16-Day Generative AI Training Schedule with Assignments

Day 1: Introduction to AI, ML, DL, and GenAI Concepts

- **Topics**: Generative models (GANs, VAEs, Transformers), AI/ML/DL differences, Real-world use cases
- **Assignment**: Experiment with ChatGPT or DALL·E to generate text or images using basic prompts and write a short summary of the results.

Day 2: Unsupervised Learning and Recommendation Systems

- **Topics**: Unsupervised learning, Recommendation system fundamentals
- **Assignment**: Implement a simple recommendation system using unsupervised learning techniques (e.g., k-means clustering) on a sample dataset.

Day 3: Multilayer Perceptron (MLP)

- **Topics**: MLP architecture, Activation functions, Optimizers
- **Assignment**: Build and train an MLP classifier using scikit-learn or Keras on a small dataset (e.g., MNIST).

Day 4: Convolutional Neural Networks (CNNs)

- **Topics**: CNN architecture, Convolution layers, Pooling, Applications
- **Assignment**: Implement a CNN model using Keras or PyTorch to classify images from a dataset like CIFAR-10.

Day 5: Recurrent Neural Networks (RNNs)

- **Topics**: RNN architecture, LSTM, GRU, Sequence modeling
- **Assignment**: Build a simple RNN model (LSTM/GRU) for a time-series prediction task or sentiment analysis.

Day 6: Generative Adversarial Networks (GANs)

- **Topics**: GAN architecture, Generator/Discriminator workflow
- **Assignment**: Implement a basic GAN to generate synthetic images using a framework like PyTorch or TensorFlow.

Day 7: Variational Autoencoders (VAEs) & Autoencoders

- **Topics**: Autoencoders for feature extraction, Denoising, VAEs for reconstruction
- **Assignment**: Develop a VAE to reconstruct images from a dataset like MNIST and compare results with a standard autoencoder.

Day 8: Sequence & Text Generation Models

- **Topics**: LSTM, GRU, GPT, BERT, Encoder-decoder models
- **Assignment**: Build a text generation model using LSTM or GRU to generate a short paragraph based on a given seed text.

Day 9: Prompt Engineering Strategies

- **Topics**: Zero-shot, Few-shot, Chain-of-thought prompting, Role-based prompts
- **Assignment**: Create and test five different prompts (including zero-shot and few-shot) using an AI model like ChatGPT and analyze their outputs.

Day 10: Working with GenAI APIs

- **Topics**: OpenAI, HuggingFace APIs, Authentication, Pricing, JSON I/O
- **Assignment**: Use the HuggingFace or OpenAI API to generate text or images and parse the JSON output in a Python script.

Day 11: Building GenAI-Powered Applications

- **Topics**: Frontend (HTML/React), Backend (Flask/FastAPI), Integration with GenAI APIs
- **Assignment**: Develop a simple web application using Flask or FastAPI that integrates a GenAI API for text or image generation.

Day 12: GenAI App Deployment

- **Topics**: Deploying applications using HuggingFace, Render, or similar platforms
- **Assignment**: Deploy the GenAI application built on Day 11 to a platform like Render or HuggingFace and document the deployment process.

Day 13: Video Generation & AI Video Tools

- **Topics**: Text-to-video generation, AI video tools (RunwayML, Pika, Sora-like), Video generation APIs
- **Assignment**: Use a video generation API or tool (e.g., RunwayML) to create a short AI-generated video clip based on a text prompt.

Day 14: Evaluation & Interpretation of Models

- **Topics**: Inception Score, FID, Result analysis, Model improvement strategies
- **Assignment**: Evaluate the performance of a previously built GAN or VAE model using Inception Score or FID and suggest improvements.

Day 15: Capstone Project Planning

- **Topics**: Methodologies for productionizing AI, Project planning, Secure deployment
- **Assignment**: Create a detailed plan for a domain-specific GenAI capstone project, including objectives, dataset, and tools.

Day 16: Capstone Project Development & Presentation

- **Topics**: Development, Testing, Deployment, Presentation of GenAI project
- **Assignment**: Complete the capstone project, deploy it, and prepare a presentation summarizing the project, results, and lessons learned.