

# Course Syllabus: Applied Artificial Intelligence (AI) - Two-Level Program

## Program Overview:

This course is designed as a two-part journey into the world of Artificial Intelligence (AI) and Machine Learning (ML), with a focus on both **scientific foundations** and **engineering applications**.

### Students will develop:

- A strong conceptual and mathematical understanding of AI/ML models
- Practical software engineering skills for implementing and deploying models

Each level balances **science (math, logic, algorithms)** and **engineering (deployment, APIs, pipelines, real-world use cases)** to prepare learners for academic research or real-world product development.

## Level 1: Foundational to Intermediate AI (20 hours)

**Duration:** 20 hours (10 sessions, 2 hours each)

**Target Audience:** Beginners to those with some programming background

### Course Objectives:

- Understand foundational concepts and applications of AI
- Learn to implement essential ML algorithms in Python
- Gain the ability to clean and process data using NumPy and Pandas
- Build simple predictive models and evaluate them
- Get hands-on experience with Jupyter and Google Colab environments

### Prerequisites:

- Basic programming knowledge (preferably Python)
- High-school level math (algebra, probability, basic statistics)

### Topics Covered:

Session	Topic	Description
1	Introduction to AI	History, branches, applications, and impact
2	Tools Setup	Python, Jupyter, Colab environments
3	Math for AI	Vectors, matrices, stats, distributions
4	Python for AI	NumPy, Pandas, data loading and cleaning
5	Intro to Machine Learning	Supervised vs Unsupervised learning

Session	Topic	Description
6	Classification Algorithms	KNN, Naive Bayes
7	Regression	Linear & logistic regression
8	Decision Trees	Decision Trees and Random Forests
9	Intro to Neural Networks	Perceptron, layers, loss functions
10	Final Project	Hands-on guided project with model evaluation

**Assessment:**

- Participation: 20%
- Weekly Exercises: 30%
- Final Project: 50%