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

Nomenclature: **Mathematics** Semester: 1st
Code: DAI-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.

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Nomenclature: **Probability and Statistics** Semester: 1st
Code: DAI-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.

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

Code: DAI-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 Artificial Intelligence

Nomenclature: Introduction to Artificial Intelligence Semester: 1st

Code: DAI-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 Formalize a real-world problem of your choice (for example route planning, 8-puzzle, or robot navigation) as a state space search problem.

Q.2 Describe Best First Search in detail, including its evaluation function, use of priority queues, and relationship to greedy search strategies.

Q.3 Compare Propositional Logic and Predicate Logic in terms of expressiveness, complexity of inference, and typical applications in AI.

Assignment – II

Q.1 Define Bayesian Belief Networks (Bayes Nets) and explain their components: nodes, directed edges, conditional probability tables (CPTs), and the Markov assumption.

Q,2 Compare and contrast uninformed search methods (DFS, BFS) with heuristic search methods (Best First, A*, AO*).

Q,3 Explain Hill Climbing algorithm in detail. Discuss problems such as local maxima, plateaus, and ridges.

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

Nomenclature: Python programming Semester: 1st

Code: DAI-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. Explain decision-making statements in Python. Discuss if, if-else, nested if, and multi-way decision statements (elif) with flowcharts and suitable example.

Q.2. Explain Python lists. Discuss list creation, indexing, slicing, searching, sorting, and common list operations.

Q.3 Explain file handling in Python. Discuss reading text files using read(), readline(), and readlines()

Assignment – II

Q.1 Explain exception handling in Python. Discuss try, except, else, and finally blocks with examples.

Q.2 Explain classes and objects in Python. Discuss class definition, object creation, and attribute access.

Q.3 Explain loop and loop control statements in Python. Compare while and for loops with syntax, flow diagrams, and examples.