

## **M.Sc. Computer Science(Data Analytics)**

### **Program Outcome**

**PO1:** Gain the skills and knowledge required to operate your computer and perform common tasks. This basic computer skills course will allow you to gain an understanding of the most popular, current technologies used at home and in the workplace.

**PO2:** The objective was set as training the students to use mathematical knowledge they have to designing and conducting 'Development Experiments' as well as analyzing and interpreting data using the Scientific Method.

**PO3:** Engage in effective software development practices over the entire system lifecycle including requirements, analysis, design, implementation, and testing.

**PO4:** Apply problem-solving skills and the knowledge of computer science to solve real problems.

**PO5:** Apply algorithmic reasoning to a variety of computational problems. Design, correctly implement and document solutions to significant computational problems.

**PO6:** Learn new Programming concepts and coding skills are now essential for the high-tech industry. Everything is about new ways to build and use products and services that are more intuitive.

**PO7:** Theoretical knowledge and practical knowledge can often lead to a deeper understanding of a concept through seeing it in the context of a greater whole and understanding the why behind it.

**PO8:** Students will develop critical thinking skills. Students will develop an understanding of change processes and be able to think critically about obstacles to change.

**PO9:** Seeks and Progresses opportunities for change and growth. Is flexible and able to adapt to rapidly changing environments.

**PO10:** It is a critical field that promotes systematic ways to design, evaluate, and manage computing solutions.

**PO11:** Intellectual rigour is encouraged for example during an assessment exercise where a debate or discussion occurs about a challenging topic.

**PO12:** Knowledge of a discipline is defined as "command of a discipline to enable a smooth transition and contribution to professional and community settings.

## **SEMESTER 1**

### **CA030102 - INTRODUCTION TO DATA ANALYTICS AND MACHINE LEARNING**

CO1: Capable of representing data graphically.

CO2: Demonstrating a strong foundation in data analysis techniques for various applications.

CO3: Apply machine learning algorithms in various domains.

CO4: Display proficiency in implementing and evaluating supervised learning algorithms.

CO5: Utilize unsupervised learning techniques for exploratory data analysis and feature extraction.

CO6: Enable to implement and train artificial neural networks effectively.

### **CA030105 - PYTHON PROGRAMMING FOR ANALYTICS**

CO1: Understand basics of Python Programming and Problem-Solving Skills.

CO2: Analyze and Manipulate Data using NumPy and Pandas Libraries.

CO3: Understand and Apply Advanced Data Analysis using Pandas.

CO4: Understand and Customize Data Visualizations with Matplotlib plotting library.

CO5: Apply Machine Learning Algorithms such as Linear Regression, Logistic Regression, SVM, KNN, K- Means, Decision tree Classifier etc using scikit-learn.

### **CA030101- DATA STRUCTURES USING C**

CO 1: Understand the core C programming concepts and apply them in practical problem-solving. Understand the data structures, their classification, and operations and apply the algorithmic concepts, including space and time complexity to create efficient computational solutions. (Understanding/ Applying)

CO 2: Implement and analyze various data structures such as arrays, Stacks, and Queues, including their different variations and applications and evaluate and compare multiple sorting and searching techniques and enabling them to select optimal methods for specific problem-solving scenarios. (Applying/Analyzing)

CO 3: Implement, assess, and critically evaluate various lists and dynamic storage management techniques in complex software systems. (Applying/ Evaluating)

CO 4: implement and evaluate various tree and graph structures, focusing on insertion, deletion, traversal, search operations, and hashing techniques, while critically assessing their practical effectiveness and limitations. (Applying/ Evaluating)

## **SEMESTER 2**

### **CA030204 -PROGRAMMING WITH JAVA**

CO 1: Understand the fundamental concepts of object-oriented programming (OOP) and apply them in Java programming, including encapsulation, inheritance, and polymorphism. (Understanding/ Applying)

CO 2: Demonstrate proficiency in handling input/output operations in Java, including working with streams, files, and characters. (Applying/ Analyzing)

CO 3: Apply packages and exception handling techniques in Java programming to ensure code modularity, reusability, and handle exceptional situations effectively. (Applying/ Evaluating)

CO 4:Develop graphical user interfaces (GUI) using Swing components in Java, including event handling and layout management, to create interactive and visually appealing applications. (Applying/Evaluate )

CO 5:Demonstrate the utilization of database connectivity, and distributed application development techniques in Java.( Apply/Evaluate)

### **CA030203 - DATA MINING AND ANALYTICS**

CO1: Describe the fundamental concepts of data mining, the KDD process, and technologies used in data mining.

CO2: Apply data preprocessing techniques, such as data cleaning, integration, and transformation, to prepare data for analysis.

CO3: Utilize association analysis techniques, including the Apriori algorithm and FP Growth algorithm, to discover frequent patterns and generate association rules.

CO4: Utilize classification techniques, such as decision tree induction, Bayesian classification, and rule-based classification, for data analysis and prediction.

CO5: Understand clustering methods, such as partitioning, hierarchical, density-based, and grid-based methods, to group similar data objects together. Understand the concept of outlier analysis and outlier detection methods.

## **SEMESTER 3**

### **CA030301 - STATISTICAL MODELING USING R**

CO1: Apply statistical models to analyse real-world scenarios.

CO2: Utilize R as a powerful tool for data analysis and management.

CO3: Demonstrating the ability to perform basic data manipulation operations.

CO4: Build Up the advanced proficiency in R programming techniques.

CO5: Enable to analyse relationships between variables and make predictions.

CO6: Enhance advanced proficiency in applying statistical techniques for data analysis and modelling.

## **CA030304 - STATISTICAL PROGRAMMING LAB USING R**

CO1: Develop the skills to confidently construct and interpret confidence intervals, making informed statistical inferences based on sample data.

CO2: Prepare for further exploration and application of R in data analysis and statistical modelling.

CO3: Illustrate the representation of real time data.

CO4: Demonstrate the skills to estimate and interpret linear relationships between variables.

## **CA850301- SOCIAL MEDIA MINING**

CO1: Understand the fundamentals of social network analysis and graph theory, enabling effective exploration and analysis of social media networks.

CO2: Apply data mining techniques to extract valuable insights from social media data, employing both supervised and unsupervised learning approaches.

CO3: Analyze the dynamics of online communities and information diffusion in social media, facilitating a comprehensive understanding of user interactions and content dissemination.

CO4: Evaluate the concepts of influence and homophily within social networks, discerning their impact on user behavior and network dynamics.

CO5: Explore recommendation systems in social media and assess their effectiveness and ethical implications, leveraging social connections for personalized content recommendations.

CO6: Utilize behavior analytics to understand individual and collective behavior patterns in social media, enabling the identification of trends and informed decision-making.

## **SEMESTER 4**

### **CA030401 - DATA VISUALIZATION**

**CO1:** Learn to visually represent data effectively, including mapping data, creating histograms, and displaying trends over time or geospatially.

**CO2:** Understand how to use D3.js to create interactive visualizations on the web, including basics like data binding and scales.

**CO3:** Develop reusable chart libraries using D3.js, adding features like axes, tooltips, and real-time updates.

**CO4:** Get familiar with Tableau's interface and functions, like data navigation and blending, for efficient data analysis.

**CO5:** Master creating various charts and dashboards in Tableau, including formatting and forecasting techniques for insightful data visualization.

### **CA850401 - BUSINESS INTELLIGENCE**

**CO1:** Understand of the concepts, types and application of business intelligence.

**CO2:** Develop proficiency in utilizing decision trees as a valuable tool in business intelligence application.

**CO3:** Apply data mining techniques to drive informed decision making in a business context.

**CO4:** Evaluate and implement business intelligence solution within the emerging technology contexts.

### **CA860402 - BUSINESS DATA ANALYTICS**

**CO1:** Describe the drivers and applications of business analytics across various domains.

**CO2:** Apply descriptive statistics techniques to analyze data and calculate various metrics such as mean, median, standard deviation, and correlation.

**CO3:** Utilize data visualization techniques and tools, such as charts and dashboards, to represent and communicate data insights effectively.

**CO4:** Model uncertainty and perform statistical inference using probability distributions, sampling, and hypothesis testing.

**CO5:** Develop an idea about using the Hadoop and MapReduce framework for processing and analyzing large-scale data.

**CO6:** Contrast other data analytical frameworks such as Pig, Hive, Apache Sqoop, and NoSQL databases for data analysis and processing.