

AI/ML/GenAI Training Curriculum

Audience: Designed for data analysts, software engineers, AI practitioners, and technology professionals who want to gain end-to-end skills in AI, Machine Learning, and Generative AI — from foundational concepts to advanced, real-world applications.

Prerequisites: A basic understanding of programming (preferably in Python) and familiarity with data handling is recommended. However, the course begins with fundamentals, making it accessible to motivated beginners.

Course Overview: This 3-month hands-on training program takes you from AI/ML fundamentals to advanced Generative AI applications. You'll build a strong foundation in Probability, Statistics, Python, and Machine Learning, then progress to Deep Learning, NLP, and Large Language Models. The course includes practical projects, LLM customization, AI agent development, and a capstone project, equipping you with the skills to design, build, and deploy real-world AI solutions.

Class Timings: Saturday & Sunday for 2.5hrs – 3hrs

Module	Topics
Module 1	Probability & Statistics Fundamentals • Probability theory & common distributions • Descriptive & inferential statistics • Hypothesis testing & p-values • Confidence intervals & variability measures <u>Learning Outcome:</u> By the end of this module, participants will be able to apply probability and statistical methods to analyze and interpret datasets for AI/ML applications.
Module 2	Python for AI/ML • Python syntax & data structures • Functions, loops, and conditionals • Data handling with NumPy & Pandas <u>Learning Outcome:</u> By the end of this module, participants will be able to write clean Python code, manipulate data structures, and perform data handling using NumPy and Pandas.
Module 3	Machine Learning Foundations & Data Preparation • ML workflow (supervised vs unsupervised) • Data preprocessing & wrangling • Feature engineering & selection • Handling missing data & outliers <u>Learning Outcome:</u> By the end of this module, participants will be able to prepare, clean, and transform raw data for effective use in machine learning models.
Module 4	Supervised Learning Models • Regression (linear, logistic, regularization) • Classification models (SVM, Naïve Bayes, KNN) • Decision trees & ensemble methods • Model selection & evaluation <u>Learning Outcome:</u> By the end of this module, participants will be able to

	select, train, and evaluate supervised learning models for classification and regression problems.
Module 5	Unsupervised Learning Models • Clustering (K-means, hierarchical, DBSCAN) • Association rules (Apriori, FP-Growth) • Dimensionality reduction (PCA) • Applications in anomaly detection <u>Learning Outcome:</u> By the end of this module, participants will be able to apply clustering, association, and dimensionality reduction techniques to uncover patterns in data.
Module 6	ML Pipelines & Model Optimization • Building ML pipelines (scikit-learn) • Hyperparameter tuning (Grid/Random/Bayesian) • Model evaluation metrics • Workflow automation <u>Learning Outcome:</u> By the end of this module, participants will be able to build end-to-end ML pipelines, tune models, and automate workflows for efficient deployment.
Module 7	Deep Learning Fundamentals • Neural networks (ANN basics) • CNN, RNN architectures • LSTM & GRU concepts • Applications in vision & sequence modeling <u>Learning Outcome:</u> By the end of this module, participants will be able to design, train, and evaluate deep learning models for vision and sequence-based applications.
Module 8	Natural Language Processing • Text preprocessing & feature extraction • Bag-of-Words, TF-IDF, embeddings • Transformer basics • Intro to Hugging Face models <u>Learning Outcome:</u> By the end of this module, participants will be able to process text data, extract features, and leverage transformer-based models for NLP tasks.
Module 9	Generative AI & LLM Foundations • Python for GenAI • Generative AI concepts & LLM basics • Tokenization, embeddings, inference • Cloud & open-source LLMs <u>Learning Outcome:</u> By the end of this module, participants will be able to understand the architecture of LLMs, perform tokenization, and work with both cloud and open-source models.
Module 10	LLM Development Tools • LangChain & LangGraph • Vector databases (Pinecone, FAISS, Chroma) • Prompt engineering

	• Retrieval Augmented Generation (RAG) <u>Learning Outcome:</u> By the end of this module, participants will be able to design, build, and integrate LLM-based solutions using tools like LangChain, vector databases, and RAG pipelines.
Module 11	AI Agents & Customization • Model monitoring & logging • AI agents with LangChain • Integrating RAG & agents in apps • Fine-tuning & implementing guardrails <u>Learning Outcome:</u> By the end of this module, participants will be able to develop AI agents, implement fine-tuning, and set up monitoring and guardrails for production systems.
Module 12	Capstone Project • End-to-end GenAI application • Integration of LLM, RAG, AI agents • Deployment & presentation • Incorporating latest GenAI trends • Understanding the MCP <u>Learning Outcome:</u> By the end of this module, participants will be able to deliver a fully functional GenAI application, integrating LLM, RAG, and AI agents, ready for deployment.