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ADIKAVI SRI MAHARSHI VALMIKI UNIVERSITY, RAICHUR

SYLLABUS

B.Sc. Three Year Degree Program for the Subject

ARTIFICIAL INTELLIGENCE

With Effect from 2024-25

DISCIPLINE SPECIFIC CORE COURSE (DSC) FOR SEM I-IV, SKILL ENHANCEMENT COURSE (SEC) FOR SEM IV/V/VI and ELECTIVE COURSES FOR SEM V AND VI

AS PER N E P (Revised): 2024

SEMESTER: IV

Course Code: CC 5	Course Title: Artificial Intelligence & Machine Learning
Course Credits: 04	Contact Hours per Week: 04
Total Contact Hours: 64	IA Marks: 20
Exam Marks: 80	Examination Duration: 03 Hours

Course Learning Objectives:

1. Understand the basic concepts, history, and applications of Artificial Intelligence and Machine Learning.
2. Learn about various AI problem-solving techniques, including search strategies and knowledge representation.
3. Grasp the fundamentals of Machine Learning, including types (supervised, unsupervised, reinforcement).
4. Apply key algorithms for classification, regression, clustering, and dimensionality reduction.
5. Gain hands-on experience in implementing AI & ML models using Python libraries like Scikit-learn, TensorFlow, or PyTorch.
6. Evaluate and tune models using validation techniques and performance metrics.
7. Understand ethical implications and challenges in deploying AI/ML systems in real-world scenarios.

Course Outcomes: On successful completion of the course, the students shall be able to

1. Define the principles and scope of AI and ML, including their real-world applications.
2. Demonstrate the ability to represent knowledge and solve problems using logic and search algorithms.
3. Distinguish between different types of learning paradigms and apply suitable ML models.
4. Design and implement supervised learning models (e.g., linear regression, decision trees, SVM).
5. Apply unsupervised learning methods such as k-means clustering and PCA to analyze data patterns.
6. Evaluate AI/ML models using accuracy, precision, recall, F1-score, and cross-validation techniques.
7. Develop and deploy small-scale AI/ML applications considering data, model selection, and interpretability.
8. Analyze ethical and societal impacts of AI technologies and promote responsible AI development.

Unit-I **16 Hrs.**

Artificial Intelligence and Intelligent Agents: Artificial Intelligence: - Introduction, what is artificial intelligence, Application of artificial intelligence, History of artificial intelligence, Types of artificial intelligence, Artificial intelligence technique. Intelligent Agent: - Agents and Environment, Structure of Agents, Types of Agents, Multi Agent System, Agent communication, Agent development tools.

Unit-II **16 Hrs.**

Introduction to Machine Learning: Definition, History and Application of Machine Learning,

Types of Machine Learning: Supervised, Unsupervised, Semi-Supervised, and Reinforcement Learning. Labeled and Unlabelled Dataset. Supervised Learning Tasks: Regression vs. Classification, Learning Framework: Training, Validation and Testing of ML models. Performance Evaluation Parameters: Confusion matrix, Accuracy, Precision, Recall, F1 Score, and AUC.

Unit-III **16 Hrs.**

Supervised Learning and Unsupervised Learning
Regression: Linear and non-linear Regression, Logistic Regression. Classification: Naïve Bayes, K-Nearest Neighbors, Decision Trees.
Linear model: Introduction to Artificial Neural Networks, Perceptron Learning Algorithm, Single Layer Perceptron, Introduction to Support Vector Machine for linearly separable data. Clustering: K-Means, Hierarchical Clustering, DBSCAN, Clustering Validation Measures. ML Applications: Ethical Considerations in Machine Learning.

Unit-IV **16 Hrs.**

Introduction to Deep Learning (DL): Convolution Neural Network(CNN), Recurrent Neural Network(RNN), Deep Neural Networks(DNN), encoders, Introduction to Transfer Learning, Long Short Term Memory (LSTM).

Text books:

1. M.C. Trivedi, A Classical Approach to Artificial Intelligence, Khanna Book Publishing Company, 2024

References:

1. M.C. Trivedi, Introduction to AI and Machine Learning, Khanna Book Publishing Company, 2024.

SEMESTER: IV

Course Code: LAB 5	Artificial Intelligence & Machine Learning Lab
Course Credits: 02	Contact Hours per Week: 04
Total Contact Hours: 32	IA Marks: 10
Exam Marks: 40	Examination Duration: 03 Hours

List of Assignments

1. Write a Python Program to Demonstrate KNN classifier
2. Write a Python Program to Demonstrate SVM Classifier
3. Write a Python Program to Demonstrate Naïve Bayes Classifier
4. Write a Python Program to Demonstrate Neural Networks Classifier
5. Write a Python Program to Demonstrate K-Means Clustering Algorithm
6. Write a Python Program to Demonstrate DBSCAN Algorithm
7. Write a Python Program to Demonstrate Convolution Neural Network(CNN).
8. Write a Python Program to Demonstrate Recurrent Neural Network(RNN).
9. Write a Python Program to Demonstrate Deep Neural Networks(DNN)
10. Write a Python Program to Demonstrate Encoders in DNN
11. Write a Python Program to Demonstrate Long Short Term Memory (LSTM) in DNN

Examination:

- Student has to answer and execute Two programs

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Evaluation Scheme for Lab Examination:

Criteria	**Marks**
Writing Program	10
Execution	20
Record + Viva-Voce	10
IA	10
Total	**50**

ARTIFICIAL INTELLIGENCE
B.Sc., Semester – IV (SEP)
DISSERTATION (PROJECT)

Course Code: PRJ	Project
Course Credits: 02	Contact Hours per Week: 02
Total Contact Hours: 32	AI Marks: 10
Exam Marks: 40	Examination Duration: 03 Hours

Examination:

- Student has to prepare the project report and present

Evaluation Scheme for Project

Criteria	**Marks**
Dissertation & Viva-voce	40 Marks
IA	10


Deputy Registrar Office (Academic)
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