

Syllabus

Foundations

- **Tools recap**
 - PyTorch: Review basics and build simple neural networks.
 - HuggingFace: Use for text classification, question answering, and generation.
 - LangChain: Create chatbots, question answering systems, and language-based applications.

- **Core techniques for Generative AI**
 - Generative adversarial networks (GANs): Generate new data by training two neural networks against each other.
 - Variational autoencoders (VAEs): Learn compressed data representations for anomaly detection and compression.
 - Diffusion models: Denoise data by reversing a gradual noising process for image and audio generation.
 - Transformers: Explore the revolutionary architecture for language translation and sentiment analysis.
 - Large language models (LLMs): Discuss architecture, training, and applications of billion-parameter models.
 - Prompt engineering: Design effective prompts to guide LLM output.



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Applications

- Text-to-Text – Creating a ChatBot over private data & enabling Q&A using adaptive RAG.
- Image-to-Image (with optional text) – Inpainting: Fill in missing or corrupted image parts using generative models.
- Music generation – Generate music using GANs and transformers, addressing coherence and music theory.

Agents

- Blog writer – Build an AI agent to write blog posts with coherent long
- form text and controlled style.

