

DATA ANALYSIS

Week 1: Introduction to Data Analysis

- What is Data Analysis?
- Types of Data (qualitative vs. quantitative)
- Types of Data Analysis:
 - ✓ Descriptive
 - ✓ Diagnostic
 - ✓ Predictive
 - ✓ Prescriptive
- Applications of Data Analysis in business, health, finance, education, etc.

Week 2: Data Collection & Sources

- Primary vs. Secondary data
- Data collection methods: surveys, interviews, experiments, APIs, web scraping
- Types of datasets (structured, semi-structured, unstructured)
- Data ethics, privacy, and security considerations

Week 3: Data Cleaning & Preparation

- Importance of data cleaning
- Handling missing values
- Removing duplicates
- Data transformation (normalization, scaling)
- Handling outliers
- Tools for cleaning: Excel, Python (Pandas), R

Week 4: Exploratory Data Analysis (EDA)

- Descriptive statistics (mean, median, mode, variance, standard deviation)
- Data visualization basics: histograms, scatterplots, bar charts, boxplots
- Identifying patterns, correlations, and distributions
- Using Python libraries (Pandas, Matplotlib, Seaborn) or Excel for EDA

Week 5: Tools for Data Analysis

- Excel / Google Sheets: For beginners (pivot tables, charts, formulas)
- SQL: Querying databases (SELECT, JOIN, GROUP BY)

- Python (Pandas, Numpy, Matplotlib, Seaborn): For intermediate analysis
- R Programming: For statistical analysis
- Power BI / Tableau: For data visualization and dashboards

Week 6: Statistical Analysis

- Probability basics
- Hypothesis testing (t-test, chi-square test, ANOVA)
- Correlation vs. causation
- Regression analysis (linear & logistic regression)
- Confidence intervals and p-values

Week 7: Advanced Data Analysis

- Introduction to Machine Learning in Data Analysis
- Clustering (K-means)
- Classification (Decision Trees, Random Forest)
- Predictive modeling basics

Week 8: Reporting & Communication

- Turning analysis into insights
- Data storytelling principles
- Creating dashboards and reports
- Communicating results to non-technical stakeholders

Week 9: Capstone Project

- Choose a dataset (e.g., health, finance, sales, or education)
- Clean and prepare the data
- Perform exploratory data analysis
- Apply basic statistical methods
- Visualize results with graphs and dashboards
- Write a final report with insights and recommendations