KOENIG SOLUTIONS · COURSE OUTLINE

Apache Airflow: DAGs, Operators & Task Orchestration

Learn to build, schedule and manage workflows in Apache Airflow using DAGs, operators, sensors and hooks.

8	38	9
MODULES	TOPICS	HANDS-ON ACTIVITIES

COURSE OVERVIEW

This course introduces Apache Airflow as a workflow management system, covering its installation, configuration and core concepts such as DAGs, operators, sensors, executors, hooks, XComs and variables. It then covers writing and managing workflows, including task dependencies, Jinja templating and scheduling, before moving into advanced features such as TaskGroups, branching, trigger rules and cross-DAG dependencies. The course also addresses monitoring, troubleshooting, scaling and production deployment, including security, high availability and integration with external systems, and closes with an overview of the wider Airflow ecosystem and provider tools.

WHO THIS COURSE IS FOR

- **Data Engineers**
- **Workflow Developers**
- **DevOps Engineers**
- **Platform Administrators**
- **ETL Developers**

LEARNING OBJECTIVES

- Explain the key features and use cases of Apache Airflow
- Configure Airflow installation, database and web server
- Describe core concepts such as DAGs, operators and sensors
- Build DAGs with tasks, dependencies and Jinja templates
- Implement branching, trigger rules and dynamic dependencies
- Analyse DAG runs, logs, retries and performance issues
- Deploy Airflow with high availability and security practices
- Compare Airflow providers with other orchestration tools

COURSE SYLLABUS

8 Modules, 38 Topics

01

Introduction to Apache Airflow

TOPICS

Overview of workflow management systems · Introduction to Apache Airflow · Key features and benefits · Use cases

02

Installation and Setup

TOPICS

System requirements · Installation methods (pip, Docker, etc.) · Configuration options · Initializing Airflow database · Setting up Airflow web server and scheduler

03

Core Concepts

TOPICS

Directed Acyclic Graphs (DAGs) · Operators and Tasks · Sensors · Executors · Hooks and Connections · XComs · Variables

04

Writing and Managing Workflows

TOPICS

Creating a DAG · Defining tasks with operators · Setting task dependencies · Templating with Jinja · Scheduling and triggering workflows

05

4 Activities

Advanced Airflow Features

TOPICS

SubDAGs and TaskGroups · Branching and Conditional Logic · Trigger Rules · Managing Dependencies Dynamically · Cross-DAG Dependencies

06

Monitoring and Troubleshooting

TOPICS

Logging and Alerts · Monitoring DAG runs and task instances · Retries and Failures · Scaling Airflow for Production · Performance optimization

07

5 Activities

Deployment and Integration

TOPICS

- High Availability and Fault Tolerance
- Security Best Practices
- Integration with External Systems (Databases, Cloud Services, etc.)
- Managing Airflow deployments in different environments

08

Airflow Ecosystem

TOPICS

- Introduction to Apache Airflow Providers
- Overview of Airflow-related tools and projects
- Comparison with other workflow orchestration tools

HANDS-ON ACTIVITIES

Practise What You Learn

#	MODULE	ACTIVITY
03	**Core Concepts**	**HANDS-ON LAB: INSTALLATION AND BASIC SETUP** ■ Install Airflow ■ Configure Airflow ■ Initialize Airflow database ■ Start Airflow web server and scheduler ■ Create a simple DAG and run it
05	**Advanced Airflow Features**	**HANDS-ON LAB: WORKFLOW DEVELOPMENT** ■ Create complex DAGs with multiple tasks ■ Implement branching and conditional logic ■ Manage dynamic task dependencies ■ Explore cross-DAG dependencies
07	**Deployment and Integration**	**HANDS-ON LAB: MONITORING, TROUBLESHOOTING, AND DEPLOYMENT** ■ Configure logging and alerts ■ Monitor DAG runs and task instances ■ Handle retries and failures ■ Deploy Airflow in a production-like environment ■ Integrate Airflow with external systems

WHAT IS INCLUDED

Everything You Need to Succeed

- Koenig course material for every module
- Delivery by certified instructors and subject matter experts
- Hands-on exercises throughout the course
- Course completion certificate from Koenig

ABOUT KOENIG

Who We Are

Established in 1993, Koenig Solutions is a globally recognised training provider with 35+ technology partnerships, 5,000+ training programmes and a network of certified instructors and subject matter experts, supporting individuals and enterprise teams worldwide.

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