COURSE TABLE OF CONTENTS

Pydantic Output Schemas with Google ADK: Agent Development, Patterns & Project

OEM: Koenig Original • Duration: 2 Days (16 hrs)

COURSE MODULES & TOPICS

Module 1: Introduction to Google ADK
- Overview of Google Agent Development Kit
- Capabilities of Google ADK

Module 2: Environment Setup and Resources
- Google ADK resources
- Setting up Google environment for coding

Module 3: Building Your First Agent Application
- Creating agent applications with Gemini Models

Module 4: Integrating Tavily Search and API Server
- Adding Tavily search tool
- API server setup for testing

Module 5: Streaming and Context Management
- Testing with Streaming and SSE
- Conversation context management with include_contents

Module 6: Direct Model API Calls and Manual Agent Runs
- Making direct API calls to models
- Running agents manually without ADK commands

Module 7: Sessions and State Management
- Google ADK sessions
- State management and four types of state

Module 8: Building Stateful Agents
- End-to-end exercises: stateful translation agent

Module 9: Agent Delegation and Subagents
- Automatic agent delegation
- Delegation pattern with sub-agents

Module 10: Sequential, Parallel, and Loop Agents
- SequentialAgent usage
- ParallelAgent usage
- LoopAgent usage

Module 11: Safety and Security Guardrails
- Implementing guardrails for AI agents

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Module 12: Integrating MCP Servers
- MCP server integration with ADK agents
- Custom MCP server with filesystem tools

Module 13: Config-Based Agent Development
- Building agents using config-based approach
- YAML agent configurations for multi-agent tutor architecture

Module 14: Design Patterns and Best Practices
- Google ADK design patterns
- Best practices for agentic apps
- Two main categories of agentic patterns

Module 15: Pattern-to-Component Mapping and Agent Hierarchy
- Mapping patterns to ADK components
- Agent classes and hierarchy
- Workflow agents

Module 16: Key Design Principles
- Guiding principles for Google ADK design

Module 17: Agent Architecture Patterns
- Solo Agent Design Pattern
- Agent Roles Design Pattern

Module 18: Agent Process and Interaction Patterns
- Prescribed Plan Design Pattern
- Agent-to-Agent Handoff Design Pattern
- Agents as Tools Design Pattern
- Multi-Agent Orchestration Design Pattern

Module 19: Advanced Design Patterns
- Reflexion Design Pattern
- ADK Agent as MCP Server Pattern
- Human-in-the-Loop Design Pattern
- Hierarchical Multi-Agent Design Pattern
- Review / Critique Design Pattern

Module 20: Applying Patterns and Principles
- Selecting patterns for ADK applications
- Principles for successful agentic apps

Module 21: 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 and session setup
- Policy documents and InMemorySessionService
- Basic authentication, uv project creation
- Approval gate, testing, and documentation