Generative AI and Responsible AI Practices with Google Cloud

Course Duration: 40 Hours **Course code: GARAPGC**

1. Course Overview

This course provides a comprehensive understanding of Generative AI and Responsible AI practices using Google Cloud. It focuses on building, deploying, and managing generative AI solutions with tools like Vertex AI, while ensuring ethical, secure, and compliant AI usage. Learners will explore large language models (LLMs), prompt engineering, grounding techniques, and governance frameworks to build reliable and trustworthy AI applications.

2. What you'll learn?

By the end of the course, you will be able to:

- Understand the fundamentals of Generative AI and Large Language Models (LLMs)
- Use Google Cloud Vertex AI for generative AI applications
- Apply prompt engineering techniques for better AI outputs
- Implement grounding and Retrieval-Augmented Generation (RAG)
- Build and deploy generative AI solutions on Google Cloud
- Identify and mitigate bias, risks, and hallucinations
- Apply Responsible AI principles and governance frameworks
- Ensure compliance, security, and ethical AI usage

3. Target Audience

- AI/ML Engineers
- Cloud Engineers and Developers
- Data Scientists
- Business and Technology Leaders

- Compliance and Risk Professionals

4. Pre-Requisites

Before taking this course, you should have:

- Basic understanding of AI/ML concepts
- Familiarity with Google Cloud Platform (GCP)
- Basic programming knowledge (Python recommended)
- Understanding of APIs and data handling

5. Course content

Module 1: Course Introduction

- Course overview and objectives
- Introduction to Generative AI
- Business use cases and trends

Module 2: Fundamentals of Generative AI

- What is Generative AI
- Overview of Large Language Models (LLMs)
- How generative models work
- Applications across industries

Module 3: Google Cloud Generative AI Ecosystem

- Overview of Vertex AI
- Generative AI Studio
- Foundation models in Google Cloud
- Integration with other GCP services

Module 4: Prompt Engineering Fundamentals

- What is prompt engineering
- Structure of effective prompts

- Role, context, and instruction design
- Common prompt patterns

Module 5: Advanced Prompt Engineering

- Few-shot and zero-shot prompting
- Chain-of-thought prompting
- Prompt tuning and optimization
- Reducing hallucinations

Module 6: Building Generative AI Applications

- Creating applications using Vertex AI
- Text, chat, and content generation
- API integration
- Real-world implementation examples

Module 7: Grounding and Retrieval-Augmented Generation (RAG)

- Concept of grounding
- Introduction to RAG
- Integrating enterprise data
- Improving response accuracy

Module 8: Model Evaluation and Optimization

- Evaluating generative AI outputs
- Metrics for quality and relevance
- Fine-tuning and parameter tuning
- Performance optimization

Module 9: Responsible AI Fundamentals

- What is Responsible AI
- Principles of fairness, accountability, and transparency

- Risks in generative AI
- Bias detection and mitigation

Module 10: AI Safety and Risk Management

- Hallucination and misinformation risks
- Content safety and moderation
- Risk assessment frameworks
- Red teaming and testing

Module 11: Security, Privacy, and Compliance

- Data protection and privacy
- IAM roles and access control
- Compliance standards (GDPR, etc.)
- Secure AI deployment

Module 12: Governance and Ethical AI

- AI governance frameworks
- Policy creation and enforcement
- Ethical decision-making in AI
- Organizational AI guidelines

Module 13: Deployment and Monitoring

- Deploying generative AI models
- Monitoring usage and performance
- Logging and auditing
- Continuous improvement

Module 14: MLOps for Generative AI

- Introduction to MLOps
- CI/CD for AI models

- Versioning and lifecycle management
- Automation in AI workflows

Module 15: Real-World Use Cases and Capstone Project

- Industry use cases (Finance, Healthcare, Retail, IT)
- Building an end-to-end generative AI solution
- Best practices and design patterns
- Final project and evaluation