SCHOOL OF ENGINEERING AND TECHNOLOGY
Computer Science and Engineering
Lecture Plan

School Name: SOET	**Department: Computer Science and Engineering**
Subject: Machine Learning	**Semester: VII**
Subject Code: CSL-0701 Credits: L (3) T(0) P(1)	**Faculty: Mr. Praveen Gupta**

Unit-1

S. No.	Topics to be covered	No. of Classes Required	References	Teaching Learning Methods	CO	BL	Tentative Date of Completion	Actual Date of Completion
1	Introduction of Machine Learning	1	T1,T2	Lectures, Case Studies, Group Discussions, Hands- on Exercises, Interactive Demos, Problem-Solving Sessions, Assessments	CO-1, CO-2	BL-2, BL-3		
2	What is Machine Learning, Need for Machine Learning, Challenges in Machines Learning,	1	T1,T2	Lectures, Case Studies, Group Discussions, Hands- on Exercises, Interactive Demos, Problem-Solving Sessions, Assessments	CO-1, CO-2	BL-2, BL-3		
3	Applications of Machines Learning-1	1	T1,T2	Lectures, Case Studies, Group Discussions, Hands- on Exercises, Interactive Demos, Problem-Solving	CO-1, CO-2	BL-2, BL-3		

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4	Applications of Machines Learning-2	1	T1,T2	Lectures, Case Studies, Group Discussions, Hands- on Exercises, Interactive Demos, Problem-Solving Sessions, Assessments	CO-1, CO-2	BL-2, BL-3		
5	Overview of variousmachine Learning Algorithms	1	T1,T2	Lectures, Case Studies, Group Discussions, Hands- on Exercises, Interactive Demos, Problem-Solving Sessions, Assessments	CO-1, CO-2	BL-2, BL-3		
6	Performance evaluation measuresfor machine learningalgorithms,	1	T1,T2	Lectures, Case Studies, Group Discussions, Hands- on Exercises, Interactive Demos, Problem-Solving Sessions, Assessments	CO-1, CO-2	BL-2, BL-3		
7	Data FeatureSelection	1	T1,T2	Lectures, Case Studies, Group Discussions, Hands- on Exercises, Interactive Demos, Problem-Solving Sessions, Assessments	CO-1, CO-2	BL-2, BL-3		
8	the curse of dimensionality , Data splitting, bias- variance trade off, over fitting vs under fitting	1	T1,T2	Lectures, Case Studies, Group Discussions, Hands- on Exercises, Interactive Demos, Problem-Solving Sessions, Assessments	CO-1, CO-2	BL-2, BL-3		

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Unit-2								
9	Supervised Learning-I Regression: Introduction to Regression, Types of Regression Models,	1	T1,T2	Lectures, Case Studies, Group Discussions, Hands-on Exercises, Interactive Demos, Problem-Solving Sessions, Assessments	CO-1, CO-2	BL-2, BL-3		
10	Introduction to Linear Regression	1	T1,T2	Lectures, Case Studies, Group Discussions, Hands-on Exercises, Interactive Demos, Problem-Solving Sessions, Assessments	CO-1, CO-2	BL-2, BL-3		
11	Simple Linear Regression	1	T1,T2	Lectures, Case Studies, Group Discussions, Hands-on Exercises, Interactive Demos, Problem-Solving Sessions, Assessments	CO-1, CO-2	BL-2, BL-3		
12	Least square regression, GradientDescent	1	T1,T2	Lectures, Case Studies, Group Discussions, Hands-on Exercises, Interactive Demos, Problem-Solving Sessions, Assessments	CO-1, CO-2	BL-2, BL-3		
13	Multiple Linear Regression (MLR),	1	T1,T2	Lectures, Case Studies, Group Discussions, Hands-on Exercises, Interactive Demos, Problem-Solving Sessions, Assessments	CO-1, CO-2	BL-2, BL-3		

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14	Regularization in Linear Regression, Ridge regression, Lasso regression,	1	T1,T2,R2	Whiteboard/Visualization, Interactive Demonstrations, Hands-on Lab Sessions, Case Studies and Problem-Solving, SQL Practice Exercises, Project-Based	CO-3	BL-3, BL-4		
15	Polynomial Regression	1	T1,T2,R2	Whiteboard/Visualization, Interactive Demonstrations, Hands-on Lab Sessions, Case Studies and Problem-Solving, SQL Practice Exercises, Project-Based Learning	CO-3	BL-3, BL-4		
16	Support Vector for Regression (SVR).	1	T1,T2,R2	Whiteboard/Visualization, Interactive Demonstrations, Hands-on Lab Sessions, Case Studies and Problem-Solving, SQL Practice Exercises, Project-Based Learning	CO-3	BL-3, BL-4		

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Unit-3								
17	Supervised Learning-II Classification – Introduction to Classification, Types of Learners in Classification	1	T1,T2,R2	Whiteboard/Visualization, Interactive Demonstrations, Hands-on Lab Sessions, Case Studies and Problem-Solving, SQL Practice Exercises, Project-Based Learning	CO-3	BL-3, BL-4		
18	Logistic Regression	1	T1,T2,R2	Whiteboard/Visualization, Interactive Demonstrations, Hands-on Lab Sessions, Case Studies and Problem-Solving, SQL Practice Exercises, Project-Based	CO-3	BL-3, BL-4		
19	K-Nearest Neighbors(K-NN)	1	T1,T2,R2	Whiteboard/Visualization, Interactive Demonstrations, Hands-on Lab Sessions, Case Studies and Problem-Solving, SQL Practice Exercises, Project-Based Learning	CO-3	BL-3, BL-4		
20	Support Vector Machine (SVM),	1	T1,T2,R2	Whiteboard/Visualization, Interactive Demonstrations, Hands-on Lab Sessions, Case Studies and Problem-Solving, SQL Practice Exercises, Project-Based Learning	CO-3	BL-3, BL-4		

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21	Naive Bayes	1	T1,T2,R2	Whiteboard/Visualization, Interactive Demonstrations, Hands-on Lab Sessions, Case Studies and Problem-Solving, SQL Practice Exercises, Project-Based Learning	CO-3	BL-3, BL-4		
22	Decision TreeClassification	1	T1,T2,R2	Whiteboard/Visualization, Interactive Demonstrations, Hands-on Lab Sessions, Case Studies and Problem-Solving, SQL Practice Exercises, Project-Based	CO-3	BL-3, BL-4		
23	Random ForestClassification	1	T1,T2	Lectures, Hands-on Exercises, Interactive Demonstrations, Problem-Solving Sessions, Online Simulations	CO-3, CO-4	BL-3, BL-4		
Unit-4								
24	Unsupervised Learning Introduction to Clustering, Types of Clustering, Types of Clustering Algorithms,	1	T1,T2	Lectures, Hands-on Exercises, Interactive Demonstrations, Problem-Solving Sessions, Online Simulations	CO-3, CO-4	BL-3, BL-4		

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25	K-Means Clustering	1	T1,T2	Lectures, Hands-on Exercises, Interactive Demonstrations, Problem-Solving Sessions, Online Simulations	CO-3, CO-4	BL-3, BL-4		
26	Hierarchical Clustering	1	T1,T2	Lectures, Hands-on Exercises, Interactive Demonstrations, Problem-Solving Sessions, Online Simulations	CO-3, CO-4	BL-3, BL-4		
27	DBSCAN Clustering	1	T1,T2	Lectures, Hands-on Exercises, Interactive Demonstrations, Problem-Solving Sessions, Online Simulations	CO-3, CO-4	BL-3, BL-4		
28	Introduction and Types of AssociationRule Learning	1	T1,T2	Lectures, Hands-on Exercises, Interactive Demonstrations, Problem-Solving Sessions, Online Simulations	CO-3, CO-4	BL-3, BL-4		
29	Apriori Algorithm	1	T1,T2	Lectures, Hands-on Exercises, Interactive Demonstrations, Problem-Solving Sessions, Online Simulations	CO-3, CO-4	BL-3, BL-4		
30	Eclat Algorithm	1	T1,T2	Lectures, Hands-on Exercises, Interactive Demos, Case Studies, Problem-Solving Sessions	CO-3, CO-4	BL-3, BL-4		

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31	F-P Growth Algorithm, Applications of Association Rule Learning.	1	T1,T2	Lectures, Hands-on Exercises, Interactive Demos, Case Studies, Problem-Solving Sessions	CO-3, CO-4	BL-3, BL-4		
Unit-5								
32	Reinforcement Learning: Introduction of Reinforcement Learning, Terms used in Reinforcement Learning, Key Features	1	T1,T2	Lectures, Hands-on Exercises, Interactive Demos, Case Studies, Problem-Solving Sessions	CO-3, CO-4	BL-3, BL-4		
33	Elements of Reinforcement Learning, How does Reinforcement Learning Work?,	1	T1,T2	Lectures, Hands-on Exercises, Interactive Demos, Case Studies, Problem-Solving Sessions	CO-3, CO-4	BL-3, BL-4		
34	The Bellman Equation, Types of Reinforcement learning, Markov Decision Process,	1	T1,T2	Lectures, Hands-on Exercises, Interactive Demos, Case Studies, Problem-Solving Sessions	CO-3, CO-4	BL-3, BL-4		
35	Reinforcement Learning Algorithms,	1	T1,T2	Lectures, Hands-on Exercises, Interactive Demos, Case Studies, Problem-Solving Sessions	CO-3, CO-4	BL-3, BL-4		

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36	Reinforcement Learning Applications	1	T1,T2	Lectures, Hands-on Exercises, Interactive Demos, Case Studies, Problem-Solving Sessions	CO-3, CO-4	BL-3, BL-4		
37	Performance Improvement of ML Models: Performance Improvement with Ensembles, Ensemble Learning Methods,	1	T1,T2	Lectures, Hands-on Exercises, Interactive Demos, Case Studies, Problem-Solving Sessions	CO-4, CO-5	BL-3, BL-4		
38	Bagging Ensemble Algorithms	1	T1,T2	Lectures, Hands-on Exercises, Interactive Demos, Case Studies, Problem-Solving Sessions	CO-4, CO-5	BL-3, BL-4		
39	Boosting Ensemble Algorithm	1	T1,T2	Lectures, Hands-on Exercises, Interactive Demos, Case Studies, Problem-Solving Sessions	CO-4, CO-5	BL-3, BL-4		
40	Voting Ensemble Algorithms	1	T1,T2	Lectures, Hands-on Exercises, Interactive Demos, Case Studies, Problem-Solving Sessions	CO-4, CO-5	BL-3, BL-4		

BoS Approved Textbooks:

1. Andreas C. Müller, Sarah Guido.(2016).Introduction to Machine Learning with Python: A Guide for Data Scientists.1st ed.O'Reilly Media.

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BoS Approved Reference Books:

1. Tom M. Mitchell.(2017).Machine Learning.1st ed.McGraw Hill Education.
2. Dr S. Sridhar, Dr M. Vijayalakshmi.(2021).Machine Learning.1st ed. Oxford University Press.
3. Manaranjan Pradhan, U Dinesh Kumar.(2019).Machine Learning using Python.1st ed. Wiley India.