Introduction to Data Science and Data Structures

Course Outcome:

1. Demonstrate understanding of the motivation behind data science through the art of storytelling with data, using real-life examples from various fields such as finance, healthcare, marketing, and social media.
- Illustrate how data abstraction and data wrangling are essential steps in the process of deriving insights from raw data.
- Explain different methods of storing data and their relevance in the context of data science projects.

2. Analyze the types of data and scales of measurement, and categorize them appropriately to understand the nature of the data being worked with.

3. Apply descriptive measures to analyze univariate metric data effectively, drawing meaningful conclusions and insights from the data.

4. Utilize descriptive measures for analyzing both bivariate metric data (correlations, linear and polynomial regressions) and bivariate categorical data (measures of associations in a contingency table) to identify relationships and trends within the dataset.

5. Understand the philosophy of exploratory data analysis (EDA) and employ basic tools such as plots, graphs, and summary statistics to uncover patterns and anomalies in the data.

6. Apply basic principles and tools of data visualization to represent qualitative, quantitative, temporal, spatial, and panel data effectively, enhancing the communication of insights derived from the data.

7. Recognize and demonstrate proficiency in various data structures such as arrays, linked lists, stacks, queues, binary trees, threaded binary trees, binary search trees, AVL trees, sets, tuples, dictionaries, and trie, along with an understanding of their applications in data management and manipulation.

8. Explain the fundamental concepts of searching and sorting algorithms, and analyze their complexity using Big-Oh, Big-Omega, and Big-Theta notations, to evaluate the efficiency of algorithms in handling large datasets.