**Course Content**

**Unit 1: Introduction to Exploratory Data Analysis 7 Hours**

Overview of EDA and its role in data analysis, The importance of data exploration in data-driven decision making, Understanding data types and data structures, Data Cleaning and Preparation, Data cleaning techniques: handling missing values, outliers, and duplicates, Data transformation: scaling, encoding categorical variables, and feature engineering, Descriptive Statistics, Measures of central tendency and variability, Distribution analysis: histograms, box plots, and density plots, Correlation and covariance analysis.

**Unit 2: Data Visualization 7 Hours**

Introduction to data visualization libraries (e.g., Matplotlib, Seaborn, or ggplot2), Creating basic plots: bar plots, scatter plots, and line plots, Customizing visualizations for better presentation, Advanced visualization techniques: heatmaps, pair plots, and 3D plots, Interactive visualizations using tools like Plotly or Bokeh, Analyzing time-series data: trend analysis, seasonality, and periodicity, Visualizing time-series data: line plots, area charts, and seasonal decomposition.

**Unit 3: Multivariate Analysis and Dimensionality Reduction 8 Hours**

Visualizing relationships between multiple variables: scatterplot matrices and parallel coordinates, Using heatmaps for correlation and covariance analysis, Introduction to dimensionality reduction techniques: PCA and t-SNE, Visualizing high-dimensional data in a lower-dimensional space, Linear Discriminant Analysis (LDA), Non-negative Matrix Factorization (NMF), Autoencoders, Random Projections, Singular Value Decomposition (SVD), Feature Selection, Application of dimensionality reduction in data visualization.

**Unit 4: Geographic Data Visualization 8 Hours**

Geospatial Data Sources, Geospatial Data Visualization Tools, Choropleth Maps, Proximity Analysis, Time-Series Visualization, 3D and Interactive Maps, Spatial Data Analysis, Real-Time Geospatial Visualization, Geo-visualization for Urban Planning, Geospatial Data Storytelling, Data Ethics and Privacy in Geo-visualization.

**Unit 5: Case Studies 6 Hours**

Netflix - "The Netflix Recommender System", Airbnb - "Data-Driven Pricing Strategy", Google Flu Trends - "Predicting Flu Outbreaks with Data", Uber - "Visualizing Urban Mobility Data", Twitter - "Analyzing Social Media Trends", World Health Organization (WHO) - "Visualizing Global Health Data"

**Text Books**

1. Data Science from Scratch, by Joel Grus, O’Reilly Publication

2. Python for Data Analysis, by Wes Mckinney , O’Reily Publication.