

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

Nomenclature: **Database Management System**
Code: DAI-21-T
Credits: 3+0+0

Semester: 2nd
Total Marks: 30

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. Explain the use of traditional file systems over DBMS in modern applications. Propose a hybrid architecture highlighting trade-offs in scalability, performance, and data integrity

Q2. Explain the three-level DBMS architecture and its relevance in modern distributed systems.

Q3. Describe relationships, roles, and structural constraints in an E-R model. How are these represented effectively using E-R diagrams?

Assignment - II

Q1. Explain the concept of normalization and database anomalies in relational database design. How do candidate keys and super keys help in reducing redundancy?

Q2. Define functional dependencies and integrity constraints in a relational model. How do they influence the process of database decomposition?

Q3. Explain the concept of database transactions and different transaction states. How do ACID properties ensure reliability in transaction processing?

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

Nomenclature: **Fuzzy Logic and Neural Networks**
Code: DAI-22-T
Credits: 3+0+0

Semester: 2nd
Total Marks: 30

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. Describe different neural network architectures such as feedforward, recurrent, competitive, and modular neural networks.
- Q2. Explain the architecture of a multilayer feedforward neural network. Discuss layers, weights, biases, and forward propagation mechanism.
- Q3. Explain the Generalized Delta Rule. Describe how error is propagated backward and how weight updates are computed.

Assignment - II

- Q1. Describe the McCulloch-Pitts Neural Model and the Perceptron model. Compare both models and explain their limitations.
- Q2. What are activation functions in neural networks? Explain different types such as Sigmoid, ReLU, and Tanh, along with their advantages and disadvantages.
- Q3. Explain the Back propagation Algorithm in a multi-layer feed forward network. Discuss the generalized delta rule and how error is minimized during training.

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

Nomenclature: **Machine Learning**
Code: DAI-23-T
Credits: 3+0+0

Semester: 2nd
Total Marks: 30

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. Discuss various machine learning activities such as data collection, data cleaning, feature engineering, model training, evaluation, and deployment. Provide a complete workflow.

Q2. Explain Principal Component Analysis (PCA) and Linear Discriminant Analysis (LDA) in detail. Compare PCA and LDA based on working, purpose, and applications.

Q3. Describe different feature selection techniques, including filter, wrapper, and embedded methods. Explain their advantages and disadvantages.

Assignment – II

Q1. Describe the working of the k-Nearest Neighbor (k-NN) algorithm. Explain distance metrics, hyperparameter tuning, and bias-variance handling.

Q2. Provide a detailed explanation of Support Vector Machines (SVM). Explain hyperplanes, margins, kernel tricks, and applications

Q3. Explain hierarchical clustering. Compare agglomerative and divisive approaches with dendrogram explanation

GURU JAMBHESWAR UNIVERSITY OF SCIENCE AND TECHNOLOGY, HISAR
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Nomenclature: **Natural Language Processing**
Code: DAI-24-T
Credits: 3+0+0

Semester: 2nd
Total Marks: 30

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. Explain the basics of human language needed for NLP: phonetics, morphology, syntax, semantics, and pragmatics. Discuss how these components support computational language understanding

Q2. Describe lexical semantics, compositional semantics, pragmatic meaning, discourse, and conversational context. Explain how ambiguity (lexical, syntactic, semantic) arises in language with examples.

Q3. Explain text representation techniques. Compare Bag of Words (BoW), term frequency (TF), TF-IDF, and vector space model of text. Discuss their advantages and limitations.

Assignment - II

Q1. Explain the role of syntax in language understanding. Discuss grammatical structure of sentences, parts of speech (POS), syntactic ambiguity, and parsing techniques.

Q2. Explain semantics in NLP. Describe types of meaning, semantic roles, selectional restrictions, semantic relationships, and lexical semantics.

Q3. Explain word prediction and sequence modeling. Discuss how RNNs, LSTMs, GRUs, and Transformers handle sequence information and context.

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

Nomenclature: **Data Analytics**

Semester: 2nd

Code: DAI-25-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. Describe the different types of Data Analytics: Descriptive, Diagnostic, Predictive, and Prescriptive. Compare them with suitable examples.

Q2. Discuss multiple linear regression. Explain how it differs from simple regression and describe its applications.

Q3. Describe cross-validation techniques. Explain k-fold cross-validation and its importance in model evaluation

Assignment - II

Q1. Discuss stream computing and its importance in real-time data processing applications such as IoT and finance.

Q2. Explain exploratory data analysis (EDA). Describe visualization techniques used before analysis and how they help in understanding data.

Q3. Describe different data types and attributes in data analytics. Explain nominal, ordinal, interval, and ratio data with examples.