



1-Month AI Course Syllabus



Course Overview

- **Duration:** 4 Weeks
- **Mode:** Online / Offline
- **Level:** Beginner → Lower-Intermediate
- **Pre-requisites:**
 - Basic computer literacy
 - Some Python experience helpful but not mandatory
- **Tools Used:**
 - Python
 - Jupyter Notebook / Google Colab
 - scikit-learn
 - Pandas, NumPy
 - Optional: TensorFlow / PyTorch (Intro-level only)

WEEK 1: Introduction to AI & Python for AI

Introduction to AI

- What is Artificial Intelligence?
- History & Milestones of AI
- Types of AI:
 - Narrow AI
 - General AI
 - Superintelligence
- Key AI Fields:
 - Machine Learning
 - Deep Learning
 - Computer Vision
 - Natural Language Processing (NLP)
- Real-world Applications of AI

Python Refresher (Part 1)

- Python Basics
- Variables, Data Types
- Conditionals (if/else)
- Loops (for, while)

Python Refresher (Part 2)

- Functions
- Lists, Tuples, Dictionaries
- File I/O
- Understanding Jupyter Notebook / Google Colab

Working with Data in Python

- Introduction to:
 - NumPy
 - Pandas
 - Loading and inspecting datasets
 - Data cleaning basics
 - Handling missing values
-

Introduction to Machine Learning

- What is Machine Learning?
 - Supervised vs. Unsupervised Learning
 - Regression vs. Classification
 - Machine Learning Workflow
-

WEEK 2: Supervised Machine Learning

Linear Regression

- Understanding Regression
 - Simple Linear Regression
 - Visualizing regression line
 - Hands-on in Python
-

Multiple Linear Regression

- Multiple predictors
 - Overfitting & Underfitting
 - Practical example in Python
-

Classification with Logistic Regression

- Classification problem
 - Logistic Regression fundamentals
 - Probability and Sigmoid function
 - Binary vs. Multi-class classification
 - Hands-on example
-

Model Evaluation

- Train/Test Split
 - Accuracy, Precision, Recall, F1-Score
 - Confusion Matrix
 - Cross-Validation
-

Decision Trees

- How decision trees work

- Splitting criteria (Gini, Entropy)
 - Visualizing decision trees
 - Hands-on in scikit-learn
-

WEEK 3: Unsupervised Learning & Deep Learning Basics

Introduction to Unsupervised Learning

- What is Unsupervised Learning?
 - Use cases
 - Clustering vs. Dimensionality Reduction
-

K-Means Clustering

- Understanding K-Means
 - Choosing K
 - Practical example in Python
-

Dimensionality Reduction (PCA)

- Concept of dimensionality reduction
 - Principal Component Analysis
 - Visualizing PCA
 - Hands-on example
-

Introduction to Deep Learning

- What is Deep Learning?
 - Artificial Neural Networks vs. Machine Learning
 - Neural Network architecture basics
 - Use cases of Deep Learning
-

Building a Simple Neural Network

- Overview of:
 - TensorFlow / Keras OR PyTorch
 - Building a simple feedforward network
 - Basic activation functions
 - Hands-on example
-

WEEK 4: Special Topics & Mini Project

Natural Language Processing (NLP) Basics

- What is NLP?
- Text preprocessing
- Tokenization

- Bag-of-Words & TF-IDF
 - Simple sentiment analysis example
-

Computer Vision Basics

- What is Computer Vision?
 - Image basics
 - Using pre-trained models (e.g., MobileNet)
 - Image classification hands-on example
-

AI Ethics & Responsible AI

- Bias in AI
 - Privacy & data protection
 - Explainable AI (XAI)
 - Responsible AI practices
-

Mini Project: Data Analysis & ML Model

- Choose a dataset:
 - E.g. Titanic, Iris, MNIST (simple)
 - End-to-end workflow:
 - Load data
 - Clean & preprocess
 - Train ML model
 - Evaluate results
 - Present findings
-

Project Presentation & Recap

- Students present mini-projects
 - Q&A
 - Career paths in AI
 - Further learning resources
-

Skills Gained

- ☐ Understand core AI and ML concepts
 - ☐ Clean and preprocess data
 - ☐ Build basic ML models (regression, classification, clustering)
 - ☐ Evaluate model performance
 - ☐ Understand basics of deep learning, NLP, and computer vision
 - ☐ Build a simple end-to-end ML project
-

Suggested Final Project Ideas

- Predict housing prices (Regression)
- Classify email spam vs. ham

- Cluster customers for marketing
 - Sentiment analysis on product reviews
 - Handwritten digit recognition (MNIST)
-

Resources

- scikit-learn documentation
 - TensorFlow/Keras or PyTorch tutorials
 - Kaggle datasets
 - Google Colab
 - Recommended books:
 - “Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow” – Aurélien Géron
 - “Python Machine Learning” – Sebastian Raschka
-



Visit: www.sarvaindia.com
