

Data Science

Duration – 100 Hours (6 Months)

Module 1: Introduction to Data Science & Analytics -- 6 Hours

- What is Data Science? The Data Science Lifecycle.
- Data Science vs. Data Analytics vs. AI/ML.
- Key Roles: Data Scientist, Data Engineer, ML Engineer.
- Setting up the environment: Jupyter Notebook, Anaconda/Python installation.

Module 2: Python Fundamentals for Data Science -- 11 Hours

- Python Basics: Data Types, Variables, Control Statements (If-else, loops).
- Python Data Structures: Lists, Tuples, Dictionaries, Sets.
- Functions, Modules, and Libraries.
- **Hands-on:** Solving basic programming problems.

Module 3: Data Handling and Manipulation -- 11 Hours

- **NumPy:** Arrays, Reshaping, Indexing, and Array Operations.
- **Pandas:** Series and DataFrames.
- Data Cleaning: Handling Missing Values, Removing Duplicates, Data Type Conversion.
- Data Manipulation: Merging, Joining, Concatenating, and GroupBy.
- **Hands-on:** Loading CSV files and cleaning raw datasets.



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Module 4: Exploratory Data Analysis (EDA) & Visualization -- 11 Hours

- Descriptive Statistics: Mean, Median, Mode, Variance, Standard Deviation.
- Data Visualization Libraries: Matplotlib (Line plots, Bar charts).
- Advanced Visualization: Seaborn (Heatmaps, Pair plots, Box plots).
- **Hands-on:** EDA on a sample dataset (e.g., Titanic or Housing data).

Module 5: Statistics for Data Science -- 11 Hours

- Probability Distributions: Normal Distribution, Bernoulli, Binomial.
- Inferential Statistics: Hypothesis Testing, P-values, Z-test, T-test.
- Correlation vs. Causation.

Module 6: Machine Learning Foundation -- 14 Hours

- Introduction to Machine Learning: Supervised vs. Unsupervised Learning.
- Regression Algorithms: Linear Regression, Logistic Regression.
- Classification Algorithms: Decision Trees, Random Forest, KNN.
- Model Evaluation Metrics: Accuracy, Precision, Recall, Confusion Matrix.
- **Hands-on:** Building a prediction model (e.g., Customer Churn or Stock Price).

Module 7: Data Science Project & Deployment -- 6 Hours

- End-to-End Project Workflow: Defining the problem, EDA, Modeling.
- Introduction to Model Deployment: Saving models (Pickle), basic deployment.
- **Project:** A short Capstone Project demonstrating the full pipeline.
- ***Hands-On Project, Deployment & Cloud Storage – 30 Hours.***



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