PYTHON AIML

Python AIML Course Syllabus

Week 1: Introduction to Python and Basics

- Introduction to Python: Installation and Setup.
- Basic Syntax and Data Types in Python.
- Variables, Expressions, and Statements.
- Basic Input/Output Operations.

Week 2: Data Structures in Python

- Understanding Lists, Tuples, and Dictionaries.
- Working with Sets and Strings.
- Operations on Data Structures.
- Practical Exercises on Data Manipulation.

Week 3: Control Structures in Python

- Introduction to Conditional Statements (if, else, elif).
- Working with Loops: For Loop and While Loop.
- Nested Loops and Loop Control Statements.
- Practical Examples Using Loops.

Week 4: File Handling in Python

- Understanding File Operations: Read, Write, and Append.
- Working with Text Files and Binary Files.
- File Handling Exceptions and Error Handling.
- Practical Exercises on File Manipulation.

Week 5: Introduction to Machine Learning

- What is Machine Learning? Overview and Applications.

- Understanding Supervised, Unsupervised, and Reinforcement Learning.

- Introduction to Python Libraries for ML: NumPy, Pandas, and Scikit-Learn.

- Setting Up the Environment for Machine Learning.

Week 6: Linear Regression

- Introduction to Linear Regression: Concepts and Use Cases.

- Implementing Simple Linear Regression in Python.

- Evaluating the Performance of a Linear Regression Model.

- Hands-On: Predicting House Prices using Linear Regression.

Week 7: Multiple and Polynomial Regression

- Understanding Multiple Linear Regression.

- Implementing Multiple Linear Regression in Python.

- Introduction to Polynomial Regression.

- Practical Example: Polynomial Regression for Curve Fitting.

Week 8: Logistic Regression

- Introduction to Logistic Regression: Concepts and Applications.

- Implementing Logistic Regression in Python.

- Model Evaluation: Confusion Matrix, Precision, Recall, and F1-Score.

- Hands-On: Predicting Binary Outcomes using Logistic Regression.

Week 9: K-Nearest Neighbors (KNN)

- Introduction to KNN: Concepts and Use Cases.

- Implementing KNN Algorithm in Python.

- Choosing the Right Value of K.

- Hands-On: KNN for Classification Problems.

Week 10: Decision Tree

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- Introduction to Decision Trees: Concepts and Splitting Criteria.

- Implementing Decision Trees in Python.

- Overfitting and Pruning in Decision Trees.

- Practical Example: Decision Tree for Predictive Modeling.

Week 11: Boosted Decision Trees

- Understanding Boosting and Ensemble Methods.

- Introduction to Boosted Decision Trees (AdaBoost, Gradient Boosting).

- Implementing Boosted Decision Trees in Python.

- Hands-On: Improving Model Accuracy using Boosting.

Week 12: Random Forest

- Introduction to Random Forest: Concepts and Advantages.

- Implementing Random Forest Algorithm in Python.

- Evaluating Model Performance and Feature Importance.

- Practical Example: Random Forest for Multi-Class Classification.

Week 13: Clustering Techniques

- Introduction to Clustering: Concepts and Applications.

- K-Means Clustering: Implementation in Python.

- Hierarchical Clustering: Concepts and Implementation.

- Practical Example: Clustering Customer Data.

Week 14: Advanced Clustering Techniques

- Introduction to DBSCAN and Mean Shift Clustering.

- Implementing Advanced Clustering Techniques in Python.

- Evaluating Clustering Performance.

- Hands-On: Clustering High-Dimensional Data.

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Week 15: Final Project Development

- Selecting a Real-World Problem for AIML Application.

- Project Development: Data Preprocessing, Model Selection, and Evaluation.

- Writing and Testing Code for the Final Project.

- Final Project Presentation and Feedback.