



Mastering Generative AI: From Theory to Production

A Comprehensive 24-Week Deep Dive for Software Professionals

Become a leader in the Generative AI revolution. This immersive, advanced course goes far beyond the basics, equipping experienced software professionals with the deep theoretical knowledge, practical development skills, and production awareness needed to design, build, and deploy sophisticated Generative AI systems.

Course Principles & Objectives

- **Deep Architectural Understanding:** Master the intricacies of core GenAI architectures like Transformers, Diffusion Models, VAEs, and GANs – not just using them, but understanding *how* and *why* they work.
- **Build & Train Advanced Models:** Gain hands-on experience training, fine-tuning, and adapting complex generative models using industry-standard frameworks (PyTorch & TensorFlow exposure).
- **Develop Agentic & Multimodal Systems:** Explore the cutting edge by learning the principles and frameworks for building AI agents that reason, plan, and act, and systems that operate across text, image, and other modalities.
- **Integrate MLOps for GenAI:** Learn the unique challenges and best practices for versioning, deploying, monitoring, and managing large generative models in production environments.
- **Champion Responsible & Ethical AI:** Develop a strong foundation in identifying, mitigating, and considering the ethical implications inherent in powerful generative technologies.
- **Specialize for High-Impact Roles:** Position yourself for specialized roles in GenAI research, engineering, or product development requiring deep technical expertise.

Benefits & Your Capabilities

- **Build an Advanced, Specialized Portfolio:** Showcase expertise through complex projects involving training/fine-tuning LLMs, building RAG systems, developing GAN/Diffusion applications, creating AI agents, or tackling multimodal challenges.
- **Master Training & Fine-tuning:** Confidently train generative models, implement advanced fine-tuning techniques (PEFT like LoRA), and adapt models for specific tasks and domains.
- **Develop Sophisticated GenAI Applications:** Design and build complex systems utilizing LLMs, Diffusion Models, and potentially VAEs/GANs, including Retrieval-Augmented Generation and basic Agentic AI systems.
- **Proficiently Use Core Frameworks & Libraries:** Gain deep practical skill with **PyTorch**, **Hugging Face** (transformers, diffusers), vector databases, and agent frameworks (LangChain/LlamaIndex). Exposure to **TensorFlow/Keras** concepts.

- **Implement MLOps Best Practices for GenAI:** Apply techniques for experiment tracking, large model versioning, inference optimization, containerization, and specialized monitoring for GenAI systems.
- **Lead Responsible GenAI Development:** Critically assess models for bias, safety, and ethical risks, and implement mitigation strategies.
- **Target Specialized GenAI Careers:** Possess the in-depth knowledge and practical experience required for roles like GenAI Engineer, LLM Engineer, Research Scientist, or AI Architect.

Course Content Highlights

- **Modules 1-3: Robust Foundations:**
 - *Principles:* Advanced Deep Learning Fundamentals, Essential Math for GenAI, Key Architectures (CNNs, RNNs, Embeddings), Dual Framework Exposure (PyTorch primary, TF/Keras concepts).
- **Modules 4-7: Core Generative Architectures Deep Dive:**
 - *Principles:* Variational Autoencoders (VAEs), Generative Adversarial Networks (GANs - including training dynamics & variants), Attention Mechanisms Deep Dive, **The Transformer Architecture** (in detail), LLM Pre-training Objectives & Scaling Laws.
- **Modules 8-12: Mastering LLMs & Agentic AI:**
 - *Principles:* Advanced Prompt Engineering, LLMs for Code Workflows (MCP/"Vibe Coding"), **Full Fine-tuning vs. PEFT (LoRA)**, Retrieval-Augmented Generation (RAG) systems, **Reasoning, Planning & Tool Use in AI Agents**, Agent Frameworks (LangChain/LlamaIndex).
- **Modules 11 & 13: Advanced Image & Multimodal Generation:**
 - *Principles:* **Diffusion Models** (Theory, Training, Conditioning - CFG), Text-to-Image Generation, Multimodal Architectures (CLIP), Connecting Modalities.
- **Modules 14-16: Evaluation, Ethics & Productionization (MLOps):**
 - *Principles:* Nuanced Evaluation of Generative Models, **Responsible AI Deep Dive** (Bias, Fairness, Safety, Copyright, Ethics of Agents), **MLOps specifically for GenAI** (Experiment Tracking, Versioning Large Models/Data/Prompts, Inference Optimization, Specialized Monitoring, Cloud Platforms).
- **Module 17-18: Future Directions & Capstone:**
 - *Principles:* Advanced GenAI Concepts (World Models, RLHF), Comprehensive Capstone Project allowing specialization.

Learning Approach

- Immersive live online sessions (2 x 2 hours per week for deeper interaction).
- Extensive hands-on coding (Primarily PyTorch, Hugging Face, relevant ecosystem libraries).
- Emphasis on both deep theoretical understanding and practical implementation.
- Challenging assignments and a substantial, specialized capstone project.
- Focus on building, training, and adapting models, not just using APIs.

Prerequisites: Solid programming experience (Python covered). Strong understanding of basic software development concepts. Prior experience with foundational ML concepts is helpful but not strictly required. High motivation for a deep technical dive.

Shape the Future with Generative AI Expertise.

Course Duration: 24 weeks

Mode: Online

Instructor Support: Live sessions, one-on-one feedback, and project reviews

Key Differences vs. 12-Week GenAI Course:

- The 24-week course provides **significantly more depth** on the theory, architecture, and training of GenAI models (VAEs, GANs, Diffusion, Transformers), moving far beyond the introductory level of the 12-week version.
- Includes dedicated, in-depth modules on **Agentic AI development, advanced fine-tuning techniques (PEFT), comprehensive MLOps tailored for GenAI, and advanced multimodal concepts**, which are only briefly introduced or omitted in the 12-week course.
- Focuses on **building, training, and deeply understanding** models, whereas the 12-week course prioritizes practical usage of existing models/APIs.
- Prepares students for **more specialized and technically demanding roles** requiring core development and research skills in Generative AI.