AI Engineer - 120 hours

Course description

The **AI Engineer Program** at Naya College is designed for professionals who want to move beyond using AI tools and gain the ability to design, build, and implement real AI solutions in organizational environments.

As organizations increasingly adopt AI technologies, the demand is shifting toward professionals who can connect data, models, and business processes into scalable, production-ready systems. This program focuses on developing those capabilities.

Throughout the course, participants will gain a deep understanding of how AI systems work "under the hood" — from data preparation and Large Language Models (LLMs), to building Knowledge Bases, designing agent-based systems, and integrating AI into real-world workflows.

The program combines technical depth with a practical, business-oriented approach, emphasizing hands-on experience, real use cases, and end-to-end solution development. By the end of the course, participants will have built a complete AI solution as part of a final project.

Target Audience

- Data Analysts, Data Engineers, and Data Scientists
- Software Developers interested in AI technologies
- BI professionals with technical orientation
- Technical professionals working with data who want to build AI solutions
- Individuals aiming to lead or take part in AI-driven projects within organizations

What You'll Gain

- A deep understanding of how modern AI systems and LLMs operate
- The ability to design and build end-to-end AI solutions
- Hands-on experience with prompt engineering and model interaction
- Skills in building and managing Knowledge Bases and data layers for AI
- Experience working with embeddings, vector databases, and RAG architectures

Course Contents:

Module 1 – Python Fundamentals (Optional)

This optional module is designed for participants without a technical background who need a foundational understanding of programming concepts.

Key Topics:

- Introduction to Python and development environments
- Basic syntax, data types, and control structures
- Working with functions and libraries
- Data handling basics (lists, dictionaries, JSON)
- Introduction to working with APIs
- Practical exercises focused on AI-related use cases

Module 2 – Data Foundations for AI

Understanding data is critical for any successful AI initiative. This module focuses on how data is structured, stored, and prepared for AI systems.

Key Topics:

- Core data concepts and lifecycle
- Types of data sources and systems:
  - Data Warehouses (DWH)
  - CRM systems
  - Files and unstructured data
- Data organization, structuring, and indexing
- Key parameters that influence LLM performance
- Data quality considerations and preprocessing basics

Module 3 – Introduction to AI

A foundational module providing a business-oriented overview of Artificial Intelligence.

Key Topics:

- What is AI and how it is used in organizations
- Differences between AI, Machine Learning, and Generative AI
- Common enterprise use cases across industries
- Limitations and risks of AI systems
- Introduction to AI architecture and workflows

Module 4 – LLMs & Prompt Engineering

This module focuses on Large Language Models (LLMs) and how to effectively interact with them.

Key Topics:

- How LLMs work (high-level architecture)
- Types of models (closed vs open source)
- Overview of popular models
- Key model parameters (temperature, tokens, etc.)
- Context window and its implications
- Principles of effective prompt engineering
- Structuring prompts for accuracy and consistency
- Providing context and grounding responses

Module 5 – Knowledge Bases & Retrieval Design

A critical module focused on building data layers that enable AI systems to provide accurate and relevant responses.

Key Topics:

- Why AI systems require Knowledge Bases (KB)
- Types of Knowledge Bases:

  - File-based
  - Relational databases
  - Vector databases
  - Graph databases
- Introduction to embeddings and semantic search
- Chunking strategies and best practices
- Designing and structuring a Knowledge Base
- Connecting KB to LLMs (RAG principles – high level)

Module 6 – Tools, MCP & AI Integrations

This module introduces the ecosystem that enables AI systems to interact with real-world data and services.

Key Topics:

- What is MCP (Model Context Protocol)
- Setting up and configuring MCP environments
- How LLMs interact with MCP
- Understanding tools in AI systems
- Agent-as-a-tool concept
- Integrating external systems (APIs, databases, services)

Module 7 – Agents & Agentic Workflows

Focus on building intelligent, action-oriented AI systems.

Key Topics:

- Difference between bots and agents
- Autonomous vs guided AI systems
- Executing actions through agents
- Transition from monolithic systems to multi-agent architecture
- Designing agent workflows for business processes

Module 8 – AI Flow Builders & Automation

This module focuses on building end-to-end AI workflows.

Key Topics:

- AI data flows and pipelines (AI-oriented ETL)
- Common data sources and destinations
- Designing conversational workflows (Chat-as-a-Flow)
- Workflow orchestration tools:
    - n8n
    - DIAL Flows
- Automation of business processes using AI

Module 9 – AI Project Structure & Management

A managerial module focused on leading AI initiatives successfully.

Key Topics:

- Characteristics of AI projects
- Differences from traditional IT projects
- Defining milestones and deliverables
- Key decision points and trade-offs
- Managing uncertainty and experimentation
- Cost structures (including dynamic costs like tokens & compute)
- Stakeholder management and alignment

Module 10 – AI Solution Analysis & Debugging

Ensuring AI solutions are accurate, efficient, and reliable.

Key Topics:

- Testing and validating AI systems
- Identifying bottlenecks

- Improving accuracy and response quality
- Performance optimization (latency, cost)
- Monitoring and ongoing control mechanisms
- Iterative improvement processes

Final Project – End-to-End AI Solution

Participants will apply everything they learned by building a complete AI solution.