Generative AI Fundamentals for Developers

A Practical 12-Week Introduction to LLMs, Diffusion Models, and More

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Step into the future of AI! Discover the power of Generative AI and learn how to leverage cutting-edge models. This hands-on course is designed for developers, testers, team leads, and software professionals eager to understand and utilize the core technologies driving the GenAI revolution.

Course Principles & Objectives

- **Understand Core GenAI Concepts:** Grasp the fundamental ideas behind Large Language Models (LLMs), Diffusion Models, Transformers, and other key generative techniques.
- **Practical Tool & API Usage:** Learn to effectively interact with and utilize state-of-the-art GenAI models through popular APIs and libraries like Hugging Face.
- **Focus on Developer Applications:** Explore how GenAI can be integrated into software workflows, including coding assistance, prompt engineering, and building simple GenAI-powered applications.
- **Build Foundational Skills Quickly:** Gain essential knowledge and practical experience in the rapidly evolving GenAI landscape within an intensive 12-week timeframe.
- **Emphasize Responsible Innovation:** Develop awareness of the ethical considerations and responsible practices crucial for working with powerful generative technologies.

Benefits & Your Capabilities

- **Build a GenAI-Focused Portfolio:** Complete hands-on projects demonstrating your ability to use LLMs via APIs, perform prompt engineering, generate images with Diffusion models, and potentially build basic RAG or Gradio/Streamlit applications.
- **Effectively Utilize LLMs:** Master prompt engineering techniques, interact confidently with LLM APIs (like OpenAI), and leverage LLMs for coding assistance and other development tasks.
- **Work with Leading Libraries:** Gain practical experience using the Hugging Face ecosystem (transformers, diffusers) and **PyTorch** for interacting with and understanding models.
- **Understand Foundational Models:** Explain the core concepts behind Transformers, Diffusion Models, and introductory concepts of VAEs/GANs.
- **Navigate the GenAI Landscape:** Understand key terminology, identify different model types and their use cases, and stay informed about major trends.
- **Enhance Your Developer Skillset:** Add highly relevant GenAI skills to your profile, opening doors to new project opportunities and demonstrating adaptability.

Course Content Highlights

- **Modules 1-3: Setting the Stage:**

- *Principles:* GenAI Overview, Core Deep Learning Refresher (NNs, Training), Essential Architectures (CNNs, Embeddings), PyTorch Fundamentals (Tensors, Autograd, nn.Module).
- *Tools:* Python, **PyTorch**, torchvision.

- **Modules 4-5: Understanding Transformers & LLMs:**
  - *Principles:* The Attention Mechanism, Transformer Architecture Overview (Self-Attention, Encoders/Decoders), LLM Pre-training Concepts, Tokenization.
  - *Tools:* Conceptual understanding, Hugging Face transformers intro.
- **Modules 6-7: Practical LLM Interaction & Application:**
  - *Principles:* Using LLM APIs, Prompt Engineering Strategies (Zero/Few-shot, Chain-of-Thought concept), Leveraging LLMs for Code Generation & Development Workflows (MCP/"Vibe Coding" concepts).
  - *Tools:* LLM APIs (e.g., OpenAI), Hugging Face pipelines.
- **Modules 8-10: Adapting LLMs & Image Generation:**
  - *Principles:* Fine-Tuning Concepts (PEFT/LoRA intro), Retrieval-Augmented Generation (RAG) Principles, Introduction to VAE/GAN Concepts, Diffusion Model Fundamentals (Noise/Denoise), Text-to-Image Generation (Stable Diffusion), Prompting for Images.
  - *Tools:* RAG conceptual frameworks (LangChain/LlamaIndex intro), Hugging Face diffusers.
- **Modules 11-12: Multimodality, Ethics & Deployment Intro:**
  - *Principles:* Multimodal AI Concepts (CLIP intro), Evaluation Challenges, **Responsible AI & Ethics** (Bias, Misinformation, Copyright), Model Saving/Loading, Basic API Deployment Ideas.
  - *Tools:* PyTorch model saving, Flask/FastAPI concept.

Learning Approach

- Engaging live online sessions (2 x 2 hours per week).
- Hands-on coding demonstrations (PyTorch, Hugging Face, APIs).
- Practical programming assignments focused on using and interacting with GenAI models.
- Emphasis on conceptual understanding and practical application over deep theory.
- Capstone project applying GenAI techniques to a practical problem.

Prerequisites: Solid programming experience (any language - Python covered in sessions 1-3). Familiarity with basic software development concepts. No prior GenAI experience required.

Start Building with Generative AI Today!

Course Duration: 12 weeks
Mode: Online
Instructor Support: Live sessions, one-on-one feedback, and project reviews

Key Differences vs. 24-Week GenAI Course (Mentioned Briefly if Asked, or in Separate Comparison):

- The 12-week course provides a *foundational overview* and *practical introduction* to using key GenAI models (LLMs, Diffusion), primarily through existing APIs and libraries.
- The 24-week course offers a *deep dive* into the theory, training, and architecture of multiple GenAI model types (VAEs, GANs, Diffusion, Transformers), includes *advanced fine-tuning* techniques, dedicated modules on **Agentic AI**, **Multimodality**, **in-depth Evaluation**, comprehensive **MLOps for GenAI**, and a more substantial capstone project. It's designed for those seeking to build, train, and deeply understand GenAI systems.