Level	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Junior	Foundations of Generative AI 1. Understand generative vs discriminative models 2. Overview of LLMs, diffusion models, and VAEs 3. Setup Python environment with PyTorch, Transformers, LangChain Link: https://www.deeplearning.ai/courses/generative-ai-with-llms/ https://www.coursera.org/learn/generative-ai-with-llms	Transformer Architecture Deep Dive 1. Attention mechanisms and self-attention 2. Encoder-decoder architecture 3. Positional encoding and tokenization strategies Link: https://www.youtube.com/playlist?list=PLoROMvodv4rMFqRtEuo6SGjY4XbRIVRd4 https://jalammar.github.io/illustrated-transformer/	Working with Pre-trained LLMs 1. Using OpenAI API, Claude API, and open-source models (Llama, Mistral) 2. Prompt engineering fundamentals 3. Zero-shot, few-shot, and chain-of-thought prompting Link: https://www.deeplearning.ai/short-courses/chatgpt-prompt-engineering-for-developers/ https://docs.anthropic.com/claude/docs	LangChain & LlamaIndex Fundamentals 1. Building LLM applications with LangChain 2. Chains, agents, and memory management 3. Document loaders and text splitters Link: https://www.deeplearning.ai/short-courses/langchain-for-llm-application-development/ https://python.langchain.com/docs/	Retrieval Augmented Generation (RAG) 1. Vector databases (Pinecone, Weaviate, ChromaDB, Qdrant) 2. Embedding models and similarity search 3. Building end-to-end RAG pipelines Link: https://www.deeplearning.ai/short-courses/building-evaluating-advanced-rag/ https://docs.llamaindex.ai/	Advanced Prompt Engineering 1. Structured outputs and JSON mode 2. Function calling and tool use 3. Prompt optimization and evaluation Link: https://www.deeplearning.ai/short-courses/functions-tools-agents-langchain/ https://cookbook.openai.com/	Fine-tuning LLMs 1. LoRA and QLoRA techniques 2. PEFT (Parameter Efficient Fine-Tuning) 3. Dataset preparation and training loops Link: https://www.deeplearning.ai/short-courses/finetuning-large-language-models/ https://huggingface.co/docs/peft	AI Agents Fundamentals 1. ReAct pattern and agent architectures 2. Tool creation and integration 3. Multi-step reasoning and planning Link: https://www.deeplearning.ai/short-courses/ai-agents-in-langgraph/ https://langchain-ai.github.io/langgraph/	Mini Projects 1. Build a RAG-based Q&A chatbot 2. Create a document summarization tool 3. Develop a code assistant with function calling	Mini Projects (Continued) 1. Build a multi-modal application 2. Create an AI writing assistant 3. Develop a semantic search engine	Capstone Project 1. Design and implement a full-stack GenAI application 2. Integrate RAG, agents, and fine-tuning concepts 3. Deploy using containerization	Capstone Project (Continued) 1. Performance optimization and evaluation 2. Documentation and presentation 3. Code review and best practices
Mid	Advanced RAG Architectures 1. Hybrid search (keyword + semantic) 2. Re-ranking and query expansion 3. Multi-index and hierarchical RAG Link: https://www.deeplearning.ai/short-courses/building-evaluating-advanced-rag/ https://arxiv.org/abs/2312.10997	LangGraph & Multi-Agent Systems 1. Building stateful agent workflows 2. Human-in-the-loop patterns 3. Agent orchestration and coordination Link: https://langchain-ai.github.io/langgraph/ https://www.deeplearning.ai/short-courses/ai-agents-in-langgraph/	LLM Evaluation & Observability 1. LLM evaluation frameworks (RAGAS, DeepEval) 2. Tracing and monitoring with LangSmith, Weights & Biases 3. A/B testing and continuous improvement Link: https://docs.ragas.io/ https://www.deeplearning.ai/short-courses/evaluating-debugging-generative-ai/	Image Generation & Diffusion Models 1. Stable Diffusion architecture and inference 2. ControlNet, IP-Adapter, and conditioning 3. Image-to-image and inpainting techniques Link: https://huggingface.co/docs/diffusers https://www.youtube.com/playlist?list=PLwRJQ4m4UJjPIvv4kgBkvu_uygrV3ut_U	Multi-Modal AI Systems 1. Vision-Language Models (GPT-4V, Claude 3, LLaVA) 2. Audio processing with Whisper and TTS 3. Building multi-modal RAG systems Link: https://www.deeplearning.ai/short-courses/building-multimodal-search-and-rag/ https://huggingface.co/docs/transformers/model_doc/llava	Vector Database Optimization 1. Indexing strategies (HNSW, IVF, PQ) 2. Scaling and sharding techniques 3. Hybrid architectures and caching Link: https://www.pinecone.io/learn/ https://qdrant.tech/documentation/	Model Serving & Inference Optimization 1. vLLM, TensorRT-LLM, and ONNX 2. Quantization (GPTQ, AWQ, GGUF) 3. Batching and KV-cache optimization Link: https://docs.vllm.ai/ https://github.com/huggingface/text-generation-inference	Semantic Kernel & Enterprise Integration 1. Microsoft Semantic Kernel framework 2. Enterprise connectors and plugins 3. Memory and planning capabilities Link: https://learn.microsoft.com/en-us/semantic-kernel/ https://github.com/microsoft/semantic-kernel	Project Leadership 1. Lead a team project building an enterprise GenAI solution 2. Implement CI/CD for ML pipelines 3. Focus on production-grade architecture	Project Leadership (Continued) 1. Performance benchmarking and optimization 2. Security and compliance considerations 3. Documentation and knowledge transfer	Project Leadership (Continued) 1. Stakeholder presentations 2. User testing and feedback integration 3. Final deployment and handover	Project Leadership (Completed) 1. Post-deployment monitoring 2. Lessons learned and retrospective 3. Future roadmap planning