COURSE TABLE OF CONTENTS

Streamlit UI Development with Google ADK and AI Agent Patterns

OEM: Koenig Original • Duration: 3 Days (24 hrs)

COURSE MODULES & TOPICS

Module 1: Introduction to Google ADK
- Overview and capabilities of Google Agent Development Kit
- Google ADK resources and environment setup

Module 2: Building Your First Agent
- Create agent application with Gemini models
- Add Tavily search tool and API server for testing

Module 3: Testing and Streaming with API Server
- API server for testing with SSE streaming

Module 4: Context and Conversation Management
- Context management with include_contents
- Direct API calls to models without ADK agent

Module 5: Manual Agent Execution
- Run agents manually without adk web or adk run

Module 6: Sessions and State Management
- Google ADK sessions and state management
- Four types of state: scope and persistence

Module 7: Stateful Agent Development
- Build a stateful translation agent
- End-to-end exercises

Module 8: Agent Delegation and Subagents
- Automatic agent delegation to subagents

Module 9: Sequential, Parallel, and Loop Agents
- SequentialAgent usage
- ParallelAgent usage
- LoopAgent usage

Module 10: Safety and Security Guardrails
- Implement guardrails for AI agent safety and security

Module 11: MCP Server Integration
- Integrate MCP servers with Google ADK agents
- Custom MCP server exposing filesystem tools

Module 12: Config-Based Agent Development

- Build AI agents using config-based approach
- Multi-agent tutor architecture with YAML configurations

Module 13: Delegation Patterns and Sub-Agents

- Delegation pattern with sub-agents

Module 14: Design Patterns and Best Practices

- Google ADK design patterns and best practices
- Two main categories of agentic patterns
- Pattern-to-ADK component mapping

Module 15: Agent Classes and Hierarchies

- Agent classes and hierarchy
- Workflow agents
- Key design principles

Module 16: Agent Architecture Patterns

- Solo agent design pattern
- Agent roles design pattern

Module 17: Agent Process and Interaction Patterns

- Prescribed plan design pattern
- Agent-to-agent handoff
- Agents as tools
- Multi-agent orchestration

Module 18: Advanced Design Patterns

- Reflexion design pattern
- ADK agent as MCP server
- Human-in-the-loop design pattern
- Hierarchical multi-agent/task decomposition
- Review/critique design pattern

Module 19: Applying Patterns and Principles

- Selecting patterns for ADK applications
- Principles for successful agentic apps

Module 20: Capstone Project: Multi-Agent Corporate Travel Management System

- Root coordinator agent and auto-delegation
- Sequential pipelines and parallel research
- Session state, callbacks, guardrails
- Artifact service and A2A protocol
- MCP integration and HITL
- Streamlit UI and quality refinement loops
- Pydantic output schemas and SQLite database
- ADK runner, session setup, policy documents
- InMemorySessionService and basic authentication
- Project creation, approval gate, testing, documentation