30-Day Python for AI & Machine Learning Plan

Week 1: Python Foundations

Day 1: Python Setup & Basics

Learning Goal: Understand Python syntax, variables, and print functions
Activity: Create a 'Hello AI!' script that prints a personalized welcome message and the current date.

Day 2: Control Structures

Learning Goal: Learn conditionals, loops, and logical operations
Activity: Build a number guessing game with random number and 5 attempts.

Day 3: Functions & Modules

Learning Goal: Write reusable functions and import custom modules
Activity: Write a BMI calculator function and use it in another file.

Day 4: Data Structures

Learning Goal: Practice lists, dictionaries, sets, tuples
Activity: Create a contact manager using dictionaries and lists (add/search/delete).

Day 5: File I/O & Errors

Learning Goal: Read/write files and handle exceptions
Activity: Build a log system that appends user input to a `.txt` file with error handling.

Day 6: OOP Basics

Learning Goal: Learn classes, objects, and methods
Activity: Build a `BankAccount` class with deposit, withdraw, and balance methods.

Day 7: Mini Project

Learning Goal: Integrate week's concepts
Activity: Create a file-based To-Do app using classes and file saving.

Week 2: Scientific Python Stack

Day 8: NumPy Basics

Learning Goal: Learn array creation, slicing, and math
Activity: Create and manipulate matrices, compute mean and dot products.

Day 9: Advanced NumPy

Learning Goal: Practice simulations, vectorization, random numbers
Activity: Simulate 1,000 dice rolls and plot frequency using NumPy.

Day 10: Pandas Basics

Learning Goal: Learn DataFrames, Series, CSV handling
Activity: Load a CSV, explore data: `head()`, `describe()`, and types.

Day 11: Advanced Pandas

Learning Goal: Group, merge, and clean data

Activity: Merge users and orders CSVs and identify top users by order count.

Day 12: Data Cleaning

Learning Goal: Handle missing, duplicate, invalid data
Activity: Clean a messy dataset with nulls, outliers, and bad formatting.

Day 13: Visualization

Learning Goal: Master Matplotlib & Seaborn
Activity: Visualize correlations and distributions using heatmaps and pairplots.

Day 14: Viz Project

Learning Goal: Tell a story with data
Activity: Visualize COVID-19 trends or weather data over time with multiple plots.

Week 3: ML Foundations

Day 15: Intro to ML

Learning Goal: Understand types of ML & workflow
Activity: Write a notebook explaining supervised vs. unsupervised ML with examples.

Day 16: Regression

Learning Goal: Build linear regression models
Activity: Predict house prices using Scikit-learn's linear regression.

Day 17: Classification

Learning Goal: Train classifiers & evaluate performance
Activity: Classify Titanic survival using logistic regression with F1-score.

Day 18: Preprocessing

Learning Goal: Clean, encode, scale, and split data
Activity: Build a full preprocessing pipeline for a dataset.

Day 19: Evaluation

Learning Goal: Learn cross-validation & ROC curves
Activity: Use K-fold validation and plot ROC/AUC for a classifier.

Day 20: Unsupervised

Learning Goal: Apply KMeans and PCA
Activity: Cluster Iris dataset and reduce dimensions with PCA for visualization.

Day 21: ML Mini Project

Learning Goal: Combine ML pipeline skills
Activity: Create a full ML pipeline for Iris dataset with training, evaluation, and explanation.

Week 4: Deep Learning + Projects

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Day 22: Neural Networks

Learning Goal: Understand perceptrons and activation functions
Activity: Manually build a 2-layer neural net using NumPy for binary classification.

Day 23: Keras Basics

Learning Goal: Learn TensorFlow/Keras basics
Activity: Train a Keras model to classify breast cancer dataset.

Day 24: CNNs

Learning Goal: Intro to computer vision with CNNs
Activity: Train a CNN on MNIST and visualize predictions with sample images.

Day 25: NLP Basics

Learning Goal: Text classification and preprocessing
Activity: Classify movie reviews (positive/negative) using TF-IDF and logistic regression.

Day 26: Deployment

Learning Goal: Model persistence and APIs
Activity: Save a trained model and build a Flask API that returns predictions.

Day 27: Real-World Project

Learning Goal: Apply DL to real data
Activity: Train an image or text classifier and test on new unseen data.

Day 28: Git & GitHub

Learning Goal: Version control for projects
Activity: Push your ML projects to GitHub with README, requirements, and visuals.

Day 29: Portfolio

Learning Goal: Organize your work
Activity: Build a portfolio markdown or webpage with links and project descriptions.

Day 30: Capstone

Learning Goal: Full ML project
Activity: Build and deploy a complete ML solution (e.g., Titanic classifier with Flask/Streamlit).