Google Cloud Vertex AI Agent Builder

Course Duration: 24 Hours **Course code: GCP-VERT-AI-AB**

1. Course Overview

This course provides a comprehensive understanding of Google Cloud Vertex AI Agent Builder, enabling learners to design, build, and deploy AI-powered agents and conversational applications. It focuses on integrating generative AI, search, and conversational capabilities to create intelligent enterprise-grade assistants for customer support, internal automation, and knowledge retrieval.

2. What you'll learn?

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

- Understand Vertex AI Agent Builder architecture and components
- Build AI-powered conversational agents using generative AI
- Design enterprise search and knowledge-based assistants
- Integrate agents with APIs, databases, and business systems
- Use grounding techniques to improve response accuracy
- Deploy and monitor AI agents in production
- Implement security, governance, and responsible AI practices
- Optimize agent performance and user experience

3. Target Audience

- AI/ML Engineers
- Cloud Engineers and Architects
- Application Developers
- Data Engineers
- Digital Transformation Professionals

Phone: +91-999-911-1686 **Mail Us:** info@ssdntech.com

4. Pre-Requisites

Before taking this course, you should have:

- Basic understanding of Google Cloud Platform (GCP)
- Familiarity with APIs and REST services
- Basic programming knowledge (Python preferred)
- Understanding of AI/ML fundamentals (recommended)

5. Course content

Module 1: Course Introduction

- Course overview and objectives
- Introduction to Vertex AI and Agent Builder
- Use cases and business applications

Module 2: Overview of Vertex AI and Agent Builder

- Introduction to Vertex AI platform
- Components of Agent Builder
- Architecture and workflow
- Benefits of AI agents in enterprises

Module 3: Foundations of Generative AI

- Overview of Large Language Models (LLMs)
- Text generation and conversational AI
- Prompt design basics
- Limitations and challenges of LLMs

Module 4: Introduction to Vertex AI Agent Builder

- What is Agent Builder
- Key features and capabilities
- Types of agents (Search, Chat, Custom Agents)
- Interface and navigation

Module 5: Building Conversational Agents

- Creating chat-based agents
- Defining intents and responses
- Context handling and session management
- Testing conversational flows

Module 6: Enterprise Search and Knowledge Integration

- Introduction to Vertex AI Search
- Indexing structured and unstructured data
- Connecting data sources (documents, websites, databases)
- Building knowledge-based agents

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

- Concept of grounding in AI
- Using RAG for accurate responses
- Data connectors and embeddings
- Improving factual correctness

Module 8: Prompt Engineering for Agents

- Designing effective prompts for agents
- Role-based and contextual prompting
- Prompt tuning and optimization
- Managing hallucinations

Module 9: Integration with APIs and External Systems

- Calling external APIs from agents
- Integration with backend services
- Workflow automation using agents
- Real-time data interaction

Module 10: Custom Agent Development

- Building advanced custom agents
- Multi-step task execution
- Decision-making logic in agents
- Orchestration of services

Module 11: Security and Governance

- Data privacy and access control
- IAM roles and permissions
- Responsible AI practices
- Compliance considerations

Module 12: Deployment and Scaling

- Deploying agents to production
- Scaling strategies
- Managing traffic and performance
- Version control and updates

Module 13: Monitoring and Optimization

- Monitoring agent performance
- Logging and debugging
- User feedback analysis
- Continuous improvement strategies

Module 14: Multimodal and Advanced Capabilities

- Voice and speech integration
- Multimodal AI (text, image, audio)
- Personalization of responses
- Advanced AI features and enhancements

Module 15: Real-World Use Cases and Capstone Project

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

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