Data Science with Python

Course Curriculum

Module 1: Introduction to Data Science & Python

What is Data Science and its business applications

Data Science lifecycle and workflow

Introduction to Python programming

Setting up Python environment (Anaconda, Jupyter Notebook)

Python basics: Variables, Data Types, Operators

Control Statements and Loops

Module 2: Python for Data Handling

Functions and Moduls

Lists, Tuples, Sets, Dictionaries

File Handling in Python

Exception Handling

Introduction to NumPy

Array operations and mathematical functions

Module 3: Data Manipulation with Pandas

Introduction to Pandas DataFrames

Data Loading (CSV, Excel, JSON)

Data Cleaning and Preprocessing

Handling Missing Values

Filtering, Grouping, and Aggregation

Data Transformation Techniques

Module 4: Data Visualization & Exploratory Data Analysis (EDA)

Introduction to EDA

Data Visualization using Matplotlib

Visualization with Seaborn

Univariate and Bivariate Analysis

Correlation and Pattern Identification

Business Insight Generation

Module 5: Statistics for Data Science

Descriptive Statistics

Probability Concepts

Probability Distributions

Hypothesis Testing

Correlation and Regression Basics

Module 6: Machine Learning – Supervised Learning

Introduction to Machine Learning

Regression (Linear & Multiple Regression)

Classification (Logistic Regression, KNN, Decision Trees)

Model Evaluation Metrics

Overfitting & Underfitting

Cross-Validation Techniques

Data Science with Python

Module 7: Machine Learning – Unsupervised Learning
Clustering (K-Means, Hierarchical Clustering)
Dimensionality Reduction (PCA)
Association Rule Mining
Real-world Use Cases

Module 8: Advanced Machine Learning Concepts
Feature Engineering
Hyperparameter Tuning
Ensemble Methods (Random Forest, Gradient Boosting)
Model Optimization Techniques

Module 9: Model Deployment & Real-Time Applications
Introduction to Model Deployment
Saving and Loading Models (Pickle/Joblib)
Building Simple Web App with Flask/Streamlit
GitHub Project Deployment
End-to-End Project Workflow

Module 10: Live Projects – Real-Time Industry Use Cases
Sales Prediction Model
Customer Churn Prediction
Credit Risk Analysis
Sentiment Analysis Project
Business Dashboard Creation