# II Year / III Semester & IV Semester
# R-2023

## U23MAT32 - DISCRETE MATHEMATICS

Upon Completion of the course, the students will be able to

| Course Outcomes | Description |
|---|---|
| CO1 | Summarize the concept of elementary mathematical logical arguments |
| CO2 | Apply basic counting techniques to solve combinatorial problems . |
| CO3 | Identify the applications of Graph theory models and data structures |
| CO4 | Apply the concepts and properties of algebraic structures such as groups, rings and fields. |
| CO5 | Extend the concepts of Boolean algebra in the area of lattices |
| CO6 | Apply the concepts and properties of algebraic structures such as groups, rings and fields |

**Correlation between Outcomes (COs) and Program Outcomes (POs)**

| Subject Code& Subject Name | Course Outcomes | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| U23MAT32 - DISCRETE MATHEMATICS | CO1 | 2 | 1 | - | - | - | - | - | - | - | - | - | - | - |
| | CO2 | 3 | 2 | 1 | 1 | - | - | - | - | - | - | - | - | - |
| | CO3 | 3 | 2 | 1 | 1 | - | - | - | - | - | - | - | - | - |
| | CO4 | 3 | 2 | 1 | 1 | - | - | - | - | - | - | - | - | - |
| | CO5 | 2 | 1 | - | - | - | - | - | - | - | - | - | - | - |
| | CO6 | 3 | 2 | 1 | 1 | - | - | - | - | - | - | - | - | - |
| | AVG | 3 | 2 | 1 | 1 | - | - | - | - | - | - | - | - | - |

## U23CST31 - COMPUTER ARCHITECTURE & ORGANIZATION

Upon Completion of the course, the students will be able to

| Course Outcomes | Description |
|---|---|
| CO1 | Understand the basic structures of a computer system. |
| CO2 | Explain the various arithmetic operations used in computers |
| CO3 | Apply pipelined control units and the different types of hazards in the instructions |
| CO4 | Interpret the concepts of parallel processing architecture |
| CO5 | Summarize the fundamentals of memory system |
| CO6 | Explain the concepts of I/O Devices |

**Correlation between Outcomes (COs) and Program Outcomes (POs)**

| Subject Code&Subject Name | Course Outcomes | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| U23CST31 - COMPUTER ARCHITECTURE & ORGANIZATION | CO1 | 2 | 1 | - | - | - | - | - | - | - | - | - | 2 | - |
| | CO2 | 2 | 1 | - | - | - | - | - | - | - | - | - | 2 | - |
| | CO3 | 3 | 2 | 1 | 1 | - | - | - | - | - | - | - | 2 | - |
| | CO4 | 2 | 1 | - | - | - | - | - | - | - | - | - | 2 | - |
| | CO5 | 2 | 1 | - | - | - | - | - | - | - | - | - | 2 | - |
| | CO6 | 2 | 1 | - | - | - | - | - | - | - | - | - | 2 | - |
| | AVG | 2 | 1 | 1 | 1 | - | - | - | - | - | - | - | 2 | - |

## U23CST32 - DATA STRUCTURES

Upon Completion of the course, the students will be able to

| Course Outcomes | Description |
|---|---|
| CO1 | Explain linear data structures using array and linked list. |
| CO2 | Understand the concept of stacks & queues. |
| CO3 | Explain non-linear data structures of tree traversal. |
| CO4 | Understand Breadth-first traversal and Depth-first traversal. |
| CO5 | Apply Searching and sorting techniques in data structures. |
| CO6 | Apply hashing techniques in data structures |

**Correlation between Outcomes (COs) and Program Outcomes (POs)**

| Subject Code&Subject Name | Course Outcomes | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| U23CST32 – DATA STRUCTURES | CO1 | 3 | 2 | 2 | 1 | 2 | 1 | 1 | - | 1 | 2 | - | 3 | 1 |
| | CO2 | 3 | 2 | 2 | 1 | 2 | - | - | - | 1 | 2 | - | 3 | 1 |
| | CO3 | 3 | 2 | 2 | 1 | 3 | - | - | - | 1 | 3 | 2 | 3 | 1 |
| | CO4 | 3 | 2 | 2 | 2 | 1 | - | - | - | 2 | 3 | 2 | 3 | 1 |
| | CO5 | 3 | 3 | 2 | 2 | 2 | - | - | - | 1 | - | - | 3 | 3 |
| | CO6 | 3 | 3 | 2 | 2 | 2 | 1 | 1 | - | 1 | - | - | 3 | 3 |
| | AVG | 3 | 2.3 | 2 | 1.5 | 2 | 1 | 1 | - | 1.1 | 2.5 | 2 | 3 | 1.6 |

## U23CST33 - DATABASE MANAGEMENT SYSTEMS

Upon Completion of the course, the students will be able to

| Course Outcomes | Description |
|---|---|
| CO1 | Explain the fundamental concepts of relational database and SQL. |
| CO2 | Build the ER model for Relational model mapping to perform database design Effectively. |
| CO3 | Summarize the properties of transactions and concurrency control mechanisms |
| CO4 | Compare and contrast various indexing strategies in different database systems. |
| CO5 | Extend Distributed Databases |
| CO6 | Explain the different advanced databases. |

**Correlation between Outcomes (COs) and Program Outcomes (POs)**

| Subject Code&Subject Name | Course Outcomes | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| U23CST33 – DATABASE MANAGEMENT SYSTEMS | CO1 | 2 | 1 | - | - | - | - | - | - | - | 1 | - | 2 | 1 |
| | CO2 | 3 | 2 | 1 | 1 | 1 | - | - | - | - | 1 | - | 2 | 1 |
| | CO3 | 2 | 1 | - | - | - | - | - | - | - | 1 | - | 2 | 1 |
| | CO4 | 2 | 1 | - | - | - | - | - | - | - | 1 | - | 2 | 1 |
| | CO5 | 2 | 1 | - | - | - | - | - | - | - | 1 | 1 | 2 | 1 |
| | CO6 | 2 | 1 | - | - | 1 | - | - | - | 2 | 1 | 1 | 2 | 1 |
| | **AVG** | **2** | **1** | **1** | **1** | **1** | **-** | **-** | **-** | **2** | **1** | **1** | **2** | **1** |

## U23CST34 - OBJECT ORIENTED PROGRAMMING

Upon Completion of the course, the students will be able to

| Course Outcomes | Description |
|---|---|
| CO1 | Develop Java programs using Object Oriented Programming principles |
| CO2 | Explain Java programs with inheritance and interface concepts |
| CO3 | Build Java applications using exceptions |
| CO4 | Build Java applications with I/O and generics classes |
| CO5 | Develop interactive Java programs using JAVAFX event handling |
| CO6 | Understand the Concept of Controls components |

**Correlation between Outcomes (COs) and Program Outcomes (POs)**

| Subject Code&Subject Name | Course Outcomes | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| U23CST34 – OBJECT ORIENTED PROGRAMMING | CO1 | 3 | 1 | 1 | - | 2 | - | - | - | - | 1 | - | 3 | 3 |
| | CO2 | 3 | 1 | 3 | - | 2 | - | - | - | - | 1 | - | 3 | 3 |
| | CO3 | 3 | 2 | 3 | - | 2 | - | - | - | - | 1 | - | 3 | 3 |
| | CO4 | 3 | 2 | 3 | - | 2 | - | - | - | - | 1 | - | 3 | 3 |
| | CO5 | 2 | 1 | 3 | - | 2 | - | - | - | - | 1 | - | 3 | 3 |
| | CO6 | 2 | 1 | 3 | - | 2 | - | - | - | - | 1 | - | 3 | 3 |
| | **AVG** | **2.67** | **1.33** | **2.67** | **-** | **2** | **-** | **-** | **-** | **-** | **1** | **-** | 3 | 3 |

## U23CSP31 - DATABASE MANAGEMENT SYSTEMS LABORATORY

Upon Completion of the course, the students will be able to

| Course Outcomes | Description |
|---|---|
| CO1 | Utilize typical data definitions and manipulation commands |
| CO2 | Develop applications to test Nested and Join Queries |
| CO3 | Build simple applications using Views |
| CO4 | Build Procedures and Functions |
| CO5 | Develop and manipulate data using NOSQL database. |
| CO6 | Develop applications that require a Front-end Tool |

**Correlation between Outcomes (COs) and Program Outcomes (POs)**

| Subject Code&Subject Name | Course Outcomes | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| U23CSP31 - DATABASE MANAGEMENT SYSTEMS LABORATORY | CO1 | 3 | 2 | 1 | 1 | 1 | - | - | - | 1 | 1 | 1 | 2 | - |
| | CO2 | 3 | 2 | 1 | 1 | 1 | - | - | - | 1 | 1 | 1 | 2 | - |
| | CO3 | 3 | 2 | 1 | 1 | 1 | - | - | - | 1 | 1 | 1 | 2 | - |
| | CO4 | 3 | 2 | 1 | 1 | 1 | - | - | - | 1 | 1 | 1 | 2 | - |
| | CO5 | 3 | 2 | 1 | 1 | 1 | - | - | - | 1 | 1 | 1 | 2 | - |
| | CO6 | 3 | 2 | 1 | 1 | 1 | - | - | - | 1 | 1 | 1 | 2 | - |
| | AVG | 3 | 2 | 1 | 1 | 1 | - | - | - | 1 | 1 | 1 | 2 | - |

## U23CSP32 - DATA STRUCTURES LABORATORY

Upon Completion of the course, the students will be able to

| Course Outcomes | Description |
|---|---|
| CO1 | Develop and array implement of Stack and Queue ADTs |
| CO2 | Develop and array implement of List ADT |
| CO3 | Develop and implement List, Stack and Queue ADTs. |
| CO4 | Apply the concept of Binary Trees, Binary Search Trees, AVL Trees |
| CO5 | Develop and implement Heaps using Priority Queues |
| CO6 | Apply the concept of searching and sorting algorithms |

**Correlation between Outcomes (COs) and Program Outcomes (POs)**

| Subject Code&Subject Name | Course Outcomes | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| U23CSP32 - DATA STRUCTURES LABORATORY | CO1 | 1 | 2 | 2 | 1 | - | - | - | - | 2 | 1 | 2 | 2 | 3 |
| | CO2 | 3 | 3 | 1 | 1 | - | - | - | - | 1 | 1 | 1 | 2 | 2 |
| | CO3 | 2 | 1 | 3 | 1 | - | - | - | - | 1 | 1 | 2 | 3 | 3 |
| | CO4 | 3 | 1 | 3 | 3 | - | - | - | - | 1 | 2 | 3 | 1 | 2 |
| | CO5 | 3 | 2 | 1 | 1 | 2 | - | - | - | 3 | 3 | 3 | 1 | 3 |
| | CO6 | 2 | 2 | 1 | 1 | 2 | - | - | - | 2 | 2 | 2 | 2 | 3 |
| | AVG | 2.3 | 1.8 | 1.8 | 1.3 | 2 | - | - | - | 1.6 | 1.6 | 2.1 | 2.1 | 2.6 |

## U23CSP33 - OBJECT ORIENTED PROGRAMMING LABORATORY

Upon Completion of the course, the students will be able to

| Course Outcomes | Description |
|---|---|
| CO1 | Develop and implement Java programs for simple applications that make use of classes and packages |
| CO2 | Develop and implement Java programs for simple applications that make use of interfaces |
| CO3 | Develop and implement Java programs with array list and exception handling |
| CO4 | Develop and implement Java programs with multithreading |
| CO5 | Design applications using file processing and generic programming |
| CO6 | Design applications using event handling |

**Correlation between Outcomes (COs) and Program Outcomes (POs)**

| Subject Code&Subject Name | Course Outcomes | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| U23CSP33 - OBJECT ORIENTED PROGRAMMING LABORATORY | CO1 | 3 | 2 | 1 | 1 | 1 | - | - | - | 1 | 1 | 1 | 2 | - |
| | CO2 | 3 | 2 | 1 | 1 | 1 | - | - | - | 1 | 1 | 1 | 2 | - |
| | CO3 | 3 | 2 | 1 | 1 | 1 | - | - | - | 1 | 1 | 1 | 2 | - |
| | CO4 | 3 | 2 | 1 | 1 | 1 | - | - | - | 1 | 1 | 1 | 2 | - |
| | CO5 | 3 | 2 | 1 | 1 | 1 | - | - | - | 1 | 1 | 1 | 2 | - |
| | CO6 | 3 | 2 | 1 | 1 | 1 | - | - | - | 1 | 1 | 1 | 2 | - |
| | AVG | 3 | 2 | 1 | 1 | 1 | - | - | - | 1 | 1 | 1 | 2 | - |

## U23CST41 - DESIGN AND ANALYSIS OF ALGORITHMS

Upon Completion of the course, the students will be able to

| Course Outcomes | Description |
|---|---|
| CO1 | Analyze the efficiency of algorithms using various frameworks |
| CO2 | Apply graph algorithms to solve problems and analyze their efficiency. |
| CO3 | Make use of algorithm design techniques like divide and conquer, dynamic programming and greedy techniques to solve problems. |
| CO4 | Make use of state space tree method for solving problems. |
| CO5 | Solve problems using approximation algorithms and randomized algorithms. |
| CO6 | Understand the concept of NP, NP- Complete and NP Hard Problems |

**Correlation between Outcomes (COs) and Program Outcomes (POs)**

| Subject Code&Subject Name | Course Outcomes | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| U23CST41 - DESIGN AND ANALYSIS OF ALGORITHMS | CO1 | 2 | 1 | 3 | 2 | - | - | - | - | 2 | 1 | 2 | 1 | 2 |
| | CO2 | 2 | 1 | 1 | 1 | 1 | - | - | - | 1 | 3 | 3 | 3 | 3 |
| | CO3 | 1 | 3 | 3 | 3 | 1 | - | - | - | 1 | 2 | 1 | 2 | 1 |
| | CO4 | 1 | 3 | 3 | 3 | 1 | - | - | - | 1 | 2 | 1 | 2 | 1 |
| | CO5 | 1 | 3 | 3 | 3 | 1 | - | - | - | 2 | 3 | 3 | 3 | 3 |
| | CO6 | 1 | 2 | 3 | 2 | 3 | - | - | - | 3 | 1 | 3 | 1 | 3 |
| | AVG | 1.3 | 1.6 | 2.6 | 2.3 | 1.1 | - | - | - | 1.6 | 2 | 2.1 | 2 | 2.1 |

## U23CST42 - MACHINE LEARNING

**Upon Completion of the course, the students will be able to**

| Course Outcomes | Description |
|---|---|
| CO1 | Make Use of appropriate search algorithms for problem solving |
| CO2 | Apply reasoning under uncertainty |
| CO3 | Build supervised learning models |
| CO4 | Build ensembling and unsupervised models |
| CO5 | Build deep learning neural network models |
| CO6 | Explain gradient descent optimization |

**Correlation between Outcomes (COs) and Program Outcomes (POs)**

| Subject Code&Subject Name | Course Outcomes | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| U23CST42 - MACHINE LEARNING | CO1 | 3 | 2 | 3 | 3 | - | - | - | - | 1 | 3 | 3 | 1 | 2 |
| | CO2 | 1 | 1 | 1 | 3 | 1 | - | - | - | 1 | 2 | 1 | 2 | 3 |
| | CO3 | 2 | 1 | 2 | 1 | 1 | - | - | - | 2 | 1 | 1 | 1 | 1 |
| | CO4 | 3 | 1 | 3 | 1 | - | - | - | - | 2 | 1 | 2 | 2 | 2 |
| | CO5 | 3 | 1 | 1 | 2 | 2 | - | - | - | 3 | 1 | 2 | 2 | 1 |
| | CO6 | 3 | 2 | 1 | 1 | 2 | - | - | - | 3 | 1 | 2 | 1 | 1 |
| | AVG | 3 | 1 | 2 | 2 | 2 | - | - | - | 2 | 2 | 2 | 2 | 2 |

## U23CST43 - OPERATING SYSTEMS

**Upon Completion of the course, the students will be able to**

| Course Outcomes | Description |
|---|---|
| CO1 | Explain the overall view of the computer system and operating system. |
| CO2 | Analyze various scheduling algorithms and process synchronization |
| CO3 | Compare and contrast various memory management schemes |
| CO4 | Explain the functionality of file systems and I/O systems |
| CO5 | Compare ioS and Android Operating Systems. |
| CO6 | Explain the concept of Virtual Machines |

**Correlation between Outcomes (COs) and Program Outcomes (POs)**

| Subject Code&Subject Name | Course Outcomes | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| U23CST43 - OPERATING SYSTEMS | CO1 | 3 | 1 | - | 1 | 1 | - | - | - | - | 2 | 1 | 2 | 3 |
| | CO2 | 3 | 1 | - | 2 | 2 | - | - | - | - | 2 | 2 | 3 | 3 |
| | CO3 | 3 | 3 | 1 | 2 | 2 | - | - | - | - | 2 | 2 | 3 | 3 |
| | CO4 | 2 | 2 | 1 | 2 | 2 | - | - | - | - | 2 | 2 | 4 | 2 |
| | CO5 | 3 | 2 | 2 | 2 | 2 | - | - | - | - | 2 | 2 | 2 | 2 |
| | CO6 | 3 | 3 | 2 | 2 | 2 | - | - | - | - | 2 | 2 | 2 | 3 |
| | **AVG** | **2.83** | **2.00** | **1.50** | **1.83** | **1.83** | **-** | **-** | **-** | **-** | **2.00** | **1.83** | **2.67** | **2.67** |

## U23GET41- ENVIRONMENTAL SCIENCES AND ENGINEERING

**Upon Completion of the course, the students will be able to**

| Course Outcomes | Description |
|---|---|
| CO1 | Demonstrate a comprehensive understanding of the world's biodiversity and the importance of its conservation. |
| CO2 | Discover knowledge in ecological perspective and value of environment |
| CO3 | Categorize different types of pollutions and their control measures. |
| CO4 | Understand the significance of various natural resources and its management. |
| CO5 | Analyze global environmental problems and come out with best possible solutions. |
| CO6 | Understand environmental laws and sustainable development. |

**Correlation between Outcomes (COs) and Program Outcomes (POs)**

| Subject Code&Subject Name | Course Outcomes | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| U23GET41- ENVIRONMENTAL SCIENCES AND ENGINEERING | CO1 | 3 | 1 | - | 1 | 1 | - | - | - | - | 2 | 1 | 2 | 3 |
| | CO2 | 3 | 1 | - | 2 | 2 | - | - | - | - | 2 | 2 | 3 | 3 |
| | CO3 | 3 | 3 | 1 | 2 | 2 | - | - | - | - | 2 | 2 | 3 | 3 |
| | CO4 | 2 | 2 | 1 | 2 | 2 | - | - | - | - | 2 | 2 | 4 | 2 |
| | CO5 | 3 | 2 | 2 | 2 | 2 | - | - | - | - | 2 | 2 | 2 | 2 |
| | CO6 | 3 | 3 | 2 | 2 | 2 | - | - | - | - | 2 | 2 | 2 | 3 |
| | **AVG** | **2.83** | **2.00** | **1.50** | **1.83** | **1.83** | **-** | **-** | **-** | **-** | **2.00** | **1.83** | **2.67** | **2.67** |

## U23CST44- COMPUTER NETWORKS

**Upon Completion of the course, the students will be able to**

| Course Outcomes | Description |
|---|---|
| CO1 | Apply Domain Name System and SNMP in the network |
| CO2 | Compare the different transport layer protocols and their applicability based on user requirements |
| CO3 | Understand the different services of network layer |
| CO4 | Explain the concept of Routing and protocols |
| CO5 | Explain how data flows from one node to another node with regard to data link layer |
| CO6 | Identify various layers of network and discuss the functions of physical layer |

**Correlation between Outcomes (COs) and Program Outcomes (POs)**

| Subject Code&Subject Name | Course Outcomes | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| U23CST44-COMPUTER NETWORKS | CO1 | 3 | 3 | 2 | 3 | - | 2 | - | - | - | 3 | - | 2 | 2 |
| | CO2 | 2 | 3 | 3 | 3 | - | 2 | - | - | - | 3 | - | 2 | 2 |
| | CO3 | 2 | 3 | 3 | 2 | - | 3 | - | - | - | 3 | - | 2 | 3 |
| | CO4 | 2 | 2 | 2 | 3 | - | 3 | - | - | - | 3 | - | 1 | 2 |
| | CO5 | 2 | 2 | 3 | 3 | - | 3 | - | - | - | 3 | - | 1 | 2 |
| | CO6 | 2 | 2 | 3 | 3 | - | 3 | - | - | - | 3 | - | 2 | 3 |
| | AVG | 2 | 3 | 3 | 3 | - | 3 | - | - | - | 3 | - | 2 | 2 |

## U23CSP41- OPERATING SYSTEMS LABORATORY

**Upon Completion of the course, the students will be able to**

| Course Outcomes | Description |
|---|---|
| CO1 | Define and implement UNIX Commands. |
| CO2 | Compare the performance of various CPU Scheduling Algorithms. |
| CO3 | Compare and contrast various Memory Allocation Methods |
| CO4 | Define File Organization and File Allocation Strategies |
| CO5 | Implement various Disk Scheduling Algorithms. |
| CO6 | Analyze the performance of the various page replacement algorithms |

**Correlation between Outcomes (COs) and Program Outcomes (POs)**

| Subject Code&Subject Name | Course Outcomes | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| U23CSP41- OPERATING SYSTEMS LABORATORY | CO1 | 3 | 1 | 3 | 1 | 1 | - | - | - | 1 | 3 | 3 | 2 | 1 |
| | CO2 | 3 | 1 | 1 | 2 | 2 | - | - | - | 3 | 2 | 1 | 3 | 1 |
| | CO3 | 3 | 3 | 2 | 1 | 2 | - | - | - | 3 | 3 | 1 | 2 | 2 |
| | CO4 | 1 | 2 | 2 | 3 | 2 | - | - | - | 3 | 1 | 3 | 1 | 2 |
| | CO5 | 2 | 2 | 1 | 1 | 3 | - | - | - | 1 | 2 | 2 | 1 | 3 |
| | CO6 | 2 | 2 | 2 | 2 | 2 | - | - | - | 2 | 2 | 2 | 2 | 2 |
| | AVG | 2.33 | 1.83 | 1.83 | 1.67 | 2.00 | - | - | - | 2.17 | 2.17 | 2.00 | 1.83 | 1.83 |

## U23CSP42 - MACHINE LEARNING LABORATORY

**Upon Completion of the course, the students will be able to**

| Course Outcomes | Description |
|---|---|
| CO1 | Understand the implementation procedures for the machine learning algorithms. |
| CO2 | Design Java/Python programs for various Learning algorithms |
| CO3 | Apply appropriate data sets to the Machine Learning algorithms |
| CO4 | Apply Machine Learning algorithms to solve real world problems |
| CO5 | Apply k-Nearest Neighbor algorithm to classify the iris data set. |
| CO6 | Apply non-parametric Locally Weighted Regression algorithm |

**Correlation between Outcomes (COs) and Program Outcomes (POs)+**

| Subject Code&Subject Name | Course Outcomes | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| U23CSP42 - MACHINE LEARNING LABORATORY | CO1 | 1 | 2 | 2 | 1 | - | - | - | - | 2 | 1 | 2 | 2 | 3 |
| | CO2 | 3 | 3 | 1 | 1 | - | - | - | - | 1 | 1 | 1 | 2 | 2 |
| | CO3 | 2 | 1 | 3 | 1 | - | - | - | - | 1 | 1 | 2 | 3 | 3 |
| | CO4 | 3 | 1 | 3 | 3 | - | - | - | - | 1 | 2 | 3 | 1 | 2 |
| | CO5 | 3 | 2 | 1 | 1 | 2 | - | - | - | 3 | 3 | 3 | 1 | 3 |
| | CO6 | 2 | 2 | 1 | 1 | 2 | - | - | - | 2 | 2 | 2 | 2 | 3 |
| | AVG | 2.3 | 1.8 | 1.8 | 1.3 | 2 | - | - | - | 1.6 | 1.6 | 2.1 | 2.1 | 2.6 |

## U23CSP43 - NETWORKS LABORATORY

**Upon Completion of the course, the students will be able to**

| Course Outcomes | Description |
|---|---|
| CO1 | Apply various protocols using TCP and UDP |
| CO2 | Compare the performance of different transport layer protocols |
| CO3 | Make use of simulation tools to analyze the performance of various network protocols |
| CO4 | Analyze various routing algorithms |
| CO5 | Build error correction codes |
| CO6 | Explain Network simulator (NS) and Simulate Congestion Control Algorithms using NS |

**Correlation between Outcomes (COs) and Program Outcomes (POs)**

| Subject Code&Subject Name | Course Outcomes | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| U23CSP43 - NETWORKS LABORATORY | CO1 | 3 | 2 | 2 | 2 | 3 | 0 | 0 | 0 | 1 | 1 | 0 | 3 | 2 |
| | CO2 | 3 | 3 | 2 | 2 | 3 | 0 | 0 | 0 | 1 | 2 | 0 | 3 | 3 |
| | CO3 | 3 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 1 | 2 | 0 | 3 | 3 |
| | CO4 | 3 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 2 | 2 | 1 | 3 | 3 |
| | CO5 | 3 | 2 | 3 | 2 | 2 | 0 | 0 | 0 | 2 | 2 | 1 | 3 | 2 |
| | CO6 | 3 | 3 | 3 | 3 | 3 | 1 | 0 | 0 | 2 | 3 | 1 | 3 | 3 |
| | AVG | 3.0 | 2.67 | 2.67 | 2.50 | 2.83 | 0.17 | 0.0 | 0.0 | 1.50 | 2.00 | 0.50 | 3.0 | 2.67 |

# III Year / V Semester & VI Semester
# R-2023

## U23CST51 - MOBILE APPLICATION DEVELOPMENT

**Upon Completion of the course, the students will be able to**

| Course Outcomes | Description |
|---|---|
| CO1 | Exhibit the knowledge on Android devices and Platform |
| CO2 | Demonstrate the usage of GUI Components for App development |
| CO3 | Decide on suitable Data storage mechanism for Apps |
| CO4 | Implement Android services using threads |
| CO5 | Develop and publish Android applications |
| CO6 | Create interactive applications in android using databases with multiple activities including audio, video and notifications and deploy them in marketplace |

**Correlation between Outcomes (COs) and Program Outcomes (POs)**

| Subject Code&Subject Name | Course Outcomes | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| U23CST51 - MOBILE APPLICATION DEVELOPMENT | CO1 | 3 | 3 | 2 | 2 | 2 | 1 | 1 | 3 | 3 | 2 | 3 | 2 | 3 |
| | CO2 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 |
| | CO3 | 3 | 3 | 2 | 2 | 1 | 2 | 2 | 2 | 3 | 1 | 3 | 3 | 2 |
| | CO4 | 3 | 3 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 1 | 3 | 3 | 3 |
| | CO5 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 3 | 3 |
| | CO6 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 3 | 3 | 3 |
| | **AVG** | **3.00** | **3.00** | **2.33** | **2.16** | **1.66** | **1.50** | **1.66** | **2.00** | **2.50** | **1.66** | **3.00** | **2.83** | **2.83** |

## U23CST52 - DATA MINING AND DATA WAREHOUSING

**Upon Completion of the course, the students will be able to**

| Course Outcomes | Description |
|---|---|
| CO1 | Design a Data warehouse system and perform business analysis with OLAP tools |
| CO2 | Apply suitable pre-processing and visualization techniques for data analysis |
| CO3 | Apply frequent pattern and association rule mining techniques for data analysis |
| CO4 | Apply appropriate classification and clustering techniques for data analysis |
| CO5 | Ability to build Data Warehouse and Explore WEKA |
| CO6 | Ability to design data mining algorithms |

**Correlation between Outcomes (COs) and Program Outcomes (POs)**

| Subject Code&Subject Name | Course Outcomes | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| U23CST52 - DATA MINING AND DATA WAREHOUSING | CO1 | 2 | 2 | 3 | 1 | 3 | 1 | - | - | - | - | - | 2 | 2 |
| | CO2 | 2 | 2 | 1 | 1 | - | 2 | 1 | 1 | - | - | - | 2 | 2 |
| | CO3 | 1 | 1 | - | - | - | - | - | - | - | - | - | 1 | 1 |
| | CO4 | 3 | 2 | 1 | 1 | 2 | - | 1 | 2 | - | - | 1 | 3 | 2 |
| | CO5 | 2 | 1 | - | - | 1 | 1 | - | - | - | - | - | 2 | 1 |
| | CO6 | 2 | 1 | - | - | - | - | 1 | - | - | - | - | 2 | 1 |
| | **AVG** | **2** | **1.5** | **1.6** | **1** | **2** | **1.3** | **1** | **1.5** | **-** | **-** | **1** | **2** | **1.5** |

## U23CST53 - SOFTWARE ENGINEERING

**Upon Completion of the course, the students will be able to**

| Course Outcomes | Description |
|---|---|
| CO1 | Identify the key activities in managing a software project |
| CO2 | Compare different process models. |
| CO3 | Concepts of requirements engineering and Analysis Modeling. |
| CO4 | Apply systematic procedure for software design and deployment. |
| CO5 | Compare and contrast the various testing and maintenance. |
| CO6 | Manage project schedule, estimate project cost and effort required. |

**Correlation between Outcomes (COs) and Program Outcomes (POs)**

| Subject Code&Subject Name | Course Outcomes | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| U23CST53 - SOFTWARE ENGINEERING | CO1 | 2 | 1 | 1 | - | - | - | - | - | - | - | - | 2 | 2 |
| | CO2 | 2 | 1 | 1 | - | - | - | - | - | - | - | - | 2 | 2 |
| | CO3 | 3 | 2 | 2 | - | - | - | - | - | - | - | - | 2 | 2 |
| | CO4 | 3 | 2 | 2 | - | - | - | - | - | - | - | - | 2 | 2 |
| | CO5 | 3 | 2 | 2 | - | - | - | - | - | - | - | - | 2 | 2 |
| | CO6 | 3 | 2 | 2 | - | - | - | - | - | - | - | - | 2 | 2 |
| | **AVG** | **3** | **2** | **2** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **2** | **2** |

## U23CSP51 - DATA MINING AND DATA WAREHOUSING LABORATORY

**Upon Completion of the course, the students will be able to**

| Course Outcomes | Description |
|---|---|
| CO1 | Ability to understand the various kinds of tools |
| CO2 | Demonstrate the classification, clustering and etc. in large data sets. |
| CO3 | Describe various preprocessing techniques and statistical techniques and apply those techniques on the given data set. |
| CO4 | Ability to add mining algorithms as a component to the exiting tools. |
| CO5 | Ability to apply mining techniques for realistic data. |
| CO6 | Create an application using outlier analysis. |

**Correlation between Outcomes (COs) and Program Outcomes (POs)**

| Subject Code&Subject Name | Course Outcomes | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| U23CSP51 - DATA MINING AND DATA WAREHOUSING LABORATORY | CO1 | 3 | 2 | 1 | 2 | 3 | 0 | 0 | 0 | 1 | 1 | 0 | 3 | 2 |
| | CO2 | 3 | 3 | 3 | 2 | 3 | 0 | 0 | 0 | 1 | 2 | 0 | 3 | 3 |
| | CO3 | 3 | 3 | 3 | 3 | 2 | 0 | 0 | 0 | 1 | 2 | 0 | 3 | 3 |
| | CO4 | 3 | 2 | 3 | 2 | 3 | 0 | 0 | 0 | 2 | 2 | 1 | 3 | 3 |
| | CO5 | 3 | 3 | 3 | 3 | 3 | 1 | 0 | 0 | 2 | 3 | 1 | 3 | 3 |
| | CO6 | 3 | 2 | 3 | 2 | 3 | 0 | 0 | 0 | 1 | 2 | 0 | 3 | 2 |
| | **AVG** | 3.0 | 2.5 | 2.67 | 2.33 | 2.83 | 0.17 | 0.0 | 0.0 | 1.33 | 2.0 | 0.33 | 3.0 | 2.67 |

## U23CSP52 - MOBILE APPLICATION DEVELOPMENT LABORATORY

**Upon Completion of the course, the students will be able to**

| Course Outcomes | Description |
|---|---|
| CO1 | Develop mobile applications using GUI and Layouts. |
| CO2 | Develop mobile applications using Event Listener. |
| CO3 | Develop mobile applications using Databases. |
| CO4 | Develop mobile applications using RSS Feed, Internal/External Storage, SMS, Multithreading and GPS. |
| CO5 | Analyze and discover own mobile app for simple needs |
| CO6 | Develop mobile applications using Projects. |

**Correlation between Outcomes (COs) and Program Outcomes (POs)**

| Subject Code&Subject Name | Course Outcomes | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| U23CSP52 - MOBILE APPLICATION DEVELOPMENT LABORATORY | CO1 | 3 | 3 | 2 | 2 | 2 | 1 | 1 | 3 | 3 | 2 | 3 | 2 | 3 |
| | CO2 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 |
| | CO3 | 3 | 3 | 2 | 2 | 1 | 2 | 2 | 2 | 3 | 1 | 3 | 3 | 2 |
| | CO4 | 3 | 3 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 1 | 3 | 3 | 3 |
| | CO5 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 3 | 3 |
| | CO6 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 3 | 3 | 3 |
| | **AVG** | **3.00** | **3.00** | **2.33** | **2.16** | **1.66** | **1.50** | **1.66** | **2.00** | **2.50** | **1.66** | **3.00** | **2.83** | **2.83** |

## U23CST61 - BIG DATA ANALYTICS

**Upon Completion of the course, the students will be able to**

| Course Outcomes | Description |
|---|---|
| CO1 | Describe big data and use cases from selected business domains. |
| CO2 | Explain NoSQL big data management. |
| CO3 | Install, configure, and run Hadoop and HDFS. |
| CO4 | Perform map-reduce analytics using Hadoop. |
| CO5 | Usage Hadoop-related tools such as HBase, Cassandra, Pig, and Hive for big data analytics. |
| CO6 | Describe big data and use cases from selected business domains. |

**Correlation between Outcomes (COs) and Program Outcomes (POs)**

| Subject Code&Subject Name | Course Outcomes | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| U23CST61 - BIG DATA ANALYTICS | CO1 | 3 | 2 | 3 | 3 | 3 | - | - | - | 1 | 3 | 3 | 3 | 2 |
| | CO2 | 2 | 2 | 2 | 1 | 2 | - | - | - | 2 | 2 | 1 | 2 | 2 |
| | CO3 | 1 | 1 | 3 | 2 | 3 | - | - | - | 1 | 2 | 1 | 1 | 2 |
| | CO4 | 2 | 3 | 3 | 1 | 2 | - | - | - | 3 | 1 | 2 | 2 | 2 |
| | CO5 | 1 | 2 | 3 | 2 | 2 | - | - | - | 2 | 1 | 3 | 1 | 1 |
| | CO6 | 1 | 2 | 3 | 2 | 2 | - | - | - | 2 | 1 | 3 | 1 | 1 |
| | AVG | 1.8 | 2 | 2.8 | 1.8 | 2.3 | - | - | - | 1.8 | 1.6 | 2.1 | 1.6 | 1.6 |

## U23CST62 - INTERNET OF THINGS

**Upon Completion of the course, the students will be able to**

| Course Outcomes | Description |
|---|---|
| CO1 | Describe the characteristics, physical and logical designs, domains and architecture. |
| CO2 | Explain about Arduino and its types |
| CO3 | Differentiate M2M and IoT, SDN and NFV design methodologies |
| CO4 | Compare the communication models in IOT |
| CO5 | Describe various real time applications of IOT |
| CO6 | Design IoT applications using Arduino/Raspberry Pi /open platform |

**Correlation between Outcomes (COs) and Program Outcomes (POs)**

| Subject Code&Subject Name | Course Outcomes | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| U23CST62 - INTERNET OF THINGS | CO1 | 3 | 2 | 3 | 3 | 3 | - | - | - | 1 | 3 | 3 | 3 | 2 |
| | CO2 | 2 | 2 | 2 | 1 | 2 | - | - | - | 2 | 2 | 1 | 2 | 2 |
| | CO3 | 1 | 1 | 3 | 2 | 3 | - | - | - | 1 | 2 | 1 | 1 | 2 |
| | CO4 | 2 | 3 | 3 | 1 | 2 | - | - | - | 3 | 1 | 2 | 2 | 2 |
| | CO5 | 1 | 2 | 3 | 2 | 2 | - | - | - | 2 | 1 | 3 | 1 | 1 |
| | CO6 | 1 | 2 | 3 | 2 | 2 | - | - | - | 2 | 1 | 3 | 1 | 1 |
| | AVG | 1.8 | 2 | 2.8 | 1.8 | 2.3 | - | - | - | 1.8 | 1.6 | 2.1 | 1.6 | 1.6 |

## U23CST63 - BLOCKCHAIN TECHNOLOGIES

**Upon Completion of the course, the students will be able to**

| Course Outcomes | Description |
|---|---|
| CO1 | Understand emerging abstract models for Blockchain Technology. |
| CO2 | Identify major research challenges and technical gaps existing between theory and practice in the crypto currency domain. |
| CO3 | Understand the functions of Blockchain methods |
| CO4 | Apply hyperledger Fabric and Ethereum platform to implement the Block chain Application. |
| CO5 | Learn about the Hyperledger Architecture |
| CO6 | Describe about the Blockchain Applications |

**Correlation between Outcomes (COs) and Program Outcomes (POs)**

| Subject Code&Subject Name | Course Outcomes | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| U23CST63 - BLOCKCHAIN TECHNOLOGIES | CO1 | 3 | 3 | 2 | 2 | 1 | - | - | - | 1 | - | - | 3 | 1 |
| | CO2 | 3 | 3 | 3 | 3 | 1 | - | - | - | 2 | - | - | 1 | 2 |
| | CO3 | 3 | 3 | 3 | 3 | 2 | - | - | - | 2 | - | - | 2 | 3 |
| | CO4 | 3 | 3 | 3 | 3 | 2 | - | - | - | 3 | - | - | 2 | 2 |
| | CO5 | 3 | 2 | 3 | 2 | 3 | - | - | - | 3 | - | - | 2 | 2 |
| | CO6 | 3 | 2 | 3 | 2 | 3 | - | - | - | 3 | - | - | 2 | 2 |
| | **AVG** | **3** | **2.6** | **2.8** | **2.5** | **2** | **-** | **-** | **-** | **2.3** | **-** | **-** | **2** | **2** |

## U23CST64 – INFORMATION SECURITY

**Upon Completion of the course, the students will be able to**

| Course Outcomes | Description |
|---|---|
| CO1 | Discuss the basics of information security. |
| CO2 | Illustrate the legal, ethical and professional issues in information security |
| CO3 | Demonstrate the aspects of risk management. |
| CO4 | Become aware of various standards in the Information Security System. |
| CO5 | Design and implementation of Security Techniques |
| CO6 | Discuss the basics of information security |

**Correlation between Outcomes (COs) and Program Outcomes (POs)**

| Subject Code&Subject Name | Course Outcomes | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| U23CST64 – INFORMATION SECURITY | CO1 | 2 | 1 | - | - | - | - | - | - | - | 1 | - | 2 | 1 |
| | CO2 | 3 | 2 | 1 | 1 | 1 | - | - | - | - | 1 | - | 2 | 1 |
| | CO3 | 2 | 1 | - | - | - | - | - | - | - | 1 | - | 2 | 1 |
| | CO4 | 2 | 1 | - | - | - | - | - | - | - | 1 | - | 2 | 1 |
| | CO5 | 2 | 1 | - | - | - | - | - | - | - | 1 | 1 | 2 | 1 |
| | CO6 | 2 | 1 | - | - | 1 | - | - | - | 2 | 1 | 1 | 2 | 1 |
| | **AVG** | **2** | **1** | **1** | **1** | **1** | **-** | **-** | **-** | **2** | **1** | **1** | **2** | **1** |

## U23CSV13 – NEURAL NETWORKS AND DEEP LEARNING

**Upon Completion of the course, the students will be able to**

| Course Outcomes | Description |
|---|---|
| CO1 | Apply Convolution Neural Network for image processing. |
| CO2 | Explain the basics of associative memory and unsupervised learning networks. |
| CO3 | Apply CNN and its variants for suitable applications. |
| CO4 | Analyze the key computations underlying deep learning and use them to build and train deep neural networks for various tasks. |
| CO5 | Apply auto encoders and generative models for suitable applications. |
| CO6 | Apply auto Decoders and generative models for suitable applications. |

**Correlation between Outcomes (COs) and Program Outcomes (POs)**

| Subject Code&Subject Name | Course Outcomes | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| U23CSV13 – NEURAL NETWORKS AND DEEP LEARNING | CO1 | 2 | 1 | - | - | - | - | - | - | - | 1 | - | 2 | 1 |
| | CO2 | 3 | 2 | 1 | 1 | 1 | - | - | - | - | 1 | - | 2 | 1 |
| | CO3 | 2 | 1 | - | - | - | - | - | - | - | 1 | - | 2 | 1 |
| | CO4 | 2 | 1 | - | - | - | - | - | - | - | 1 | - | 2 | 1 |
| | CO5 | 2 | 1 | - | - | - | - | - | - | - | 1 | 1 | 2 | 1 |
| | CO6 | 2 | 1 | - | - | 1 | - | - | - | 2 | 1 | 1 | 2 | 1 |
| | **AVG** | **2** | **1** | **1** | **1** | **1** | **-** | **-** | **-** | **2** | **1** | **1** | **2** | **1** |

## U23CSV64 – QUANTUM COMPUTING

**Upon Completion of the course, the students will be able to**

| Course Outcomes | Description |
|---|---|
| CO1 | Understand the basics of quantum computing. |
| CO2 | Understand the background of Quantum Mechanics. |
| CO3 | Analyze the computation models. |
| CO4 | Build the circuits using quantum computation. Environments and frameworks. |
| CO5 | Understand the quantum operations such as noise and error–correction. |
| CO6 | Develop and Evaluation of Quantum Key Distribution Protocols. |

**Correlation between Outcomes (COs) and Program Outcomes (POs)**

| Subject Code&Subject Name | Course Outcomes | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| U23CSV64 – QUANTUM COMPUTING | CO1 | 3 | 3 | 3 | 3 | 3 | 1 | 1 | 2 | 3 | 3 | 3 | 3 | 3 |
| | CO2 | 3 | 3 | 3 | 3 | 3 | 1 | 1 | 2 | 3 | 3 | 3 | 3 | 3 |
| | CO3 | 3 | 3 | 3 | 3 | 3 | 1 | 1 | 1 | 3 | 3 | 3 | 3 | 3 |
| | CO4 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 2 | 2 | 2 | 2 | 3 | 3 |
| | CO5 | 3 | 3 | 3 | 3 | 3 | 1 | 1 | 2 | 3 | 3 | 3 | 3 | 3 |
| | CO6 | 3 | 3 | 3 | 3 | 3 | 2 | 1 | 3 | 3 | 3 | 3 | 3 | 3 |
| | **AVG** | **3** | **3** | **3** | **3** | **3** | **1.33** | **1.33** | **2** | **2.83** | **2.83** | **2.83** | **3** | **3** |

## U23CSP61 – DATA ANALYTICS LABORATORY

**Upon Completion of the course, the students will be able to**

| Course Outcomes | Description |
|---|---|
| CO1 | Demonstrate the knowledge of big data analytics and implement different file management task in Hadoop. |
| CO2 | Understand Map Reduce Paradigm and develop data applications using variety of systems. |
| CO3 | Illustrate and apply different operations on relations and databases using Hive. |
| CO4 | Analyze and perform installation of Hive. |
| CO5 | Understand and implement file management tasks, such as Adding files and directories, retrieving files and Deleting files |
| CO6 | Understand the Fundamental Concepts Of Big Data and Hadoop |

**Correlation between Outcomes (COs) and Program Outcomes (POs)**

| Subject Code&Subject Name | Course Outcomes | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| U23CSP61 – DATA ANALYTICS LABORATORY | CO1 | 3 | 2 | 2 | 2 | 3 | 0 | 0 | 0 | 1 | 1 | 0 | 3 | 2 |
| | CO2 | 3 | 3 | 2 | 2 | 3 | 0 | 0 | 0 | 1 | 2 | 0 | 3 | 3 |
| | CO3 | 3 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 1 | 2 | 0 | 3 | 3 |
| | CO4 | 3 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 2 | 2 | 1 | 3 | 3 |
| | CO5 | 3 | 2 | 3 | 2 | 2 | 0 | 0 | 0 | 2 | 2 | 1 | 3 | 2 |
| | CO6 | 3 | 3 | 3 | 3 | 3 | 1 | 0 | 0 | 2 | 3 | 1 | 3 | 3 |
| | **AVG** | **3.0** | **2.67** | **2.67** | **2.50** | **2.83** | **0.17** | **0.0** | **0.0** | **1.50** | **2.00** | **0.50** | **3.0** | **2.67** |

## U23CSP62 – INTERNET OF THINGS LABORATORY

**Upon Completion of the course, the students will be able to**

| Course Outcomes | Description |
|---|---|
| CO1 | Understand the concept of Internet of Things |
| CO2 | Implement interfacing of various sensors with Arduino/Raspberry Pi. |
| CO3 | Demonstrate the ability to transmit data wirelessly between different devices. |
| CO4 | Show an ability to upload/download sensor data on cloud and server. |
| CO5 | Implement IoT based street light control system. |
| CO6 | Implement IoT based weather monitoring system |

**Correlation between Outcomes (COs) and Program Outcomes (POs)**

| Subject Code&Subject Name | Course Outcomes | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| U23CSP62 – INTERNET OF THINGS LABORATORY | CO1 | 1 | 1 | 1 | - | - | - | - | 1 | 1 | 1 | - | 1 | - |
| | CO2 | 2 | 2 | 2 | - | - | - | - | 2 | 2 | 2 | - | 2 | - |
| | CO3 | 3 | 3 | 3 | - | - | - | - | 3 | 2 | 2 | - | 2 | - |
| | CO4 | 3 | 3 | 3 | - | - | - | - | 3 | 3 | 3 | - | 3 | - |
| | CO5 | 3 | 3 | 3 | - | - | - | - | 3 | 3 | 3 | - | 3 | - |
| | CO6 | 3 | 3 | 3 | - | - | - | - | 3 | 3 | 3 | - | 3 | - |
| | AVG | 2.5 | 2.5 | 2.5 | - | - | - | - | 2.5 | 2.3 | 2.3 | - | 2.3 | - |