

STATE INSTITUTE OF ENGINEERING & TECHNOLOGY

Department of Computer Engineering

LESSON PLAN

Subject Name: Machine Learning

Subject Code: B23-CSE-305

Year: 3rd

Semester: 5th

Teacher Name: Mrs. Shubh Chawala, Mr. Ashish Kharb

Lecture No	Unit No	Topic	COs Covered
L 1	Unit-I	Introduction to Machine Learning, Introduction-Data representation	CO1
L 2		domain knowledge for productive use of machine learning, diversity of data: structured/unstructured	
L 3		machine learning and data mining	
L 4		Basic linear algebra in machine learning techniques	
L 5		relevant resources for machine learning	
L 6		Revision	
L 7	Unit-II	Supervised learning using regression	CO2
L 8		types of regression, linear regression: simple and multiple	
L 9		logistic regression, overview of other types of regression	
L 10		model diagnostics and analysis using residual and outlier	
L 11		handling of multi-collinearity	
L 12		Classification: Decision Tree algorithms	
L 13		Random forests, Decision tree learning, Building a decision tree	
L 14		combining weak to strong learners via random forest	
L 15		Regularized loss minimization machine learning and inferential statistical analysis	
L 16		descriptive statistics in learning techniques	
L 17		Bayesian reasoning: a probabilistic approach to inference	

L 18		Revision	
L 19		K-Nearest Neighbor (KNN) Algorithm	
L20		Naive Bayes	
L21		Linear Discriminant Analysis	
L22		Latent variables and Expectation-maximization algorithm	
L23		Feature transformations, Feature learning	
L24	Unit-III	Learning with support vector machines (SVM)-introduction	CO3
L25		linear discriminant functions for binary classification	
L26		perceptron algorithm	
L27		linear maximal margin classifier for linearly separable data	
L28		linear soft margin classifier for overlapping classes	
L29		kernel-induced feature spaces	
L30		nonlinear classifier	
L31		regression by support vector machines	
L32		decomposing multiclass classification problem into binary classification tasks	
L33		variants of basic SVM techniques	
L34		Revision	
L35	Unit-IV	Unsupervised Learning-unsupervised learning, engineering the data	CO4
L36		overview of basic clustering methods means clustering	
L 37		k-means clustering	
L 38		expectation-maximization (EM) algorithm	
L 39		gaussian mixtures clustering, some useful data transformations	
L40		Dimensionality reduction: Principal Component Analysis	
L 41		Random projections	
L 42		Compressed sensing entropy-based method for attribute discretization	

L 43		principal components analysis (PCA) for attribute reduction	
L 44		rough sets-based methods for attribute reduction	
L45		Revision	

Text Books:

1. M. Pradhan, U. Dinesh Kumar, Machine Learning using Python, Wiley India, Latest Edition.
2. J. Han, M. Kamber, J. Pei, Data Mining Concepts and Techniques, Latest Edition
3. Christopher Bishop. Pattern Recognition and Machine Learning. 2e.
4. Machine Learning. Tom Mitchell. First Edition, McGraw- Hill, 1997.
5. Introduction to Machine Learning Edition 2, by EthemAlpaydin.
6. M. Gopal, Applied Machine learning, McGraw-Hill Education, 2019
7. David Forsyth, Applied Machine learning, Springer, 2019
8. Pascal Bugnion, Patrick R. Nicolas, Alex Kozlov, Scala: Applied Machine Learning, Packt Publishing, 1st Edition, 2017.

Web resources:

1. <https://www.geeksforgeeks.org/machine-learning/python-for-machine-learning/>
2. <https://www.geeksforgeeks.org/machine-learning/machine-learning/>
3. https://www.tutorialspoint.com/machine_learning/index.htm