AcademixPath

MACHINE LEARNING WITH PYTHON

1 Month Basic + 2 Months Expert
Frequency: 2 Classes/Week
Days & Timings: Friday, Saturday - 08.30PM to 10:00PM

Beginner Level — Python Foundations & Core Machine Learning Algorithms

Goal: To build Python fluency, get comfortable with Jupyter, and learn to manipulate and visualize datasets and to cover ML fundamentals, math intuition, Sklearn implementations, and evaluation metrics.

Module 1: Python Basics for Data Science

Introduction to Jupyter Notebook, Python essentials, and NumPy arrays for numerical operations.

Module 2: Data Manipulation with Pandas

Loading CSV files, exploring datasets, filtering, grouping, merging, and handling missing values.

Module 3: Data Visualization

Creating plots with Matplotlib, Seaborn, and interactive charts with Plotly to explore and understand data.

Module 4: Assessment 1

EDA on a dataset. Clean, visualize, and summarize findings in a Jupyter notebook.

Module 5: Introduction to Machine Learning

Overview of ML types (supervised vs unsupervised), concept of features/labels, train/test split, and the ideas of overfitting & underfitting.

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Module 6: Linear & Logistic Regression

Mathematical intuition (equations, gradient descent), hands-on implementation from scratch in Python, and with sklearn. Model evaluation with MSE, accuracy, and confusion matrix.

Module 7: Naive Bayes & Decision Trees

Bayes' theorem and Naive Bayes for classification (Play Tennis dataset, sentiment analysis using Bag of Words). Decision Tree Classifier with sklearn, interpreting splits and visualization.

Module 8: Assessment 2

Project on a Kaggle dataset. Preprocessing data, training multiple models, and evaluating results.

Expert Track — Real-World ML Workflow & Feature Engineering

Goal: To introduce ensemble models, feature engineering, evaluation metrics, and structured ML projects.

Module 9: Feature Engineering & Encodin

Practical methods for transforming data: one-hot encoding, label encoding, scaling, Bag of Words, and TF-IDF for text datasets.

Module 10: Model Evaluation & Data Challenges

Working with imbalanced data (Credit Card Fraud / Churn dataset), using cross-validation, precision/recall, F1-score, and ROC curves to evaluate models.

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Module 11: Ensembles & Professional ML Workflow

Introduction to ensemble methods. Building reproducible ML projects with modular code, sklearn pipelines, and version control.

Module 12: Final Project

End-to-end project. Handling messy data, applying feature engineering, training multiple models, and evaluating with advanced metrics.

Final Evaluation (100 Marks)

- Assessments: 2×30 = 60
- Final Project: 40
- Total Marks: 100 (60+40)

Course Fee Structure

Pkr.30,000/-

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ABOUT THE INSTRUCTOR
Asma Khalil

SHORT BIO

Asma Khalil is an educator with a strong background in programming and applied AI. With experience in mentoring students, coordinating academic projects, and working on practical AI applications, she is passionate about making complex topics easy to understand. She brings a balance of technical knowledge and teaching skills, helping learners build confidence while exploring programming and machine learning.

PROFESSIONAL EXPERIENCE:

Teaching & Mentorship: Taught C++ programming fundamentals, OOP, Signals & Systems, Logic Design, and Computer Communication & Networking to undergraduate students. Guided final-year projects with a focus on applying AI and automation concepts.

Applied AI Exposure: Gained hands-on experience with machine learning, NLP, and computer vision techniques while working with an Austrian start-up. Worked on projects such as anomaly detection in traffic signs.

Industry & Training Work: Worked with Mindrift as an AI Tutor, evaluating and refining AI-generated responses to improve model performance.

Academic Coordination & Quality Assurance: Served as final-year project coordinator and member of the QA committee, providing guidance, feedback, and organizational support to the department.

EDUCATIONAL QUALIFICATIONS:

- Electronic Engineering

ACHIEVEMENTS / HIGHLIGHTS:

- Developed dashboards in Finance and Marketing sector and optimize them.
- Completed Heart Disease Prediction Model using machine learning.
- Conducted multiple freelancing projects in data analysis on Upwork.
- Currently concluding Data Analytics course with AI integration

AREAS OF EXPERTISE:

Python programming, Machine Learning, Prompt Engineering, LLMs, Academic Mentorship & Research Guidance

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