AiOps Training and Certification Course

Curriculum 5 Days

Day - 1

- **Overview of AIOps**
  - Benefits of Artificial Intelligence for IT Operations (AIOps)
  - Artificial Intelligence for IT Operations (AIOps) Overview
  - Benefits of AIOps
  - Use Case: Evaluating the Benefits of AIOps
  - Implications of AIOps for Business
  - Implications of AIOps for Business
  - Use Case: Implications of AIOps for Business
  - Key Capabilities of Artificial Intelligence for IT Operations (AIOps)
  - Key Capabilities of AIOps
  - Use Case: Understanding Key Capabilities of AIOps
  - Key Dimensions of IT Operations Monitoring
  - IT Operations Monitoring: Overview and Relevance
  - Understanding Key Dimensions of IT Operations Monitoring
  - Key Dimensions of IT Operations Monitoring and AIOps
  - Use Case: Understanding Key Dimensions of IT Operations Monitoring
  - AIOps Deployment Types & storages
  - AIops Industry Use cases
  - AIOps Vs DevOps Vs MLOps Life cycle
  - AIOps Challenges
  - AIOps Popular Solutions

- AIOps Best Practices
- AIOps supporting DevOps & SRE

- **Introduction to Prometheus**
  - **Overview of Prometheus**
    - Brief history and purpose
    - Key features and architecture
  - **Basic Installation and Configuration**
    - Quick setup guide
    - Overview of configuration files and settings
  - **Understanding Metrics and Data Model**
    - Introduction to Prometheus metrics
    - Data types and structure
  - **Q&A Session**
- **Basic Monitoring with Prometheus**
  - **Instrumentation and Metrics Collection**
    - How to add Prometheus metrics to an application
    - Best practices for metric collection
  - **Introduction to Prometheus Query Language (PromQL)**
    - Basic syntax and queries
    - Creating simple alerts
  - **Hands-On Exercise**
    - Quick setup of basic monitoring for a demo application

- **Introduction to Grafana and Dashboard Creation**
  - **Overview of Grafana**
    - Key features and integration with Prometheus

- **Setting up Grafana**
  - Connecting Grafana to Prometheus
- **Creating Basic Dashboards in Grafana**
  - Introduction to dashboard creation and configuration
  - Overview of visualization type
- **Hands-On Exercise**
  - Participants create a basic dashboard for the demo application

- **Advanced Features and AIOps Integration**
  - **Advanced Dashboard Techniques in Grafana**
    - Dynamic dashboards with variables
    - Setting up basic alerts in Grafana
  - **Integrating Prometheus and Grafana with AIOps**
    - How these tools fit into an AIOps strategy
    - Brief on AIOps concepts relevant to monitoring and observability
  - **Wrap-Up and Q&A**
    - Recap of key concepts
    - Open floor for questions and discussion on real-world applications

Data Collection and Monitoring Tools

Log management: ELK Stack (Elasticsearch, Logstash, Kibana)

- **Introduction to the ELK Stack**
  - **Overview of ELK Stack**
    - Introduction to Elasticsearch, Logstash, and Kibana
    - Role of ELK in AIOps
    - Basic architecture and flow of data within the ELK Stack
  - **Introduction to Elasticsearch**
    - Understanding Elasticsearch basics: Indexes, Documents, and Nodes
    - Basic Elasticsearch operations: CRUD (Create, Read, Update, Delete)
  - **Q&A Session**
    - Address initial queries and clarifications

- **Deep Dive into Logstash and Data Ingestion**
  - **Understanding Logstash**
    - Logstash fundamentals: Input, Filter, and Output plugins
    - Configuring Logstash for data ingestion
  - **Hands-On Exercise: Setting Up Logstash**
    - Walkthrough of setting up a basic Logstash pipeline
    - Ingesting sample data into ElasticSearch

- **Kibana for Data Visualization and Analysis**
  - **Introduction to Kibana**
    - Kibana Dashboard, Visualization, and Discover features
    - Connecting Kibana to Elasticsearch
  - **Hands-On Exercise: Creating Visualizations and Dashboards**
    - Participants create basic visualizations and dashboards using the ingested data
    - Exploration of Kibana's features relevant to AIOps

- **ELK Stack in AIOps and Advanced Topics**
  - **ELK Stack in the Context of AIOps**
    - Integrating ELK with AIOps workflows
    - Real-world use cases of ELK in AIOps (e.g., anomaly detection, performance monitoring)
  - **Advanced ELK Features**
    - Brief on advanced Elasticsearch queries
    - Overview of X-Pack features (security, alerting, machine learning)
  - **Wrap-Up and Q&A**
    - Recap of key points
    - Open Q&A session to discuss practical applications and address any remaining questions

- **Introduction to Apache Kafka**
  - **Introduction to Kibana**
    - What is Apache Kafka and why it's important in AIOps
    - Kafka's architecture and core components (Brokers, Topics, Producers, Consumers)
  - **Kafka Installation and Basic Configuration**

        - Setting up a basic Kafka environment
        - Overview of Kafka configuration files
    - **Kafka Producers and Consumers**
        - Understanding Producers and Consumers
        - Writing basic producers and consumers
    - **Q&A Session**
        - Address initial queries and clarifications

- **Kafka in Depth - Topics, Partitions, and Replication**
    - **Deep Dive into Kafka Topics and Partitions**
        - Creating and managing Topics
        - Understanding Partitions for scalability and reliability
    - **Kafka Replication and Fault Tolerance**
        - Concept of replication for high availability
        - Leader and follower partitions

- **Kafka Streams and Kafka Connect**
    - **Introduction to Kafka Streams**
        - Understanding stream processing in Kafka
        - Basics of Kafka Streams API
    - **Kafka Connect for Integration**
        - Overview of Kafka Connect
        - Setting up connectors for data import/export

- **Kafka in AIOps and Practical Exercise**
  - **Using Kafka in an AIOps Context**
    - Role of Kafka in event-driven architectures for AIOps
    - Real-world use cases: Log aggregation, metrics collection, real-time analytics
  - **Hands-On Exercise: Setting Up a Kafka Pipeline**
    - Building a simple pipeline for data ingestion and processing
    - Monitoring and managing Kafka performance
  - **Wrap-Up and Q&A Session**
    - Recap of key concepts and best practices
    - Open floor for final questions and discussions

Data Collection and Monitoring Tools

Machine learning libraries: TensorFlow

- **Introduction to TensorFlow and Machine Learning Basics**
  - **Overview of TensorFlow**
    - Introduction to TensorFlow and its relevance in AIOps
    - Core features and capabilities of TensorFlow
  - **Machine Learning Fundamentals**
    - Brief overview of machine learning concepts
    - How TensorFlow supports machine learning operations
  - **Setting Up TensorFlow**
    - Installation and setup of TensorFlow
    - Introduction to TensorFlow's programming model
  - **Q&A Session**
    - Address initial queries and clarifications

- **TensorFlow Basics - Operations, Graphs, and Sessions**
  - **TensorFlow Core Concepts**
    - Understanding Tensors, Operations, Graphs, and Sessions
    - Building simple computation graphs
  - **Hands-On Exercise: Basic TensorFlow Operations**
    - Creating and executing a simple TensorFlow program
    - Introduction to TensorFlow data types and operations

- **Building Machine Learning Models with TensorFlow**
  - **Introduction to Neural Networks in TensorFlow**
    - Basic concepts of neural networks
    - Building a simple neural network in TensorFlow
  - **Practical Exercise: Building a Basic ML Model**
    - Step-by-step construction of a machine learning model for a simple problem (e.g., regression or classification)
- **TensorFlow in AIOps and Advanced Topics**
  - **TensorFlow in the Context of AIOps**
    - Discussing the role of TensorFlow in AIOps (e.g., anomaly detection, predictive maintenance)
    - Real-world examples of TensorFlow applications in AIOps
  - **Advanced TensorFlow Features**
    - Overview of advanced features like TensorFlow Extended (TFX), Keras for deep learning, and distributed training
  - **Wrap-Up and Q&A Session**
    - Recap of key concepts and best practices
    - Open floor for final questions and discussions on practical TensorFlow applications in AIOps

Data analysis tools: Jupyter Notebook

- **Introduction to Jupyter Notebooks**
  - **Overview of Jupyter Notebooks**
    - Introduction to Jupyter Notebooks and their importance in data analysis
    - Key features and benefits in the context of AIOps
  - **Setting up Jupyter Notebooks**
    - Installation and basic setup
    - Navigating the Jupyter Notebook interface
  - **Basic Operations in Jupyter Notebook**

        - Creating and managing notebooks
        - Overview of Markdown, code cells, and kernel management
    - **Q&A Session**
        - Addressing initial queries and clarifications

- **Data Analysis Basics in Jupyter Notebook**
    - **Data Import and Manipulation**
        - Importing data from various sources (CSV, databases)
        - Basic data manipulation using Pandas
    - **Hands-On Exercise: Working with Data**
        - Participants practice importing and manipulating a sample dataset

- **Advanced Data Analysis and Visualization**
    - **Advanced Data Analysis Techniques**
        - Exploring more complex data manipulation and transformation
        - Introduction to time series analysis relevant to AIOps
    - **Data Visualization in Jupyter**
        - Using Matplotlib and Seaborn for data visualization
        - Creating plots and charts relevant to AIOps data (e.g., performance metrics)

- **Jupyter Notebooks in AIOps Context and Best Practices**
    - **Applying Jupyter Notebooks in AIOps**
        - Case studies or examples of Jupyter Notebooks used in AIOps scenarios
        - Integrating Jupyter Notebooks with other AIOps tools and platforms
    - **Best Practices and Advanced Features**
        - Tips for effective use of Jupyter Notebooks
        - Overview of advanced features like JupyterLab, extensions
    - **Wrap-Up and Q&A Session**

- Recap of key concepts and functionalities
- Open floor for final questions and in-depth discussions

Day - 4

Analysis and Automation

Configuration management tools: Ansible

- **Introduction to Ansible and Configuration Management**
  - **Overview of Ansible**
    - Introduction to Ansible and its role in AIOps
    - Key features and advantages of using Ansible for configuration management
  - **Ansible Architecture and Components**
    - Understanding Ansible architecture: Playbooks, Roles, Tasks, Modules, Inventory
    - YAML syntax basics
  - **Setting Up Ansible**
    - Installation and basic setup of Ansible
    - Setting up an inventory file
  - **Q&A Session**
    - Addressing initial queries and clarifications

- **Basic Playbooks and Ad-hoc Commands**
  - Writing Your First Ansible Playbook
    - Creating a simple playbook
    - Defining tasks and running the playbook
  - Ansible Ad-hoc Commands
    - Introduction to ad-hoc commands in Ansible
    - Practical examples of common ad-hoc commands

- **Advanced Ansible Features**
  - Variables, Templates, and Roles

        - Using variables and templates for dynamic configurations
        - Organizing playbooks with roles
    - Error Handling and Debugging
        - Best practices for error handling in Ansible playbooks
        - Using Ansible's debugging tools

- **Ansible in AIOps and Hands-On Exercise**
    - **Applying Ansible in an AIOps Context**
        - Case studies or examples of Ansible used in AIOps scenarios
        - Integration of Ansible with monitoring and alerting tools
    - **Hands-On Exercise: Building an AIOps Pipeline**
        - Participants work on creating a basic pipeline using Ansible
        - Automating a simple operational task relevant to AIOps
    - **Wrap-Up and Q&A Session**
        - Recap of key concepts and functionalities
        - Open floor for final questions and in-depth discussions

Infrastructure-as-code software tool: Terraform

- **Introduction to Terraform and Infrastructure as Code**
    - **Overview of Terraform**
        - Introduction to Terraform and its role in infrastructure automation
        - Key features and benefits of using Terraform in AIOps
    - **Terraform Basics**
        - Understanding Terraform's syntax and structure
        - Core concepts: Providers, Resources, Variables, State

- **Setting Up Terraform**
  - Installing Terraform
  - Basic setup and configuration
- **Q&A Session**
  - Addressing initial queries and clarifications

- **Writing Terraform Configuration**
  - **Creating Your First Terraform Configuration**
    - Writing a basic Terraform configuration file
    - Managing infrastructure as code
  - **Understanding Terraform Workflow**
    - The Terraform workflow: init, plan, apply, destroy
    - Hands-on demo of managing a simple infrastructure

- **Advanced Terraform Concepts**
  - **Modules and Remote State**
    - Using modules to organize and reuse code
    - Managing state in complex environments
  - **Dynamic Infrastructure with Terraform**
    - Dynamic configurations with loops and conditionals
    - Integrating with cloud providers (AWS, Azure, GCP)

- **Terraform in AIOps and Practical Exercise**
  - **Terraform in an AIOps Context**
    - Real-world use cases of Terraform in AIOps
    - Automating and maintaining AIOps infrastructure with Terraform

- **Hands-On Exercise: Implementing an AIOps Scenario**
  - Participants implement a small-scale infrastructure setup relevant to AIOps
  - Practicing Terraform commands and configurations
- **Wrap-Up and Q&A Session**
  - **Recap of key concepts and best practices**
  - **Open floor for final questions and discussions on practical applications**

Day - 5

CI/CD and Automation

Continuous integration tools: Jenkins

- **Introduction to Jenkins and Continuous Integration**
  - **Overview of Jenkins**
    - Introduction to Jenkins and its importance in CI/CD pipelines
    - The role of Jenkins in AIOps
  - **Jenkins Architecture and Key Concepts**
    - Understanding Jenkins architecture: master, agents, plugins
    - Core concepts: Jobs, Builds, Plugins, Pipelines
  - **Setting Up Jenkins**
    - Installing and configuring Jenkins
    - Navigating the Jenkins interface
  - **Q&A Session**
    - Addressing initial queries and clarifications

- **Building Jobs and Basic Pipelines in Jenkins**
  - **Creating Your First Jenkins Job**
    - Setting up a freestyle project
    - Configuring source code management (SCM), build triggers, and build steps
  - **Introduction to Jenkins Pipelines**
    - Creating a basic pipeline using Jenkinsfile
    - Pipeline syntax and scripted vs. declarative pipelines

- **Advanced Jenkins Usage and Integration**
  - Automated Testing and Notifications
    - Integrating automated testing into Jenkins pipelines
    - Configuring build notifications (e.g., email, Slack)
  - Integrating Jenkins with Other Tools
    - Connecting Jenkins with version control systems (like Git)
    - Using Jenkins with containerization tools (like Docker)

- **Jenkins in AIOps and Practical Exercise**
  - **Jenkins in the Context of AIOps**
    - Discussing the role of Jenkins in automated operations
    - Use cases of Jenkins in monitoring, alerting, and auto-remediation
  - **Hands-On Exercise: Implementing a CI/CD Pipeline**
    - Participants create a simple CI/CD pipeline relevant to AIOps
    - Emphasizing on automated deployment and testing
  - **Wrap-Up and Q&A Session**
    - Recap of key concepts and functionalities
    - Open floor for final questions and discussions

Runbook Automation Platform: Rundeck

- **Introduction to Rundeck and Runbook Automation**
  - **Overview of Rundeck**
    - Introduction to Rundeck and its significance in AIOps
    - Understanding the role of runbook automation in IT operations
  - **Rundeck Architecture and Key Features**
    - Core components: Jobs, Nodes, Projects, Commands

        - Overview of Rundeck's UI and basic navigation
    - **Setting Up Rundeck**
        - Installation and basic configuration
        - Setting up projects and access controls
    - **Q&A Session**
        - Addressing initial queries and clarifications

- **Creating and Managing Jobs in Rundeck**
    - **Defining and Executing Jobs**
        - Creating your first job in Rundeck
        - Configuring job workflows, options, and scheduling
    - **Advanced Job Features**
        - Using job plugins for extended functionality
        - Handling job outputs and logs

- **Integrating Rundeck with Other Tools and Services**
    - Rundeck Integrations
        - Integrating with version control systems (e.g., Git)
        - Connecting Rundeck with monitoring tools (e.g., Nagios, Splunk)
    - API and CLI Usage
        - Utilizing Rundeck's API for automation
        - Command-line interface for Rundeck management

- **Rundeck in AIOps and Practical Exercise**
    - **Applying Rundeck in an AIOps Context**
        - Case studies or examples of Rundeck used in AIOps scenarios

- Automating routine operations and incident response

- **Hands-On Exercise: Implementing a Runbook Automation Scenario**
  - Participants implement a basic runbook automation task relevant to AIOps
  - Emphasizing on automated problem resolution and reporting
- **Wrap-Up and Q&A Session**
  - Recap of key concepts and functionalities
  - Open floor for final questions and discussions on practical applications