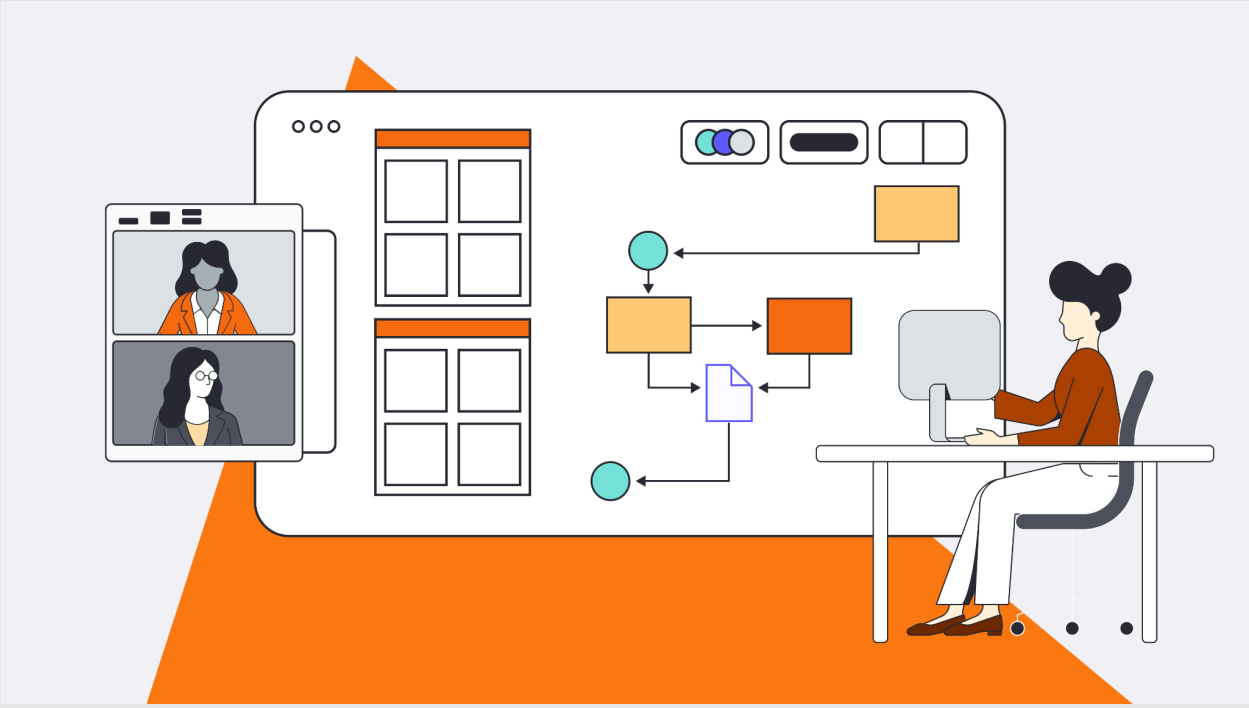
RetenaAI



GENERATIVE AI ENGINEERING PROGRAM

CURRICULUM

🔍 Program Goal

To equip learners with the **practical, strategic, and technical skills** required to become **Generative AI Engineers**. Graduates will be able to design, integrate, and manage AI-powered systems, craft adoption strategies, build intelligent agents, or apply generative AI programming — depending on their chosen specialisation. The program blends **foundational literacy, specialised training, and real-world projects** to prepare participants for high-impact roles in AI-driven industries.

🔍 Program Highlights

⏱️ 150+ Hours of Guided Learning

Structured 12-week curriculum with foundations, specialisation, and capstone project phases.

🧭 5 Specialisation Tracks

Learners choose between:

Systems Integration & Automation

- **Focus**: Workflows, APIs, automation tools (Make, n8n, etc.).
- **Outcome**: AI Automation Engineer / AI Systems Integrator.

AI Strategy & Consulting

- **Focus**: AI adoption roadmaps, ROI mapping, executive communication.
- **Outcome**: AI Consultant / Transformation Strategist.

AI Agent Development – Low-Code Op

- **Focus**: Multi-agent systems, memory, reasoning, tools like Flowise/N8N.
- **Outcome**: AI Agent Engineer.

Generative AI Programming – Code–Op

- **Focus**: Python, RAG systems, embeddings, vector DBs, fine-tuning basics.
- **Outcome**: Generative AI Engineer (technical track).

AI Product Development – No-Code SaaS

- **Focus**: Python, RAG systems, embeddings, vector DBs, fine-tuning basics.
- **Outcome**: Generative AI Engineer (technical track).

🤖 **40+ Applied AI Projects & Simulations**
Hands-on projects covering automation, consulting, agents, and programming — tailored to each specialisation.

📝 **Portfolio-Ready Capstone**
End-to-end project simulating a real-world business challenge, presented at Demo Day to peers, mentors, and industry experts.

🎓 **Mentorship & Peer Review Sessions**
Continuous feedback cycles, peer collaboration, and 1:1 support from experienced AI engineers, strategists, and system builders.

🚀 **Career Pathways & Accelerator Support**
Transition into client projects, product launches, or job placements with career coaching, portfolio packaging, and optional accelerator tracks.

🌍 Fusion Phase (Weeks 1–4)

Objective: Build a conceptual foundation in Generative AI, prompt engineering, workflow literacy, and applied business thinking. All learners complete these modules before selecting their specialization track.

Module 1: Introduction to Generative AI (Week 1)

Description:
Learners will gain a foundational understanding of generative AI technologies, their underlying principles, and their potential applications across industries. This module sets the stage for responsible and informed use of AI.

Topics Covered:

- What is Generative AI?
- How Large Language Models (LLMs) Work (transformers, tokens, embeddings basics)
- Understanding how transformers advance language models.
- Understanding differences in language models
- Responsible AI (ethics, safety, copyright, governance)

Outcome:
Students can explain how Gen-AI works, evaluate its risks, and articulate its business value.

Module 2: Prompt Engineering (Week 2)

Description:
Learners explore the art and science of designing effective prompts for LLMs. They practice structured frameworks for achieving consistent, high-quality outputs.

Topics Covered:

- What is Prompt Engineering?
- RETENA Prompting Framework (Context → Persona → Output Goal).
- Prompting Techniques: Role-based, Few-shot, Chain-of-Thought.
- Custom Instructions & Role Assignments.
- Prompt Testing & Evaluation for Reliability.

Outcome:
Students can design structured prompts and reliably solve business-related tasks using LLMs.

Module 3: Workflow & Systems Thinking (Week 3)

Description:
Learners build an understanding of how AI fits into business systems and workflows. They are introduced to automation, APIs, and orchestration tools through hands-on demonstrations.

Topics Covered:

- AI vs. Automation vs. Analytics.
- Business Process Intelligence & Friction Mapping.
- Systems Mindset: *Input* → *Tool* → *Output* → *Business Value*.
- Introduction to APIs & JSON (conceptual, no-code tools like Postman/REST clients).
- Workflow Automation Demo (n8n/Make).

Outcome:
Students can map business processes, identify automation opportunities, and design simple AI-powered workflows.

Module 4: Specialisation Previews (Week 4)

Description:
Learners get a hands-on preview of each specialisation track. They complete mini-projects across different domains before selecting their specialisation for Phase 2.

Topics Covered (tasters): (Examples)

- **Systems Integration & Automation:** Build a simple automation (email summarizer → Google Sheets).
- **AI Strategy & Consulting:** Diagnose a fictional business problem and create a mini AI opportunity map.
- **AI Agent Development:** Deploy a one-task agent with basic memory (N8N).
- **Generative AI Programming:** Use embeddings + vector DB demo (basic retrieval system).
- **AI Product Development:** Wireframe an AI-powered SaaS MVP using Lovable + OpenAI API.

Outcome:
Students can design structured prompts and reliably solve business-related tasks using LLMs.

🌍 Specialization Phase (Weeks 5–8)

Track 1: Systems Integration & Automation

Objective:
Equip learners with the ability to design, deploy, and manage AI-powered workflows using no-code tools, APIs, and automation frameworks. By the end of this track, learners can confidently build end-to-end AI systems that solve real business problems.

Module 5: Agentic AI & Automation Thinking (Week 5)

Description:
Learners will develop a systems-integrator mindset and learn how to think in terms of triggers, actions, and outputs to deliver business value.

Topics Covered:

- What are AI Agents and why do they matter?
- Automation vs. AI vs. traditional workflows
- Framework: *Input → Tool → Output → Business Value*
- Business process mapping for automation opportunities

Outcome:
Students can identify where automation fits into business processes and frame AI agents as part of those workflows.

Module 6: APIs & No-Code Integration (Week 6)

Description:
Learners get hands-on with APIs, understanding how they connect AI models to real-world applications. Focus is on practical, no-code tools to read and integrate APIs.

Topics Covered:

- What are APIs (conceptual + practical)?
- HTTP Methods: GET, POST
- Reading JSON responses
- Using Postman / no-code REST clients

Outcome:
Students can read basic API documentation, test endpoints, and integrate APIs into no-code workflows.

Module 7: Workflow Design & Automation (Week 7)

Description:
Learners apply automation principles to build actual workflows using industry tools. This module focuses on end-to-end system design and deployment.

Topics Covered:

- Workflow design principles
- Trigger-Action architecture
- Building AI-powered automations in Make (demo project)
- Building AI-powered automations in n8n (demo project)
- Monitoring & troubleshooting workflows

Outcome:
Students can design, deploy, and monitor AI-powered automation workflows in Make/n8n.

Module 8: Business Systemisation with AI (Week 8)

Description:
Learners bring everything together to design a full business solution, package it as a client-ready system, and prepare for a portfolio showcase.

Topics Covered:

- Designing a business solution using agents + workflows
- Portfolio groundwork (documenting workflows & integrations)
- Client readiness checklist (scalability, usability, pricing)
- Packaging & presenting AI systems to stakeholders

Outcome:
Students can deliver a **client-ready AI system** and pitch it effectively, while also documenting it as part of their professional portfolio.

Track 2: AI Strategy & Consulting

Objective:
Equip learners with the consulting and strategic skills required to guide organizations through AI adoption. By the end of this track, learners can diagnose business challenges, design ROI-driven AI roadmaps, and communicate strategies effectively to stakeholders.

Module 5: AI Opportunity Design & Business Mapping (Week 5)

Description:
Learners practice identifying where AI fits into business processes and how to structure opportunities into actionable workflows.

Topics Covered:

- Business process intelligence & friction mapping
- Opportunity identification frameworks (effort vs. impact, automation readiness)
- Turning pain points into AI-powered workflows
- AI opportunity mapping exercise

Outcome:
Students can confidently map out business processes and identify high-ROI AI opportunities.

Module 6: AI Readiness & Transformation Planning (Week 6)

Description:
Learners develop skills in evaluating organizational readiness for AI adoption and designing structured transformation plans.

Topics Covered:

- Conducting AI readiness audits
- Short-term vs. long-term AI transformation plans
- Change management principles
- Stakeholder alignment technique

Outcome:
Students can create readiness assessments and draft initial AI transformation roadmaps for organisations.

Module 7: AI Implementation Strategy & Consulting Frameworks (Week 7)

Description:
Learners are introduced to consulting frameworks and practice packaging strategies into client-ready deliverables.

Topics Covered:

- AI adoption playbooks
- Consulting templates (recommendation decks, transformation canvases)
- ROI-driven case building for AI investments
- Structuring a strategy presentation for executives

Outcome:
Students can design structured consulting deliverables and present AI strategies persuasively.

Module 8: Client Strategy Labs & Portfolio (Week 8)

Description:
Learners simulate real-world consulting environments by diagnosing client needs, pitching solutions, and finalising portfolio-ready projects.

Topics Covered:

- Simulated client discovery calls
- Drafting AI strategy recommendations
- Peer feedback cycles on consulting proposals
- Packaging & pricing AI consulting services

Outcome:
Students can run a simulated client engagement, deliver a persuasive AI strategy pitch, and package it as part of their consulting portfolio.

Track 3: AI Agent Development – Low-Code Op

Objective:
Enable learners to design, build, and deploy intelligent AI agents capable of reasoning, memory retention, and multi-step task execution. By the end of this track, learners can create agent-based systems that solve real-world business and productivity challenges.

Module 5: Foundations of AI Agents (Week 5)

Description:
Learners explore what makes an AI agent different from traditional automation, including autonomy, reasoning, and decision-making.

Topics Covered:

- What is an AI agent?
- Agent vs. workflow automation
- Core agent capabilities: planning, reasoning, acting
- Intro to agentic frameworks (LangChain, Flowise, Relevance AI, n8n)

Outcome:
Students understand the fundamentals of AI agents and their potential applications in business and personal productivity.

Module 6: Memory & Context in Agents (Week 6)

Description:
Learners experiment with adding memory to agents, enabling them to maintain context across interactions.

Topics Covered:

- Session memory vs. long-term memory
- Knowledge grounding in agents
- Tools for memory: vector databases (Pinecone, Weaviate)
- Building a memory-enabled agent demo (Flowise/Relevance AI, n8n)

Outcome:
Students can design agents that retain context, use knowledge bases, and deliver more intelligent responses.

Module 7: Multi-Agent Systems & Collaboration (Week 7)

Description:
Learners move from single agents to multi-agent systems that collaborate or specialise in different tasks.

Topics Covered:

- Multi-agent system design
- Agent-to-agent communication patterns
- Examples: research agent + summarizer agent, customer support agent + escalation agent
- Tools: CrewAI, LangGraph, Relevance AI
- Demo: design a multi-agent project simulation

Outcome:
Students can design and orchestrate multi-agent systems for specialised workflows.

Module 8: Applied Agent Development & Portfolio (Week 8)

Description:
Learners bring all agent development skills together to build a real-world applied project and prepare it for their portfolio.

Topics Covered:

- Building a domain-specific agent (e.g., customer support bot, research assistant, HR assistant)
- Testing & monitoring agent behavior
- Packaging agent projects for clients/employers
- Final showcase: present an applied agent project

Outcome:
Students can design and orchestrate multi-agent systems for specialized workflows.

Track 4: Generative AI Programming – Code–Op

Objective:
Equip learners with hands-on programming skills for working with LLMs, embeddings, retrieval systems, and lightweight fine-tuning. By the end of this track, learners can build functional Gen-AI applications using Python, APIs, and vector databases.

Module 5: Generative AI 1 — Core Technical Foundations (Week 5)

Description:
Learners gain a technical understanding of how LLMs and embeddings work under the hood and why this matters for building real-world applications.

Topics Covered:

- Word embeddings & contextual embeddings
- LLMs — the “hard parts” (limitations, scaling, context windows)
- Retrieval Augmented Generation (RAG) — introduction & architecture
- Vector databases (Pinecone, FAISS, Weaviate)
- Demo: setting up a basic retrieval pipeline

Outcome:
Students can explain core Gen-AI concepts and build a minimal RAG demo with embeddings + a vector DB.

Module 6: Python for AI Workflows (Week 6)

Description:
Learners explore Python as the primary programming language for generative AI applications, focusing on practical use, not theory-heavy coding.

Topics Covered:

- Python basics for AI: data types, functions, packages
- Working with the OpenAI API (ChatCompletion, Embeddings endpoints)
- Handling JSON data from AI responses
- Building a simple Q&A chatbot with Python + OpenAI API
- Debugging and logging outputs

Outcome:
Students can write basic Python scripts that interact with LLM APIs and handle responses programmatically.

Module 7: Applied RAG & Custom AI Applications (Week 7)

Description:
Learners build more advanced retrieval systems and apply RAG to create domain-specific AI assistants.

Topics Covered:

- RAG pipelines in practice
- Chunking, embeddings, and indexing documents
- Building domain-specific chatbots (e.g., HR assistant, legal advisor, product knowledge bot)
- Using LangChain for orchestration
- Testing retrieval quality & performance

Outcome:
Students can implement RAG-powered assistants that pull from a knowledge base and provide accurate, grounded answers.

Module 8: Fine-Tuning & Applied Project (Week 8)

Description:

Learners experiment with lightweight model customization (fine-tuning & prompt-tuning) and build a portfolio-ready applied programming project.

Topics Covered:

- Fine-tuning vs. prompt-tuning — when and why
- Preparing datasets for fine-tuning (JSONL formatting)
- Running a fine-tune on OpenAI or Hugging Face models
- Packaging and deploying an AI-powered app (e.g., simple Flask/Streamlit app)
- Documenting and showcasing code projects in GitHub/portfolio

Outcome:

Students can fine-tune a small model or apply advanced prompt-tuning, then ship a working Gen-AI project (e.g., a knowledge assistant or prototype app).

Track 5: AI Product Development – No-Code SaaS

Objective:
Equip learners with the skills to design, prototype, and launch scalable AI-powered products using no-code platforms. By the end of this track, learners can take an idea from concept to MVP and package it as a SaaS offering.

Module 5: SaaS Product Design Principles (Week 5)

Description:
Learners understand what makes a successful SaaS product and explore AI product opportunities across industries.

Topics Covered:

- SaaS vs. custom automation vs. consulting
- Identifying AI-driven SaaS opportunities
- Lean product validation & customer discovery
- SaaS monetization models (subscriptions, credits, freemium)
- Wireframing product workflows

Outcome:
Students can validate product ideas and design a SaaS workflow that solves a clear user problem.

Module 6: No-Code AI Product Prototyping (Week 6)

Description:
Learners gain hands-on experience with no-code tools to rapidly build AI product prototypes.

Topics Covered:

- No-code platforms: Bubble, Retool, Webflow, Softr, Lovable
- Backend setup: Supabase/Firebase basics
- API integration: connecting OpenAI/Claude APIs into no-code apps
- User interface design for AI interactions
- Demo: Build a simple AI SaaS MVP (e.g., content generator, chatbot, summarizer)

Outcome:
Students can build a functioning no-code AI prototype integrated with an LLM API.

Module 7: Multi-User Systems & SaaS Infrastructure (Week 7)

Description:
Learners expand their prototypes into systems that support multiple users and basic SaaS operations.

Topics Covered:

- Authentication & roles (admin vs. user)
- Managing user data securely
- Subscription & billing integrations
- Usage metering (credits/tokens)
- Scaling considerations for no-code SaaS

Outcome:
Students can implement user management and billing in their no-code AI products.

Module 8: Multi-User Systems & SaaS Infrastructure (Week 8)

Description:

Learners prepare their SaaS product for real-world presentation, including packaging, pricing, and pitching.

Topics Covered:

- Packaging AI products for launch (pitch decks, landing pages)
- Pricing strategy for SaaS products
- Growth & distribution strategies (early adopters, communities, PLG models)
- Final pitch day: showcase SaaS MVP to peers, mentors, and potential users

Outcome:

Students can present a **working SaaS MVP**, with pricing and growth strategy, as a portfolio-ready capstone.

🌍 Capstone Phase (Weeks 9–12)

Objective: Guide learners through applying their specialization skills to real-world projects, while equipping them with the soft skills, frameworks, and portfolio assets to showcase their expertise professionally.

Module 9: Project Scoping & Design (Week 9)

Description:
Learners choose or are assigned capstone projects aligned with their specialization. They define scope, objectives, and deliverables under mentor guidance.

Content Covered:

- Project scoping frameworks (problem → solution → outcome)
- Translating business/user needs into technical or strategic requirements
- Drafting a project proposal (requirements, tools, timeline)
- Peer/mentor feedback sessions

Outcome:
Students can define and propose a clear, achievable AI project aligned with their specialization track.

Module 10: Build & Implementation Support (Week 10)

Description:
Learners work on building, testing, and refining their projects with structured checkpoints and mentor support.

Content Covered:

- Agile project management basics (sprints, iterations)
- Debugging and troubleshooting approaches
- Mid-build review sessions with mentors
- Timeboxing & productivity techniques for technical/consulting work

Outcome:
Students make measurable progress on their projects and refine them through review and iteration.

Module 11: Presentation & Pitching Skills (Week 11)

Description:
Learners prepare to present their projects persuasively to a professional audience, whether clients, executives, or investors.

Content Covered:

- Storytelling with data and AI outcomes
- Building effective decks and demos
- Communicating technical concepts to non-technical stakeholders
- Mock pitch sessions + peer review

Outcome:
Students can structure and deliver a compelling project pitch tailored to different audiences.

Module 12: Portfolio & Demo Day (Week 12)

Description:
Learners finalize their capstone projects, document them for their portfolios, and showcase them in a demo day environment.

Content Covered:

- Documenting projects for professional portfolios (GitHub, Notion, Slide decks, Video demos)
- Packaging skills into a personal brand (LinkedIn, CV, personal site)
- Final Demo Day — present projects to peers, mentors, and industry experts
- Career/next-step planning (freelance, product launch, job search)

Outcome:
Students graduate with a **portfolio-ready project** and the confidence to present it to clients, employers, or investors.

🧩 Capstone-Aligned Development Assessments (CADA Progression)

Each specialization track includes a **four-level progressive challenge system**, designed to move learners from guided tasks to independent, real-world projects.

- **Level 4:** Entry-level applied task that validates core understanding of the specialization's foundations.
- **Level 3 :** A more complex, scenario-based task requiring tool/application use and creative problem solving.
- **Level 2** A near real-world project challenge simulating client or industry conditions.
- **Level 1 (Capstone Project):** Final project that integrates specialization skills into a portfolio-ready deliverable.

👉 Learners complete **Levels 4 → 3 → 2 during the Specialization Phase**, and their **Capstone Project serves as Level 1**.

✅ How This Plays Out

- **Specialization Phase (Weeks 5–8):**
    - As they progress through modules, learners simultaneously complete Level 4, 3, and 2 of the CADA ladder.
    - These aren't *per-module quizzes* — they are **layered challenges** that grow in difficulty.

- **Capstone Phase (Weeks 9–12):**
    - Level 1 = The Capstone Project.
    - So the Capstone isn't "new assessment" — it's simply the **final rung** of the ladder.

🌍 Post-Training Pathways

Transition from learner to builder or job-ready professional.

Upon completing the program, fellows can choose from one of three guided pathways designed to accelerate their career or entrepreneurial journey:

🚀 Pilot Program (Client/Industry Projects) (2–3 Months)

For learners who want to **build and launch AI-driven products or services**.

- Hands-on support in taking capstone projects from MVP to market.
- Access to mentors, product coaches, and growth experts.
- Guidance on product validation, fundraising, and go-to-market strategies.

Outcome: Launch-ready AI product or service, with initial traction and monetization frameworks.

💼 Career Placement & Talent Pool (1–2 Months)

For learners who want to **transition directly into roles, freelancing, or consulting engagements**.

- Access to the RetenaAI job placement pool.
- Internship, freelance, or full-time job opportunities.
- Career coaching, interview prep, and personal branding support.

Outcome: Employment or consulting opportunities as an AI Engineer, Systems Integrator, Consultant, or Product Builder.

✅ By the End of This Program, Learners Will Be Able To:

- Diagnose business problems and propose AI-powered workflows.
- Design and deploy LLM, RAG, and automation systems with no-code or light-code tools.
- Build and orchestrate AI agents to perform multi-step tasks.
- Package, present, and pitch AI systems or products to clients, employers, or investors.
- Showcase their expertise with a **portfolio-ready capstone project**.

📌 Program Duration

12 weeks of structured learning + optional post-training pathway (Accelerator, Pilot, or Career Placement: 1–3 months).

Note: Regular standups, mentorship sessions, and portfolio reviews continue into the post-training pathways to ensure real-world readiness.