



**Saraswati College of Engineering**  
**Department- Computer Engineering**  
**Semester-III**  
**Scheme R-16**

**Subject- Engineering Mathematics-III**

**Subject Code-CSC301**

**Course Outcomes**

<b>PO</b>	<b>PSO</b>	<b>Competancy</b>	<b>PI</b>	<b>Bloom' s Level</b>	<b>CO</b>	<b>Description</b>
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

<b>Sr. No.</b>	<b>Description</b>
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

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

## 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	<b>Understand the Discrete Mathematics Concept.</b>
2	<b>Apply clear thinking and creative problem-solving using laws of logic and mathematical Induction.</b>
3	<b>Understand the concepts of relation and functions.</b>
4	<b>Understand the permutation and combination.</b>
5	<b>Understand the basic concept in graph theory and their properties.</b>
6	<b>Understand the technique for detecting and correcting code in transmitted data.</b>

## 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**

<b>PO</b>	<b>PSO</b>	<b>Competency</b>	<b>PI</b>	<b>Bloom's Level</b>	<b>CO</b>	<b>Description</b>
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**

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

## 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

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

## 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 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	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

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

## 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 1	2.6	2.6.2	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

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

## 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

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

## 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

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

## 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 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.
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

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

## 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

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

## 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

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

## 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

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

## 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

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

## 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	<b>To use the concept of web technology for solving the problem of web application.</b>
2	<b>To design &amp; develop static web pages using HTML5 and CSS3</b>
3	<b>To Apply the concept of client-side validation and design dynamic web pages using JavaScript and jQuery.</b>
4	<b>To create Interactive web pages using PHP, AJAX with database connectivity using MySQL to solve the problem of web application</b>
5	<b>To apply the concept of XML, DTD &amp; XSL and design dynamic web pages using XML and XSLT</b>
6	<b>To create web application using appropriate web technologies and web development framework suited to meet user requirement</b>

## 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

Subject-SPCC

Subject Code- CSC602

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

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

Subject-DWM

Subject Code- CSC603

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

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

## 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

Subject-ML

Subject Code- CSDLO6021

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

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

## 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- Evaluat e	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.

**Subject- System Software Lab**

**Subject Code- CSL602**

**Course Outcomes**

<b>PO</b>	<b>PSO</b>	<b>Competency</b>	<b>PI</b>	<b>Bloom's Level</b>	<b>CO</b>	<b>Description</b>
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

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

## 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

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

## 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

<b>Sr. No.</b>	<b>Description</b>
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

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

## 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

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

## 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

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

## 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**

<b>PO</b>	<b>PSO</b>	<b>Competency</b>	<b>PI</b>	<b>Bloom's Level</b>	<b>CO</b>	<b>Description</b>
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

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

## 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.

## 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

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



Subject-NLP

Subject Code- CSDLO801

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

<b>Sr. No.</b>	<b>Description</b>
<b>1</b>	<b>To understand the basic concepts of Natural Language Processing</b>
<b>2</b>	<b>To create and apply appropriate techniques for word level analysis in natural language processing.</b>
<b>3</b>	<b>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.</b>
<b>4</b>	<b>To investigate engineering problem and design model for semantic analysis.</b>
<b>5</b>	<b>To identify difficult issues of society and to create the various language models in world of NLP.</b>
<b>6</b>	<b>To design and present Miniproject in groups.</b>

## 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

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

## 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

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

## 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

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