

**Guru Tegh Bahadur Institute of Technology, New Delhi**  
**Department of Computer Science & Engineering**

Lecture Plan for Data Science

**Course Name: B.Tech (CSE) Semester: 7th SUB CODE: CIE 405T**

No of hours allotted per week: **3**

<b>S.No</b>	<b>Topic Details</b>	<b>No of Hours Planned</b>	<b>Reference/text book</b>
1.	<b>Unit-I:</b> Introduction to Data Science, Difference among AI, Machine Learning and Data Science.	2	T1, R1
	Basic introduction of python, Google Colab and their features Popular Dataset Repositories along with discussion on some datasets	3	T3, R2
	Data Pre-processing, Data Scales, Similarity and Dissimilarity measures, sampling and quantization of data, filtering,	4	T2, R2
	Data transformation and merging. Data visualization, PCA, Correlation, Chi Square test. Illustration of these techniques through Python	4	T1, T3, R2
2.	<b>Unit-II</b> Regression Analysis, linear, generalized, regularized regression, Cross validation, Training and Testing data set.	3	T1, R1

	Overview of nonlinear regression, Overview of Ridge regression.	3	T1, R1
	Latent variables, Structure Equation modelling. Illustration of these techniques through Python	4	T3, R2
3.	<b>Unit-III</b>  Forecasting, time series data analysis, Stationarity, Seasonality.  Recurrent models, autoregressive models. Illustration of these techniques through Python.	4  4	T1, T2  T3, R1
4.	<b>UNIT – IV</b> Classification, Linear discriminant analysis, overview of support vector machine.  Decision trees, Clustering Clustering techniques. Illustration of these techniques through Python.	4  4	T1, R1  T1, R2

**Text Books:**

1. Runkler, Thomas A., "Data Analytics: Models and Algorithms for Intelligent Data Analysis", Springer, 2012.
2. Friedman, Jerome, Trevor Hastie, and Robert Tibshirani, "The elements of statistical learning". Vol. 1. New York: Springer Series in Statistics, 2001.
3. Thareja, R., "Data Science and Machine Learning using Python" McGraw Hill, 2022

**Reference Books:**

1. Kroese, D. P. Botev, Z., Taimre, T. & Vaisman, R., "Data Science and Machine Learning: Mathematical and Statistical Methods." CRC Press, 2019
2. Grus, J. "Data Science from Scratch: First Principles with Python" O'Reilly Media, 2019

