# Guru Tegh Bahadur Institute of Technology, New Delhi

**Lecture Plan for Foundations of Data Science**

# Course Name: B.Tech (AIML) Semester: 5th SUB CODE: AIML203

No of hours allotted to complete the syllabi: **40**

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

|  |  |  |  |
| --- | --- | --- | --- |
| **S.No** | **Topic Details** | **No of Hours Planned** | **Reference/text book** |
| 1. | **Unit-I:** |  |  |
|  | Introduction to data science, Applications of data science  Data scientist roles and responsibilities, Skills needed to become a data scientist  Need of Python for data analysis  Introduction to data understanding and pre-processing  Domain knowledge, Understanding structured and unstructured data  Creation of synthetic dataset in MS Excel | 1  1  1  2  1  2 | T1, R1  T1, R1  T1, R1, R2  T2, R1, R2  T1, R1, R2    T1, R1, R2 |
|  |  |  |  |
| 2. | **Unit-II**  Basics of Python programming: Variables, printing values, if condition, arithmetic operations, loops  Data Analysis process  Dataset generation, Importing Dataset: Importing and Exporting Data  Basic insights from datasets  Cleaning and preparing the data: Identify and Handle missing values. | 4  1  2  2  3 | T2, R1, R2  T2, R1, R2  T2, R2  T3, R1, R2  T3, R1, R2 |
| 3. | **Unit-III**  Basics of Essential Python libraries: Introduction to NumPy, Pandas, Matplotlib, SciPy  Data processing, Data visualization  Basic visualization tools  Specialized visualization tools  Seaborn Creating and Plotting maps | 5  1  2  2  2 | T2, R1, R2  T3, R1, R2  T3, R1. R2  T3, R1. R2  T3, R1. R2 |
| 4. | **Unit-IV**  Mathematical and scientific applications for data analysis  Basics of Supervised and Unsupervised learning, Decision making  Trend and predictive mining using python  Recommender systems | 2  2  2  2 | T1, R1, R2  T3, R1, R2  T2, R1, R2  T3, R1, R2 |

## Text Books:

[T1] Wes Mckinney, Python for Data Analysis, First Edition, Publisher O’Reilly Media

[T2] Foundational Python for Data Science, 1st edition, Kennedy Behrman, Pearson Publication

[T3] Data analytics using Python, Bharti Motwani, Wiley Publication

## Reference Books:

[R1] Allen Downey, Jeffrey Elkner, Chris Meyers, Learning with Python, Dreamtech Press.

[R2] Reema Thareja. Python Using Problem Solving approach, Oxford University press