TECHMINDS ACADEMY

Prompt Engineering & AI Tools

Practical AI Curriculum · Beginner to AI-Powered Professional

A structured 14-week programme open to all students regardless of technical background. From understanding how AI models work to building automated AI-powered workflows and integrating the OpenAI and Anthropic APIs into real applications.

14	5	60+	9	0
Weeks	Stages	Lessons	Projects	Prerequisites

LLM Fundamentals · Zero-Shot & Few-Shot · Chain-of-Thought · Prompt Templates · ChatGPT & Claude · AI Automation · OpenAI API · Capstone AI System

LEARNING PATHWAY

Programme Overview

Stage	Focus	Duration	Level	Prerequisite
Stage 1	Understanding AI & Large Language Models	2 weeks	Beginner	None
Stage 2	Core Prompting Techniques	3 weeks	Beginner	Stage 1
Stage 3	Advanced Prompting & Prompt Design	3 weeks	Intermediate	Stage 2
Stage 4	AI Tools Mastery	3 weeks	Intermediate	Stage 3
Stage 5	AI Workflows, API Integration & Capstone	3 weeks	Advanced	Stage 4

CURRICULUM RATIONALE

Key Decisions Explained

Why prompt engineering?	AI tools are now used in every industry — marketing, law, finance, healthcare, and technology. The person who can direct AI precisely and reliably is more productive than ten who use it casually. This is a skill with immediate, measurable impact on the quality of work produced.
Why no coding prerequisite?	The first four stages require no coding knowledge. Prompt engineering is a communication and systems-thinking skill before it is a technical one. Stage 5 introduces the API for students who want to go further — but even non-coders complete a meaningful capstone project.
Why cover both automation and APIs?	n8n and Zapier let non-coders build powerful AI workflows without writing code. The API teaches developers how to embed AI into their own applications. Covering both ensures the curriculum is useful to every student regardless of their technical background.
What comes after this course?	Students interested in building AI products can proceed to the TechMinds Agentic AI and MCP course — covering AI agents, tool use, and building production AI applications with the Anthropic and OpenAI ecosystems.

Stage 01 · Beginner 2 Weeks · Weeks 1 – 2

Understanding AI & Large Language Models

How AI models work and why prompting is a skill worth mastering

Before writing a single prompt, the student must understand what they are working with. This stage demystifies AI — what large language models are, how they generate responses, what they are good at, and where they fail. Understanding the model is the foundation of writing prompts that work.

Week 1 **How AI Language Models Work** 5 lessons · 4 hrs

01 What is an AI language model? A plain-English explanation

02 How LLMs are trained — data, patterns, and prediction

03 Tokens — how AI reads and counts text

04 Temperature and creativity — deterministic vs creative outputs

05 Context windows — how much the model can remember at once

06 The difference between ChatGPT, Claude, Gemini, and Llama

PROJECT A written comparison of 3 AI tools — test the same 5 prompts and document differences in output

Week 2 **The Anatomy of a Prompt** 5 lessons · 4 hrs

01 What is a prompt? Input, instruction, and context

02 Why the same question gets different answers

03 The four components of a well-structured prompt

04 System prompts vs user prompts — roles and instructions

05 What AI cannot do — hallucinations, knowledge cutoffs, limits

06 Evaluating AI output — how to spot a bad response

PROJECT Rewrite 5 weak prompts into structured prompts and document the improvement in outputs

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Stage 02 · Beginner 3 Weeks · Weeks 3 – 5

Core Prompting Techniques

The foundational techniques every AI user must know

This stage covers the prompting techniques that have been researched, tested, and proven to improve AI output quality. From zero-shot to chain-of-thought, these are the tools a competent prompt engineer reaches for automatically — not occasionally.

Week 3 — Zero-Shot, Few-Shot & Role Prompting

5 lessons · 5 hrs

- 01 Zero-shot prompting — asking without examples
- 02 Few-shot prompting — teaching by example
- 03 How many examples are enough? Finding the right number
- 04 Role prompting — assigning a persona to the AI
- 05 Combining role + few-shot for highly specific outputs
- 06 When each technique works best — practical decision guide

PROJECT Build a few-shot prompt that generates consistent product descriptions for an e-commerce store

Week 4 — Chain-of-Thought & Structured Reasoning

5 lessons · 5 hrs

- 01 Chain-of-thought prompting — making AI show its work
- 02 Step-by-step instructions — breaking tasks into stages
- 03 Self-consistency — asking the model to verify its own answer
- 04 Tree-of-thought — exploring multiple reasoning paths
- 05 When to use reasoning prompts vs direct prompts
- 06 Applying chain-of-thought to complex real-world tasks

PROJECT A multi-step business analysis prompt — market research, SWOT, and recommendation in one chain

Week 5 — Formatting, Constraints & Output Control

5 lessons · 5 hrs

- 01 Specifying output format — JSON, markdown, tables, bullet points
- 02 Length control — asking for short, medium, or detailed responses
- 03 Negative constraints — telling the model what NOT to do
- 04 Tone and style instructions — formal, casual, technical, friendly
- 05 Asking for multiple options — generating variants for comparison
- 06 Structured JSON output — using AI as a data generation tool

PROJECT A prompt that generates structured JSON product data — name, price, description, tags — for 10 items

Stage 03 · Intermediate 3 Weeks · Weeks 6 – 8

Advanced Prompting & Prompt Design

Designing reliable, reusable prompt systems for real-world tasks

This stage moves from individual prompts to prompt systems — reusable templates, iterative refinement workflows, and meta-prompting. Students learn to design prompts that work reliably across different inputs, and to debug prompts that produce inconsistent or poor outputs.

Week 6 — Prompt Templates & Reusability

5 lessons · 5 hrs

- 01 What is a prompt template? Variables and placeholders
- 02 Designing templates for repeatable tasks
- 03 Building a content generation template — blog, social, email
- 04 Parameterising prompts — {topic}, {tone}, {audience}
- 05 Storing and organising your prompt library
- 06 Sharing and versioning prompts — prompt management tools

PROJECT A prompt template library — 5 reusable templates for content, code, research, email, and analysis

Week 7 — Iterative Refinement & Prompt Debugging

5 lessons · 5 hrs

- 01 Why first-draft prompts rarely work perfectly
- 02 The prompt refinement loop — test, evaluate, adjust, repeat
- 03 Common failure modes — vague, over-constrained, conflicting
- 04 Diagnosing a bad prompt — what went wrong and why
- 05 A/B testing prompts — comparing two versions systematically
- 06 Keeping a prompt changelog — tracking what worked

PROJECT Take a failing prompt through 3 documented refinement iterations until it produces reliable output

Week 8 — Meta-Prompting & Prompt Chaining

5 lessons · 6 hrs

- 01 Meta-prompting — asking the AI to write or improve your prompt
- 02 Prompt chaining — feeding output of one prompt into the next
- 03 Building a multi-step workflow with chained prompts
- 04 Conditional chaining — different chains based on AI output
- 05 Avoiding context loss across long chains
- 06 Designing a prompt pipeline for a real business task

PROJECT A 4-step prompt chain: research topic > outline > draft article > edit for tone — all linked

Stage 04 · Intermediate 3 Weeks · Weeks 9 – 11

AI Tools Mastery

Using the leading AI tools productively across real work and business tasks

Prompt engineering without tool knowledge is theory without practice. This stage covers the leading AI platforms in depth — ChatGPT, Claude, Gemini, Midjourney, and AI coding tools. Students build practical workflows for content creation, research, coding assistance, and business productivity.

Week 9 — ChatGPT & Claude — Text & Reasoning

5 lessons · 5 hrs

- 01 ChatGPT in depth — GPT-4o, custom GPTs, memory, plugins
- 02 Claude in depth — long context, document analysis, coding
- 03 Choosing the right model for the task at hand
- 04 Uploading documents — analysing PDFs, spreadsheets, images
- 05 Building custom GPTs — instructions, knowledge, and actions
- 06 Claude Projects — persistent context for ongoing work

PROJECT Build a custom GPT for a Nigerian small business — trained on FAQs, products, and tone guidelines

Week 10 — AI for Content, Research & Productivity

5 lessons · 5 hrs

- 01 AI-assisted writing — blog posts, newsletters, social media
- 02 Research workflows — summarising papers and reports with AI
- 03 Perplexity AI — AI-powered search with citations
- 04 NotebookLM — deep research on your own documents
- 05 AI for spreadsheets — formulas, data cleaning, analysis
- 06 Building a weekly content calendar workflow with AI

PROJECT A full content workflow — research, outline, draft, and schedule a 4-week social media calendar using AI

Week 11 — AI Coding Tools & Image Generation

5 lessons · 5 hrs

- 01 GitHub Copilot — AI code completion in VS Code
- 02 Claude and ChatGPT for code — debugging, explaining, refactoring
- 03 Cursor IDE — AI-native code editor
- 04 AI image generation: Midjourney, DALL-E, and Ideogram
- 05 Writing effective image prompts — style, composition, lighting
- 06 AI video tools: Runway, Sora, and Kling — an overview

PROJECT Use Copilot to build a small JavaScript utility, and Midjourney to create a brand image set with 10 consistent assets

Stage 05 · Advanced 3 Weeks · Weeks 12 – 14

Building AI-Powered Workflows & Capstone

Automating real tasks and delivering a complete AI-powered system

The final stage brings everything together. Students learn to build automated AI workflows using tools like n8n and Zapier, integrate the OpenAI and Anthropic APIs directly into applications, and evaluate AI outputs at scale. The capstone is a complete, documented AI-powered system built for a real or simulated use case.

Week 12 — AI Workflow Automation

5 lessons · 6 hrs

- 01 What is AI automation? Triggers, actions, and AI steps
- 02 n8n — open-source workflow automation with AI nodes
- 03 Zapier AI — connecting apps and adding AI processing steps
- 04 Make (Integromat) — visual automation with AI integration
- 05 Building a lead qualification workflow with AI scoring
- 06 Building an AI-powered email response workflow

PROJECT An automated workflow: new form submission > AI classifies and summarises it > sends formatted email report

Week 13 — Using the OpenAI & Anthropic APIs

5 lessons · 7 hrs

- 01 What is an AI API? When to use it vs a chat interface
- 02 The OpenAI API — authentication, models, and the messages array
- 03 The Anthropic API — Claude models, system prompts, and max tokens
- 04 Calling the API from JavaScript with fetch()
- 05 Streaming responses — displaying output as it generates
- 06 Building a simple AI chatbot in the browser with vanilla JS

PROJECT A branded AI assistant in the browser — custom system prompt, conversation history, streaming responses

Week 14 — Capstone Project

6 sessions · 10 hrs

- 01 Defining the problem — what task will AI solve?
- 02 Designing the prompt system — templates, chains, constraints
- 03 Building the interface or workflow — web app or automation
- 04 Connecting the AI API — system prompt, user input, response
- 05 Testing and refining — evaluate outputs across varied inputs
- 06 Documentation — prompt rationale, workflow diagram, usage guide

PROJECT A complete AI-powered system — student chooses: customer support bot, content generator, CV analyser, or business intelligence tool

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ASSESSMENT & COMPLETION

How Students Are Evaluated

Component	Description	Weight
Weekly Projects (×9)	Prompt, workflow, or AI output built and documented each week	**40%**
Stage Assessments (×5)	Practical prompt challenge and written evaluation at end of each stage	**30%**
Capstone AI System	Complete AI-powered tool or workflow — built, tested, and documented	**30%**

LEARNING OUTCOMES

What Students Can Do on Completion

On completing this programme, the student will be able to:

- — Explain how large language models work, including tokens, context, and temperature
- — Write structured, reliable prompts using zero-shot, few-shot, and chain-of-thought techniques
- — Control AI output format, tone, length, and structure with precision
- — Design reusable prompt templates and maintain a personal prompt library
- — Debug and iteratively refine prompts that produce inconsistent outputs
- — Build multi-step prompt chains and automated AI workflows using n8n or Zapier
- — Use ChatGPT, Claude, Gemini, and Perplexity productively for real work tasks
- — Generate images and brand assets using Midjourney or DALL-E
- — Call the OpenAI and Anthropic APIs from JavaScript to build AI-powered applications
- — Design, build, and document a complete AI-powered capstone system

TOOLS & RESOURCES

Everything the Student Needs

Tool	Purpose	Cost
ChatGPT (OpenAI)	Primary AI assistant — GPT-4o with custom GPTs	Free / Plus
Claude (Anthropic)	Long-context AI — document analysis, coding, reasoning	Free / Pro
Perplexity AI	AI-powered search with cited real-time sources	Free
Midjourney / DALL-E	AI image generation for brand and creative assets	Paid / Free

n8n	Open-source AI workflow automation	Free (self-host)
GitHub Copilot	AI code completion inside VS Code	Free tier
OpenAI API	Programmatic access to GPT models for app building	Pay-as-you-go
Anthropic API	Programmatic access to Claude for app building	Pay-as-you-go

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