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

Nomenclature: **Database Management System** Semester: 2nd
Code: DDS-21-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. What is Database Systems? Explain the advantages and disadvantages of using a DBMS over traditional file systems.

Q2. What is Data Independence? Explain the architecture of a DBMS and how data independence is achieved through it.

Q3. What are E-R diagrams? Draw and explain an E-R diagram for a hospital management system including entity sets, attributes, and relationships.

Assignment - II

Q1. What is Normal Form? Explain First Normal Form (1NF), Second Normal Form (2NF), and Third Normal Form (3NF) with examples. How does normalization help in designing better databases?

Q2. What is a Transaction in DBMS? Describe the ACID properties of transactions with examples.

Q3. Write short notes on:

a) Concurrency Control

b) Locking Techniques

c) Deadlock in DBMS

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Nomenclature: **Artificial Intelligence** Semester: 2nd
Code: DDS-22-T Total Marks: 30
Credits: 3+0+0

Important Instructions:

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Assignment – I

Q1. Define Artificial Intelligence. Discuss the importance and applications of AI in various domains like healthcare, robotics, and games.

Q2. Explain the concept of a state space with an example. What is the role of the Production System in AI problem solving?

Q3. Compare and explain any three search algorithms: Depth First Search, Breadth First Search, and A* Algorithm with examples.

Assignment – II

Q1. What is Predicate Logic? How does it differ from Propositional Logic? Give examples to support your answer.

Q2. What are fuzzy logic systems? Discuss fuzzy sets and fuzzy rules with an example from real-life applications.

Q3. Explain Bayesian Belief Networks. How do they help in probabilistic reasoning?

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Nomenclature: **Machine Learning** Semester: 2nd
Code: DDS-23-T Total Marks: 30
Credits: 3+0+0

Important Instructions:

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Assignment – I

Q1. Define the concept of K-Means clustering with an example.

Q2. How the concept of Principal Component Analysis can be used for the dimensionality reduction?

Q3. Define the concept of linear regression and its application.

Assignment - II

Q1. Describe the concept of Artificial Neural Networks with their different taxonomy.

Q2. Discuss the concept of Backpropagation algorithm used to train the ANN.

Q3. What is Bayes theorem and how it can be applied for the concept of classification?

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Nomenclature: **Python Programming** Semester: 2nd
Code: DDS-24-T Total Marks: 30
Credits: 3+0+0

Important Instructions:

1) Attempt all Questions each assignment given below
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Assignment – I

Q1. Explain the various Python data types with examples. Also, differentiate between mutable and immutable data types.

Q2. Write a Python program to demonstrate the use of decision-making statements (if, if-else, elif). Explain how these statements help control the flow of the program.

Q3. Describe different loop control statements in Python. Write a program using a nested loop and break, continue, and pass statements.

Assignment - II

Q1. What are user-defined functions in Python? Explain with examples the concepts of actual and formal parameters, default arguments, and recursion.

Q2. Explain file handling in Python. Write a program to read data from a file and append new data to the same file.

Q3. Describe the concept of Object-Oriented Programming in Python. Explain inheritance with an example program that includes method overriding.

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Nomenclature: **Data Analytic** Semester: 2nd
Code: DDS-25-T Total Marks: 30
Credits: 3+0+0

Important Instructions:

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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. What is Bayes' theorem, and how does it form the basis of Bayesian Belief Networks? Explain the structure and functionality of Bayesian belief networks, providing an example scenario where this approach would significantly enhance decision-making or inference capabilities.

Q2. Explain Fuzzy Reasoning and the role of Fuzzy Rules within fuzzy logic systems. Demonstrate how fuzzy inference mechanisms work by presenting an illustrative example of a simple fuzzy logic controller.

Q3. What is Data Analytics, and why is it important in today's data-driven world? Explain how organizations across different industries use data analytics to gain a competitive advantage.

Assignment - II

Q1. Explain the Stream Data Model and Architecture. How does it differ from traditional data processing models, and what challenges does it address in real-time data environments?

Q2. What is Sampling in Data Streams? Explain at least two techniques used for sampling streaming data and discuss their advantages and limitations in real-world applications.

Q3. What is Exploratory Data Analysis and why is it important to perform visualization before analysis? Illustrate your answer with examples of plots used in R or Python for single-variable and multi-variable data.