

MERN Academy: Generative AI and AI Automation Mastery Syllabus

Course Overview

Institution	Course Name	Duration	Goal
MERN Academy	Generative AI and AI Automation Mastery	4 Months	To provide students with a 100% hands-on, practical curriculum for building and automating AI workflows using modern tools, M/LLMs (Gemini, OpenAI), Python, and automation platforms.

Course Format

- Schedule:** Saturday and Sunday regular classes.
- Class Duration:** 2-3 hours per session.
- Focus:** 100% Hands-on Practical sessions, building real-world projects.

Course Structure: 4-Month Module Breakdown

This course is structured into four progressive modules, ensuring a strong foundation in Python and culminating in advanced AI automation and M/LLM deployment.

Month	Module	Core Topics	Key Technologies/Concepts
1	AI Prerequisites: Python & Data Essentials	Python Basics for AI, Essential Libraries (Pandas, NumPy), Data Handling, CLI Tools	Python, Pandas, NumPy, Command Line Interface (CLI) tools
2	Workflow Automation with N8N & Integrations	Automation Fundamentals, Workflow Design, Data Flow, External Tool Integration	N8N Workflow Automation, Webhooks, API Integration, JSON
3	Foundational M/LLM	Introduction to Large Language Models (LLMs), Prompt Engineering, Local LLMs	Gemini Models, OpenAI Models (GPT-4, etc.), Prompt Engineering, OLLAMA
4	Advanced Automation & AI Application Development	RAG Implementation, Agentic Workflows, Building AI-Powered Web Applications	Retrieval-Augmented Generation (RAG), LangChain/Llamaindex Basics, Web Development with AI

Detailed Monthly Syllabus

Month 1: AI Prerequisites: Python & Data Essentials

- **Week 1:** Python Fundamentals: Data types, control flow, functions, and list comprehensions. Emphasis on concise, clean code.
- **Week 2:** Data Handling with Pandas and NumPy: Data loading, cleaning, manipulation, and vectorized operations.
- **Week 3:** Environment Setup and CLI Tools: Virtual environments, package management (pip/conda), and essential command-line tools for AI projects.
- **Week 4:** Introduction to APIs: Making basic REST API calls in Python and handling JSON data structures.

Month 2: Workflow Automation with N8N & Integrations

- **Week 1:** Introduction to N8N: Installation (local/cloud), UI navigation, and basic node operations (HTTP Request, Set, If).
- **Week 2:** Building Data Pipelines: Creating workflows to ingest, transform, and export data between various services (e.g., Google Sheets, Email, databases).

- **Week 3:** Advanced N8N Features: Webhooks for real-time triggers, error handling, and using custom Python/JavaScript code nodes.
- **Week 4:** Practical Automation Projects: Automating content summarization, social media posting, and internal notification systems.

Month 3: Foundational M/LLM

- **Week 1:** Gemini and OpenAI Models: Understanding different model capabilities (e.g., text generation, chat, embeddings) and API structure.
- **Week 2:** Prompt Engineering: Techniques for effective prompting, chain-of-thought, personal assignments, and iterative refinement.
- **Week 3:** Working with OLLAMA: Setting up OLLAMA locally, running open-source models, and basic interaction via the OLLAMA CLI and API.
- **Week 4:** Advanced M/LLM Features: Function Calling/Tools, managing conversation history, and fine-tuning concepts.

Month 4: Advanced Automation & AI Application Development

- **Week 1:** Retrieval-Augmented Generation (RAG) Basics: Understanding the RAG pipeline (document loading, chunking, embedding, retrieval).
- **Week 2:** Agentic Workflows: Implementing multi-step, decision-making AI agents using a basic framework (e.g., using Gemini for tool selection).
- **Week 3:** Web Development with AI: Integrating AI features into simple web applications using Flask/Streamlit and M/LLM APIs.
- **Week 4:** Final Project & Deployment: Students develop and present an end-to-end AI automation solution and explore deployment options (e.g., containerization).

Enrollment and Contact

To enroll in the Generative AI and AI Automation Mastery course, please review the registration process and fee structure available in our official course material: [Download](#)

- **Contact for Enrollment:** Pratik Verma at enrollment@mernacademy.com
- **Course Commencement Date:** The next batch is scheduled to start.