2	2.2.2	2	2	Express the importance of oscillators and power amplifiers in communication system.
4	2	4.2	4.2.1	2	3	Represent basic concepts of operational amplifier and their applications.
1	2	1.3	1.3.1	2	4	Summarize the fundamental concepts of electronic communication.
2	2	2.2	2.2.3	3	5	Apply knowledge of electronic devices and circuits to communication applications.
5	2	5.1	5.1.1	5	6	Evaluate basic concepts of information theory

Course Objectives

Sr. No.	Description
1	To develop the knowledge of semiconductor devices and circuits, and explain their use in communication applications.
2	To design different circuits using transistors.
3	To gain knowledge in electronic devices and circuits that is useful in real life applications
4	To understand the fundamental concepts of electronic communication and their use in computer applications.
5	To develop the knowledge of analog communication and explain their use in communication applications.
6	To Illustrate the information theory.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
2		2.6 2.1	2.6.1 2.1.2	1	1	Identify functionalities of Data structures resources Identify Data structure of a computer-based system to solve an engineering problem
3		3.6	3.6.2	1	2	Able to produce a variety of potential design solutions suited to meet functional requirements for implementation of stack and queue
5		5.4	5.4.1	1	3	Identify different Linked list techniques for engineering activities
4		4.5	4.4.3	1	4	Able to choose appropriate tree traversal method to conduct the experiment.
5		5.4	5.4.2	6	5	Adapt graph traversal techniques to solve engineering problems
1	PSO 1	1	1.7.1	3	6	Apply theory and principles searching techniques of computer science and engineering to solve an engineering problem

Course Objectives

Sr. No.	Description
1	Understand the basic concepts of Data Structure and efficient storage mechanism of data for an easy access.
2	Design and implementation of various Operations data structure.
3	Identify the various techniques for representation of the data in linked list.
4	Learn the different tree techniques.
5	Investigate the logical ability and understand the generic principles of graph as applied to sophisticated data structure.
6	Understand different sorting and searching techniques & design the miniproject based on Data Structure in a group of students.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO2 PO3	PSO 1	2.8 3.6	2.8.1 3.6.1	2- Understand 5- Evaluate	CO1	Understand the basics implementation of gates.
PO4	PSO 2	4.4	4.4.2	5- Evaluate 6-Create	CO2	Implement arithmetic operations using Multiplexer/demultiplexer.
PO3 PO5	PSO 1	3.6 5.4	3.6.2 5.4.1	2- Understand 3-Apply	CO3	Understand and learn about basics of counters.
PO2 PO5	PSO 2	2.8 5.4	2.8.1 5.4.2	3-Apply 5- Evaluate	CO4	Implement arithmetic operations using various algorithms.
PO4	PSO 1	4.4	4.4.3	2- Understand 6- Evaluate	CO5	Understand and implement the processor designing.
PO 5	PSO 1	5.4	5.4.1	3-Apply 5- Evaluate	CO6	Implement the operation of memory and caches.

Course Objectives

Sr. No.	Description
1	To understand the basics implementation of gates.
2	To Implement arithmetic operations using Multiplexer/demultiplexer.
3	To understand and learn basics of counters.
4	To implement arithmetic operations using various algorithms.
5	To understand and implement the processor designing.

Subject-ECCF Lab

Subject Code- CSL302

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
2	2	2.4.2	2.4	4	1	To identify and test various electronic components
2	2	2.4.2	2.4	3	2	To calculate the frequency of oscillators.
4	2	4.1.2	4.1	2	3	To illustrate different operations of OP-AMP that is useful in real life applications
4	2	4.2.1	4.2	2	4	To demonstrate different modulation techniques of electronic communication and their use in computer applications.
5	2	5.1.1	5.1	1	5	To draw the different types of pulse modulation waveform
5	2	5.2.1	5.2	6	6	Construct different circuits using simulation

Course Objectives

Sr. No.	Description
1	Verify the theory of semiconductor devices.
2	Design of oscillators and power amplifiers in communication system.
3	Represent basic concepts of operational amplifier and their applications.
4	Summarize the fundamental concepts of electronic communication.
5	Apply knowledge of electronic devices and circuits to communication applications.
6	Study basic concepts of information theory.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
3		3.6	3.6.2	1	1	Able to produce a variety of potential design solutions suited to meet functional requirements for implementation of stack .
3		3.6	3.6.2	6	2	Design potential solutions suited to meet functional requirements for implementation of queue.
5		5.4	5.4.1	3	3	illustrate and apply different Linked list techniques for engineering activities.
4		4.5	4.4.3	1	4	Able to choose appropriate tree traversal method to conduct the experiment.
5		5.4	5.4.2	6	5	Adapt graph traversal techniques to solve engineering problems.
1	PSO 1	1	1.7.1	3	6	Apply theory and principles searching techniques of computer science and engineering to solve an engineering problem.

Course Objectives

Sr. No.	Description
1	To implement basic data structures such as arrays, stacks.
2	To implement basic data structures such as queue.
3	To implement basic data structures such as linked list.
4	Compute the complexity of various Tree algorithms.
5	Investigate the logical ability and understand the generic principles of graph as applied to sophisticated data structure.
6	Understand different sorting and searching techniques & design the miniproject based on Data Structure in a group of students.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO3	PSO1	3.6	3.6.1	Level 2 Understand	CO1	To Understand the features and concept of Object-Oriented Programming.
PO5	PSO1 PSO2	5.5	5.5.2	Level 4 Analyze	CO2	Analyze and implement the pillars of Object-oriented programming like classes, objects, constructors, packages.
PO3	PSO2	3.5	3.6.2	Level 3 Apply	CO3	Apply the concepts of Arrays and Strings
PO5	PSO1 PSO2	5.4	5.4.2	Level 2 Understand	CO4	Understand the different types of inheritance and polymorphism
PO4	PSO2	4.5	4.5.1	Level 2 Understand	CO5	Deep understand of handling exceptions and threads in JAVA Programming
PO3	PSO1	3.7	3.7.1	Level 3 Apply	CO6	Implementation of applets, awt and JDBC in JAVA

Course Objectives

Sr. No	Description
1	Understand and develop the concept of OOPM
2	Develop the understanding of OOPM like classes, objects, constructors and packages
3	To understand the Arrays and Strings
4	To understand the different types of inheritance and polymorphism
5	To understand the exception handling and threads
6	To understand the applets, awt and JDBC in JAVA OOPM

Semester-IV

Subject-Applied Mathematics IV

Subject Code- CSC401

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1,2	-	1.6	1.6 .1	3,5	CO 1	Use the concept of Complex integration for evaluating integrals, computing residues and evaluate various contour integrals.
PO1,3	-	1.2	1.2 .1	1,3	CO 2	Extend the concept of matrices to Eigen value and eigen vector and use it to solve various engineering problems.
PO1,2	-	1.2	1.2 .2	2,3	CO 3	Illustrate understanding the concepts of probability and expectations for getting spread of the data and probability distribution.
PO1,2,4	-	1.2	1.2 .2	3	CO 4	Apply the concept of sampling distribution, Test of hypothesis, LOS, one and two tailed test to determine large sample.
PO1,2,4	-	4.5	4.5 .1	3	CO 5	Apply the concept of students t-distribution for dependent and independent samples and Use chi-square test for goodness of fit.
PO1,2,1 2		2.8	2.8 .4	3	CO 6	Apply the concept of Linear and Nonlinear programming problem to solve engineering problem.

Course Objectives

Sr. No.	Description
1	To study Line and Contour integrals and expansion of complex valued functions in a power series.
2	To inculcate an ability to relate engineering problems to mathematical context.
3	To acquaint with the concept of probability, random variables with their distributions and expectations.
4	To explain the test of hypothesis, Level of significance for large sample using sampling theory.
5	To understand the concept students t- distribution, test of goodness of fit, contingency table for small sample.
6	To understand the basic techniques of LPP and NLPP for optimization of engineering problems.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1 PO4	1	1.2	1.2.1	2-Understand, 3-Apply 4-Analyze	CO1	Illustrate and analyze the runningtime and space complexity of algorithms.
PO2	1	2.1	2.5.2	2-Understand, 3-Apply 4-Analyze	CO2	Describe, apply and analyze the complexity of divide and conquer strategy.
PO2	1	3.7	3.7.1 3.7.2	2-Understand 3-Apply 4-Analyze	CO3	Identify, apply and analyze the complexity of greedy strategy.
PO2	1	1.2	1.2.2	2-Understand, 3-Apply 4-Analyze	CO4	Determine, apply and analyze the complexity of dynamic programming strategy.
PO2 PO3	1	4.6	4.6.1	2-Understand, 3-Apply	CO5	Explain, design and apply backtracking, branch and bound and string-matching techniques to deal with some hard problems.
PO2 PO5	1	2.6	2.6.5	4-Analyze	CO6	Categorize the classes P, NP, and NP-Complete and be able to prove that a certain Problem is NP-Complete.

Course Objectives

Sr. No.	Description
1	To Illustrate and analyze the running time and space complexity of algorithms.
2	To determine, apply and analyze the complexity of divide and conquer strategy.
3	To identify, apply and analyze the complexity of greedy strategy.
4	To describe, apply and analyze the complexity of dynamic programming strategy.
5	To understand and apply backtracking, branch and bound and string-matching techniques to deal with some hard problems.
6	To analyse strategies for solving problems not solvable in polynomial time.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO2	PSO 1	2.5	2.5.2	2-Understand	CO 1	Understand basic structure of the computer system and demonstrate the arithmetic algorithms for solving ALU operation
PO2	PSO	2.6	2.6.	2-Understand	CO 2	Understand instruction level parallelism and hazards in typical processor pipelines.
PO3	PSO 2	3.6	3.6.1	6-Create	CO 3	Design the hardwired and microprogrammed control unit
PO3	PSO 1	3.7	3.7.1	4-Analyze	CO 4	Analyze the memory mapping techniques.
P04	PSO 1	4.6	4.6.1	3-Apply	CO 5	Identify various types of buses, interrupts and I/O operations in a computer system.
P05	PSO 1	5.5	5.5.1	2-Understand	CO 6	Understand superscalar architectures, multi-core architecture and their advantages

Course Objectives

Sr. No.	Description
1	To understand the basic structure and operation of a digital computer.
2	To understand the parallelism and hazards in processor pipeline.
3	To understand and design control unit.
4	To understand the hierarchical memory system including cache memories and virtual memory.
5	To understand the different ways of communicating with I/O devices and standard I/O interfaces.
6	To study different architectures.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO 1 PO 6		1.3, 6.2	1.3.1 6.2.1	2 Underst and 3 Apply	CO -1	Realize the fundamentals or basic concepts of Computer Graphics. Apply the knowledge to identify its need in different areas.
PO 1 PO 2	PSO 1	1.4, 2.2, 2.4	1.4.1 2.2.2 , 2.4.3	3, 4 Analyze	CO -2	Apply the knowledge of various algorithms for scan conversion and filling of basic objects and analyze its performance in terms of complexity and correctness.
PO 1 PO 2		1.3, 2.2, 2.4	1.3.1 2.2.4 , 2.4.3	2, 3, 6	CO -3	Identify and formulate 2D geometric transformations, viewing transformations. Apply this knowledge for viewing and clipping on graphical objects.
PO 2 PO 4 PO 5	PSO 2	2.3, 4.1, 5.2	2.3.1 4.1.1 5.2.1	3, 6 Create	CO -4	Select & apply appropriate projection, solid model representation techniques for 3D. Apply the knowledge of transformations. Design curve using different techniques and analyze it.
PO 2 PO 3	PSO 1	2.3, 3.2, 3.3	2.3.1 3.2.2 , 3.3.1	3, 4	CO -5	Apply different algorithms to identify visible surface or back face in 3D. Analyze different back face removal algorithms and find appropriate one.
PO 2 PO 6		2.1, 2.2, 6.1	2.1.2 , 2.2.2 6.1.1	3, 6	CO -6	Apply the knowledge to analyze surface rendering techniques and illumination models. Design a software system which explore concepts of subject, its use in different areas, impact on other alternatives available.

Course Objectives

Sr. No.	Description
1	To equip students with the fundamental knowledge and basic technical competence in the field of computer graphics.
2	To emphasize on implementation aspect of Computer Graphics Algorithms.
3	To understand different transformation such as translation, scaling, rotation, clipping on 2D objects.
4	To modify different transformation algorithms of 2D for 3D.
5	To use basic algorithms studied to draw curves and fractals.
6	To operate hidden surfaces of objects e.g., removal of it.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO 7	PSO 1	2.1	2.1.2	Level 2 Underst and	CO 1	Understand the objectives, functions and evolution of Operating system.
PO 2	PSO 1	2.1 2.2	2.1.2 2.2.4	Level 4 Analyze	CO 2	Analyze the concept of process management and evaluate performance of process scheduling algorithms
PO 2	PSO 1	2.6	2.6.3 2.6.4	Level 3 Apply	CO 3	Understand and apply the concepts of synchronization and deadlocks.
PO 2	PSO 1	2.6	2.6.2	Level 4 Analyze	CO 4	Evaluate performance of memory management.
PO 2	PSO 1	2.7	2.7.2	Level 2 Underst and	CO 5	Understand the concepts of file management.
PO 1	PSO 1	1.7	1.7.1	Level 3 Apply	CO 6	Apply concepts of I/O management and analyze techniques of disk scheduling

Course Objectives

Sr. No.	Description
1	To understand the objective, structure and evolution of operating system
2	To analyze and evaluate the process of scheduling algorithm
3	To understand and apply the concept of synchronization and deadlock.
4	To evaluate the performance of memory management.
5	To understand the concept of file management.
6	To apply the concepts of I/O management and analyze techniques of disk scheduling.

Course Outcomes

PO	PS O	Competency	PI	Bloom's Level	CO	Description
PO2 PO4	1	2.8 4.6	2.8.2 4.6.1	4-Analyze	CO 1	Analyze the complexities of various problems in different domains.
PO2 PO1	1	2.5 1.7	2.5.2 1.7.1	2- Understand 3-Apply 4-Analyze	CO 2	Describe, apply and analyze the running time of the basic algorithms for those classic problems in various domains using divide and conquer strategy.
PO2 PO1	1	2.5 1.7	2.5.2 1.7.1	2- Understand, 3-Apply 4-Analyze	CO 3	Define and apply the efficient algorithms for the effective problem solving with the help of different strategies like greedy method.
PO1	1	1.7	1.7.1	3-Apply	CO 4	Apply dynamic programming strategy to solve different problems effectively.
PO2 PO1	1	2.5 1.7	2.5.3 1.7.1	2- Understand, 3-Apply	CO 5	Recognize and apply backtracking, branch and bound and string-matching techniques to deal with some hard problems.
PO4	1	4.6	4.6.1 4.6.2	4-Analyze	CO 6	Illustrate to prove that a certain problem is NP-Complete.

Course Objectives

Sr. No.	Description
1	To analyze the complexities of various problems in different domains.
2	To Describe, apply and analyze the running time of the basic algorithms for those classic problems in various domains using divide and conquer strategy.
3	To Define and apply the efficient algorithms for the effective problem solving with the help of different strategies like greedy method.
4	To apply dynamic programming strategy to solve different problems effectively.
5	To Recognize and apply backtracking, branch and bound and string-matching techniques to deal with some hard problems.
6	To illustrate to prove that a certain problem is NP-Complete.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1 PO2		1.3, 2.2	1.3.1 2.2.3 2.2.4	2 Understand 3 Apply 4 Analyze	CO-1	Apply the knowledge of line, circle drawing algorithms to implement it and analyze the difference in techniques.
PO1 PO2 PO4 PO5		1.3, 2.2, 4.2, 5.2	1.3.1 2.2.4 4.2.1 5.2.1	3, 4, 6 Create	CO-2	Apply the basic knowledge to draw 2D objects. Select and apply appropriate techniques to fill polygon, analyze results. Design a system which apply various transformation on 2D.
PO2 PO4 PO5		2.2, 4.2, 5.2	2.2.4 4.2.1 5.2.1	2, 3, 4	CO-3	Identify technique or algorithms, to generate curve of various types. Analyze these algorithms result. Apply appropriate technique to design fractal.
PO5	PSO1	5.2	5.2.1	3	CO-4	Select and apply techniques to project 3D on 2D plane.
PO1 PO6		1.3, 6.1	1.3.1 6.1.1	2, 3	CO-5	Understand basics of OpenGL, apply the knowledge to draw different shapes and characters.
PO4, PO5, PO6, PO7, PO8, PO9, PO10, PO11, PO12	PSO2	4.2, 5.2, 6.1, 7.2, 8.2, 9.1, 10.1, 10.3, 11.3, 12.1	4.2.1, 5.2.1, 6.1.1, 7.2.1, 8.2.1, 9.1.1, 10.1.3, 10.3.1, 11.3.1, 12.1.2	3, 5, 6	CO-6	Design a system or miniproject in a team, where students will work effectively as a member & leader which will use concepts of Computer Graphics to achieve common goal.

Course Objectives

Sr. No.	Description
1	To equip students with the fundamental knowledge, To emphasize on implementation aspect of Computer Graphics Algorithms.
2	To understand different transformation such as translation, scaling, rotation, clipping on 2D objects.
3	To use basic algorithms studied to draw curves and fractals.
4	To modify different transformation algorithms of 2D for 3D.
5	To understand basics of OpenGL in Computer Graphics.
6	To design or create a system using concepts of Computer Graphics (miniproject).

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO2	PSO 1	2.6	2.6.2	6-Create	CO1	Assemble personal computer
PO3	PSO 1	3.8	3.8.2	6-Create	CO2	Design Full adder, Ripple carry adder, Carry look-ahead adder
PO3	PSO 1	3.8	3.8.2	3-Apply	CO3	Design the basic building blocks of a computer: arithmetic-logic unit, registers, central processing unit, and memory.
PO2	PSO 1	2.1	2.5.2	6-Create	CO4	Implement various algorithms like Booth's algorithm for arithmetic operations
PO3	PSO 1	3.6	3.6.1	1-Remember	CO5	Describe various I/O buses with merits and demerits.
PO3	PSO 1	3.6	3.6.3	3-Apply	CO6	Illustrate study of multi-core Processors

Course Objectives

Sr. No.	Description
1	To study structure and working of computer
2	To understand the concept of addition and subtraction using Full adder, Ripple carry adder, Carry look-ahead adder
3	To design memory subsystem including cache memory
4	To implement the operation of the arithmetic unit including the algorithms & implementation of fixed-point and floating-point addition, subtraction, multiplication & division.
5	To study the different ways of communicating with I/O devices and standard I/O interfaces. To have through understanding of various computer buses
6	To study the different types of processors

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO 1	PSO 1	1.7	1.7.1	Level 2 Understand	CO 1	Explain basic operating system commands.
PO 2	PSO 1	2.7	2.7.1	Level 2 Understand	CO 2	Explain various system calls.
PO 3	PSO 1	3.6	3.6.1	Level 3 Apply	CO 3	Solve shell scripts and commands using kernel API.
PO 3	PSO 1	3.8	3.8.2	Level 3 Apply	CO 4	Illustrate different process scheduling algorithms.
PO 2	PSO 1	2.5	2.5.2	Level 4 Analyze	CO 5	Analyze different memory management algorithms.
PO 1	PSO 2	5.5	5.5.1	Level 5 Evaluate	CO 6	Determine process management techniques and deadlock handling using simulator.

Course Objectives

Sr. No.	Description
1	To explain basic operating system commands.
2	To explain various system calls.
3	To solve shell scripts and commands using kernel API.
4	To Illustrate different process scheduling algorithms.
5	To analyze different memory management algorithms.
6	To determine process management techniques and deadlock handling using simulator.

Course Outcomes

PO	PSO	Competency Level	PI	Bloom's Level	CO	Description
PO2	PSO1	2.1	2.5.2	Level 2 Understand	CO1	Developed the understanding of basic concepts in python and Perl
PO3	PSO1 PSO2	3.6	3.6.1	Level 3 Analyze	CO2	Implementation of contents of files, directories and text processing with python
PO4	PSO2	4.5	4.5.1	Level 6 Create	CO3	To develop program for data structure using built in functions in python.
PO5	PSO1	5.4	5.4.2	Level 3 Apply	CO4	To operate on Django web framework for developing python-based web application
PO3	PSO1	3.6	3.6.2	Level 3 Analyze	CO2	To understand file handling and database handling using Perl.
PO5	PSO2	5.4	5.4.2	Level 6 Create	CO6	To develop basics of two-way communication between client and server using python and Perl

Course Objectives

Sr. No.	Description
1	To understand the basic concepts in python and Perl
2	To implement the contents of files, directories and text processing with python
3	To develop and understand the DS using different functions of Python
4	To operate the Django framework for web-based applications
5	To handle files available in python and Perl also understand the dB connectivity of python and Perl.
6	To understand the coding of client server on python and Perl

Semester-V

Subject-Microprocessor

Subject Code- CSC501

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1	PSO 1	1.3	1.3.1	3-Apply	CO -1	Apply basic engineering fundamentals to describe the architecture of 8086 processor.
PO2	PSO 1	2.4	2.4.1 2.4.2	3-Apply 4-Analyze	CO -2	Apply the instructions of 8086 to implement the assembly language program. analyze and interpret the result of ALP using integrated tool.
PO1 PO3	PSO 2	1.3 3.4	1.3.1 3.4.2	3-Apply	CO -3	Apply engineering fundamentals to describe DOS and BIOS interrupts. Apply knowledge to implement DOS and BIOS interrupt and to integrate modules with 8259 IC chip
PO3	PSO 2	3.4	3.4.1	3-Apply	CO -4	Able to refine architecture design into detailed design using processor, memory chip or different peripheral ICs within existing constraints
PO3	PSO 1	3.1	3.1.5	3-Apply	CO -5	Explore and synthesize 80386 system requirements from larger social and professional concerns.
PO3	PSO 1	3.3	3.3.5	3-Apply	CO -6	Able to perform systematic evaluation of degree of microprocessor from 8086 to Pentium to which several design concepts meet the criteria

Course Objectives

Sr. No.	Description
1	To apply basic engineering fundamentals for describing the architecture of 8086 processor
2	To apply the instruction of 8086 and analyze the result of ALP using integrated tool
3	To apply engineering fundamentals and knowledge to describe and implement DOS and BIOS interrupt
4	To refine the architecture design into detailed design using processor, memory chip or different peripheral ICs
5	To explore and synthesize 80386 system requirements
6	To able to perform systematic evaluation of degree of microprocessor from 8086 to Pentium

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO2	PSO 1	2.6	2.6.3	4- Analyze 2- Understand	CO 1	Identify and analyze the roles and responsibilities of different types of users and investigate the different architecture to find appropriate solution.
PO4	PSO 1	4.5	4.5.1	6- Create 2- Understand	CO 2	Understand and Design data modeling using ER and Extended ER features to meet the specified needs.
PO3	PSO 1	3.6	3.6.2	3- Apply 6- Create	CO 3	Investigate and apply different relational algebra operators to find appropriate solution leading to valid conclusion.
PO5	PSO 1	5.4	5.4.2	6- Create	CO 4	Investigate and formulate SQL queries to find appropriate solution to complex problems.
PO4	PSO 1	4.6	4.6.4	4- Analyze 3- Apply	CO 5	Analyze and apply different normalization techniques to process and meet the specified needs with appropriate solution
PO5	PSO 1	5.5	5.5.1	2- Understand	CO 6	Identify the strength and limitation of tools for concept of transaction, concurrency and recovery.

Course Objectives

Sr. No.	Description
1	To understand the role of database management system in an organization.
2	To design data modeling using the entity-relationship and developing database designs.
3	To understand the relational algebra operators.
4	To understand the use of Structured Query Language (SQL) and learn SQL syntax.
5	To understand the normalization techniques to normalize the database.
6	To understand the needs of database processing and learn techniques for controlling the consequences of concurrent data access.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO 1 PO 2		1.3 2.2	1.3.1 2.2.4	2 Understan d 3 Apply 4 Analyze	CO -1	Apply the knowledge of fundamentals of data communication to identify the differences between ISO - OSI model, TCP/IP model and connection oriented and connectionless services.
PO 1 PO 2		1.4 2.2, 2.4	1.4.1 2.2.2 2.4.3	2 3 4	CO -2	Apply the knowledge of data communication fundamentals to identify & analyze different types of media i.e. guided, unguided used at physical layer.
PO 2 PO 3	PSO 1	2.2, 2.4 3.2	2.2.4 2.4.3 3.2.2	2 3 4	CO -3	Apply the knowledge of different protocols used at data link layer to investigate appropriate protocol for system. Identify and analyze the differences in protocols.
PO 2 PO 5 PO 6		2.3 5.2 6.2	2.3.1 5.2.1 6.2.1	2 3 4	CO -4	Select and apply appropriate concepts of subnetting / super netting of IP addressing. Analyze various routing algorithms and protocols at network layer. Realize the impact of protocol on system.
PO 2 PO 3		2.3 3.2, 3.3	2.3.1 3.2.2 3.3.1	2 3 4	CO -5	Classify and compare transport layer protocols. Relate connection management with real time communication. Investigate congestion and apply appropriate congestion control algorithm.
PO 2 PO 6		2.1, 2.2 6.1	2.1.2 2.2.2 6.1.1	3 4	CO -6	Identify the protocols used at application layer. Analyze the protocols in terms of organization need, its impact.

Course Objectives

Sr. No.	Description
1	To explain and introduce concepts and fundamentals of data communication and computer networks.
2	To interrelate the inter-working of various layers of OSI. To distinguish between different media used for communication.
3	To discuss the issues and challenges of protocols design while delivering packet in network.
4	To study different protocols used for packet delivery in network layer. To assess the strengths and weaknesses of various routing algorithms.
5	To understand how process to process communication occurs i.e., transport layer and protocols used in this layer.
6	To understand various application layer protocols.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO 1		1.3	1.3.1	Level 4 Analyze	CO 1	Identify the central concepts in theory of computation and analyze differentiate between deterministic and nondeterministic automata, apply formulate knowledge to obtain equivalence of NFA and DFA.
PO 2		2.4	2.4.1	Level 4 Analyze	CO 2	Investigate the equivalence of languages described by finite automata and regular expressions.
PO 5		5.1	5.1.2	Level 6 Create	CO 3	Create and apply regular, context free grammars while recognizing the strings and tokens.
PO 2		2.4	2.4.2	Level 6 Create	CO 4	Design pushdown automata model to recognize the language.
PO 2		2.4	2.4.2	Level 6 Create	CO 5	Develop an understanding of computation through Turing Machine
PO 1		1.3	1.3.1	Level 2 understand	CO 6	Acquire fundamental understanding of decidability and undecidability and apply the knowledge to solve computer engineering problem.

Course Objectives

Sr. No.	Description
1	To recognize concepts in theory of computation and differentiate between deterministic and nondeterministic automata
2	To build concepts of theoretical design of deterministic and non-deterministic finite automata.
3	To acquire conceptual understanding of fundamentals of grammars and languages
4	To express the concept of theoretical design of push down automata to recognize the language
5	To develop understanding of different types of Turing machines and applications
6	To discuss the concept of Undecidability.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO 1	PSO 1	1.6	1.6.1	2-Understand 3-Apply	CO-1	Understand basics of multimedia and multimedia system architecture and apply the knowledge in engineering profession
PO 7	PSO 1	7.3	7.3.2	2-Understand	CO-2	Understand the impact of multimedia components on society and environment for sustainable development
PO 5	PSO 1	5.5	5.5.2	2-Understand	CO-3	Understand file formats for different multimedia components
PO 2	PSO 2	2.1 2.8	2.5.2 2.8.1	2-Understand 3-Apply 4-Analyze 6-Create	CO-4	Identify, formulate and analyse different compression techniques and apply them solve complex computer engineering problems
PO 1	PSO 1	1.7	1.7.1	3-Apply	CO-5	Apply the knowledge of multimedia communication techniques to improve the quality of service
PO 2	PSO 2	2.1 2.8	2.5.2 2.8.1	2-Understand 3-Apply 4-Analyze 6-Create	CO-6	Identify, formulate and analyse different security techniques and apply these techniques of information security in multimedia environments

Course Objectives

Sr. No.	Description
1	To understand the basics of multimedia and multimedia architecture
2	To provide the knowledge of different components of multimedia
3	To understand different file formats for different components
4	To identify and analyze compression techniques and apply them
5	To provide the knowledge of multimedia communication techniques to improve the quality of service
6	To study different security techniques and apply these techniques of information security in multimedia environments

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO 1	PSO 1	1.7	1.7.1	3-Apply	CO-1	Explain basic engineering fundamentals to describe the architecture of 8086 processor.
PO 3 PO 5	PSO 2	3.8 5.4	3.8.2 5.4.1 5.4.2	3-Apply 4-Analyze	CO-2	Explain the instructions of 8086 to implement the assembly language program. Identify and interpret the result of ALP using integrated tool.
PO 1 PO 3	PSO 2	1.3 3.4	1.3.1 3.4.2	3-Apply	CO-3	Apply engineering fundamentals to describe DOS and BIOS interrupts. Apply knowledge to implement DOS and BIOS interrupt and to integrate modules with 8259 IC chip
PO 3	PSO 2	3.6	3.6.2	6-Create	CO-4	Design 8086 based system using Memory and peripheral chip.
PO 2	PSO 1	2.5	2.5.2	5-Evaluate	CO-5	Appraise the architecture of 80386 DX processor.
PO 4	PSO 1	4.6	4.6.1	5-Evaluate	CO-6	Determine the degree of microprocessor from 8086 to Pentium to which several design concepts meet the criteria.

Course Objectives

Sr. No.	Description
1	To explain basic engineering fundamentals to describe the architecture of 8086 processor.
2	To explain the instructions of 8086 to implement the assembly language program. Identify and interpret the result of ALP using integrated tool.
3	To understand the concepts of interrupts and determine the services of interrupts by 8086.
4	To design 8086 based system using Memory and peripheral chip.
5	To appraise the architecture of 80386 DX processor.
6	To determine the degree of microprocessor from 8086 to Pentium to which several design concepts meet the criteria.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO 1 PO 2		1.3, 2.4	1.3.1 2.4.2	2 Understand 3 Apply 4 Analyze 6 Create	CO-1	Apply the knowledge to design a network and configure it for IP addressing, subnetting. Analyze its results.
PO 1 PO 2		1.3, 2.2	1.3.1 2.2.2	2 3	CO-2	Identify different network commands in Linux. Apply it to find solution for different network problems.
PO 1	PSO 1	1.3, 1.4	1.3.1 1.4.1	3	CO-3	Apply knowledge to understand the operation of TCP/IP layers using Wireshark.
PO 5		5.2, 5.3	5.2.1 5.3.1	3 4	CO-4	Select and apply different error detection and correction, flow control, congestion control algorithm. Analyze the results and derive conclusion.
PO 1 PO 2	PSO 2	1.3, 2.4	1.3.1 2.4.2	3 4 6	CO-5	Apply the knowledge to design network system using TCP, UDP. Analyze the difference in working.
PO 1 PO 2		1.3, 2.4	1.3.1 2.4.2	3 4	CO-6	Apply appropriate technique for routing in different network system and analyze the results.

Course Objectives

Sr. No.	Description
1	To apply the knowledge to design a network and configure it for IP addressing, subnetting. Analyze its results.
2	To identify different network commands in Linux. Apply it to find solution for different network problems.
3	To apply knowledge to understand the operation of TCP/IP layers using Wireshark.
4	To select and apply different error detection and correction, flow control, congestion control algorithm. Analyze the results and derive conclusion.
5	To apply the knowledge to design network system using TCP, UDP. Analyze the difference in working.
6	To apply appropriate technique for routing in different network system and analyze the results.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO 3	PSO 1	3.5	3.5.1	4-Analyze	CO 1	Identify and investigate the Real life problem to find appropriate solution and design and draw ER and EER diagram with software tool
PO 4	PSO 2	4.6	4.6.3	6-Create	CO 2	Design, Create and update database and tables with different DDL and DML statements
P05	PSO 2	5.6	5.6.1	3-Apply	CO 3	Apply appropriate integrity constraints and provide security to data.
P04	PSO 2	4.4	4.4.2	4-Analyze	CO 4	Investigate and formulate SQL queries to find appropriate solution to complex problems.
P04	PSO 1	4.5	4.5.1	4-Analyze 3-Apply	CO 5	Identify and apply triggers and procedures for specific module to meet the specified needs with appropriate solution to safety standards and societal consideration.
P05	PSO 2	5.6	5.6.2	6-Create	CO 6	Design a software system effectively as a member and leader in a team for a common goal of database processing and controlling consequences of concurrent data access

Course Objectives

Sr. No.	Description
1	To develop entity relationship data model and its mapping to relational model
2	To learn relational algebra and Formulate SQL queries
3	To learn integrity Constraints
4	To apply normalization techniques to normalize the database
5	To understand concept of transaction, concurrency control and recovery techniques
6	To design a software Database.

Course Outcome

PO	PS O	Competency	PI	Bloom's Level	CO	Description
PO 1		1.1	1.1.2	3. Apply	CO 1	Use the concept of web technology for solving the problem of web application.
PO 4		4.5	4.5.1	6. CREATE	CO 2	Design & develop static web pages using HTML5 and CSS3
PO 4		4.5	4.5.1	3,6, Apply, Create	CO 3	Apply the concept of client-side validation and design dynamic web pages using JavaScript and JQuery.
PO 5		5.4	5.4.2	6.CREAT E	CO 4	create Interactive web pages using PHP, AJAX with database connectivity using MySQL to solve the problem of web application
PO 4		4.5	4.5.1	3,6, Apply, Create	CO 5	Apply the concept of XML, DTD & XSL and design dynamic web pages using XML and XSLT
PO 3		3.6	3.6.2	6. CREATE	CO 6	Create web application using appropriate web technologies and web development framework suited to meet user requirement

Course Objective

Sr. No.	Description
1	To use the concept of web technology for solving the problem of web application.
2	To design & develop static web pages using HTML5 and CSS3
3	To Apply the concept of client-side validation and design dynamic web pages using JavaScript and jQuery.
4	To create Interactive web pages using PHP, AJAX with database connectivity using MySQL to solve the problem of web application
5	To apply the concept of XML, DTD & XSL and design dynamic web pages using XML and XSLT
6	To create web application using appropriate web technologies and web development framework suited to meet user requirement

Course Outcome

PO	PSO	Competency	PI	Bloom's Level	CO	Description
3		3.5	3.5.1 & 3.5.2	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.

Semester-VI

Subject-Software Engineering

Subject Code- CSC601

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO 1	PSO 1	1.7	1.7.1	2-Understand 3-Demonstrate	CO -1	Understand and demonstrate basic knowledge in software engineering
PO 2	PSO 1	2.5 3.5	2.5.1 3.5.2	2-Understand 4-Analyze	CO -2	Identify requirements, analyze and prepare models
PO 4	PSO 2	4.4 4.5	4.4.4 4.5.1	3-Apply 6-Create	CO -3	Plan, schedule and track the progress of the projects
PO 3	PSO 2	3.8	3.8.1	3-Apply 6-Create	CO -4	Design and develop the software projects
PO 5	PSO 1	5.5 5.6	5.5.2 5.6.1 5.6.2	2-Understand	CO -5	Identify risks, manage the change to assure quality in software projects
PO 5	PSO 2	5.4 5.5	5.4.2 5.5.1	5-Evaluate	CO -6	Apply testing principles on software project and understand the maintenance concepts

Course Objectives

Sr. No.	Description
1	To give the knowledge of software engineering discipline
2	To apply analysis, design and testing principles to software project development
3	To demonstrate and evaluate real time projects with respect to software engineering principles
4	To identify requirements and apply process model to selected case study
5	To analyze and design models for the selected case study using UML modeling
6	To use various software engineering tools

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO 2		2.2	2.2.2	2 Understand 4 Analyze	CO -1	Identify and analyze the relevance of different system programs.
PO 1 PO 2	PSO 1	1.4, 2.3	1.4.1 2.3.1	2, 3 Apply	CO -2	Describe the various data structures and demonstrate its use in passes of assembler design.
PO 2		2.2, 2.3	2.2.2 2.3.1	2	CO -3	Identify the need for different features and designing of macros.
PO 2		2.2	2.2.2 2.2.4	2, 4	CO -4	Distinguish different loaders and linkers and discuss their contribution in developing efficient user applications.
PO 1 PO 2 PO 4	PSO 2	1.3, 2.2, 2.3, 4.2	1.3.1 2.2.2 2.3.2 4.2.1	2, 3, 6 Create	CO -5	Identify and discuss phases of compiler. Construct and demonstrate use of different parsers for given context free grammars.
PO 2 PO 6		2.2, 2.3, 6.1	2.2.2 2.3.1 6.1.1	2, 5 Evaluate	CO -6	Identify and justify the need synthesis phase to produce object code optimized in terms of high execution speed and less memory usage.

Course Objectives

Sr. No.	Description
1	To identify and analyze the relevance of different system programs.
2	To describe the various data structures and demonstrate its use in passes of assembler design.
3	To identify the need for different features and designing of macros.
4	To distinguish different loaders and linkers and discuss their contribution in developing efficient user applications.
5	To identify and discuss phases of compiler.
6	To Identify and justify the need synthesis phase to produce object code optimized in terms of high execution speed and less memory usage.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1		1.7	1.7.1	Level 4 Analyze	CO 1	Understand data warehouse with dimensional modelling and analyze different OLAP operations.
PO1		1.7	1.7.1	Level 2 understand	CO 2	Understand data mining principles and use data preprocessing and data exploration.
PO2		2.5	2.5.2	Level 4 Analyze	CO 3	Classify and evaluate appropriate data mining algorithm
PO4		4.6	4.6.1	Level 4 Analyze	CO 4	Compare and evaluate different data mining techniques like classification, prediction, clustering.
PO5		5.4	5.4.1	Level 3 Apply	CO 5	Identify and apply associate rule mining technique for real time applications.
PO4		4.6	4.6.1	Level 3 Apply	CO 6	Understand and apply the concept of web mining

Course Objectives

Sr. No.	Description
1	To identify the scope and essentiality of Data ware house
2	To understand the ETL process and data warehouse with dimensional modelling and apply OLAP operations.
3	To understand and analyze techniques of data mining for data exploration and preprocessing
4	To identify the scope of task in Data Mining such as Classification, Prediction etc.,
5	To analyze the different methods of association rules and patterns
6	To understand the spatial and web data mining.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO 1		1.1	1.1.1	3	CO1	Apply the knowledge of modular arithmetic and number theory to solve problems related to security.
PO 2		2.6	2.6.4	4	CO2	Compare and contrast different encryption and decryption methods to select best methods
PO 2		2.8	2.8.2	4	CO3	Analyze the performance of different message digest algorithm and interpret the integrity of messages by varying the size of messages.
PO 2		2.6	2.6.4	4	CO4	Compare and contrast alternative methods of digital signature to select best methods
PO 2		2.8	2.8.4	4	CO5	Analyze and interpret the performance of firewalls and security protocols like SSL, IPsec using contemporary tools.
PO 1		1..4	1.4.1	3	CO6	Apply the concepts of system security to solve problems related to security.

Course Objectives

Sr. No.	Description
1	To introduce classical encryption techniques and concepts of modular arithmetic and number theory.
2	To create secure a message over insecure channel by various means
3	To explore the working principles and utilities of various cryptographic algorithms including secret key cryptography, hashes and message digests, and public key algorithms
4	To explore the design issues and working principles of various authentication protocols, PKI standards and various secure communication standards including Kerberos, IPsec, and SSL/TLS & email.
5	To develop the ability to use existing cryptographic utilities to build programs for secure communication.
6	To understand various protocols for network security to protect against the threats in the networks

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1	PSO1	1.4	1.4.1	3-Apply	CO 1	Apply theory and principles of computer science and engineering to identify the applications and steps in developing ML application.
PO2	PSO1	1.3	1.3.1	3-Apply	CO 2	Apply engineering fundamentals to define Neural Network and to identify various NN architecture
PO3	PSO1	2.2	2.2.4	3-Apply	CO 3	Compare and contrast alternative solution to select best methods
PO4	PSO1	1.1	1.1.1	3-Apply	CO 4	Apply the knowledge of discrete structures, Linear Algebra, Statistics, Numerical technique to solve problem
PO5	PSO1	1.1	1.1.2	3-Apply	CO 5	Apply the concepts of probability, Statistics for solving Machine Learning problems
PO6	PSO1	1.1	1.1.1	3-Apply	CO 6	Apply the knowledge of discrete structures, Linear Algebra, Statistics, Numerical technique to solve problem

Course Objectives

Sr. No.	Description
1	To apply theory and principles of computer science and engineering for identifying the applications and steps in ML application development
2	To apply engineering fundamentals to define neural network and identify NN architecture
3	To compare and contrast alternative solution to select best methods
4	To apply the knowledge of discrete structures, Linear Algebra, Statistics, Numerical technique for problem solving
5	To apply the concepts of probability, Statistics for solving Machine Learning problems
6	To apply the knowledge of discrete structure, Linear algebra, Statistics, Numerical technique for problem solving

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO2	PSO 1	2.7	2.7.2	4-Analyze	CO 1	Identify traditional and agile process Models.
PO3	PSO 2	3.7	3.7.1	6-Create	CO 2	Develop Software Requirement Specification (SRS) document and Data Flow Diagram (DFD).
PO4	PSO 1	4.6	4.6.1	3-Apply	CO 3	Calculate tracking and scheduling of the project.
PO3	PSO 1	3.6	3.6.1 3.6.3	2-Underst and	CO 4	Explain and classify the design of Software Project using basic Principles and concepts.
PO4 PO5	PSO 2	4.5 5.6	4.5.1 5.6.1	3-Apply 6-Create	CO 5	Prepare Risk Mitigation plan and Construct Version Control.
PO5	PSO 1	5.4	5.4.2	5-Evaluate	CO 6	Test the Software by using various Testing Approaches.

Course Objectives

Sr. No.	Description
1	To identify and study traditional and agile process Models.
2	To develop Software Requirement Specification (SRS) document and Data Flow Diagram (DFD).
3	To Calculate project estimation techniques and Show tracking and scheduling of the project.
4	To explain and classify the design of Software Project using Principles and concepts.
5	To prepare Risk Mitigation plan and Construct Version Control.
6	To test the Software by using various Testing Approaches.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO 2	PSO 1	2.2	2.2.2	2 Understand 3 Apply	CO -1	Generate machine code by using various databases generated in pass one of two pass assembler.
PO 1 PO 2	PSO 1	1.4, 2.3	1.4.1 2.3.1	6 Create	CO -2	Construct different databases of single pass macro processor.
PO 2		2.2, 2.3	2.2.2 2.3.1	2	CO -3	Identify and validate different tokens for given high level language code.
PO 2	PSO 2	2.2	2.2.4	6	CO -4	Parse the given input string by constructing Top down /Bottom-up parser.
PO 1 PO 2 PO 4		1.3, 2.3, 4.2	1.3.1 2.3.2 4.2.1	3	CO -5	Implement synthesis phase of compiler with code optimization techniques.
PO 2 PO 6		2.2, 2.3, 6.1	2.2.2 2.3.1 6.1.1	2, 5 Evaluate	CO -6	Explore various tools like LEX and YACC.

Course Objectives

Sr. No.	Description
1	To understand the need for modular design, the need for well-defined data structures and their storage management.
2	To construct different databases of single pass macro processor, assembler.
3	To identify and validate different tokens for given high level language code.
4	To parse the given input string by constructing Top down /Bottom-up parser.
5	To implement synthesis phase of compiler with code optimization techniques.
6	To explore various tools like LEX and YACC.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1		1.7	1.7.1	Level 6 Create	CO 1	Design data warehouse and perform various OLAP operations
PO1		1.7	1.7.1	Level 4 Analyze	CO 2	Implement classification mining algorithms.
PO2		2.5	2.5.2	Level 4 Analyze	CO 3	Classify and evaluate appropriate data mining algorithm
PO4		4.6	4.6.1	Level 4 Analyze	CO 4	Demonstrate prediction and Implement clustering algorithms on a given set of data sample using data mining tools
PO5		5.4	5.4.1	Level 3 Apply	CO 5	Implement Association Rule Mining algorithm
PO4		4.6	4.6.1	Level 3 Apply	CO 6	Implement spatial and web mining algorithms

Course Objectives

Sr. No.	Description
1	To identify the scope and essentiality of Data ware house
2	To perform various OLAP operations.
3	To understand and analyze techniques of data mining for data exploration and preprocessing
4	To identify the scope of task in Data Mining such as Classification, Prediction etc
5	To analyze the different methods of association rules and patterns
6	To understand the spatial and web data mining.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO 1		1.1	1.1.1	3	CO1	Apply the knowledge of symmetric cryptography to implement simple cipher to solve security related problems.
PO 3		3.8	3.8.2	3	CO2	Implement public key algorithms like RSA & EL Gamal
PO 2		2.8	2.8.2	4	CO3	Analyze & interpret the results of hashing algorithms.
PO 4		4.6	4.6.1	3	CO4	Use appropriate reconnaissance tools to gather information about network& other tools for analyzing packets in network.
PO 2		2.8	2.8.2	4	CO5	Analyze & interpret the results of firewall and intrusion detection system
PO 2		2.1	2.1.2	3	CO6	Identify various attacks like buffer overflow & web application attacks to solve problems of security.

Course Objectives

Sr. No.	Description
1	To apply the knowledge of symmetric cryptography to implement simple cipher to solve security related problems.
2	To implement public key algorithms like RSA & EL Gamal
3	To analyze & interpret the results of hashing algorithms.
4	To use appropriate reconnaissance tools to gather information about network& other tools for analyzing packets in network.
5	To Analyze & interpret the results of firewall and intrusion detection system
6	To Identify various attacks like buffer overflow & web application attacks to solve problems of security.

Course Outcomes

PO	PS O	Competency	PI	Bloom's Level	CO	Description
PO2 PO3		2.1,3.5	2.1.2,3.5.1	3	CO 1	Define problem statement with objective & scope & identify methodologies/algorithms to solve problem
PO3		3.8	3.8.3	4	CO 2	Verify & validate results, functionalities & design of project
PO7		7.3	7.3.1,7.3.2	3	CO 3	Identify impact of engineering products & understand relationship between the technical, socio-economics & environmental dimensions of sustainability's.
PO9 PO1 1		9.4,11.6	9.4.2,11.6. 2	3	CO 4	Use project management tools to schedule an engineering project, so it is completed on time & on budget & implement norms of practice.
PO1 0		10.4, 10.6	10.4.2, 10.6.2	3.4	CO 5	Produce clear, well structured & well supported written engineering document & use variety of media effectively to convey a message in a document or presentation
PO9		9.5	9.5.1	6	CO 6	Demonstrate effective communication, problem-solving, conflict resolution & leadership skill

Course Objectives

Sr. No.	Course Objectives
1	To define problem statement with objective, scope & identify methodologies/algorithms to solve problem
2	To Verify & validate results.
3	To identify impact of engineering products & understand relationship between the technical, socio-economics & environmental dimensions of sustainability's.
4	To use project management tools to schedule an engineering project, so it is completed on time & on budget & implement norms of practice.
5	To produce clear, well structured & well supported written engineering document & use variety of media effectively to convey a message in a document or presentation.
6	To demonstrate effective communication, problem-solving, conflict resolution & leadership skill.

Semester-VII

Subject-DSIP

Subject Code- CSC701

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1		1.2	1.2.1	3-Apply, 4-Analyze	CO1	Classify and analyze discrete time signals and systems
PO2		2.1	2.5.3	3-Apply	CO2	Use DFT properties for the computation of DFT
PO2		2.8	2.8.1	3-Apply	CO3	Solve Fast Fourier Transform of signals
PO1		1.2	1.2.1	2-Understand	CO4	Discuss the fundamental concepts of digital image.
PO3		3.6	3.6.1	3-Apply	CO5	Use the enhancement techniques to explore alternative methods in Spatial domain.
PO2		2.6	2.6.5	4-Analyze	CO6	Differentiate between the advantages and disadvantages of different edge detection techniques

Course Objectives

Sr. No.	Description
1	To understand the fundamental concepts of digital signal processing and Image processing.
2	To Compute DFT for 1-D and 2-D signals.
3	To Calculate FFT for 1-D signal
4	To explain the fundamental concepts of Digital image.
5	To apply enhancement techniques for digital Image Processing
6	To apply digital image processing techniques for edge detection.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO 2 PO 6		2.3, 6.2	2.3.1 6.2.1	2 Understand 4 Analyze	CO-1	Identify fundamentals or basic concepts and principles in mobile communication & computing. Analyze the techniques available and understand its impact.
PO 1 PO 2 PO 6	PSO1	1.4, 2.2, 6.2	1.4.1 2.2.2 6.2.1	2, 3 Apply 4, 5 Evaluate	CO-2	Realize all generation of mobile computing i.e., GSM, GPRS, UMTS, UTRAN. Apply the knowledge to analyze its performance, its impact on society, environment for sustainable development.
PO 1 PO 3 PO 5		1.4, 3.3, 5.2	1.4.1 3.3.1 5.2.1	3, 4	CO-3	Apply appropriate techniques for communication or routing in mobile computing. Analyze it to realize fundamentals or different concepts related to it. Investigate problems in communication, discuss its solutions.
PO 2	PSO1	2.2, 2.3, 2.4	2.2.2 2.3.1 2.4.3	2, 4	CO-4	Identify the difference between WLAN, HIPERLAN1, HIPERLAN2 (802.11a, 802.11b etc.). Analyze it in terms of protocols, bandwidth used etc.
PO 4 PO 5 PO 6	PSO2	4.1, 5.2, 6.1	4.1.1 5.2.1 6.1.1	3, 4	CO-5	Realize the impact of mobility on communication. Select and apply appropriate techniques for mobility management.
PO 1 PO 3		1.4, 3.2, 3.3	1.4.1 3.2.1 3.3.1	3	CO-6	Apply the knowledge to understand Long Term Evolution (LTE) architecture, its interfaces, different types.

Course Objectives

Sr. No.	Description
1	To define the basic concepts and principles in mobile computing.
2	To explain major techniques involved, and networks & systems issues for the design and implementation of mobile computing systems and applications i.e. GSM, GPRS.
3	To describe or explore both theoretical and practical issues of network layer, transport layer of mobile computing.
4	To distinguish between different protocols used in mobile computing and applications based on it.
5	To study main aspect of mobile computing i.e., mobility in detail.
6	To determine or provide an opportunity for students to understand the key components and technologies involved and to gain hands-on experiences in building mobile applications.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO2	PSO 1	2.1	2.5.2	2-Understand	CO 1	Identify the various characteristics of Artificial Intelligence and Soft Computing techniques.
PO4	PSO 1	4.5	4.5.1	3-Apply 2-Understand	CO 2	Identify and apply an appropriate problem-solving method for an agent to find a sequence of actions to reach the goal state.
PO3	PSO 1	3.6	3.6.2	4-Analyze	CO 3	Analyze the strength and weakness of AI approaches to knowledge representation, reasoning and planning.
PO5	PSO 1	5.4	5.4.1	6-Create 2-Understand	CO 4	Identify the applications which can use fuzzy logic. Design fuzzy controller system
PO5	PSO 1	5.4	5.4.2	6-Create	CO 5	Design supervised and unsupervised ANN for real world applications.
PO5	PSO 1	5.5	5.5.1	6-Create 3-Apply	CO 6	Apply Hybrid approach for expert system design.

Course Objectives

Sr. No.	Description
1	To conceptualize the basic ideas and techniques of AI and SC.
2	To distinguish various search techniques and to make student understand knowledge representation and planning.
3	To provide the mathematical background for carrying out the optimization. Familiarizing genetic algorithm for seeking global optimum in self-learning situation.
4	To introduce the ideas of fuzzy sets, fuzzy logic and use of heuristics based on human experience.
5	To become familiar with basics of Neural Networks that can learn from available examples and generalize to form appropriate rules for inference systems.
6	To familiarize with Hybrid systems and to build expert system.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1		1.4	1.4.1	3 Apply	CO1	Apply the theory of access control policies & control mechanism for solving the problem of security
PO2		2.1	2.1.2	3 Apply	CO2	Identify the malicious, no malicious & Targeted code & use the concept of OS, file security to solve the problem of security
PO2		2.4	2.4.2	4 Analyze	CO3	Analyze & counter threats to web application using contemporary tool
PO3		3.6	3.6.1	4 Analyze	CO4	Explore different measures to secure wireless protocols, WLAN, VPN networks & mobile devices & use the different protection mechanism of networks to solve the problems of Wi-Fi network security
PO8		8.4	8.4.2	3 Apply	CO5	Examine and apply legal & ethical issues associated with cybercrime to known case studies
PO4		4.6	4.6.1	3,4 Apply, Analyze	CO6	Apply appropriate procedures, tools and techniques to acquire and duplicate data from compromised systems and analyze it

Course Objectives

Sr. No.	Description
1	To Understand cyberattacks and defense strategies and express underlying principles of access control mechanisms.
2	To Classify malicious code and targeted malicious code
3	To explore software vulnerabilities, attacks and protection mechanisms of web application
4	To explore vulnerabilities, attacks and protection mechanisms of wireless networks and protocols, WLAN & mobile devices
5	To Develop and mitigate security management and policies
6	To Use and explore techniques used in digital forensics

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO 1	PSO 1	1.3	1.3.1	3-Apply	CO 1	Apply theory and principles of computer science and engineering to identify different types of cybercrime and its effect on outside world.
PO 1	PSO 1	1.3	1.3.1	3-Apply	CO 2	Apply engineering fundamentals to identify various security challenges in mobile device for different types of attack and distinguish different aspects of cyber law
PO 2	PSO 2	4.3	4.3.1	3-Apply	CO 3	Use of different tools and methods in Cyber Security.
PO 6	PSO 1	6.2	6.2.1	2-Understand	CO 4	Interpret legislation, regulation, codes and standards relevant to cyberlaw and explain IT act 2000 and its latest amendments
PO 6	PSO 1	6.2	6.2.1	2-Understand	CO 5	Interpret legislation, regulation, codes and standards relevant to cyberlaw and explain IT act 2000 and its latest amendments
PO 3	PSO 1	3.1	3.1.3	1-Remember	CO 6	Able to choose appropriate information security standards during software design and development

Course Objectives

Sr. No.	Description
1	To apply theory and principles of computer science and engineering to identify different types of cybercrime and its effect on outside world
2	To apply engineering fundamentals to identify various security challenges for different types of attack
3	To use different tools and methods in Cyber Security
4	To interpret legislation, regulation, codes and standards relevant to cyberlaw with explanation of IT act 2000 and its latest amendments
5	To interpret legislation, regulation, codes and standards relevant to cyberlaw with explanation of IT act 2000 and its latest amendments
6	To choose appropriate information security standards during software design and development

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO7		7.1	7.1.2	Level 4 Analyze	CO 1	Identify the impact information systems have on an organization and society and explain how information systems transform Business.
PO2		2.2	2.2.2 2.2.3 2.2.4	Level 4 Analyze	CO 2	Compare and contrast the principal tools and technologies for accessing information from databases to improve business performance and decision making.
PO2		2.2	2.2.3 2.2.4	Level 4 Analyze	CO 3	Classify and compare threats to information resources and security controls used to protect the same in an organization.
PO1 1		11.2	11.2. 1	Level 1 Remember	CO 4	Recognize innovative ways to use social computing for market research and business.
PO4		4.3	4.3.2	Level 4 Analyze	CO 5	Analyze the impact of networks on a business.
PO3 PO7		3.3, 7.1	3.3.1 7.1.1	Level 3 Apply	CO 6	Explain the significance of system development life cycle and importance of enterprise-wide knowledge management and its value for business.

Course Objectives

Sr. No.	Description
1	To identify the impact information systems, have on an organization and society and explain how information systems transform Business.
2	To compare and contrast the principal tools and technologies for accessing information from databases to improve business performance and decision making.
3	To classify and compare threats to information resources and security controls used to protect the same in an organization.
4	To recognize innovative ways to use social computing for market research and business.
5	To analyze the impact of networks on a business.
6	To explain the significance of system development life cycle and importance of enterprise-wide knowledge management and its value for business.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1		2.8	2.8.1	2- Understand	CO1	Illustrate and implement the concept sampling and reconstruction of signal.
PO2		2.1 2.8	2.5.3 2.8.1	2- Understand 3-Apply	CO2	Demonstrate and apply operations like Convolution, Correlation, DFT on DT signals
PO2		2.8	2.8.1	3-Apply	CO3	Apply Fast Fourier Transform on DT signals
PO1		1.2	1.2.1	2- Understand 3-Apply	CO4	Illustrate and apply the fundamental concepts of digital image.
PO3		3.6	3.6.1	3-Apply	CO5	Apply enhancement techniques for digital Image Processing
PO2		2.6 2.8	2.6.4 2.8.1	3-Apply 4-Analyze	CO6	Apply and classify the digital image processing techniques for edge detection.

Course Objectives

Sr. No.	Description
1	To understand the fundamental concepts of digital signal processing and Image processing.
2	To Compute DFT for 1-D and 2-D signals.
3	To Calculate FFT for 1-D signal
4	To explain the fundamental concepts of Digital image.
5	To apply enhancement techniques for digital Image Processing
6	To apply digital image processing techniques for edge detection.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO 4 PO 6		4.2, 6.2	4.2.1 6.2.1	2 Understand 3 Apply	CO -1	Apply the knowledge of MAC layer techniques to implement CDMA and understand its impact.
PO 2 PO 4 PO 5 PO 6	PSO 1	2.1, 4.2, 5.1, 6.2	2.1.3 4.2.1 5.1.2 6.2.1	2, 3, 4 Analyze, 5 Evaluate, 6 Create	CO -2	Understand GSM. Design a security system using A3/A5/A8 algorithm, Handoff system. Analyze the difference in simple system and handoff system working. Apply appropriate technique to find Mobile users' location (GPS) and design a system.
PO 1 PO 4 PO 6		1.3, 4.2, 6.2	1.3.1 4.2.1 6.2.1	2, 3	CO -3	Understand Java, J2ME. Apply the knowledge to design a system which calculates income tax/EMI.
PO 1 PO 3 PO 5	PSO 1	1.3, 3.2, 5.1	1.3.1 3.2.2 5.1.2	3	CO -4	Apply the knowledge of mobility. Investigate problems because of mobility. Apply appropriate technique to design mobile node discovery.
PO 4 PO 6		4.2, 6.2	4.2.1 6.2.1	6	CO -5	Understand Android SDK. Design a software system or application which makes use of database, gives alert message upon receiving message.
PO 2 PO 5		2.1, 5.1	2.1.3 5.1.2	3, 6	CO -6	Select and apply appropriate technique to find route from source to destination, design a system and analyze the results.

Course Objectives

Sr. No.	Description
1	To apply the knowledge of MAC layer techniques to implement CDMA.
2	To understand GSM. Design a security system using A3/A5/A8 algorithm, Handoff system.
3	To understand Java, J2ME.
4	To Apply the knowledge of mobility. Investigate problems because of mobility.
5	To understand Android SDK.
6	To Select and apply appropriate technique to find route from source to destination.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO5	PSO1	5.4	5.4.1	4- Analyze	CO 1	Identify the problem and formulate it.
PO4	PSO1	4.4	4.4.3	2- Understand	CO 2	Understand the basic techniques to build intelligent systems
PO4	PSO1	4.5	4.5.1	6- Create	CO 3	Create knowledge base and apply appropriate search techniques used in problem solving
PO4	PSO1	4.6	4.6.1	4- Analyze 3- Apply	CO 4	Identify and analyze Algorithm to solve the problem
PO5	PSO2	5.4	5.4.1	6- Create	CO 5	Design fuzzy controller system.
PO5	PSO2	5.4	5.4.2	6- Create	CO 6	Design the supervised/unsupervised learning algorithm.

Course Objectives

Sr. No.	Description
1	Select a problem statement relevant to Artificial Intelligence
2	understand the basics of PROLOG
3	Make student understand knowledge representation and planning.
4	Study different optimization techniques and implement it
5	Introduce the ideas of fuzzy sets, fuzzy logic and generalize to form appropriate rules for inference systems.
6	Become familiar with basics of Neural Networks and supervised/unsupervised learning algorithm

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO2		2.8	2.8.2	4	CO1	Analyze & interpret code & program vulnerabilities using opensource tools.
PO2		2.8	2.8.2	4	CO2	Analyze & interpret network vulnerabilities using opensource tools.
PO4		4.6	4.6.1	3,4	CO3	Use appropriate tools to detect web application & browsers vulnerabilities & analyze it
PO3		3.6	3.6.1	3,4	CO4	Explore different tools to secure wireless network, routers & mobile devices & perform penetration testing & analyze it
PO3		3.8	3.8.2	3	CO5	Implement AAA using RDIOUS & TACACS
PO4		4.6	4.6.1	3,4	CO6	Use appropriate forensic tools to collect, duplicate & analyze data

Course Objectives

Sr. No.	Description
1	To analyze & interpret code & program vulnerabilities using opensource tools.
2	To analyze & interpret network vulnerabilities using opensource tools.
3	To use appropriate tools to detect web application & browsers vulnerabilities & analyze it
4	To explore different tools to secure wireless network, routers & mobile devices & perform penetration testing & analyze it
5	To Implement AAA using RDIOUS & TACACS
6	To use appropriate forensic tools to collect, duplicate & analyze data

Subject-Major Project-I**Subject Code- CSP705****Course Outcomes**

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO6 PO7	PSO2	6.1, 7.1, 7.2	6.1.1 7.1.1 7.2.1	2 Understand 3 Apply	CO -1	Identify societal, health and legal issues and apply practical knowledge within the chosen area of technology for project development.
PO8 PO1 1	PSO1	8.2, 11.2, 11.3	8.2.2 11.2. 1 11.3. 1	2 Understand 4 Analyze 6 Formulate	CO -2	Identify, analyze and formulate problem within programming projects in a comprehensive and systematic approach.
PO5	PSO1	5.1, 5.2	5.1.2 5.2.1	6	CO -3	Design and develop Engineering solutions to complex problem utilizing a systematic approach.
PO9 PO1 0		9.3, 10.2, 10.3	9.3.1 10.2. 1 10.3. 1	5 Evaluate	CO -4	Work effectively as an individual or in a team in development of technical projects.
PO1 0 PO1 2	PSO1 , PSO2	10.2, 10.3, 12.2	10.2. 1 10.3. 1 12.2. 1	5	CO -5	Communicate effectively with profession by presenting project related activities.
PO1 0		10.2, 10.3	10.2. 1 10.3. 1	3	CO -6	Demonstrate knowledge, skills and attitude of a professional engineers and community at large.

Course Objectives

Sr. No.	Description
1	To identify societal, health and legal issues and apply practical knowledge within the chosen area of technology for project development.
2	To identify, analyze and formulate problem within programming projects in a comprehensive and systematic approach.
3	To design and develop Engineering solutions to complex problem utilizing a systematic approach.
4	To work effectively as an individual or in a team in development of technical projects.
5	To communicate effectively with profession by presenting project related activities.
6	To demonstrate knowledge, skills and attitude of a professional engineers and community at large.

Semester-VIII

Subject-HMI

Subject Code- CSC801

Course Outcomes

PO	PS O	Competency	PI	Bloom's Level	CO	Description
PO 1		1.4	1.4.1	3	CO 1	Apply User Interface (UI) design principles to solve a problem HMI
PO 2		2.6	2.6.5	4	CO 2	Compare & contrast alternative processes of design & software to select best process.
PO 3		3.8	3.8.2	3	CO 3	Implement & integrate graphical user interface with modern software tools.
PO 4		4.5	4.5.1	6	CO 4	Design screen by using different components & develop interface using different interaction techniques.
PO 4		4.5	4.5.1	6	CO 5	Design & develop mobile interface based on mobile element & tools.
PO 2		2.6	2.6.5	4	CO 6	Compare & contrast interaction styles for communication to select best styles.

Course Objectives

Sr. No.	Description
1	To learn the foundation of human machine interaction.
2	To understand the importance of human psychology in designing good interfaces.
3	To learn the graphical user interface.
4	To make aware of mobile interaction design and its usage in day – to – day activities.
5	To understand various design technologies to meet user requirements.
6	To encourage to indulge into research in Machine Interaction Design.

Subject-Distributed Computing**Subject Code- CSC802****Course Outcomes**

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO 1		1.3, 1.4	1.3.1 1.4.1	2 Underst and 3 Apply	CO -1	Recognize fundamentals of Distributed system. Apply or demonstrate knowledge of the basic elements and concepts related to distributed system technologies.
PO 2 PO 3	PSO 1	2.2, 3.2, 3.3	2.2.2 , 2.2.4 3.2.1 , 3.3.1	2, 3, 4 Analyze	CO -2	Investigate, identify and analyze the middleware technologies that support distributed applications such as RPC, RMI and Object based middleware.
PO 2		2.1, 2.3, 2.4	2.1.2 2.3.1 2.4.4	2, 3, 4	CO -3	Apply knowledge of synchronization and mutual exclusion to identify and analyze the various techniques used for clock synchronization and mutual exclusion in distributed system.
PO 1 PO 2	PSO 1	2.1, 2.2	2.1.2 2.2.4	2, 4	CO -4	Elaborate the concepts of Resource and Process management and synchronization algorithms. Analyze different algorithms of it.
PO 2 PO 6		2.1, 2.2, 6.1	2.1.2 , 2.2.3 6.1.1	2, 3	CO -5	Identify use of consistency, replication and demonstrate the use of Consistency and Replication Management.
PO 1 PO 2 PO 5		1.4, 2.2, 5.2	1.4.1 2.2.2 5.2.1	3, 4	CO -6	Apply the knowledge of Distributed File System to analyze various file systems like NFS, AFS and the experience in building large-scale distributed applications

Course Objectives

Sr. No.	Description
1	To provide students with contemporary knowledge in distributed systems
2	To equip students with skills to analyze and design distributed applications.
3	To learn master skills to measure the performance of distributed synchronization algorithm.
4	To study different resources and process management techniques in distributed environment.
5	To explain techniques to maintain data consistent in distributed computing.
6	To understand and explore knowledge of distributed file system.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
12 2		12.5 2.6	12.5.2 2.6.3	4	1	Identify and Illustrate Processing of natural language to cope with change in a world of technology.
2 5		2.5 5.4	2.5.2 5.4.1	1	2	Describe and recognize appropriate techniques for word level analysis in natural language processing
4	PSO 1	4.5	4.5.1	5	3	Design and develop the concept of main language level: Morphology, syntax, semantic, pragmatic for a software system to meet specified needs with social cons
2 5		2.7 5.5	2.7.1 5.5.1	4	4	Identify engineering problem and Select model for semantic analysis.
5 2		5.4 2.5	5.4.2 2.5.2	3	5	Discover difficult issues of society and use the various language models in world of NLP.
9 10 3	PSO 2	9.4 10.6 3.8	9.4.1 10.6.2 3.8.2	6	6	Design & Invent NLP mini projects in groups.

Course Objectives

Sr. No.	Description
1	To understand the basic concepts of Natural Language Processing
2	To create and apply appropriate techniques for word level analysis in natural language processing.
3	To design and apply the concept of main language level: Morphology, syntax, semantic, pragmatic For a software system to meet specified needs with social consideration.
4	To investigate engineering problem and design model for semantic analysis.
5	To identify difficult issues of society and to create the various language models in world of NLP.
6	To design and present Miniproject in groups.

Subject-EVM

Subject Code- ILO8029

Course Outcomes

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

Course Objectives

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

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO 2	PSO 2	2.6	2.6.3	6-Create	CO -1	Design user centric interfaces.
PO 6	PSO 2	6.3	6.3.1	6-Create	CO -2	Develop innovative and userfriendly interfaces.
PO 5	PSO 2	5.5	5.5.1	3-Apply	CO -3	Use HMI in their day-to-day activities
PO 5	PSO 2	5.6	5.6.2	4-Analyze	CO -4	Analyze existing interface designs, and improve them.
P06	PSO 2	6.3	6.3.1	4-Analyze	CO -5	Illustrate application for social and technical task.
PO 2	PSO 1	2.6	2.6.5	4-Analyze	CO -6	Distinguish input and output devices.

Course Objectives

Sr. No.	Description
1	To demonstrate an understanding of guidelines, principles, and theories influencing human machine interaction.
2	To understand the importance of a good interface design.
3	To understand the importance of human psychology in designing good interfaces.
4	To motivate students to apply HMI in their day – to – day activities.
5	To bring out the creativity in student – build innovative applications that are user friendly.
6	To encourage students to indulge into research in Machine Interface Design.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO 1 PO 4		1.3, 4.2	1.3.1 4.2.1	2 Understand 3 Apply 4 Analyze	CO -1	Develop, test and debug RPC/RMI based client-server programs.
PO 5		5.1, 5.2	5.1.1 5.2.1	2, 3, 4	CO -2	Implement the main underlying components of distributed systems such as IPC.
PO 5		5.1, 5.2	5.1.1 5.2.1	2, 3, 4	CO -3	Implement the main underlying components of distributed systems such as name resolution. (DNS, ns lookup).
PO 2 PO 5	PSO 1	2.2, 2.3, 5.2	2.2.4 2.3.2 5.2.1	2, 4	CO -4	Implement various techniques of synchronization.
PO 4		4.2	4.2.1	3, 6 Create	CO -5	Design and implement application programs on distributed systems.
PO 1 PO 2		1.4, 2.2	1.4.1 2.2.2	2	CO -6	Explore the concepts of distributed file systems.

Course Objectives

Sr. No.	Description
1	To develop, test and debug RPC/RMI based client-server programs.
2	To implement the main underlying components of distributed systems such as IPC.
3	To implement the main underlying components of distributed systems such as name resolution.(DNS, ns lookup).
4	To implement various techniques of synchronization.
5	To design and implement application programs on distributed systems.
6	To explore the concepts of distributed file systems.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO 1 PO 2		1.3, 2.4	1.3.1 2.4.2	2 Understand 3 Apply 4 Analyze 6 Create	CO-1	Apply the knowledge to design a network and configure it for IP addressing, subnetting. Analyze its results.
PO 1 PO 2		1.3, 2.2	1.3.1 2.2.2	2 3	CO-2	Identify different network commands in Linux. Apply it to find solution for different network problems.
PO 1	PSO 1	1.3, 1.4	1.3.1 1.4.1	3	CO-3	Apply knowledge to understand the operation of TCP/IP layers using Wireshark.
PO 5		5.2, 5.3	5.2.1 5.3.1	3 4	CO-4	Select and apply different error detection and correction, flow control, congestion control algorithm. Analyze the results and derive conclusion.
PO 1 PO 2	PSO 2	1.3, 2.4	1.3.1 2.4.2	3 4 6	CO-5	Apply the knowledge to design network system using TCP, UDP. Analyze the difference in working.
PO 1 PO 2		1.3, 2.4	1.3.1 2.4.2	3 4	CO-6	Apply appropriate technique for routing in different network system and analyze the results.

Course Objectives

Sr. No.	Description
1	To apply the knowledge to design a network and configure it for IP addressing, subnetting. Analyze its results.
2	To identify different network commands in Linux. Apply it to find solution for different network problems.
3	To apply knowledge to understand the operation of TCP/IP layers using Wireshark.
4	To select and apply different error detection and correction, flow control, congestion control algorithm. Analyze the results and derive conclusion.
5	To apply the knowledge to design network system using TCP, UDP. Analyze the difference in working.
6	To apply appropriate technique for routing in different network system and analyze the results.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
12 2		12.5 2.6	12.5.2 2.6.3	4	1	Identify and Illustrate Processing of natural language to cope with change in a world of technology.
2 5		2.5 5.4	2.5.2 5.4.1	1	2	Describe and recognize appropriate techniques for word level analysis in natural language processing
4	PSO 1	4.5	4.5.1	5	3	Design and develop the concept of main language level: Morphology, syntax, semantic, pragmatic for a software system to meet specified needs with social cons
2 5		2.7 5.5	2.7.1 5.5.1	4	4	Identify engineering problem and Select model for semantic analysis.
5 2		5.4 2.5	5.4.2 2.5.2	3	5	Discover difficult issues of society and use the various language models in world of NLP.
9 10 3	PSO 2	9.4 10.6 3.8	9.4.1 10.6.2 3.8.2	6	6	Design & Invent NLP mini projects in groups.

Course Objectives

Sr. No.	Description
1	To understand the basic concepts of Natural Language Processing
2	To apply the basic algorithm in Natural Language Processing for word level analysis.
3	To understand the concept in main language level: morphology, syntax, semantics and pragmatics
4	To implement the applications based on Natural language Processing for semantic analysis.
5	To apply the knowledge of NLP to create the various language models.
6	To design the miniproject based on NLP techniques in a group of students.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO6 PO7	PSO2	6.1, 7.1, 7.2	6.1.1 7.1.1 7.2.1	2 Understand 3 Apply	CO -1	Identify societal, health and legal issues and apply practical knowledge within the chosen area of technology for project development.
PO8 PO1 1	PSO1	8.2, 11.2, 11.3	8.2.2 11.2. 1 11.3. 1	2 Understand 4 Analyze 6 Formulate	CO -2	Identify, analyze and formulate problem within programming projects in a comprehensive and systematic approach.
PO5	PSO1	5.1, 5.2	5.1.2 5.2.1	6	CO -3	Design and develop Engineering solutions to complex problem utilizing a systematic approach.
PO9 PO1 0		9.3, 10.2, 10.3	9.3.1 10.2. 1 10.3. 1	5 Evaluate	CO -4	Work effectively as an individual or in a team in development of technical projects.
PO1 0 PO1 2	PSO1 , PSO2	10.2, 10.3, 12.2	10.2. 1 10.3. 1 12.2. 1	5	CO -5	Communicate effectively with profession by presenting project related activities.
PO1 0		10.2, 10.3	10.2. 1 10.3. 1	3	CO -6	Demonstrate knowledge, skills and attitude of a professional engineers and community at large.

Course Objectives

Sr. No.	Description
1	To identify societal, health and legal issues and apply practical knowledge within the chosen area of technology for project development.
2	To identify, analyze and formulate problem within programming projects in a comprehensive and systematic approach.
3	To design and develop Engineering solutions to complex problem utilizing a systematic approach.
4	To work effectively as an individual or in a team in development of technical projects.
5	To communicate effectively with profession by presenting project related activities.
6	To demonstrate knowledge, skills and attitude of a professional engineers and community at large.

Department: Electronics and Telecommunication Engineering

Semester-III

Scheme R-19

Subject- ENGINEERING MATHEMATICS-III

Subject Code-ECC 301

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
1,	-	1.1	1.1.2	5	CO 1	Apply the concept of Laplace transforms and use to solve real integrals in engineering problems
2	-	2.1	2.1.2	3,4	CO 2	Identify the concept of inverse linear transform and compare to various functions and its applications
3	-	3.1	3.1.6	3	CO 3	Determine and develop Fourier series for real life problems and applications.
3	-	3.2	3.2.1	3	CO 4	Apply the properties of Complex analysis and select the application to orthogonal trajectories.
1	-	1.1	1.1.3	3	CO 5	Use the concept of matrices to solve problems in machine learning, computer graphics and in Google page ranking
12	-	12.1	12.1.1	3	CO 6	Solve gradient of spf, line integral , divergence and curl of vector and apply in Green's and Stoke's theorem.

Course Objectives

Sr. No.	Description
1	To familiarize with the Laplace Transform and its properties.
2	To study Inverse Laplace Transform of various functions, theorems and its applications.
3	To acquaint with the concept of Fourier Series, its complex form and enhance the problem solving skills
4	To familiarize with the concept of complex variables, C-R equations with applications.
5	To study the application of concept of Eigen value and eigen vectors matrices
6	To study the application of Vectors in complex engineering problems.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1	PSO1	1.3	1.3.1	BL2	CO1	understand construction and working principle of all electronic devices
PO2	PSO1	2.1	2.1.3	BL3	CO2	Identify and apply various DC biasing technics for Bipolar junction transistor and Field effect transistor
PO3	PSO2	3.2	3.2.2	BL3	CO3	To built small signal model to analyse the performance parameter of Bipolar junction transistor and Field effect transistor
PO4	PSO1	4.3	4.3.2	BL4	CO4	Evaluate the working of small signal model of Bipolar junction transistor and Field effect transistor at various frequencies
PO2	PSO1	2.4	2.4.4	BL2	CO5	To understand the basic working of large signal amplifier
PO2	PSO1	2.4	2.1.3	BL2	CO6	To understand and apply the knowledge for designing of differential amplifiers

Course Objectives

Sr. No.	Description
1	To explain functionality different electronic devices.
2	To perform DC and AC analysis of small signal amplifier circuits.
3	To analyze frequency response of small signal amplifiers.
4	To understand working of small signal amplifiers.
5	To understand working of large signal amplifiers.
6	To explain working of differential amplifiers and it's applications in Operational Amplifiers

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1	PSO1	1.3	1.3.1	2	CO1	Understand different binary codes and apply engineering fundamentals for conversion from one no. system to another system.
PO2	PSO1	2.1	2.1.3	2	CO2	Identify and solve the logic expressions by applying laws of Boolean algebra, and Demorgan's law to logic gates.
PO2	PSO2	3.2	3.2.3	3	CO3	To design the various combinational circuits and implement them.
PO4	PSO2	4.1	4.1.2	3	CO4	Design and interpretation of sequential circuits and logic circuit designs.
PO1	PSO2	1.3	1.3.1	2	CO5	Understand and characterise different memories and PLDs
PO4	PSO1	4.1	4.1.3	3	CO6	Design and debug simple digital circuits and systems with the aid of VHDL software tools.

Course Objectives

Sr. No.	Description
1	Apply the knowledge of fundamentals digital electronics to understand different number systems and for conversion from one number system to another.
2	Ability to derive, analyze or minimize logic expressions & circuits by applying properties of Boolean laws and K map
3	Design and analyze combinational circuits like adders, MUX, encoders etc.
4	Develop a state diagram & simplify the given sequential logic. Use state machine diagram to design finite state
5	Analyze the combinational building blocks and memory elements, types of memory
6	Design, debug and verify simple digital circuits and systems with the aid of VHDL simulation tools

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1	PSO2	1.4	1.4.1	BL3	CO1	To apply the knowledge of basic electronics circuits to solve various engg problems
PO4	PSO1	4.3	4.3.3	BL5	CO2	Evaluate And analyze various basic network circuits using graphical representation
PO2	PSO1	2.4	2.4.1	BL4	CO3	To analyze time and frequency domain analysis of network circuits
PO3	PSO1	3.4	3.4.2	BL4	CO4	Analysis of NETWORKS through the application of various test inputs and generating information for improvisation in circuits
PO4	PSO2	4.1	4.1.4	BL5	CO5	To examine the network topologies and establish relationship between measured data
PO1	PSO1	1.1	1.1.2	BL2	CO6	To understand and apply advanced mathematical techniques for network synthesis

Course Objectives

Sr. No.	Description
1	To understand the basics of circuits theorms for solving complex engineering problems
2	To learn graphical methods of evaluation of basic network circuits
3	To analyze circuits in time and frequency domains
4	To study network topologies fucntions two port networks, ladder etc.
5	To analyze two port networks and relationship between them
6	To synthesize and apply basic electrical circuits

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
1,2,3	1	1.4	1.4.1	L2-Understand	CO1	Apply the knowledge of engineering fundamentals for measurement of electronics components and Instrument
4,5,6,	2	2.1	2.1.2	L3 Apply	CO2	Understand the principle of working of various transducer used to measure temperature, displacement, level, pressure and their application in industry displacement, level, pressure and their application in industry
1,2	1	2.1	2.1.3	L2-Understand	CO3	Apply, the knowledge of Engineering Fundamentals to determine the models of physical systems in forms suitable for use in the analysis and design of control systems.
3,4	1	2.2	2.2.4	L3-Apply	CO4	Apply the knowledge of Engineering Fundamentals to find transfer functions for given system
4,6,7	2	3.2	3.2.3	L4-Analyze	C05	Analyze and design a system and calculate its time domain and frequency domain parameter and understand its impact for development and understand its impact for development
9,10,11	2	4.3	4.3.3	L5-Evaluate	C06	To effectively apply appropriate techniques to predict stability of given system using appropriate criteria and engage in learning process

Course outcomes

Sr. No.	Description
1	To Identify various sensors, transducers and their brief performance specification
2	To Understand the principle of working of various transducer used to measure temperature, displacement, level, pressure .
3	To Determine the models of physical systems in forms suitable for use in the analysis and design of control systems.
4	To find transfer functions for given system
5	To Understand the analysis of systems in time domain and frequency domain.response
6	To develop concepts of stability and its assessment criteria.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1	PSO1	1.3	1.3.1	2	CO1	Understand different binary codes and apply engineering fundamentals for conversion from one no. system to another system.
PO2	PSO1	2.1	2.1.3	2	CO2	Identify and solve the logic expressions by applying laws of Boolean algebra, and Demorgan's law to logic gates.
PO2	PSO2	3.2	3.2.3	3	CO3	To design the various combinational circuits and implement them.
PO4	PSO2	4.1	4.1.2	3	CO4	Design and interpretation of sequential circuits and logic circuit designs.
PO1	PSO2	1.3	1.3.1	2	CO5	Understand and characterise different memories and PLDs
PO4	PSO1	4.1	4.1.3	3	CO6	Design and debug simple digital circuits and systems with the aid of VHDL software tools.

Course Objectives

Sr. No.	Description
1	Apply the knowledge of basic principles of digital circuits and different systems, basic gates and various engineering applications involving digital electronics and circuits
2	Understand and analyze the logic expressions (POS & SOP) and circuits using boolean laws, K- maps, De- morgan's laws and their applications in digital design.
3	Construct basic combinational circuits like Adders,/ Subtractors/ MUX/ DEMUX/ Encoders/ PLA/ ROM etc
4	Construct basic combinational circuits like FFs and their conversion.
5	Ability to understand the different shift registers and ability to design various counter circuits.
6	Ability to understand the different shift registers and ability to design various counter circuits.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
1	2	1.1	1.1.1	5	1	Plot and validate the performance characteristics of transducers.
2	2	2.1	2.1.2	4	2	Validate the characteristics of various temperature, pressure and level transducers.
2	2	2.2	2.2.2	4	3	Plot frequency response of first-order electrical system
4	2	4.2	4.2.1	5	4	Plot time response of second-order electrical system and calculate the steady-state error.
5	2	5.1	5.1.1	2	5	Validate the effect of damping factor on the response of second order system.
5	2	5.3	5.3.2	2	6	Inspect the frequency response specifications of systems by using bode-plot, Polar plot, Nyquist-plot techniques, and comment on the stability of system

Course Objectives

Sr. No.	Description
1	To make students understand the construction and the working principle of various transducers used for Displacement measurement, Temperature measurement and Level measurement.
2	To examine steady-state and frequency response of the diff Types
3	To examine steady-state and frequency response of the Type 0, 1, and 2 systems.
4	To examine steady-state and frequency response of first and second order electrical systems.
5	To inspect stability analysis of system using Root locus, Bode plot, polar plot and Nyquist plot.
6	To study basic electronic components

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1	PSO1	1.1	1.3.1	BL1	CO1	To learn fundamentals of OOPs Programming
PO2	PSO2	2.1	2.1.3	BL2	CO2	To understand OOPs concept for effective programming
PO3	PSO2	3.4	3.4.1	BL6	CO3	To design and apply concepts of OOPs programming
PO4	PSO1	4.2	4.2.1	BL6	CO4	To develop programming applications using OOPs language
PO5	PSO2	5.2	5.2.1	BL4	CO5	To analyze strengths of OOPs programming in perceptability and applicability of OOPs
PO6	PSO1	12.2	12.2.2	BL6	CO6	To create a step for new upcoming programming paradigms

Course Objectives

Sr. No.	Description
1	To understand the basics of Object oriented programming
2	To study and apply OOPs concepts in programming
3	To apply the concepts of OOPs in problem solving
4	To understand fundamentals of JAVA programming
5	To analyze the strength of OOPs programming
6	To set a foundation for advanced programming

Semester-IV

Subject- Engineering Mathematics IV

Subject Code-ECC 401

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
1,2,4	-	2.2	2.2.1	5	CO 1	Use the concepts of Complex Integration for evaluating integrals, computing residues & evaluate various contour integrals.
1,2,3,12	-	3.1	3.1.6	3	CO 2	Apply the concept of Correlation, Regression and curve fitting to the engineering problems in data science.
1,2,4,12	-	4.2	4.2.2	4	CO 3	Illustrate understanding of the concepts of probability and expectation for getting the spread of the data and distribution of probabilities.
1,2	-	1.1	1.1.3	3	CO 4	Use the concept of matrices to solve problems in machine learning, computer graphics and in Google page ranking
1,2,3,12	-	3.3	3.3.1	3	CO 5	Apply the concept of Quadratic forms and Singular value decomposition which are very useful tools in various Engineering applications
1,2,3,4	-	2.4	2,4.1	2	CO 6	Find the extremals of the functional using the concept of Calculus of variation.

Course Objectives

Sr. No.	Description
1	To study Line and Contour integrals and expansion of complex valued function in a power series
2	To familiarize with the concepts of statistics for data analysis
3	To acquaint with the concepts of probability, random variables with their distributions and expectations
4	To familiarize with the concepts of probability distributions.
5	To understand the concepts of Quadratic forms and Singular value decomposition.
6	To understand the concepts of Calculus of Variations.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO2	PSO1	2.1	2.1.1	BL2	CO1	Describe memory systems with design and analysis of mapping technics for cache and virtual memory
PO4	PSO1	4.1	4.1.3	BL2	Co2	Understand Architecture Also Classify/Illustrate different types of algorithm for microcontroller and it's application.
PO5, PO3, PO6, PO1 2	PSO2	3.4	3.4.1	BL3	CO3	Use/Apply the knowledge to interface various peripheral devices with microcontroller.
PO2	PSO1	2.1	2.1.2	BL2	CO4	Understand and describe detailed architecture of ARM 7.
PO4	PSO1	4.2	4.2.1	BL2	CO5	Classify/Illustrate different types of algorithm for ARM 7.
PO3	PSO2	3.4	3.4.1	BL6	CO6	Develop programmes in ARM 7 using embedded C.

Course Objectives

Sr. No.	Description
1	To Describe memory systems with design and analysis of mapping technics for cache and virtual memory
2	To Classify/Illustrate different types of algorithm for microcontroller and it's application.
3	To Apply the knowledge to interface various peripheral devices with microcontroller.
4	To understand and describe detailed architecture of ARM 7.
5	To classify/Illustrate different types of algorithm for ARM 7.
6	To develop programmes in ARM 7 using embedded C.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
1	1	1.6.1	1.6	3	1	Apply the knowledge of Engineering fundamentals to design simple circuits using OP-AMP
2	1	2.5.1	2.1	6	2	Identify, formulate and analyze complex engineering problems reaching substantiated conclusions using the oscillators and active filters circuits
3	1	3.5.1	3.5	6	3	Design an electronic system or process like various Comparators, waveform generator and Precision rectifier to meet specified needs with appropriate attention to health, safety, standards, environmental and societal considerations.
3	1	3.7.2	3.7	2	4	Explain and compare the working of multivibrators using special application IC 555 and general purpose opamp.
5	1	5.4.2	5.4	6	5	Create, select and apply appropriate techniques, resources, advanced engineering tools necessary to analyze and design telecommunication engineering problems like waveform generators, timers and voltage regulators
5	1	5.5.1	5.5	2	6	Illustrate the function of application specific ICs such as VCO, PLL and its application in communication.

Course Objectives

Sr. No.	Description
1	To understand the basic building blocks of linear integrated circuits
2	To perform analysis of circuits like oscillators, Filters based on linear integrated circuits.
3	To introduce the concepts of waveform generation, comparators, precision rectifier for particular applications using linear integrated circuits.
4	To introduce some special function ICs
5	To understand and implement the working of different circuits using OP-AMP
6	To introduce the theory and applications of PLL

Subject- SS

Subject Code-ECC 404

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1	1	1.6	1.6.1	L2	CO1	Understand the concept & types of signals, classification of signals.
PO2	1	2.5	2.5.3	L4	CO2	Analysis of signals& systems, classification of systems with examples.
PO2	1	2.8	2.8.1	L3	CO3	Illustrate the time domain analysis of continuous & discrete time system
PO2	1	2.8	2.8.1	L3	CO4	Apply the knowledge of frequency domain analysis of continuous & discrete time system
PO3	1	3.6	3.6.3	L4	CO5	Analyze the discrete time LTI system using Z transform
PO1	1	1.7	1.7.1	L2 L3	CO6	Understand & solve the concept of state, state variables & application of signals& system

Course Objectives

Sr. No.	Description
1	Apply the concept & theory of signals and systems in engineering field
2	Classification & analysis of signals& systems
3	Apply the knowledge of time domain analysis of continuous & discrete time system
4	Apply the knowledge of frequency domain analysis of continuous & discrete time system
5	Use of transform in analysis of system
6	Apply the concept of state,state variables & application of signals& system

Course Outcomes

PO	PS O	Comp etency	PI	Bloom's Level	CO	Description
1,5	1	1.3	1.3.1	L2- Underst and	CO1	Understand the basic components and types of noises in communication Engineering system
2,4, 6	1	2.4	2.4.4	L3-Apply	CO2	Analyze the concepts of amplitude modulation for basic communication problems to meet environment and societal considerations
3,5, 6	1	2.4	2.4.4	L3-Apply	CO3	Analyze the concepts of angle modulation in telecommunication system to meet specified needs of society and environment
4,7, 8	2	2.2	2.2.4	L4- Analyze	CO4	Compare the performance of AM and FM receivers for analog communication system with attention to health,safety and legal issues and accountability in engineering profession
12	2	3.2	3.2.3	L4- Analyze	CO5	Describe analog and digital pulse modulation techniques in adaptation to the changing world of technology
9,10 ,11,	2	3.3	3.3.1	L4- Analyze	CO6	Illustrate the principles of multiplexing techniques and design an electronic system to communicate effectively by working in a team ,managing finance and engaging in life long learning

Course Objectives

Sr. No.	Description
1	To illustrate the fundamentals of basic communication system.
2	To understand various analog modulation and demodulation techniques.
3	To Investigate and analyze transmitter and receiver circuits
4	To focus on applications of analog modulation and demodulation techniques.
5	To explain the key concepts of analog and digital pulse modulation and demodulation techniques.
6	To Illustrate the principles of multiplexing and demultiplexing techniques.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO2 PO6		2.1 6.3	2.5.1 6.3.1	1	1	Identify problems based on societal /research needs.
PO1 PO5		1.6 5.4	1.6.1 5.4.1	3	2	Apply Knowledge of Arduino board using the IDE for utilizing the onboard resources to solve societal /technical problem
PO4 PO5		4.4 5.4	4.4.1 5.4.1	4	3	outline the proper inferences from available results through theoretical / experimental/simulations.
PO 10		10.4	10.4. 1	3	4	Demonstrate an ability to comprehend technical literature and document project work
PO6		6.3	6.3.1	3	5	Demonstrate project management principles during project work
PO5 PO9 PO1 0	PSO1	5.4 9.1 10.1	5.4.1 9.1.1 10.1. 3	6	6	Design Arduino based and raspberry Pi mini project and Develop interpersonal skills to work as member of a group or leader.

Course Objectives

Sr. No.	Description
1	To acquaint with the process of identifying the needs and converting it into the problem.
2	To familiarize and use of Arduino board using the IDE for utilizing the onboard resources to solve societal /technical problem
3	To acquaint with the process of applying basic engineering fundamentals to attempt solutions to the problems.
4	Students will able to present their project work
5	To inculcate the process of self-learning and research
6	Identify the appropriate integrated circuits,Arduino board and raspberry Pi board for designing engineering application in group

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO2	PSO1	2.1	2.1.1	BL2	CO1	Understand and describe detailed architecture of 8051 Microcontroller.
PO4	PSO1	4.1	4.1.3	BL2	Co2	Use of different algorithm for microcontroller .
PO5, PO3, PO6, PO1 2	PSO2	3.4	3.4.1	BL3	CO3	To interface various peripheral devices with microcontroller.
PO2	PSO1	2.1	2.1.2	BL2	CO4	Use of different algorithm for ARM 7.
PO4	PSO1	4.2	4.2.1	BL2	CO5	Classify/Illustrate different types of algorithm for ARM 7.
PO3	PSO2	3.4	3.4.1	BL6	CO6	Develope programmes in ARM 7 using embedded C.

Course Objectives

Sr. No.	Description
1	To understand and describe detailed architecture of 8051 Microcontroller.
2	To Classify/Illustrate different types of algorithm for microcontroller and it's application.
3	To Apply the knowledge to interface various peripheral devices with microcontroller.
4	To understand and describe detailed architecture of ARM 7.
5	To classify/Illustrate different types of algorithm for ARM 7.
6	To develop programmes in ARM 7 using embedded C.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
1	1	1.1	1.1.1	3	1	Apply the knowledge to do simple mathematical operations
2	1	2.1	2.1.3	3	2	Calculate the frequency of Oscillator using OP-AMP
3	1	3.3	3.3.1	5	3	Evaluate different electronic systems like various Comparators, waveform generator and Precision rectifier to meet specified needs with appropriate attention to health, safety, standards, environmental and societal considerations.
3	1	3.4	3.4.1	6	4	Construct multivibrators using special application IC 555 and general purpose opamp.
5	1	5.1	5.5.2	6	5	Develop voltage regulator ICs to design simple applications.
5	1	5.3	5.3.2	2	6	Understand the differences between theoretical, practical and simulated results in integrated circuits and construct mini project

Course Objectives

Sr. No.	Description
1	To revise the basic building blocks of linear integrated circuits
2	To perform operation of circuits like oscillators, Filters based on linear integrated circuits.
3	To design the waveform generation, comparators, precision rectifier for particular applications using linear integrated circuits.
4	To introduce some special function ICs
5	To understand and implement the working of different circuits using OP-AMP
6	Design mini project based on linear integrated circuits.

Subject- PCE Lab

Subject Code-ECL 403

Course Outcomes

PO	PS O	Compet ency	PI	Bloom's Level	CO	Description
1	1	1.3	1.3.1	L2- Underst and	CO1	Understand and analyze analog modulation and demodulation techniques to solve Engineering Problems
2,4, 7	1	2.1	2.1.3	L3-Apply	CO2	Identify and solve basic communication problems to meet environment and societal considerations
3,5, 6	1	2.4	2.4.4	L4- Analyze	CO3	Analyze the waveforms of Radio receivers to meet specified needs of society and environment
4,7, 8	2	2.4	2.4.4	L3-Apply	CO4	Implement analog pulse modulation and demodulation circuits in attention to health,safety and accountability in engineering profession
12	2	3.2	3.2.3	L4- Analyze	C05	To Demonstrate digital pulse modulation and demodulation techniques. in adaptation to the changing world of technology
9,10 ,11	2	3.3	3.3.1	L4- Analyze	C06	To Verify the concepts of multiplexing and design an electronic system to communicate effectively by working in a team ,managing finance and engaging in life long learning

Course Objectives

Sr. No.	Description
1	To give an understanding of Time and Frequency domain representation of signals
2	To demonstrate continuous wave modulation and demodulation. To demonstrate continuous wave modulation and demodulation.
3	To Investigate and analyze transmitter and receiver circuits
4	To demonstrate analog and digital pulse communication.
5	To verify concepts of Multiplexing and to design an electronic system to communicate effectively
6	To use simulation software to build communication circuits.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1	PSO1	1.1	1.3.1	BL2	CO1	To understand syntax and semantics of python programming
PO4	PSO2	4.2	4.2.2	BL3	CO2	To demonstrate file handling operations in python
PO2	PSO2	2.2	2.4.2	BL3	CO3	To use Object oriented programming in python programming
PO4	PSO1	4.3	4.3.3	BL6	CO4	To create and apply GUI based applications using python
PO5	PSO2	5.2	5.2.2	BL3	CO5	To implement database operations using python
PO4	PSO2	4.2	4.2.1	BL6	CO6	To design and develop machine learning applications using python

Course Objectives

Sr. No.	Description
1	To learn core programming aspects of python.
2	To illustrate various file handling operations using python
3	To interpret OOPs programming with python programming
4	To apply GUI applications using python
5	To design and apply database operations using python
6	To apply machine learning applications using python programming

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
2		1.4	1.4.1	Level 3	1	Apply the concepts of information theory in source coding
3		2.2	2.2.4	Level 5	2	Compare different error control systems and apply various error detection codes
2,3		1.4	1.4.1	Level 4	3	Analyze different error correction codes
4		2.2	2.2.4	Level 5	4	Compare various baseband transmission methods for digital signals
3		1.4	1.4.1	Level 5	5	Evaluate the performance of optimum baseband detection in the presence of white noise.
3		2.2	2.2.4	Level 5	6	Compare the performance of different digital modulation techniques.

Course Objectives

Sr. No.	Description
1	To apply the concepts of information theory in source coding
2	To compare different error control systems and apply various error detection codes
3	To analyze different error correction codes
4	To compare various baseband transmission methods for digital signals
5	To evaluate the performance of optimum baseband detection in the presence of white noise.
6	To compare the performance of different digital modulation techniques.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
1,2		1.1	1.1.2	Level 3	1	Use concepts of trigonometry, complex algebra, Fourier transform, z-transform to analyze the operations on signals and acquire knowledge about Systems
4		1.4	1.4.1	Level 4	2	Select proper tools for analog-to-digital and digital-to-analog conversion. Also select proper tools for time domain and frequency domain implementation.
1,2		2.1	2.1.3	Level 5	3	Design, implementation, analysis and comparison of digital filters for processing of discrete time signals
2		1.4	1.4.1	Level 2	4	Understand the concept of multirate signal processing.
5,6		3.2	3.2.1	Level 4	5	Illustrate signal processing strategies at multidisciplinary team activities.
5		4.2	4.2.2	Level 6	6	Integrate computer-based tools for engineering applications

Course Objectives

Sr. No.	Description
1	To use concepts of trigonometry, complex algebra, Fourier transform, z-transform to analyze the operations on signals and acquire knowledge about Systems
2	To select proper tools for analog-to-digital and digital-to-analog conversion. Also select proper tools for time domain and frequency domain implementation.
3	To design, implementation, analysis and comparison of digital filters for processing of discrete time signals
4	To understand the concept of multirate signal processing.
5	To illustrate signal processing strategies at multidisciplinary team activities.
6	To integrate computer-based tools for engineering applications

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1	1	1.7	1.7.1	1	CO1	Demonstrate a clear understanding of choice of technology, Explain the process of fabrication and list down the MLD rules and draw the MLD
PO2	1	2.6	2.6.1	2	CO2	List different parameters, Concept of static and dynamic analysis, compare different types of Inverters.
PO3	1	2.8	2.8.2	2	CO3	Explain different design styles used in digital design like PTL, Transmission gates etc. Implement concept of sizing. Implementation of various circuits using different design styles.
PO4	1	5.5	5.5.1	3	CO4	Explain different memory structures; explain working of memory units, its modes of operation and its peripheral circuitry.
PO5	1	4.4	4.4.3	6	CO5	Explain different types of adder circuits, Compare it's performance. Explain multiplier circuits and allied circuitry.
PO6	1	5.6	5.6.1	1	CO6	Understand importance of Low power design and implement protection circuitry, Explain Interconnect model and scaling.

Course Objectives

Sr. No.	Description
1	To impart the knowledge about VLSI design trends, methodologies and allied systems used in digital design.
2	To introduce fabrication process flow of VLSI Design.
3	To understand MOSFET operation from VLSI design perspective.
4	To learn VLSI design performance metric and various tradeoffs.
5	To design, implement and verify combinational and sequential logic circuits using various MOS design styles.
6	To provides an exposure to RTL design and programming

Subject- RSA**Subject Code-ECC 504****Course Outcomes**

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1	PSO1	1.3	1.3.1	2	CO1	To understand how random signal theory is applicable in communication field, Familiarization with probability, BAYE'S Theorem and conditional probability
PO2	PSO2	2.1	2.1.3	2	CO2	Development of the mathematical skills to analyze random variables, density function, distribution function etc.
PO3	PSO2	3.2	3.2.3	3	CO3	To Study the use of Characteristic Function of Random variable to obtain the Moments of Random Variable.
PO4	PSO2	4.1	4.1.2	3	CO4	Study Joint density and distribution function, concept of correlation and covariance for pair of Random variables
PO1	PSO1	1.3	1.3.1	2	CO5	Describe the concept of random process which is essential for random signals and systems encountered in communication and statistical learning, study of Markov Processes with suitable Examples.
PO4	PSO1	4.1	4.1.3	3	CO6	Study cocepts of linear regression algorithms and apply for predictive applications .

Course Objectives

Sr. No.	Description
1	To Study, axiomatic definition of probability, Communication Engineering Application of BAYE'S Theorem, Total probability theorem and conditional probability
2	Deal with the random variables, probability distribution function, probability mass function of Discrete Random variables (Binomial, Poisson RVs), continuous Random variables (Uniform and Gaussian).
3	To Study the use of mean, variance, characteristic Function of Random variable to obtain the Moments of Random Variable, Markov inequality and Chebyshev inequality
4	Study and the concept of correlation and covariance for pair of Random variables, understand importance of central limit theorem with suitable Applications.
5	Understand the definition of SSS and WSS random process, study of Markov Processes with suitable Examples and Ergodic random process
6	Study concepts of linear regression algorithms and apply for predictive applications .

Subject- DCC**Subject Code-ECCDLO 5012****Course Outcomes**

PO	PSO	Competency	PI	Bloom's Level	CO	Description
1,2,5	1	1.4	1.4.1	L2-Understand	CO1	Apply and select various compression techniques for text and understand image compression and its standards for Telecommunication engineering purpose
3,4	1	2.1	2.1.3	L3-Apply	CO2	Select and investigate suitable compression techniques for specified lossless and lossy audio and video applications and find solutions to meet specified needs
6,7,8	2	2.2	2.2.4	L4-Analyze	CO3	Compare between symmetric and asymmetric cryptography and also describe different symmetric cryptographic techniques and standards relevant to engineering development .
5	1	1.1	1.1.2	L3-Apply	CO4	Apply number theory concepts to solve the cryptographic problems.
6,7	2	4.3	4.3.2	L4-Analyze	CO5	Analyze different public key cryptography algorithms and also describe and understand methods that provide the goals for integrity, confidentiality and authentication.
,910,11,12	2	8.1	8.1.1	L5-Evaluate	CO6	Describe and assess system security facilities and appreciate ethical issues and work effectively to incorporate educational needs related to system security

Course Objectives

Sr. No.	Description
1	To Gain a fundamental understanding of data compression methods for text, images, video and audio
2	To Select suitable compression techniques for specified lossless and lossy audio and video applications
3	To Compare between symmetric and asymmetric cryptography
4	To Apply number theory concepts to solve the cryptographic problems.
5	To Understand the concepts of cryptography and different algorithms to provide system security.
6	Describe system security facilities designed to protect a computer system from security threats and also appreciate ethical issues related to system security.

Semester-V**Subject- DCOM Lab****Subject Code-ECL 501****Course Outcomes**

PO	PSO	Competency	PI	Bloom's Level	CO	Description
5		1.3	1.3.1	Level 4	1	Compare various source coding schemes.
1,5		1.4	1.4.1	Level 5	2	Design and implement different error detection codes.
2,5		1.3	1.3.1	Level 4	3	Compare various line coding techniques.
5		2.1	2.1.2	Level 2	4	Illustrate the impulse response of a matched filter for optimum detection.
5		2.4	2.4.1	Level 2	5	Demonstrate various digital modulation techniques.
4,5		4.1	4.1.3	Level 3	6	Use different simulation tools for digital communication applications.

Course Objectives

Sr. No.	Description
1	To compare various source coding schemes.
2	To design and implement different error detection codes.
3	To compare various line coding techniques.
4	To illustrate the impulse response of a matched filter for optimum detection.
5	To demonstrate various digital modulation techniques.
6	To use different simulation tools for digital communication applications.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
1		1.4	1.4.1	Level 4	1	Illustrate basic discrete time signal processing operations.
2		4.1	4.1.3	Level 4	2	Illustrate Linear convolution, circular convolution , autocorrelation and interpret the results
2,3		5.1	5.1.1	Level 2	3	Demonstrate frequency analysis of different discrete time sequences and systems
2		4.1	4.1.3	Level 2	4	Demonstrate difference between DFT and DTFT
5		4.2	4.2.1	Level 6	5	Design and implement FIR and IIR filters for given specifications
3,4		5.1	5.1.1	Level 6	6	Implement and analyze applications related to the field of biomedical signal processing and audio signal processing.

Course Objectives

Sr. No.	Description
1	To carryout basic discrete time signal processing operations.
2	To perform Linear convolution, circular convolution , autocorrelation and interpret the results
3	To demonstrate frequency analysis of different discrete time sequences and systems
4	To demonstrate difference between DFT and DTFT
5	To design and implement FIR and IIR filters for given specifications
6	To implement and analyze applications related to the field of biomedical signal processing and audio signal processing.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
1		1.4	1.4.1	Level 4	1	Illustrate basic discrete time signal processing operations.
2		4.1	4.1.3	Level 4	2	Illustrate Linear convolution, circular convolution , autocorrelation and interpret the results
2,3		5.1	5.1.1	Level 2	3	Demonstrate frequency analysis of different discrete time sequences and systems
2		4.1	4.1.3	Level 2	4	Demonstrate difference between DFT and DTFT
5		4.2	4.2.1	Level 6	5	Design and implement FIR and IIR filters for given specifications
3,4		5.1	5.1.1	Level 6	6	Implement and analyze applications related to the field of biomedical signal processing and audio signal processing.

Course Objectives

Sr. No.	Description
1	To carryout basic discrete time signal processing operations.
2	To perform Linear convolution, circular convolution , autocorrelation and interpret the results
3	To demonstrate frequency analysis of different discrete time sequences and systems
4	To demonstrate difference between DFT and DTFT
5	To design and implement FIR and IIR filters for given specifications
6	To implement and analyze applications related to the field of biomedical signal processing and audio signal processing.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1	1	1.7	1.7.1	1	CO1	Describe the spice code for given combinational and sequential CMOS circuits.
PO2	1	2.6	2.6.3	2	CO2	Apply various analysis like operating point, dc, transient etc of given CMOS circuits.
PO3	1	3.8	3.8.3	2	CO3	Explain the performance of given CMOS circuits.
PO4	1	4.6	4.6.1	3	CO4	Diagram the layout of given CMOS circuit and also able extract various parasitic using open source layout tool like Magic.
PO5	1	4.4	4.4.3	6	CO5	Design, simulate, and verify CMOS circuit for given specifications.
PO6	1	5.6	5.6.2	1	CO6	Understand importance of Low power design and implement protection circuitry, Explain Interconnect model and scaling.

Course Objectives

Sr. No.	Description
1	To impart the knowledge about VLSI design trends, methodologies and allied systems used in digital design.
2	To become familiar with open source circuit simulation tools like Ngspice, Magic etc.
3	To perform various type of analysis of combinational and sequential CMOS circuits
4	To evaluate performance of given combinational and sequential CMOS circuits
5	To design, implement and verify combinational and sequential CMOS circuits using open source VLSI design tools
6	To provides an exposure to RTL design and programming

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
4	1	4.5	4.5.1	6	1	Design a technical document using precise language, suitable vocabulary and apt style
5	2	5.5.	5.5.1	6	2	Develop writing skills of a cover letter and a CV/resume/SOP
5	2	5.5	5.5.1	6	3	Develop interpersonal skills to progress professionally by building strong relationships with peers
5	2	5.5	5.5.1	6	4	Develop effective presentation skills and an impressive body language
1	2	1.5	1.5.1	3	5	Apply codes of personal integrity, values, aptitudes and skills
6	1	6.1	6.1.1	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.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1	1	1.5	1.5.2	2	CO1	Understand the embedded systems with design metrics.
PO2	1	2.6	2.6.2	2	CO2	Understand microcontrollers and programming in Embedded C.
PO3	1	3.5	3.5.2	3	CO3	Implementation of Embedded systems with different sensors and peripherals as IoT.
PO4	1	4.4	4.4.2	3	CO4	Implementation of Embedded systems with different communication protocols as IoT.
PO5	1	3.8	3.8.2	4	CO5	Analyze concepts of Real time operating systems.
PO6	1	5.4	5.4.2	6	CO6	Design embedded system applications using sensors, peripherals and RTOS

Course Objectives

Sr. No.	Description
1	To develop background knowledge Embedded Systems.
2	To understand designing of embedded systems.
3	To choose proper microcontroller for Embedded systems
4	To understand use of wireless sensors/communications with Embedded systems
5	To understand communication techniques.
6	To write programs for embedded systems and real time operating systems /IoT

Semester-III Scheme (R-16)

Subject- Applied Mathematics -III

Subject Code- ECC 301

Course Outcomes

P O	PS O	Compete ncy	PI	Bloom 's Level	CO	Description
1,	-	1.1	1.1. 2	5	CO 1	Apply the concept of Laplace transforms and use to solve real integrals in engineering problems
2	-	2.1	2.1. 2	3,4	CO 2	Identify the concept of inverse linear transform and compare to various functions and its applications
3	-	3.1	3.1. 6	3	CO 3	Determine and develop Fourier series for real life problems and applications.
2, 3	-	3.2	3.2. 1	3	CO 4	Solve gradient of spf, line integral , divergence and curl of vector
12	-	12.1	12.1 .1	3	CO 5	Apply the concept of vector differentiation in Green's Stoke's and divergence theorem.
3	-	3.2	3.2. 1	3	CO 6	Apply the properties of Complex analysis and Bessel function to model the problems of the electronics and telecommunication engineering and solve it

Course Objectives

Sr. No.	Description
1	To familiarize with the Laplace Transform and its properties.
2	To study Inverse Laplace Transform of various functions, theorems and its applications.
3	To acquaint with the concept of Fourier Series, its complex form and enhance the problem solving skills
4	To study the application of Vectors in complex engineering problems.
5	To study the application of concept of Divergence and curl.
6	To familiarize with the concept of complex variables, C-R equations with applications and Bessel function.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO 1	PSO 1	1.2	1.2.1	L3	1A	Apply the current voltage characteristics of semiconductor devices
PO 2	PSO 1	2.2	2.2.4	L4	1B	Analyze dc circuits and relate ac models of semiconductor devices.
PO 1	PSO 1	1.3	1.3.1	L2	2A	Understand the concepts for Regulators and Amplifiers.
PO 3	PSO 1	3.2	3.2.2	L3	2B	Apply the concepts for the design of Regulators and Amplifiers.
PO 1	PSO 1	2.2	2.2.2	L1	3A	Identify different transistor biasing techniques
PO 3	PSO 2	3.2	3.2.1	L4, L6	3B	Analyse and design transistor biasing techniques
PO 2	PSO 2	2.2	2.2.3	L4	4	Analyze transistor modelling and small signal analysis of amplifier.
PO 2	PSO 1	2.2	2.2.2	L5	5	Evaluate frequency response to understand behaviour of Electronics circuits.
PO 3	PSO 2	3.2	3.2.2	L6	6	Design small signal amplifiers.

Course Objectives

Sr. No.	Description
1	To describes operation, DC analysis and AC models of semiconductor devices.
2	To study the concepts for the design of Regulators and Amplifiers.
3	To Understand transistor biasing techniques and designing.
4	Use transistor modeling and small signal analysis of amplifier.
5	Analyze high frequency response for BJT and FET amplifiers.
6	Implement mini projects based on concept of electronics circuit concepts.

Course Outcomes

PO	PS O	Competen cy	PI	Bloo m's Level	CO	Description
P O1	PS O1	1.3	1.3. 1	2	CO1	Understand different binary codes and apply engineering fundamentals for conversion from one no. system to another system.
P O2	PS O1	2.1	2.1. 3	2	CO2	Identify and solve the logic expressions by applying law of Boolean algebra, and Demorgan's law to logic gates.
P O2	PS O2	3.2	3.2. 3	3	CO3	To design the various combinational circuits and implement them.
P O4	PS O2	4.1	4.1. 2	3	CO4	Design and interpretation of sequential circuits and logic circuit designs.
P O1	PS O2	1.3	1.3. 1	2	CO5	Understand and characterise different memories and PLDs
P O4	PS O1	4.1	4.1. 3	3	CO6	Design and debug simple digital circuits and systems with the aid of VHDL software tools.

Course Objectives

Sr. No.	Description
1	Apply the knowledge of fundamentals digital electronics to understand different number systems and for conversion from one number system to another.
2	Ability to derive, analyze or minimize logic expressions & circuits by applying properties of Boolean laws and K map
3	Analyze logic operations using combinational circuits like adders, MUX, encoders etc.
4	Develop a state diagram & simplify the given sequential logic. Use state machine diagram to design finite state
5	Understand concept of Programmable devices like PLA, PAL, CPLD etc and memory elements, types of memories.
6	Design, debug and verify simple digital circuits and systems with the aid of VHDL simulation tools

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1	1	1.6	1.6.1	L3	CO1	Apply their knowledge in analyzing Circuits by using network theorems.
PO2	1	2.8	2.8.2	L4	CO2	Analyze magnetic circuits.
PO3	1	3.6	3.6.3	L3	CO3	Apply/Use the time and frequency method analysis to circuits
PO2	1	2.8	2.8.1	L2 L3	CO4	Understand & solve network topology & network functions for one port and two port networks.
PO2	1	2.5	2.5.2	L5	CO5	Evaluate the various parameters of two port networks inter relationship among various circuit parameters, solve more complex network using these parameters.
PO4	1	4.6	4.6.4	L4	CO6	Synthesize the network using passive elements

Course Objectives

Sr. No.	Description
1	Analyze the Circuits with independent and dependent sources.
2	Analyze magnetic circuits.
3	Apply time and frequency domain analysis to circuits
4	Compute network Topology, network Functions.
5	Apply/Compute two port networks, inter relationship among various circuit parameters, solve more complex network using these parameters.
6	Synthesize the network using passive elements

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
1	2	1.6	1.6.1	3	CO1	Apply the knowledge of engineering fundamentals for measurement of electronics components and Instrument.
4	2	4.6	4.6.1	4	CO2	Design an electronic system or process using different sensors to meet specified needs with appropriate attention to health, safety, standards, environmental and societal considerations.
5	2	5.4	5.4.2	6	CO3	Create, select and apply appropriate techniques, resources, advanced engineering and software tools like Design Data Acquisitions and Telemetry system to analyze and design telecommunication engineering problems
1	2	1.3	1.3.1	2	CO4	Apply, the knowledge of Engineering Fundamentals to find transfer functions for given system
3	2	3.3	3.3.2	3	CO5	To design a system and calculate its time domain and frequency domain parameter and understand its impact for development
4	2	4.3	4.3.1	4	CO6	To Analyze and effectively apply appropriate techniques to predict stability of given system using appropriate criteria and engage in learning process

Course Objectives

Sr. No.	Description
1	Generate basic concepts and definitions in measurement.
2	Classify and explain Principles of working of sensors and component used in electronics measurement
3	Discover the basic knowledge of advanced electronics instruments and data acquisition systems applied in Wireless sensor network.
4	Use fundamental concepts of control system such as transfer function, mathematical modelling,
5	Make system's time and frequency-domain analysis with response to test inputs. Analysis includes the determination of the system stability
6	Develop concepts of stability and its assessment criteria and engage in learning process

Subject- EDCI LAB

Course Code : ECL 301

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
1	2	1.1	1.1.1	5	1	Measure voltage, frequency and phase of any waveform using CRO
2	2	2.1	2.1.2	4	2	Design voltage regulator using Zener diode.
2	2	2.2	2.2.2	4	3	Analyze the characteristics of different electronic devices such as diodes, transistors, FET etc., and simple circuits like rectifiers, amplifiers etc.,
4	2	4.2	4.2.1	5	4	Analyze output in different operating modes of different semiconductor devices.
5	2	5.1	5.1.1	2	5	To understand the concepts of simulation by using Spice too
5	2	5.3	5.3.2	2	6	Understand the differences between theoretical, practical and simulated results in electronic circuits and construct mini project

Course Objectives

Sr. No.	Description
1	To study basic electronic components
2	To observe characteristics of electronic devices
3	Develop the voltage regulator using Zener Diode
4	To study different biasing techniques to operate transistor , FET , in different modes
5	Model the electronic circuits using tools such as PSPICE
6	Design mini project based on electronic circuits.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1	PSO1	1.3	1.3.1	2	CO1	Understand different binary codes and apply engineering fundamentals for conversion from one no. system to another system.
PO2	PSO1	2.1	2.1.3	2	CO2	Identify and solve the logic expressions by applying laws of Boolean algebra, and Demorgan's law to logic gates.
PO2	PSO2	3.2	3.2.3	3	CO3	To design the various combinational circuits and implement them.
PO4	PSO2	4.1	4.1.2	3	CO4	Design and interpretation of sequential circuits and logic circuit designs.
PO1	PSO2	1.3	1.3.1	2	CO5	Understand and characterise different memories and PLDs
PO4	PSO1	4.1	4.1.3	3	CO6	Design and debug simple digital circuits and systems with the aid of VHDL software tools.

Course Objectives

Sr. No.	Description
1	Apply the knowledge of basic principles of digital circuits and different systems, basic gates and various engineering applications involving digital electronics and circuits
2	Understand and analyze the logic expressions (POS &SOP) and circuits using Boolean laws, K- maps, De- Morgan's laws and their applications in digital design.
3	Construct basic combinational circuits like Adders,/ Subtractors/ MUX/ DEMUX/ Encoders/ PLA/ ROM etc
4	Construct basic combinational circuits like FFs and their conversion.
5	Ability to understand the different shift registers and ability to design various counter circuits.
6	Ability to understand the different shift registers and ability to design various counter circuits.

Semester-IV

Subject- Applied Mathematics-IV

Subject Code- ECC 401

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
1,2,3,4	-	2.4	2,4.1	2	CO 1	Find the extremals of the functional using the concept of Calculus of variation.
1,2,3,12	-	3.3	3.3.1	3	CO 2	Use the concept of vector space to solve problems in machine learning, computer graphics and in Google page ranking
1,2	-	1.1	1.1.3	3	CO 3	Demonstrate basic knowledge of Matrix Theory which are very useful tools in various Engineering applications
1,2,4,12	-	4.2	4.2.2	4	CO 4	Illustrate understanding of the concepts of probability and expectation for getting the spread of the data and distribution of probabilities.
1,2,3,12	-	3.1	3.1.6	3	CO 5	Apply the concept of Correlation, Regression and curve fitting to the engineering problems in data science.
1,2,4	-	2.2	2.2.1	5	CO 6	Use the concepts of Complex Integration for evaluating integrals, computing residues & evaluate various contour integrals.

Course Objectives

Sr. No.	Description
1	To understand the concepts of Calculus of Variations.
2	To understand the concepts of vector space and its properties
3	To familiarize with the concepts of matrices and function of linear transformation
4	To familiarize with the concepts of probability distributions.
5	To acquaint with the concepts of correlation, regression and curve fitting.
6	To study Line and Contour integrals and expansion of complex valued function in a power series

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1	PSO1	1.3	1.3.1	L2	1	Understand the operation of bias circuit of MOSFET.
PO2 & PO3	PSO1	2.2 & 3.2	2.2.3 & 3.2.2	L3 & L4	2	Apply design and analyze the operation of MOSFET.
PO2	PSO1	2.2	2.2.3	L1 & L3	3	Identify and use the multistage amplifier using BJT and FET in various configuration to determine frequency response and concept of voltage gain.
PO3	PSO2	3.3	3.3.1	L3	4	Illustrate different power amplifier circuits, their design and use in electronics and communication circuits.
PO2	PSO1	2.2	2.2.4	L4	5	Categorize the concept of negative feedback amplifier and their characteristics.
PO3	PSO2	3.2	3.2.2	L6	6	Design the different oscillator circuits for various frequencies.

Course Objectives

Sr. No.	Description
1	To describe the operation of the various bias circuits of MOSFET.
2	To Analyze and Design MOSFET bias circuits.
3	To Apply the operation and design of multistage amplifier for a given specification.
4	To understand the operation and design of transformer coupled various types of power amplifier circuits.
5	Classify and describe the effects of negative feedback on amplifier circuits.
6	Compare the different RC and LC oscillator circuits and to determine the frequency of oscillation.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
2,4		1.3	1.3.1	level 3	1	Explain various current mirror circuits and illustrate differential amplifier with active load.
1,2		1.4	1.4.1	Level 1	2	Describe characteristics as well as linear and non linear applications of Op-amps.
5		4.1	4.1.3	Level 6	3	Construct and compare different circuits for mathematical operations using op amp 741.
1,4		4.2	4.2.1	Level 4	4	Analyze different comparators and waveform generators.
2,5		4.1	4.1.3	level 3	5	Show use of special purpose IC555 in monostable and astable modes and their applications.
5		4.1	4.1.3	Level 6	6	Construct voltage regulator circuits using IC78XX, IC 79XX, IC 723 , LM317 and ADC/DAC.

Course Objectives

Sr. No.	Description
1	To analyze and design differential amplifier, current sources and describe basics of Op-amp.
2	To enable students to analyze AC and DC characteristics of Op-Amp.
3	To design and explain different linear, non-linear and mathematical application circuits using op-amps.
4	To analyze different comparators and waveform generators.
5	To illustrate use of special purpose IC555 in monostable and a stable modes and their applications.
6	To construct voltage regulator circuits using IC78XX, IC 79XX, IC 723 , LM317 and ADC/DAC.

Subject- SS

Subject Code- ECC404

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1	1	1.6	1.6.1	L2	CO1	Understand the concept & types of signals, classification of signals.
PO2	1	2.5	2.5.3	L4	CO2	Analysis of signals& systems, classification of systems with examples.
PO2	1	2.8	2.8.1	L3	CO3	Illustrate the time domain analysis of continuous & discrete time system
PO2	1	2.8	2.8.1	L3	CO4	Apply the knowledge of frequency domain analysis of continuous & discrete time system
PO3	1	3.6	3.6.3	L4	CO5	Analyze the discrete time LTI system using Z transform
PO1	1	1.7	1.7.1	L2 L3	CO6	Understand & solve the concept of state, state variables & application of signals& system

Course Objectives

Sr. No.	Description
1	Apply the concept & theory of signals and systems in engineering field
2	Classification & analysis of signals& systems
3	Apply the knowledge of time domain analysis of continuous & discrete time system
4	Apply the knowledge of frequency domain analysis of continuous & discrete time system
5	Use of transform in analysis of system
6	Apply the concept of state, state variables & application of signals& system

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
1,5	1	1.3	1.3.1	L2-Understand	CO1	Understand different fundamental concept of modulation and demodulation techniques used in analog communication to solve Engineering Problems
2,4,7	1	2.4	2.4.4	L3-Apply	CO2	Identify and solve basic communication problems to meet environment and societal considerations
3,5,6	1	2.4	2.4.4	L3-Apply	CO3	Investigate and analyze transmitter and receiver circuits to meet specified needs of society and environment
4,8	2	2.2	2.2.4	L4-Analyze	CO4	Compare and contrast design issues, advantages, disadvantages and limitations of analog communication system with attention to health, safety and legal issues and accountability in engineering profession
12	2	3.2	3.2.3	L4-Analyze	CO5	To study pulse modulation and demodulation techniques in adaptation to the changing world of technology
9,10,11	2	3.3	3.3.1	L4-Analyze	CO6	To design an electronic system to communicate effectively by working in a team ,managing finance and engaging in life long learning

Course Objectives

Sr. No.	Description
1	To introduce students to various modulation and demodulation techniques of analog communication
2	To analyze different parameters of analog communication techniques
3	To Investigate and analyze transmitter and receiver circuits
4	To Compare and contrast design issues, advantages, disadvantages and limitations of analog communication system
5	To study pulse modulation and demodulation techniques
6	To Illustrate the principles of multiplexing and demultiplexing techniques.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
1	2	1.1	1.1.2	5	1	Know about different power amplifier circuits, their design and use in electronics and communication circuits.
2	2	2.3	2.3.2	6	2	Able to design amplifier circuits using BJT s And FET's. and observe the amplitude and frequency responses of common amplifier circuits
2	2	2.4	2.4.2	5	3	Measure the effect of negative feedback on different parameters of an Amplifier and different types of negative feedback topologies.
4	2	4.3	4.3.1	5	4	Measure the effect of positive feedback and able to design and working of different Oscillators using BJTS.
5	2	5.1	5.1.1	2	5	To understand the concepts of simulation by using Spice too
5		5.3	5.3.2	2	6	Understand the differences between theoretical, practical and simulated results in electronic circuits and construct mini project

Course Objectives

Sr. No.	Description
1	To understand the working of transistor at high frequency
2	Observe the effect of negative feedback on different parameters of an Amplifier and different types of negative feedback topologies.
3	To design and implement feedback amplifier circuits
4	To measure the frequency of oscillators.
5	Model the electronic circuits using tools such as PSPICE
6	Design mini project based on electronic circuits.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
2,4		1.3	1.3.1	level 3	1	Explain and illustrate various applications of Op amp such as integrator and differentiator.
1,2		1.4	1.4.1	Level 1	2	Describe characteristics as well as linear and non linear applications of Op-amps.
5		4.1	4.1.3	Level 6	3	Construct and compare different circuits for mathematical operations using op amp 741.
1,4		4.2	4.2.1	Level 4	4	Analyze different comparators and waveform generators.
2,5		4.1	4.1.3	level 3	5	Show use of special purpose IC555 in monostable and astable modes and their applications.
5		4.1	4.1.3	Level 6	6	Construct voltage regulator circuits using IC78XX, IC 79XX, IC 723 , LM 317

Course Objectives

Sr. No.	Description
1	To analyze and design differential amplifier, current sources and describe basics of Op-amp.
2	To enable students to analyze AC and DC characteristics of Op-Amp.
3	To design and explain different linear, non linear and mathematical application circuits using op-amps.
4	To analyze different comparators and waveform generators.
5	To illustrate use of special purpose IC555 in monostable and astable modes and their applications.
6	To construct voltage regulator circuits using IC78XX, IC 79XX, IC 723 , LM317 and ADC/DAC.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
1	1	1.3	1.3.1	L2-Understand	CO 1	Understand and analyze analog modulation and demodulation techniques to solve Engineering Problems
2,4,7	1	2.1	2.1.3	L3-Apply	CO 2	Identify and solve basic communication problems to meet environment and societal considerations
3,5,6	1	2.4	2.4.4	L4-Analyze	CO 3	Analyze the waveforms of Radio receivers to meet specified needs of society and environment
4,7,8	2	2.4	2.4.4	L3-Apply	CO 4	Implement analog pulse modulation and demodulation circuits in attention to health,safety and accountability in engineering profession
12	2	3.2	3.2.3	L4-Analyze	C05	To Demonstrate digital pulse modulation and demodulation techniques. in adaptation to the changing world of technology
9,10,11	2	3.3	3.3.1	L4-Analyze	C06	To Verify the concepts of multiplexing and design an electronic system to communicate effectively by working in a team ,managing finance and engaging in life long learning

Course Objectives

Sr. No.	Description
1	To introduce students to various modulation and demodulation techniques of analog communication
2	To analyze different parameters of analog communication techniques
3	To Investigate and analyze transmitter and receiver circuits
4	To Compare and contrast design issues, advantages, disadvantages and limitations of analog communication system
5	To study pulse modulation and demodulation techniques
6	to verify concepts of TDM and FDM and to design an electronic system to communicate effectively

SEMESTER V**Subject-MPP****Subject Code-ECC 501****Course Outcomes**

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1		1.3	1.3.1	2	1	Understand the components of microcomputer systems, like I/O devices ,Memory ,Buses etc and concept of HLL & LLL
PO2		2.2	2.2.2	2	2	Understand the architecture and write software of microprocessor 8086
PO3 PO4		3.1 4.1	3.1.6 4.1.1	6	3	To investigate engg problems and Design electronic System to solve real time problems
PO4 PO5		4.2 5.1	4.2.1 5.2.1	6	4	Design multiprocessor electronic system to meet society needs
PO5	PSO1	5.1	5.1.1	4	5	Identify difficult issues of society & Create Data Acquisition system
PO8 PO9 PO10	PSO2	8.1 9.1 10.1	8.1.1 9.1.1 10.1.3	6	6	Design & present mini projects in groups.

Course Objectives

Sr. No.	Description
1	To understand the basic concepts of microcomputer systems.
2	To develop background knowledge and core expertise in 8086 microprocessor ,co-processor 8087 and write ALP for 8086.
3	To explain peripheral devices and their interfacing to 8086 and to apply it to design microprocessor-based system.
4	To understand 8087 Math Co-Processor and Design of Memory devices and their interfacing to 8086 .
5	Apply knowledge of 8086 & interfacing devices to Create data Acquisition System
6	Design miniproject based on 8086 Microprocessor in group of Students

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1	1	1.1	1.1.1	BL2	CO1	Apply Mathematical techniques such as statistics and random variables to solve engineering problems.
PO2	1	2.1	2.1.3	BL3	CO2	To identify and formulate various source coding techniques to attain errorless communication.
PO2	1	2.4	2.4.3	BL4	CO3	Identify the sources of error in the system and rectify it by using different channel coding methods.
PO4	2	4.1	4.1.2	BL5	CO4	Examine the relevant modulation techniques and apply it for optimum data communication.
PO4	2	4.3	4.3.2	BL4	CO5	Analyze and interpret various baseband modulation techniques and apply it for errorless reception.
PO2	1	2.2	2.2.3	BL2	CO6	Identify and demonstrate a solution using various techniques for errorfree communication.

Course Objectives

Sr. No.	Description
1	Understand probability and random variable theory.
2	Classify source encoder and finding out codewords using Shannon Fano and Huffman coding algorithm
3	Estimate information, average information (Entropy) and Interpret channel encoder.
4	Understand impact of different modulation techniques.
5	Detection and correction of error to produce optimum receiver.
6	Classify various digital modulation techniques.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
1,5		1.3, 1.4	1.3.1 1.4.1	Level 3	1	Apply the knowledge of vector calculus and basic mathematics to determine fields in free space and materials.
2,3		2.1	2.1.2	Level 4	2	Identify the difference between static fields and time varying fields and derive boundary conditions for different interfaces.
3,5		2.4	2.4.1	Level 4	3	Analyze and derive Maxwell's Equations in differential and integral forms and apply them to diverse engineering problems.
3,6		1.4	1.4.1	Level 3	4	Examine the phenomena of radio wave propagation in different media and its interfaces and its applications in microwave engineering.
4,5		5.1	5.1.2	Level 5	5	Measure different transmission line parameters using Smith Chart and understand its significance in impedance matching.
7,9		2.4	2.4.1	Level 4	6	Identify and utilize different electromagnetic phenomena in appropriate applications such as EMI, EMC, Metamaterials, Optical nanocircuits and ESDs

Course Objectives

Sr. No.	Description
1	To apply the knowledge of vector calculus and basic mathematics to determine fields in free space and materials.
2	To identify the difference between static fields and time varying fields and derive boundary conditions for different interfaces.
3	To analyze and derive Maxwell's Equations in differential and integral forms and apply them to diverse engineering problems.
4	To examine the phenomena of radio wave propagation in different media and its interfaces and its applications in microwave engineering.
5	To measure different transmission line parameters using Smith Chart and understand its significance in impedance matching.
6	To correlate and utilize different electromagnetic phenomena in appropriate applications such as EMI, EMC, Metamaterials, Optical nanocircuits and ESDs

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1	PSO1	1.1	1.1.1	Level2	CO1	Describe concept of DFT and FFT.
PO3	PSO1	3.6	3.6.1	Level3	CO2	Apply the knowledge of design of digital IIR filter with arbitrary specification.
PO3	PSO1	3.6	3.6.1	Level3	CO3	Apply the knowledge of design of digital FIR filter with arbitrary specification.
PO2	PSO1	2.6	2.6.4	Level4	CO4	Analyze the effect of hardware limitation on performance of digital filter.
PO2	PSO1	2.8	2.8.1	Level5	CO5	Explain finite word length effect of digital filters.
PO5	PSO1	5.4	5.4.2	Level6	CO6	Implement DSP Processor for real time application.

Course Objectives

Sr. No.	Description
1	Develop through understanding of DFT and FFT their application.
2	Teach different design technique of digital IIR filters.
3	Teach different design technique of digital FIR filters.
4	Analyze performance of digital filters.
5	Understand finite word length effect of Digital filters.
6	Introduce the DSP processor and its application.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO2	PSO1	2.3	2.2.4	BL2	CO1	To understand and formulate the best method for text compression
PO4	PSO1	4.3	3.3.1	BL3	CO2	To Analyze and compare various image compression techniques
PO3	PSO2	3.2	3.2.2	BL4	CO3	To model and demonstrate different audio and video compression algorithms
PO3	PSO2	3.1	3.1.5	BL2	CO4	To explore various methods of data security using ciphering
PO3	PSO1	3.1	3.2.1	BL5	CO5	To design and develop cryptography algorithms in the field of data security
PO5	PSO2	5.3	5.1.1	BL5	CO6	To apply and Evaluate Modern Security Systems Against Cyber Crime

Course Objectives

Sr. No.	Description
1	To learn the basic methods of text compressions
2	To study and understand various image compression techniques
3	To implement audio and video compression algorithms with efficient solutions
4	To understand different data security ciphering techniques
5	To learn and apply cryptography algorithms in the field of data security
6	To study modern security techniques against cyber security

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1		1.3	1.3.1	2	1	Understand the basic concepts of microcomputer systems
PO2		2.2	2.2.2	2	2	Understand the architecture and software aspects of microprocessor 8086.
PO5		5.1	5.1.1	4	5	Write Assembly language program in 8086.
PO3		3.1	3.1.6	6	3	Know the Co-processor configurations.
PO2		2.2	2.2.2	2	5	Interface peripherals for 8086
PO8 PO9 PO10	PSO1	8.1 9.1 10.1	8.1.1 9.1.1 10.1.3	6	6	Design elementary aspect of microprocessor based system for creating application types devices.

Course Objectives

Sr. No.	Description
1	To understand the basic concepts of microcomputer systems.
2	To develop background knowledge and core expertise in 8086 microprocessor and co-processor 8087
3	To write assembly language programs for 8086 microprocessors
4	To Understand the Data Acquisition System and Different Conversion ICs.
5	To understand peripheral devices and their interfacing to 8086 and to study the design aspects of basic microprocessor based system
6	To understand 8087 Math Co Processor and Design of Memory devices and their interfacing to 8086

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1	1	1.1	1.1.1	BL1	CO1	understand various digital modulation techniques
PO2	1	2.1	2.1.3	BL3	CO2	Identify and formulate various source coding techniques to attain errorless communication.
PO2	1	1.1	1.1.2	BL4	CO3	Estimate information, average information(Entropy) and Interpret channel encoder.
PO4	2	4.1	4.1.2	BL4	CO4	To identify and formulate various source coding techniques to attain errorless communication.
PO4	2	4.3	4.3.2	BL4	CO5	Identify the sources of error in the system and rectify it by using different channel coding methods.
PO2	1	2.2	2.2.3	BL2	CO6	Apply various digital modulation techniques for bandwidth reduction

Course Objectives

Sr. No.	Description
1	To understand various digital modulation techniques
2	Analyse source encoder and finding out codewords using Shannon Fano and Huffman coding algorithm
3	Estimate information, average information (Entropy) and Interpret channel encoder.
4	Analyze and interpret various baseband modulation techniques and apply it for errorless reception.
5	Detection and correction of error to produce optimum receiver.
6	Apply various digital modulation techniques for bandwidth reduction

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
5	1	1.1	10.1.1	1	1	Design a technical document using precise language, suitable vocabulary and apt style
7	1	9.2	9.2.1 & 9.2.2	3	2	Develop writing skills of business and technical proposals and documents
11	2	8.1	8.1.1 & 8.2.2	3, 5	3	Develop the life skills/interpersonal skills to progress professionally by building strong relationships
9	1	10.2	10.2.2	1,3	4	Represent them as team members and leaders with well groomed, organized, social etiquettes in professional and social environment.
8	2	10.1	10.1.1	2,3	5	Demonstrate awareness of contemporary issues, knowledge of professional and ethical responsibilities
12	2	9.1 & 9.2	9.1.1 & 9.2.2	2,3	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 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

Course Outcomes

PO	PS O	Competenc y	PI	Bloom's Level	CO	Description
1,2	1	1.4	1.4.1	L2- Understand	1	Understand different open source programming tools for use in communication engineering technology
1,3,5	2	2.1	2.1.2	L3 Apply	2	Simulate using software tools and analyze the performance of communication system and find appropriate solution to Engineering problems
4,5	2	3.1	3.1.6	L2- Understand	3	Design and Implement the communication system/subsystem by applying appropriate techniques
5,6,7	1	4.3	4.3.4	L3-Apply	4	Understand and Analyze and the signals in time domain and frequency domain for sustainable developments
8,9,10	2	5.1	5.1.2	L4-Analyze	5	Design and Simulate Digital Circuits and use effectively for use in Engineering profession
4,5,11,12	2	5.3	5.3.1	L5- Evaluate	6	Design and Simulate various Circuits of Operational Amplifiers, BJT, MOSFETs etc by incorporating principles of management in a changing world of technology (1,2,3,5,6,7,8,9,10,11,12)

Course Objectives

Sr. No.	Description
1	Introduction to open source tools for communication lab.
2	To simulate and analyze the various parameters of communication systems.
3	To understand and implement the communication system/sub system.
4	To Understand and Analyze and the signals in time domain and frequency domain
5	To Simulate various digital Circuits
6	To Simulate various Circuits of operational Amplifiers, BJT, MOSFETs etc

Subject- Data compression and encryption

Subject Code- ECLDLO 514 (lab)

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO2	PSO1	2.3	2.2.4	BL2	CO1	To formulate text compression techniques
PO4	PSO1	4.3	3.3.1	BL3	CO2	To design image compression technique
PO3	PSO2	3.2	3.2.2	BL4	CO3	To model and demonstrate different audio and video compression algorithms
PO3	PSO2	3.1	3.1.5	BL2	CO4	To design ciphering methods for encryption
PO3	PSO1	3.1	3.2.1	BL5	CO5	To design and develop cryptography algorithms in the field of data security
PO9	PSO2	9.1	9.2.1	BL5	CO6	To demonstrate project on real life case study using modern ciphers

Course Objectives

Sr. No.	Description
1	To design basic methods of text compressions
2	To study and understand various image compression techniques
3	To implement audio and video compression algorithms with efficient solutions
4	To understand different data security ciphering techniques
5	To learn and apply cryptography algorithms in the field of data security
6	To demonstrate modern ciphering security techniques for product development

SEMESTER VI

Subject-MCA

Subject Code-ECC 601

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO2	PSO1	2.1	2.1.1	BL2	CO1	Understand and describe detailed architecture of 8051 Microcontroller.
PO4	PSO1	4.1	4.1.3	BL2	Co2	Classify/Illustrate different types of algorithms for microcontroller and its application.
PO5,PO3,PO6,PO12	PSO2	3.4	3.4.1	BL3	CO3	Use/Apply the knowledge to interface various peripheral devices with microcontroller.
PO2	PSO1	2.1	2.1.2	BL2	CO4	Understand and describe detailed architecture of ARM 7.
PO4	PSO1	4.2	4.2.1	BL2	CO5	Classify/Illustrate different types of algorithms for ARM 7.
PO3	PSO2	3.4	3.4.1	BL6	CO6	Develop programmes in ARM 7 using embedded C.

Course Objectives

Sr. No.	Description
1	To understand and describe detailed architecture of 8051 Microcontroller.
2	To Classify/Illustrate different types of algorithm for microcontroller and it's application.
3	To Apply the knowledge to interface various peripheral devices with microcontroller.
4	To understand and describe detailed architecture of ARM 7.
5	To classify/Illustrate different types of algorithm for ARM 7.
6	To develop programmes in ARM 7 using embedded C.

Subject- CCN**Subject Code-ETC602****Course Outcomes**

PO	PSO	Competency	PI	Bloom's Level	CO	Description
1,2,7	1	1.4	1.4.1	L2-Understand	CO1	To identify and apply the knowledge of Engineering fundamentals to design a small or medium sized computer network including media types, end devices, and interconnecting devices that meets a customer specific need
3	1	2.1	2.1.2	L3-Apply	CO2	Investigate and perform basic configurations on routers and Ethernet switches
4,6	2	2.4	2.4.2	L3-Apply	CO3	Demonstrate knowledge of programming for network communications to understand and find appropriate standard solution to meet society needs
4,5	1	3.3	3.3.1	L4-Apply	CO4	Learn to design and simulate computer networks by appropriate software tools and analyse the simulation results
8,9	2	4.1	4.1.3	L5-Evaluate	CO5	Troubleshoot connectivity problems in a host occurring at multiple layers of the OSI model
10,11,12	2	4.3	4.3.4	L5-Evaluate	CO6	Develop knowledge and skills necessary to gain employment in Engineering Profession and work effectively as computer network engineer and network Management administrator engaging in lifelong learning

Course Objectives

Sr. No.	Description
1	Conceptual understanding and functional aspects of computer communication and telecom networks.
2	To Design and configure small/medium sized computer network that meets a specific need for communications.
3	To Investigate and Perform basic configurations on routers and Ethernet switches
4	To Demonstrate knowledge of programming for network communications
5	To Simulate computer networks and analyse the simulation results including troubleshoot connectivity problem occurring at layers of TCP/IP model.
6	To Develop knowledge and skills necessary to gain employment in Engineering Profession

Subject- Antenna & Radio Wave Propagation (ARWP)
603

Subject Code- ECC

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
1,2		1.4	1.4.1	Level 3	1	Apply the knowledge of fundamental parameters of antenna to design wireless transmit and receive system.
2		1.4	1.4.1	Level 4	2	Identify different antennas and analyze dipole, monopole, loop helical and other wired antennas.
5		4.1	4.1.2	Level 6	3	Design linear arrays for efficient and complex transmit and receive system
2,3		4.1	4.1.2	level 2	4	Understand current antenna requirements and develop cost effective and compact antennas such as patch antennas accordingly.
4		4.2	4.2.1	Level 5	5	Measure different antenna parameters and understand characteristics of radio wave propagation for analyzing wireless systems.
4		4.2	4.2.1	Level 4	6	Select type of antenna and provide appropriate design solution according to specified parameters.

Course Objectives

Sr. No.	Description
1	To apply the knowledge of fundamental parameters of antenna to design wireless transmit and receive system.
2	To identify different antennas and analyze dipole, monopole, loop helical and other wired antennas.
3	To design linear arrays for efficient and complex transmit and receive system
4	To understand current antenna requirements and develop cost effective and compact antennas such as patch antennas accordingly.
5	To measure different antenna parameters and understand characteristics of radio wave propagation for analyzing wireless systems.
6	To effectively select type of antenna and provide appropriate design solution according to specified parameters.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
P01	PSO1	1.1	1.1.1	BI3	CO1	Use concept of matrices to solve image processing problems
P02	PSO1	2.5	2.5.3	BI3	CO2	Apply theory and concept of DFT, DCT, Walsh Transform to solve image processing problems
P02	PSO1	2.6	2.6.4	BI4	CO3	Compare and contrast alternative methods of image enhancement to select best method
P02	PSO1	2.8	2.8.1	BI4	CO4	Apply morphological operations on image for image restoration
P03	PSO1	3.6	3.6.1	BI5	CO5	To explore alternative methods of image segmentation
P05	PSO2	5.4	5.4.2	BI6	CO6	Create machine learning tools for image analysis

Course Objectives

Sr. No.	Description
1	Describe mathematical models of digital image processing.
2	Classify and explain different types of image transforms.
3	Apply time and frequency domain techniques for image enhancement.
4	Use Image morphological and restoration techniques for image correction.
5	Analyse image segmentation techniques to recognize various shapes/ objects in an image.
6	Formulate classification techniques in machine vision to classify objects.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1	PSO1	1.7	1.7.1	BL2	CO1	1) Gain knowledge about basics of database management i.e. Relational database management system in electronics and computer related applications.
PO3	PSO2	3.5	3.5.3	BL5	CO2	2) compare existing data modelling techniques & get advantage of RDBMS over them
PO5	PSO1	5.5	5.5.1	BL6	CO3	3) To implement basic programming of SQL syntax.
PO2	PSO1	2.7	2.7.1	BL6	CO4	4) To design and analyze ERD (entity relationship diagram) modelling technique for database designing.
PO1	PSO1	1.2	1.2.1	BL3	CO5	5) To apply transaction management properties [ACID] in DBMS.
PO5	PSO2	5.4	5.4.2	BL2	CO6	6) TO understand and apply efficient concurrency control in order to develop sustainable DBMS benefiting towards the betterment of social and security applications.

Course Objectives

Sr. No.	Description
1	To teach students basics of database management i.e. Relational database management system
2	To learn the advantages of RDBMS over existing data modelling techniques
3	To learn and program SQL syntax and understand the structure query language
4	To design and analyze ERD (entity relationship diagram) modelling technique for database designing
5	To study and understand database designs in DBMS and transaction management properties
6	To learn the techniques of efficient concurrency control in order to develop sustainable DBMS benefiting towards the betterment of social and security applications.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO4	1	4.5	4.5.1	Level -6	CO1	Realize logic circuits with different design styles.
PO4	1	4.4		Level-1,2,3,5,6	CO2	Understand operation of memory, storage circuits and data path elements.
PO6	1	6.4	6.4.1	Level-1	CO3	Interpret Adders, Multipliers and shifters using logic design styles.
PO1	1	1.6	1.6.1	Level-3	CO4	Demonstrate an understanding of system level design issues such as protection, clocking and routing.
PO5	1	5.4	5.4.2	Level-5	CO5	Simulate & synthesize digital circuits using HDL Language.
PO3	1	3.8	3.8.2	Level-6	CO6	Implement RTL designing for Practical Applications like High level state machine and FIR filter design.

Course Objectives

Sr. No.	Description
1	Implement MOS circuit logic design using various design styles with layouts.
2	Study fundamental of memory and storage circuits.
3	Understand designing of Adders, Multipliers and Shifters with their circuit design issues.
4	Highlight circuit design issues in the context of VLSI technology.
5	Illustrate HDL for system based and data path design.
6	Acquire knowledge of RTL designing.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO2	PSO1	2.1	2.1.1	BL2	CO1	Understand and describe detailed architecture of 8051 Microcontroller.
PO4	PSO1	4.1	4.1.3	BL2	Co2	Use of different algorithm for microcontroller .
PO5,PO3,PO6,PO12	PSO2	3.4	3.4.1	BL3	CO3	To interface various peripheral devices with microcontroller.
PO2	PSO1	2.1	2.1.2	BL2	CO4	Use of different algorithm for ARM 7.
PO4	PSO1	4.2	4.2.1	BL2	CO5	Classify/Illustrate different types of algorithm for ARM 7.
PO3	PSO2	3.4	3.4.1	BL6	CO6	Develop programmes in ARM 7 using embedded C.

Course Objectives

Sr. No.	Description
1	To understand and describe detailed architecture of 8051 Microcontroller.
2	To Classify/Illustrate different types of algorithm for microcontroller and it's application.
3	To Apply the knowledge to interface various peripheral devices with microcontroller.
4	To understand and describe detailed architecture of ARM 7.
5	To classify/Illustrate different types of algorithm for ARM 7.
6	To develop programmes in ARM 7 using embedded C.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1	1	1.7	1.7.1	1	CO1	Identify a computer network including media types, end devices that meets a customer's specific needs.
PO2	1	2.6	2.6.1	3	CO2	Illustrate basic network configuration on routers and Ethernet switches.
PO3	1	2.8	2.8.2	2	CO3	Describe the knowledge of programming for network communications.
PO4	1	5.5	5.5.1	4	CO4	Illustrate and analyze the simulation for computer networks.
PO5	1	4.4	4.4.3	6	CO5	Modify the connectivity problems in a host occurring at multiple layers of the OSI model.
PO6	1	5.6	5.6.1	1	CO6	Describe knowledge and skills necessary to gain employment as computer network engineer and network administrator.

Course Objectives

Sr. No.	Description
1	To introduce analysis and design of computer communication networks.
2	To design and configure a network for an organization.
3	To implement client-server socket programs.
4	To analyse the traffic flow and the contents of protocol frames.
5	To study working process for Protocols and analysing packets.
6	To study requirements and scope of Subnetting and Network Translation

Subject- Antenna & Radio Wave Propagation Lab(ARWP) Subject Code- ECL 603

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
1,2		1.4	1.4.1	Level 3	1	Apply the knowledge of fundamental parameters of antenna to measure radiation pattern of dipole antennas.
2		1.4	1.4.1	Level 4	2	Identify different antennas and analyze dipole, monopole, loop helical and other wired antennas.
5		4.1	4.1.2	Level 6	3	Design linear arrays for efficient and complex transmit and receive system
2,3		4.1	4.1.2	level 2	4	Understand current antenna requirements and design cost effective rectangular patch antenna.
4		4.2	4.2.1	Level 5	5	Measure different antenna parameters and understand characteristics of radio wave propagation for analyzing wireless systems.
4		4.2	4.2.1	Level 4	6	Select type of antenna and provide appropriate design solution according to specified parameters.

Course Objectives

Sr. No.	Description
1	To apply the knowledge of fundamental parameters of antenna to design wireless transmit and receive system.
2	To identify different antennas and analyze dipole, monopole, loop helical and other wired antennas.
3	To design linear arrays for efficient and complex transmit and receive system
4	To understand current antenna requirements and develop cost effective and compact antennas such as patch antennas accordingly.
5	To measure different antenna parameters and understand characteristics of radio wave propagation for analyzing wireless systems.
6	To effectively select type of antenna and provide appropriate design solution according to specified parameters.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
P01	2	1.3	1.3.1	BI3	CO1	Convert original image into different color models
P02	2	2.2	2.2.4	BI3	CO2	Use various image transforms on an image.
P02	2	2.3	2.3.1	BI4	CO3	Perform point operations and filtering in spatial domain
P02	2	2.4	2.4.1	BI4	CO4	Apply various morphology techniques on an image
P03	2	3.3	3.3.1	BI5	CO5	Segment image into regions.
P05	2	5.1	5.1.1	BI6	CO6	Construct mini project based on anyone of the image process

Course Objectives

Sr. No.	Description
1	Describe mathematical models of digital image processing.
2	Design different types of images transforms for different application.
3	Apply time and frequency domain techniques for image enhancement.
4	Use Image morphological and restoration techniques for image correction.
5	Analyse image segmentation techniques to recognize various shapes/ objects in an image.
6	Identify Mini project for Specific application

Subject- DATABASE MANAGEMENT SYSTEMS LAB Subject Code- ECCDLO6023**Course Outcomes**

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1	PSO1	1.7	1.7.1	BL2	CO1	To understand basic SQL programming for DBMS implementations
PO3	PSO2	3.5	3.5.3	BL5	CO2	To design data definition (DDL) commands using SQL
PO5	PSO1	5.5	5.5.1	BL6	CO3	To implement basic programming of SQL syntax using DML,DRL commands
PO4	PSO1	4.3	4.3.3	BL6	CO4	To design and analyze ERD (entity relationship diagram) modelling technique for database designing.
PO1	PSO1	1.2	1.2.1	BL3	CO5	To apply transaction management properties [ACID] in DBMS.
PO9	PSO2	9.2	9.2.1	BL2	CO6	To develop project based on case study as a result of product development

Course Objectives

Sr. No.	Description
1	To teach students basics of database management i.e. Relational database management system
2	To implement DDL commands using SQL
3	To implement DML,DRL,DCL commands using SQL
4	To design and analyze ERD (entity relationship diagram) modelling technique for database designing
5	To study and understand database designs in DBMS and transaction management properties
6	To design a project based case study for real life scenario involving database applications

Subject-DVLSI (Lab)

Subject Code- ECLDOL6021

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1	1	1.5	1.5.1	1	CO1	Identify various tools and processes used in VLSI Design.
PO2	1	2.6	2.6.2	2	CO2	Describe working of various CMOS combinational and sequential circuits used in VLSI Design
PO3	1	3.5	3.5.4	2	CO3	Derive expressions for performance parameters of basic building blocks like CMOS inverter.
PO4	1	4.4	4.4.2	3	CO4	Demonstrate different design styles used in digital design like RTL, Transmission gates etc. Implement concept of sizing. Implementation of various circuits using different design styles.
PO5	1	3.8	3.8.2	4	CO5	Outline suitable circuit and design style for given application.
PO6	1	5.4	5.4.2	1	CO6	Analyze various combinational and sequential circuits for given specifications.

Course Objectives

Sr. No.	Description
1	To impart the knowledge about VLSI design trends, methodologies and allied systems used in digital design.
2	To introduce fabrication process flow of VLSI Design.
3	To understand MOSFET operation from VLSI design perspective.
4	To learn VLSI design performance metric and various tradeoffs.
5	To design, implement and verify combinational and sequential logic circuits using various MOS design styles.
6	To provides an exposure to RTL design and programming

Semester VII

Subject-Microwave Engineering

Subject Code- ECC701

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
2		2.1	2.1.3	L3	1A	Find the scattering parameters of various microwave circuits.
2		2.3	2.3.2	L6	1B	Design and draw impedance matching networks.
1		1.1	1.1.1	L2	2A	Analyze the waveguide's operation mathematically for transmission of microwave signal.
1		1.3	1.3.1	L4	2B	Demonstrate the working of waveguide microwave devices to solve microwave engineering problems.
3		3.3	3.3.1	L5	3	Compare all microwave solid state devices for generation and amplification of microwave signals.
4		4.2	4.2.1	L2	4A	Explain electronics circuits using Microwave semiconductor devices.
4		4.3	4.3.2	L1	4B	Describe that how microwave semiconductor devices meet specified needs at microwave frequencies
5		5.2	5.2.1	L4	5A	Select appropriate microwave measurement techniques as per the requirement.
		5.3	5.3.2	L4	5B	Analyze microwave measurement techniques with various microwave parameters based on its accuracy and limitations.
4		4.1	4.1.2	L4	6	Identify complex microwave circuit designing problems and its solutions by discussing MMICs and HMICs in detail.

Course Objectives

Sr. No.	Description
1	To illustrate basic concepts of microwave communication and to focus on microwave designing using smith charts and microwave signal generation scattering parameters.
2	To understand fundamentals of waveguide modes and working of waveguide devices
3	To express the working of solid-state amplifiers and oscillators at microwave frequencies.
4	To explain the characteristics of microwave semiconductor devices.
5	To demonstrate measurement methods of microwave parameters.
6	To compare MMIC and HMIC and their constructions.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1	PSO1	1.3	1.3.1	BL2	CO1	To Understand, identify & describe various multiple access techniques to cope with change in world of technology
PO3	PSO2	3.2	3.2.2	BL6	CO2	To Design Various Cellular system design to meet Specific need.
po5	PSO2	5.1	5.1.2	BL3	CO3	To investigate engineering problems and Design electronic communication System to solve real time problems
PO1	PSO1	1.2	1.2.1	BL6	CO4	To Know and Design GSM, LTE Communication system to meet society needs
po2	PSO2	2.1	2.1.2	BL3	CO5	To Identify difficult issues of society & Create Cellular system using different propagation models.
po3	PSO2	3.2	3.2.1	BL3	CO6	To apply the concept of mobile communication for modern applications like cognitive radio

Course Objective

Sr. No.	Description
1	To learn various multiple acces technologies in Mobile communications
2	To design cellular systems aspects for mobile commuincations
3	To solve enginnering problems for real time
4	To design and analyze GSM, LTE and other cellular standards
5	To learn different propagation models
6	To model and apply concepts to modern mobile technology

Subject- OC

Subject Code- ECC 703

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1	PSO1	1.3	1.3.1	2	CO1	Understand construction of optical fiber, its transmission characteristics, types of fibers etc.
PO2	PSO1	2.1	2.1.3	2	CO2	Identify and analyse the various causes of signal degradation and loss mechanism in fibers, also understand the different types of attenuation and dispersion phenomenon.
PO3	PSO2	3.2	3.2.3	3	CO3	Learn the optical sources of coherent and incoherent signal like LED and LASER to be studied and understand their working principle, types.
PO4	PSO2	4.1	4.1.2	3	CO4	Optical receivers and detectors like PIN, APD etc should be understood including their working and noise performance.
PO1	PSO2	1.3	1.3.1	2	CO5	Different important optics components like fibre joints, connectors, splices, couplers, optical amplifiers etc. to be analysed and understood.
PO4	PSO1	4.1	4.1.3	3	CO6	Study the theoretical concepts of designing an optical fibre link with different system components using Link Budget design.

Course Objectives

Sr. No.	Description
1	Apply the knowledge of Science and Engineering fundamentals for understanding of optical fibre communication link Ray propagation and transmission properties of optical fibres.
2	Understand the estimation of losses and analyse the propagation characteristics of an optical signal in different types of fibres.
3	Describe the principles and characteristics of optical sources like LED and LASER.
4	To learn the characteristics of fibre optic receivers and noise performance in photo detectors
5	To learn the different fibre optics components like fibre joints connectors splices couplers optical amplifiers and filters etc.
6	Design of an optical fibre link based on Link budget Design.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO2		2.1	2.1.2	2	1	Understand and illustrate artificial neural networks solve complex Electronics and telecommunication engineering Problems.
PO5		5.1	5.1.1	4	2	Identify and apply supervised neural networks to solve telecommunication engineering problem
PO1		1.1	1.1.2	2	3	Interrelate supervised neural networks to find appropriate solution leading to valid conclusion
PO2		2.1	2.1.2	4	4	Identify and detect neural networks-based methods to solve the complex computer engineering problems.
po5		5.1	5.1.2	5	5	Determine the concept of fuzziness involved in various systems and provide adequate knowledge about fuzzy set theory, and fuzzy logic
PO5 PO3		5.1 3.2	5.1.1 3.2,2	6	6	design the real-world fuzzy systems.

Course Objectives

Sr. No.	Description
1	Understand the artificial neural networks
2	Learn about supervised neural networks
3	Identify unsupervised neural network design concepts
4	Learn neural networks based methods to solve real world complex problems
5	Understand the concept of fuzziness involved in various systems and provide adequate knowledge about fuzzy set theory, and fuzzy logic
6	Learn fuzzy logic to design the real world fuzzy systems

Course Outcomes

PO	PSO	Competency	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

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
1,2		1.4	1.4.1	Level 3	1	Apply the knowledge of fundamental parameters of waveguide to measure wavelength
2		1.4	1.4.1	Level 4	2	Identify different microwave components active and passive.
5		4.1	4.1.2	Level 6	3	Design stub matching circuit for impedance matching
2,3		4.1	4.1.2	level 2	4	Understand working mechanism of klystron power amplifier.
4		4.2	4.2.1	Level 5	5	Measure different parameters of TWTA and understand its working mechanism
4		4.2	4.2.1	Level 4	6	Measure VSWR, frequency of a signal in rectangular waveguide.

Course Objectives

Sr. No.	Description
1	To apply the knowledge of fundamental parameters of waveguide to measure wavelength
2	To Identify different microwave components active and passive.
3	To design stub matching circuit for impedance matching
4	To understand working mechanism of klystron power amplifier.
5	To measure different parameters of TWTA and understand its working mechanism
6	To measure VSWR, frequency of a signal in rectangular waveguide.

Subject-MCS

Course Code: ECL702

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
1	1	1.1	1.1.1	2	1	Illustrate the cellular fundamentals and estimate the coverage and capacity of cellular systems
2,3	1	2.1	2.1.2	4	2	Analyze different types of propagation models and analyze the link budget
2,3,4	2	2.2	2.2.2	2	3	Summarize the fundamentals and system architecture of GSM system
3,4,5	2	4.2	4.2.1	4	4	analyze the design parameters of 3G technologies and CDMA
3,4,5	2	5.1	5.1.1	4	5	Identify the emerging technologies for upcoming mobile communication systems.
4,5,9	2	5.3	5.3.2	6	6	construct mini project based on different mobile communication technology.

Course Objectives

Sr. No.	Description
1	To understand the cellular system and fundamentals
2	To study and design different types of propagation models
3	To study the system architecture of 2G, 2.5 G and 3G
4	understanding the operation of mobile communications systems and their generation divisions
5	To develop the concepts of emerging technologies for 4 G standards and beyond.
6	Design mini project based on different mobile communication technology.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1	1	1.6	1.6.1	L3	CO1	Calculate the numerical aperture.
PO2	1	2.1	2.1.3	L4	CO2	Illustrate the dispersion for given fiber.
PO4	1	4.3	4.3.1	L4	CO3	Analyze the link Loss for given link.
PO3	1	3.2	3.2.3	L2	CO4	Understand the performance analysis of Optical Link with Different Sources.
PO4	1	4.1	4.1.2	L1	CO5	Remember the performance analysis of optical link with different detectors.
PO2	1	2.7	2.7.2	L2	CO6	Summarize the Normalized frequency (V Number) and Number of modes in fiber.

Course Objectives

Sr. No.	Description
1	Apply the knowledge of mathematics and Science to analyse the concept of light propagation inside optical fibres and understand its transmission properties
2	Comprehend the basic elements of optical fibre link and optical fibre structure.
3	Identify the optical loss characteristics and distortion of signal in optical waveguide that affect the performance of fibres.
4	Understand and demonstrate the important basic parameters related to performance of optical fibre by using simulation tools.
5	Design an optical fibre link with different system components and analyse its performance.
6	Design and develop innovative optical devices for practical applications in groups and present.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1		1.3	1.3.1	2	1	Understand, the impact of neural network on society and environment for sustainable development.
PO2		2.2	2.2.3	4	2	Identify ,formulate and analyze the principles of artificial neural network to conceptualize the working of human brain
PO1		1.3	1.3.1	5	3	determine and apply appropriate basic neural network rule to analyze engineering rules
PO5		5.1	5.1.2	3	4	Apply the knowledge of supervised and unsupervised learning algorithms to solve complex engineering problem
PO2		2.2	2.2.2	4	5	Identify and select other Fuzzy logic techniques to meet specified needs.
PO4 PO 5	PSO1	4.1 5.1	4.1.1 5.1.2	6	6	Investigate the impact of fuzzy logic and fuzzy system to lead to valid conclusion.

Course Objectives

Sr. No.	Description
1	Understand the impact of neural network.
2	Understand the basic concepts of working of human brain.
3	Identify the various neural network rules.
4	Apply the knowledge of supervised and unsupervised learning rule algorithms.
5	To become familiar with fuzzy logic.
6	Understand the fuzzy system.

SEMESTER VIII**Subject- RF Design****Subject Code- ECC801****Course Outcome**

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1	PSO1	1.6	1.6.1	Level2	CO1	Implement matching networks using passive elements
PO3	PSO1	3.6	3.6.1	Level3	CO2	Apply the knowledge of design and appraise RF amplifiers.
PO3	PSO1	3.6	3.6.1	Level3	CO3	Apply the knowledge of design of oscillator & Mixer
PO2	PSO1	2.6	2.6.4	Level4	CO4	Analyze the Frequency Synthesizers.
PO5	PSO1	5.4	5.4.1	Level2	CO5	Explain the concept of EMI in RF Circuit.
PO5	PSO1	5.4	5.4.1	Level2	CO6	Analyze EMC in RF circuits.

Course Objectives

Sr. No.	Description
1	Provide basic information on the RF circuit design
2	An ability to design single stage and power amplifiers for RF applications
3	An ability to design RF subsystems such as mixers, oscillators.
4	Analyze performance of Frequency Synthesizers.
5	Understand Electromagnetic Interference in RF circuits.
6	learn importance of Electromagnetic Compatibility

Subject-WN

Subject Code- ECC 802

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1	PSO1	1.3	1.3.1	2	CO1	Basics of wireless network architectures, Classification of various wireless networks, WBAN architecture and applications in medical field.
PO2	PSO1	2.1	2.1.3	2	CO2	To study the various emerging technologies like Zigbee, Bluetooth etc.
PO2	PSO2	3.2	3.2.3	3	CO3	Concepts of WLAN equipment, topologies, BSS and main features of IEEE 802.11 standard
PO4	PSO2	4.1	4.1.2	3	CO4	To understand architecture, planning and design of wireless networks.
PO1	PSO2	1.3	1.3.1	2	CO5	To develop the concepts of wireless adhoc network architecture.
PO4	PSO1	4.1	4.1.3	3	CO6	To understand the WSN applications and IOT working, advantages in modern world.

Course Objectives

Sr. No.	Description
1	Introduction to fundamentals, architecture, and classification of various wireless networks, network architecture of Body area Networks.
2	Study emerging wireless Personal area network (PAN) technologies like ZigBee, Bluetooth, RFID, NFC and UWB.
3	Classify various LAN topologies and technologies and study the features of 802.11 standard
4	Illustrate the architecture of WMAN- WiMAX, Wi-Fi and describe the phases of planning and Design of wireless networks.
5	Discuss various wireless adhoc networks architecture and protocols like VANET
6	Understand the Sensor network architecture, WSN applications, basic architecture and working of IOT.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1	1	1.2	1.2.2	1	CO1	Identify the issues related to signal degradation and multiplexing.
PO2	1	2.5	2.5.2	3	CO2	Demonstrate a comprehensive overview of optical network evolution and analyze basic nonlinearities phenomenon in optical fiber systems.
PO3	1	3.8	3.8.1	3	CO3	Apply the knowledge developed in-class to contemporary optical fiber communication research and industrial areas.
PO4	1	3.7	3.7.1	4	CO4	Illustrate the concepts of designing and operating principles of modern optical communication systems and networks.
PO5	1	4.6	4.6.1	4	CO5	Analyze, comprehend and model the functioning of passive components essential for optical networks
PO6	1	3.6	3.6.1	3	CO6	Demonstrate an ability to model and design WDM optical networks and access networks with respect to routing, dimensioning and configurations

Course Objectives

Sr. No.	Description
1	Investigate different issues related to signal degradation due to linear impairment
2	High data rate WDM optical transport network performance.
3	Optical Network architecture and operating principles.
4	Understand the concepts of Packet switching and access optical networks
5	Provide the design of optical network
6	Network Management functions and standards.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
2	2	2.1	2.1.3	L3	1A	Find the antenna look angles for an Earth station antenna.
2	2	2.2	2.2.2	L3	1B	Identify and assemble the basic satellite communication concepts to find the values of different orbital parameters like eccentricity and apogee and perigee height of a satellite orbit, rate of regression of nodes and rotation of line of apsides.
1	2	1.3	1.3.1	L4	2	Demonstrate the working of all subsystems of space segment
4	2	4.2	4.2.2	L1	3A	Understand the importance of types of Earth station antennas.
4	2	4.3	4.2.3	L1	3B	Describe the various sub systems of earth stations, transmit –receive type earth station.
1	2	1.1	1.1.1	L5	4A	Determine various losses of satellite link.
1	2	1.2	1.2.1	L3	4B	Calculate carrier to noise ratios and other parameters for satellite link by applying the knowledge of basic communication and antenna concepts.
4	2	4.3	4.3.2	L4	5	Analyze the different satellite access techniques according to its applications and compare their performance.
5	2	5.2	5.2.2	L4	5A	Survey of various applications of Satellite Communication, its advantages and limitations.
4	2	4.2	4.2.2	L2	5B	Illustrate the working of Laser Satellite Communication.

Course Objectives

Sr. No.	Description
1	To illustrate basic concepts of satellite communication and to calculate the look angles of an earth station antenna and various satellite orbital parameters.
2	To understand fundamentals of working of space segment.
3	To express the aspects and functioning of earth station and different types of earth stations.
4	To design link power budget for satellite communication system.
5	To summarize modern satellite multiple access techniques, modulation and coding techniques.
6	To explain different applications of satellite communication.

Course Outcomes

PO	PSO	Competency	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 PO10 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 strategically .
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	PI	Bloom's Level	CO	Description
PO7		7.1.2	LEVEL 1	CO1	To Understand and identify environmental issues relevant to India and global concerns
PO7		7.2.1	LEVEL 2	CO2	To Study the needs for sustainable development
PO7		7.1.1	LEVEL 1	CO3	To Learn concepts of ecology
PO7		7.2.2	LEVEL 2	CO4	To Understand the Scope and implementation of Environment Management in corporates
PO7		7.1.1	LEVEL 3	CO5	To Learn Total Quality Environmental Management and its certification process
PO7		7.2.2	LEVEL 2	CO6	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

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1	PSO1	1.6	1.6.1	Level2	CO1	Implement matching networks using passive elements
PO3	PSO1	3.6	3.6.1	Level3	CO2	Apply the knowledge of design and appraise RF amplifiers.
PO3	PSO1	3.6	3.6.1	Level3	CO3	Apply the knowledge of design of oscillator & Mixer
PO2	PSO1	2.6	2.6.4	Level4	CO4	Analyze the Frequency Synthesizers.
PO5	PSO1	5.4	5.4.1	Level2	CO5	Explain the concept of EMI in RF Circuit.
PO5	PSO1	5.4	5.4.1	Level2	CO6	Analyze EMC in RF circuits.

Course Objectives

Sr. No.	Description
1	Provide basic information on the RF circuit design
2	An ability to design single stage and power amplifiers for RF applications
3	An ability to design RF subsystems such as mixers, oscillators.
4	Analyze performance of Frequency Synthesizers.
5	Understand Electromagnetic Interference in RF circuits.
6	learn importance of Electromagnetic Compatibility

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1	PSO1	1.6	1.6.1	L2	CO1	Understand the basics of wireless network architectures, Classification of various wireless networks.
PO4	PSO1	4.5	4.5.1	L6	CO2	Design the various emerging technologies like Zigbee, Bluetooth etc.
PO3	PSO1	3.6	3.6.1	L4	CO3	Analyze the of WLAN equipment, topologies, BSS and main features of IEEE 802.11 standard
PO3	PSO2	3.6	3.6.1	L3	CO4	Demonstrate & design of wireless networks.
PO4	PSO2	4.5	4.5.1	L4	CO5	Analyze the performance of a MANET with increasing node mobility.
PO3	PSO1	3.6	3.6.2	L6	CO6	Design a wireless sensor network

Course Objectives

Sr. No.	Description
1	Study of fundamentals, architecture, and classification of various wireless networks, network architecture of Body area Networks.
2	Simulation of emerging wireless Personal area network (PAN) technologies like ZigBee, Bluetooth, RFID, NFC and UWB.
3	Design various LAN topologies and technologies and study the features of 802.11 standard
4	Develop the architecture of WMAN- WiMax, WiFi and describe the phases of planning and Design of wireless networks.
5	Create various wireless adhoc networks architecture and protocols like VANET
6	Design the Sensor network architecture, WSN applications, basic architecture and working of IOT.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1	1	1.2	1.2.2	1	CO1	Demonstrate the working principle of optical components.
PO2	1	2.5	2.5.2	3	CO2	Design of optical amplifier
PO3	1	3.8	3.8.1	3	CO3	Implement working principle of SONET
PO4	1	3.7	3.7.1	4	CO4	Analyze the DDWM traffic
PO5	1	4.6	4.6.1	4	CO5	Illustrate the SDN optical network/Intelligent optical network.
PO6	1	3.6	3.6.1	3	CO6	Demonstrate the model for WDM optical networks.

Course Objectives

Sr. No.	Description
1	Investigate different issues related to signal degradation due to linear impairment
2	High data rate WDM optical transport network performance.
3	Optical Network architecture and operating principles.
4	Understand the concepts of Packet switching and access optical networks
5	Provide the design of optical network
6	Network Management functions and standards.

Subject- Satellite communication and networking (Lab) Subject Code- ECLDLO804

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO2	PSO1	2.3	2.2.4	BL2	CO1	To understand basics of Satellite communications
PO4	PSO1	4.3	3.3.1	BL3	CO2	To evaluate carrier to noise ratio using satellite designing concepts
PO3	PSO2	3.2	3.2.2	BL4	CO3	To model and demonstrate telemetry and tracking command subsystem of satellite systems
PO3	PSO2	3.1	3.1.5	BL2	CO4	To Study various subsystems of earth stations and transmit receive earth stations
PO3	PSO1	3.1	3.2.1	BL5	CO5	To design and develop programming approach for finding link budget analysis of satellite
PO3	PSO2	3.1	3.1.5	BL2	CO6	To Study communications and networking concepts in satellite systems

Course Objectives

Sr. No.	Description
1	To learn fundamentals of Satellite communications in relation with physics
2	To evaluate carrier to noise ratio for uplink and downlink of satellite
3	To demonstrate telemetry and tracking command subsystem of satellite systems
4	To adhere different subsystems of earth stations and transmit receive earth stations
5	To calculate and design link budget analysis of satellite using basic given parameters
6	To compare and understand communications and networking concepts in satellite systems

Department: INFORMATION TECHNOLOGY**Semester-III****Scheme R-19****Subject-Engineering Mathematics-III****Subject Code-ITC301****Course Outcomes**

PO	PSO	Competency	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	Competency	PI	Bloom's Level	CO	Description
5	1	5.6	5.6.1	2		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		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		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		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		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	ata structure viz. stack, queue, linked list, trees and graph

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	Competency	PI	Bloom's Level	CO	Description
		2.5 2.6	2.5.2 2.6.6	L4 L4		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
		2.7 2.8	2.7.2 2.8.1	L4 L3		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	Competency	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 knowldge to Compare different programming paradigm
PO1	1	1.6	1.6.1	Level 1 Remember	Co2	able to apply knowldge understand the basic concept of object oriented
PO1	1	1.6	1.6.1	Level 1 Remember	CO3	apply knowldge 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	Competency	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	Competency	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	Competency	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	Competency	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 IOstreams 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	Competency	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		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 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 familiarize the process of solving the problem in a group.
5	To acquaint with the process of applying basic engineering fundamentals to attempt solutions to The problems.
6	To inculcate the process of self-learning and research.

Semester- IV

Subject-Engineering Mathematics-IV

Subject Code-ITC401

Course Outcomes

PO	PSO	Competency	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	Competency	PI	Bloom's Level	CO	Description
2	1	2.6	2.6.2	L2		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		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		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		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	Competency	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	Competency	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	Competency	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	Competency	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	Competency	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	Competency	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	Competency	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	Competency	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		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 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 familiarize the process of solving the problem in a group.
5	To acquaint with the process of applying basic engineering fundamentals to attempt solutions to the problems.
6	To inculcate the process of self-learning and research.

Semester- V

Subject- Internet Programming

Subject Code- ITC501

Course Outcomes

PO	PSO	Competency	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		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	Competency	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		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		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	Competency	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		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.
P07	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	Competency	PI	Bloom's Level	CO	Description
3		3.5	.1 & 3.	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	Competency	PI	Bloom's Level	CO	Description
2	1	2.5	2.5.2	L4		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		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		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		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		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		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	Competency	PI	Bloom's Level	CO	Description
2	1	3.6	3.6.1	2,3		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		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		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		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	Competency	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	Competency	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	Competency	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	Competency	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		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 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 familiarize the process of solving the problem in a group.
5	To acquaint with the process of applying basic engineering fundamentals to attempt solutions to The problems.
6	To inculcate the process of self-learning and research.

Semester- III
Scheme (R-16)

Subject- AMIII

Subject Code- ITC301

Course Outcomes

PO	PSO	Competency	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	Competency	PI	Bloom's Level	CO	Description
PO1		1.6	1.6.1	L3		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		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		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		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	Competency	PI	Bloom's Level	CO	Description
5	1	5.6	5.6.1	2		Discuss the data structure principles, ADT & classification of Data Structures such as Linear-Non Linear 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		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		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		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		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	6	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		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.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
		2.5 2.6	2.5.2 2.6.6	L4 L4		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
		2.7 2.8	2.7.2 2.8.1	L4 L3		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.

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO1		1.6	1.6.1	L3		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		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		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		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		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	Competency	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

Course Outcomes

PO	PSO	Competency	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 Notation, 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 various operations 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 Tree 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.

Course Outcomes

PO	PSO	Competency	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		4.6 2.7	4.6.1 2.7.1	L2 L3		Demonstrate an ability to retrieve data and analyze data
2 2		2.7 2.8	2.7.1 2.8.1	L3 L2		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.

Course Outcomes

PO	PSO	Competency	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 through 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 srtructure 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.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
2	1	2.6	2.6.2	L2		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		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		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 networks
1	1	1.7	1.7.1	L2		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		Categorize the type of Transmission Media
1	1	1.7	1.7.1	L2		Understand Multiplexing and Modulation Techniques

Course Objectives

Sr. No.	Description
1	Study basics of Computer Network Hardware, Software 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

Course Outcomes

PO	PSO	Competency	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 4 Analyze	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		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		describe the architecture of 8086
PO1		1.6	1.6.1	L1		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		demonstrate control unit operations and conceptualize instruction level
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		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		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	Competency	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	Competency	PI	Bloom's Level	LO	Description
4	1	4.6	4.6.1	L3	LO1	Demonstrate Basic network administration commands to Investigate network.
3	1	3.6	3.6.2	L2	LO2	Installation and Implementation of network simulator (NS) and Implementation 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	Competency	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. commands for 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.

Course Outcomes

PO	PSO	Competency	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

Course Outcomes

PO	PSO	Competency	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		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		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		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		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		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		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

Course Outcomes

PO	PSO	Competency	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		Discuss programming concepts of HTML5 and CSS3.
PO4	PSO2	4.5	4.5.1	L6		Design responsive web pages
	PSO1	5.5	5.5.1	L4		Identify the characteristics of rich internet applications .
	PSO2	5.4	5.4.2	L6		Create website using rich internet applications
PO4	PSO1	4.6	4.6.1	L4		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
	PSO1	2.6	2.6.4	L5		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	Competency	PI	Bloom's Level	CO	Description
2	P1	2.5	2.5.2	L4		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		Identify sophisticated access control protocols
5	P1	5.4	5.4.1	L3		Apply different access control 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		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		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		5.4	5.4.1	L2		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

Course Outcomes

PO	PSO	Competency	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		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		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	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		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		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

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	understan	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 payment 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

Course Outcomes

PO	PSO	Competency	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

Course Outcomes

PO	PSO	Competency	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 programming 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	Competency	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	Design 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.

Course Outcomes

PO	PSO	Competency	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 dataware housing

Course Outcomes

PO	PSO	Competency	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	Competency	PI	Bloom's Level	CO	Description
PO1	1	1.6	1.6.1	L1	CO1	Apply the knowlgede 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

Course Outcomes

PO	PSO	Competency	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
				L2		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	2.5.2	L2		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		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		4.6	4.6.1	L3		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 algorithms, methods of evaluation
4	To make students well versed in concept of clustering algorithms and concept of outliers
5	To make students understand the concept of market basket analysis and its multivalued association 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	Competency	PI	Bloom's Level	CO	Description
	PSO1	2.6	2.6.3	Level 2 Understand		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 solutions for cloud data.

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
2	1	2.6	2.6.2	L2 L3		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		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		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		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

Course Outcomes

PO	PSO	Competency	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	Competency	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.

Course Outcomes

PO	PSO	Competency	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.

Course Outcomes

PO	PSO	Competency	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	Demonstrate 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.

Course Outcomes

PO	PSO	Competency	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 understand programming on Platform as a Service cloud
6	To study implementation of Storage as a service using Own Cloud.

LAB Outcomes

PO	PSO	Competency	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

Course Outcomes

PO	PSO	Competency	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
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	Competency	PI	Bloom's Level	CO	Description
3	1	3.5	3.5.2	L4		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		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		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		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	Competency	PI	Bloom's Level	CO	Description
	PSO1	1.6	1.6.1	Level 1 Remember		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
	PSO1	2.5	2.5.2	Level 4 Analyze		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
	PSO1	2.6	2.6.3	Level 4 Analyze		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	Competency	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	Competency	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	Competency	PI	Bloom's Level	CO	Description
	1	2.6	2.6.3	L2		Understand software testing terminology and software life cycle
	1	2.7	2.7.1	L3		apply software testing methodology to prevent and remove bugs
	1	3.6	3.6.2	L2		understand different testing techniques
	2	4.5	4.5.1	L6		design and develop test plan and testcases based on different objectives
6	1	6.3	6.3.1	L4		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
	1	7.3	7.3.1	L4		
	1	7.4	7.4.2	L3		
3	1	3.5	3.5.4			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 plans and test organization
5	To introduced Different testing tools
6	To introduced concept of Quality assurance models

Course Outcomes

PO	PSO	Competency	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

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
2	1	2.6	2.6.3	L2		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		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		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		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

Course Outcomes

PO	PSO	Competency	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.

Lab Outcomes

PO	PSO	Competency	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	Representation 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 Development Lab Subject Code: ITL704

Course Outcomes

PO	PSO	Competency	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.

Course Outcomes

PO	PSO	Competency	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
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.

Semester-VIII

Subject-Big Data

Subject Code-ITC801

Course Outcomes

PO	PSO	Competency	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.

Course Outcomes

PO	PSO	Competency	PI	Blooms Level	CO	Description
PO2	2	2.1	2.5.1	Level 4 Analyze		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		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		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	Competency	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	Competency	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 PO10 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

Course Outcomes

PO	PSO	Competency	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	Competency	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		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.

Course Outcomes

PO	PSO	Competency	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 wireless 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	Competency	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	Competency	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.

Course Outcomes

PO	PSO	Competency	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.