

MACHINE LEARNING TECHNIQUES

Credits: 4

Semester: V

Subject Code: DS24503

No. of Lecture Hours: 75

Objectives:

- To understand the concepts of machine learning.
- To understand supervised and unsupervised learning and their applications.
- To learn aspects of computational learning theory.

Outcomes: Student will be able to

CO1: Have a good understanding of the fundamental issues and challenges of machine learning: data, model selection, model complexity, etc.

CO2: Classify the learning algorithms and apply to the given data set.

CO3: Identify the underlying mathematical relationships within and across Machine Learning algorithms and the paradigms of supervised and un-supervised learning.

CO4: Evaluate and interpret the results of the algorithms.

CO5: Design and implement machine learning solutions to classification, regression and clustering problems

UNIT 1: Introduction to Machine Learning	15 hrs
1 Overview of Machine Learning	
- Definition, scope, and applications	3
- Types of learning: supervised, unsupervised, reinforcement.	3
2 Basic concepts and Python basics for ML	
- Understanding datasets, features and labels	3
- Introduction to Python.	2
- Libraries: NumPy, Pandas, Matplotlib.	4
UNIT 2: Supervised Learning	15 hrs
1 Linear Regression	
- Basic and Mathematical Representation	4
- Implementation in Python using scikit-learn	4
2 Classification Algorithms	
- Logistic Regression, K-NN, Decision Trees, SVM.	4
- Evaluation metrics: accuracy, precision, recall.	3
UNIT 3: Unsupervised Learning	15 hrs
1 Clustering	
- K-Means, Hierarchical	5
2 Dimensionality Reduction	
- PCA	5
3 Association Rule Learning	
- Apriori algorithm.	5
UNIT 4: Introduction to Neural Networks	15 hrs
1 Basics of Neural Networks	

	- Neurons, layers, activation functions.	4
	- Feedforward and backpropagation.	5
2	Types of Neural Networks	
	- MLPs, CNNs, RNNs.	6
	UNIT 5: Advanced Topics in Machine Learning	15 hrs
1	Natural Language Processing (NLP)	
	- Basics and applications in text processing.	4
2	Transfer Learning	
	- Understanding transfer learning.	2
	- Application of pre-trained models.	2
3	Artificial Intelligence Integration	
	- Exploring intersections between AI and ML.	2
	- Applications and synergies.	2
4	Reinforcement Learning Fundamentals	
	- Basics, algorithms, and key concepts.	3