Course Type	Course Code	Name of Course	L	T	P	Credit
DC	MSC527	Machine Learning Lab.	0	0	2	2

Course Objective
In this laboratory course, one will be introduced to some popular machine learning techniques and give insights on how to apply these techniques to solve a new business related problem. The course will be taught with popular software like R, and Python.
Learning Outcomes
• To develop understanding in various types of machine learning algorithm • To develop the skill in application software like Python or R for solving business application problems through machine learning.

Exp. No.	Topics	Lectures	Learning Outcome
1. 2. 3. 4.	**Supervised Learning:** Linear Regression (with one variable and multiple variables), Gradient Descent; Classification (Logistic Regression, Overfitting, Regularization, Support Vector Machines); Artificial Neural Networks (Perceptron, Multilayer networks, and back-propagation); Decision Trees.	8	Students will learn different types of supervised learning algorithms: classification/regression problems.
5. 6. 7. 8.	**Unsupervised Learning:** Clustering (K-means, Hierarchical); Dimensionality reduction; Principal Component Analysis; Anomaly Detection.	8	Students will learn to find the structures and patterns in the data.
9. 10. 11.	**Theory of Generalization:** In-sample and out-of sample error, VC inequality, VC analysis, Bias and Variance Analysis.	6	Students will learn different types of error, and techniques to minimize error in the model.
12.	**Applications:** Spam Filtering, recommender systems, and others	4	Students will learn the implementation of different types of machine learning algorithms for real-life problems.
Total		26	

Text Books:

1. “Understanding Machine Learning”, Shai Shalev-Shwartz and Shai Ben-David. Cambridge University Press. 2017.
2. “Data Analytics using Python”, Bharti Motwani, First Edition, Wiley India Pvt. Ltd., 2020.

Reference Books:

1. “Foundation of Data Science”, Avrim Blum, John Hopcroft and Ravindran Kannan. January 2017.
2. “Machine Learning”, Tom Mitchell, First Edition, McGraw-Hill, 1997.