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Data Science with Python

Build Intelligent Data-Driven Solutions

8 Weeks Duration • 40 Total Lectures (5 Lectures/Week) • Beginner to Advanced

About the Course

- **Structured Learning Journey:** From Python essentials & statistical EDA to advanced Machine Learning and deployment
- **Career-Oriented:** Designed specifically for developers, analysts, and IT professionals transitioning to Data Science
- **Comprehensive Scope:** Covers NumPy, Pandas, Scikit-Learn, Supervised/Unsupervised ML, and Streamlit app deployment
- **Hands-On Methodology:** 100% practical Jupyter notebook coding labs building end-to-end predictive models
- **Portfolio Capstone:** Build, train, optimize, and deploy production ML applications with live interactive web UI

Who Can Attend?

- Software Developers & Python Developers transitioning to Data Science
- Data Analysts & Business Analysts scaling up to predictive Machine Learning
- QA Engineers, Support Engineers & Technical Professionals
- Graduates and tech enthusiasts aiming for high-growth Data Scientist roles

**No previous Machine Learning experience required. Starting points are tailored to learner background.*

Course Outline

Module 1: Python Essentials (Week 1)

- Python Fundamentals, Data Types & Flow Control
- Functions, Lambda expressions, List Comprehensions & OOP Basics
- Data Structures: Lists, Tuples, Dictionaries & Sets
- Hands-on: Python scripting for data problem solving

Module 2: Data Preparation & Wrangling (Week 2)

- NumPy: Multi-dimensional Arrays & Mathematical Operations
- Pandas: DataFrames, Series, Indexing & Data Slicing
- Data Cleaning: Imputation, Outlier Detection & Handling Missing Values
- Feature Engineering: Encoding Categorical Variables & Feature Scaling

Module 3: Exploratory Data Analysis & Statistics (Weeks 3–4)

- Exploratory Data Analysis (EDA) methodologies and distribution analysis
- Data Visualizations: Matplotlib, Seaborn & multi-variable correlation heatmaps
- Descriptive & Inferential Statistics, Probability Distributions
- Hypothesis Testing: T-Tests, ANOVA, Chi-Square Tests & P-Value interpretation

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Module 4: Machine Learning Fundamentals (Week 5)

- Supervised vs. Unsupervised Learning paradigms
- Machine Learning Project Lifecycle: Scoping, Training, Validation & Inference
- Bias-Variance Tradeoff, Overfitting vs. Underfitting & Regularization
- Scikit-Learn workflow: Pipelines, Estimators & Transformers

Module 5: Core Machine Learning Algorithms (Weeks 6–7)

- Regression: Linear Regression, Ridge, Lasso & Polynomial Regression
- Classification: Logistic Regression, Decision Trees, Random Forests & Gradient Boosting
- Clustering: K-Means, Hierarchical Clustering & DBSCAN
- Dimensionality Reduction: Principal Component Analysis (PCA)

Module 6: Evaluation & Deployment (Week 8)

- Evaluation Metrics: Confusion Matrix, Precision, Recall, F1-Score & ROC-AUC
- Cross-Validation techniques (K-Fold, Stratified K-Fold) & Hyperparameter Tuning (GridSearchCV)
- Model Serialization with Pickle & Joblib
- Streamlit Introduction: Building interactive web applications and live model inference

Hands-on Projects

- **Customer Churn Prediction:** End-to-end binary classification model identifying high-risk churn customers
- **Loan Approval Prediction:** Risk scoring model using ensemble algorithms with feature importance analysis
- **Sales Demand Forecasting:** Multivariate regression model predicting future seasonal retail revenues

Tools & Technologies

Python, Jupyter Notebook, VS Code, NumPy, Pandas, Scikit-learn, Matplotlib, Seaborn, Streamlit, GitHub, Google Colab

Why This Program?

- Practical machine learning foundation with 100% hands-on notebook implementations
- Industry case studies and real-world datasets from finance, healthcare & retail
- Production-ready projects for your GitHub portfolio to showcase to hiring managers
- AI career readiness and dedicated technical interview coaching
- Designed specifically for career transition into Data Science & Machine Learning roles

How This Fits Your Full Learning Stack

- Data Analysis → Data Science → Machine Learning → MLOps & AI Engineering
- **Final Result: Full Stack + AI + Data Scientist**

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