GURU JAMBHESWAR UNIVERSITY OF SCIENCE AND TECHNOLOGY, HISAR Centre for distance and online education Programme: Diploma in Data Science

Nomenclature: **Mathematics** Semester: 1st
Code: DDS-11-T Total Marks: 30
Credits: 3+0+0

Important Instructions:

1) Attempt all Questions each assignment given below
2) Each assignment carries 15 marks
3) All questions are to be attempted in legible handwriting on plane white A-4 size paper and upload the scanned copy of the assignments on student's portal

Assignment – I

Q.1 Using elementary row transformations reduces a given matrix to echelon form and hence find its rank. Explain each step clearly with suitable numerical example.

Q.2 Explain and verify the Cayley–Hamilton theorem for a given matrix and explain its importance.

Q.3 Expand a given function using Taylor's series about a specified point up to second or third order.

Assignment - II

Q.1 Use multiple integrals to find the volume of a solid bounded by given surfaces.

Q.2 Discuss the geometrical interpretation of Taylor's series and Mean Value Theorems with examples.

Q.3 Show that eigen vectors corresponding to distinct eigen values are linearly independent.

GURU JAMBHESWAR UNIVERSITY OF SCIENCE AND TECHNOLOGY, HISAR Centre for distance and online education Programme: Diploma in Data Science

Nomenclature: **Probability and Statistics** Semester: 1st

Code: DDS-12-T Total Marks: 30

Credits: 3+0+0

Important Instructions:

1) Attempt all Questions each assignment given below
2) Each assignment carries 15 marks
3) All questions are to be attempted in legible handwriting on plane white A-4 size paper and upload the scanned copy of the assignments on student's portal

Assignment – I

Q1. State and prove Bayes' theorem. Explain its significance in decision-making problems using a suitable numerical example.

Q2. Derive the cumulative distribution function (CDF) of a discrete random variable and discuss its properties.

Q3. Define Normal distribution. Derive its standard form and explain its important properties and applications.

Assignment - II

Q1. Define Student's t-test for testing the significance of a single mean and explain its assumptions.

Q2. Describe probability, type l and type ll error, one tail and two tail test.

Q3. Explain point estimation and derive properties of a good estimator such as unbiasedness, consistency, and efficiency.

GURU JAMBHESWAR UNIVERSITY OF SCIENCE AND TECHNOLOGY, HISAR Centre for distance and online education Programme: Diploma in Data Science

Nomenclature: **Data Structure** Semester: 1st

Code: DDS-13-T Total Marks: 30

Credits: 3+0+0

Important Instructions:

1) Attempt all Questions each assignment given below
2) Each assignment carries 15 marks
3) All questions are to be attempted in legible handwriting on plane white A-4 size paper and upload the scanned copy of the assignments on student's portal

Assignment – I

Q.1 what is Data Structure? Explain different types of Data Structure with examples. Also describe data structure operations.

Q.2 what do you understand by stack? Explain polynomial representation using linked lists and describe algorithms for polynomial addition and multiplication.

Q.3 what do you mean by Queue? Explain circular queue implementation in detail. Show how it overcomes the drawbacks of linear queues.

Assignment – II

Q.1 Explain binary tree traversals (in-order, pre-order, post-order). Derive recursive algorithms for each and analyze their complexity.

Q.2 Define heap data structure. Explain max-heap and min-heap representations with the help of a suitable example for each.

Q.3 Explain Depth First Search (DFS)and Breadth First Search (BFS) algorithm in detail . Analyze time and space complexity for each .

GURU JAMBHESWAR UNIVERSITY OF SCIENCE AND TECHNOLOGY, HISAR Centre for distance and online education Programme: Diploma in Data Science

Nomenclature: **Introduction to Data Science** Semester: 1st

Code: DDS-14-T Total Marks: 30
Credits: 3+0+0

Important Instructions:

1) Attempt all Questions each assignment given below
2) Each assignment carries 15 marks
3) All questions are to be attempted in legible handwriting on plane white A-4 size paper and upload the scanned copy of the assignments on student's portal

Assignment – I

Q.1 Explain and compare data science, statistics, and artificial intelligence. Explain their overlap and differences using a Venn-diagram-based discussion.

Q.2 Explain data pre-processing meaning, challenges and solution from real-world data sources such as missing values, noise, and inconsistencies.

Q.3 (a) Describe the primary and secondary methods of data collection, Discuss the different types of data (structured, unstructured, semi-structured) and their measurement scales.

(b) Explain the various types of datasets (such as multimedia, social media, biological, and sensor data).

Assignment - II

Q.1 Explain the components of the data science methodology and describe how each component contributes to solving a data-driven problem.

Q.2 Explain each components of data science methodology and life cycle in detail. Discuss how methodology improves data-driven problem solving.

Q.3 (a) Define Exploratory Data Analysis (EDA). Explain its objectives and importance in data science workflows.

(b) Describe data visualization and plots like line plots, bar charts, and scatter plots in detail. Explain when and why each should be used.

GURU JAMBHESWAR UNIVERSITY OF SCIENCE AND TECHNOLOGY, HISAR Centre for distance and online education Programme: Diploma in Data Science

Nomenclature: **R Programming** Semester: 1st

Code: DDS-15-T Total Marks: 30

Credits: 3+0+0

Important Instructions:

1) Attempt all Questions each assignment given below
2) Each assignment carries 15 marks
3) All questions are to be attempted in legible handwriting on plane white A-4 size paper and upload the scanned copy of the assignments on student's portal

Assignment – I

Q.1 (a) what is R programming Language? Explain different R data types in detail. Discuss vectors, lists, matrices, arrays, factors, and data frames with examples and memory behaviour.

(b) Explain the key features of R Studio, including the R command prompt, R script files, and how comments are used in R programming.

Q.2 Explain string handling in R. Discuss functions such as substr(), strsplit(), paste(), grep(), toupper(), and tolower().

(b) Explain the different decision-making statements in R, Also Discuss the various types of loops in R.

Q.3 Explain matrix creation and manipulation in R. Discuss indexing, slicing, and matrix operations such as addition, subtraction, multiplication, and division with examples.

Assignment - II

Q.1 (a) what do you mean by R vectors, explain in detail. Discuss how to access vector elements, assign names to vector elements, and perform mathematical operations on vectors.

(b) Explain functions used to explore data frames such as dim(), nrow(), ncol(), str(), summary(), head(), and tail()and combining data frames using rbind() and cbind() with real-world examples.

Q.2 Explain lists in R. Discuss list creation, accessing elements, modifying lists, and nested lists.

Q.3 (a) what is Data Frame in R. Discuss the functions used to access and explore data in a data frame.

(b) What do you understand by data visualization in R? Provide examples to illustrate each visualization type and its usage.