

Day - 1

- **Introduction to Generative AI**

- Overview of Generative AI: Definition and scope
- Key concepts: Generative Adversarial Networks (GANs), Variational Autoencoders (VAEs), Transformers
- Use cases: Image generation, text generation, music creation, and video synthesis
- Generative AI in industries: Healthcare, Entertainment, Finance, and Manufacturing.

- **Overview of Databricks Platform for AI**

- Introduction to Databricks: Features, architecture, and integration with Apache Spark
- Databricks as a platform for machine learning and AI: Key tools and workflows
- Overview of MLflow and Databricks Workflows for model training and deployment
- Hands-on Lab: Setting up a Databricks workspace for Generative AI workflows.

- **Machine Learning Foundations for Generative AI**

- Understanding Supervised vs Unsupervised learning
- Key ML algorithms for generative models: Autoencoders, GANs, Transformers
- Overview of data preparation and feature engineering for generative tasks
- Hands-on Lab: Data preprocessing and feature engineering for training generative models.

- **Introduction to Generative Models**

- In-depth understanding of Generative Adversarial Networks (GANs)
- Structure and working of GANs: Generator vs Discriminator
- Applications and challenges of GANs
- Introduction to Variational Autoencoders (VAEs)
- Hands-on Lab: Implementing a basic GAN model for image generation

- **Advanced Techniques in Generative AI**

- Exploring Deep Convolutional GANs (DCGANs) for image generation
- Conditional GANs (CGANs) for controlled generation
- CycleGANs: Image-to-image translation
- Hands-on Lab: Implementing DCGAN for generating realistic images.

- **Transformer Models for Generative AI**

- Introduction to Transformer models and their architecture (Self-attention, Multi-head attention)
- Applications of GPT-3, BERT, and T5 in text generation
- Overview of fine-tuning transformers for specific generative tasks
- Hands-on Lab: Implementing a text generation task using GPT-2.

- **Integration of Generative Models with Databricks Workflows**

- Orchestrating end-to-end AI workflows using Databricks
- Integrating MLflow for experiment tracking and model management
- Using Databricks clusters for large-scale model training
- Hands-on Lab: Deploying a generative model pipeline using Databricks Workflows.

- **Data Augmentation and Synthetic Data Generation**

- Introduction to Data Augmentation in generative AI: Enhancing model performance with synthetic data
- Techniques for generating synthetic data for training deep learning models
- Applications in NLP, computer vision, and autonomous systems
- Hands-on Lab: Implementing synthetic data generation for a computer vision task

- **Deploying Generative Models to Production**

- Overview of MLOps for deploying generative AI models
- Using Databricks Model Serving for real-time inference
- Packaging models using MLflow and deploying as APIs
- Hands-on Lab: Deploying a generative model using Databricks Model Serving.

- **Monitoring and Scaling Generative AI Models**

- Best practices for model monitoring and handling model drift
- Scaling generative AI models for high throughput and low latency using Databricks
- Setting up logging and alerting for model performance
- Hands-on Lab: Implementing model monitoring and scaling strategies

- **Advanced Topics in Generative AI**

- Exploring recent advancements in generative AI: Text-to-Image models (e.g., DALL-E)
- Diffusion Models for high-quality generative tasks
- Ethical considerations and challenges in generative AI
- Hands-on Lab: Exploring DALL-E or similar models for generating images from text descriptions.

- **Exam Preparation and Review**

- Overview of the Databricks Certified Generative AI Engineer Associate Exam
- Review of the certification exam structure and tips for exam success
- Sample exam questions and detailed answer explanations
- Hands-on mock exam: Simulated exam with scenario-based questions
- Review answers and provide insights on areas of improvement.