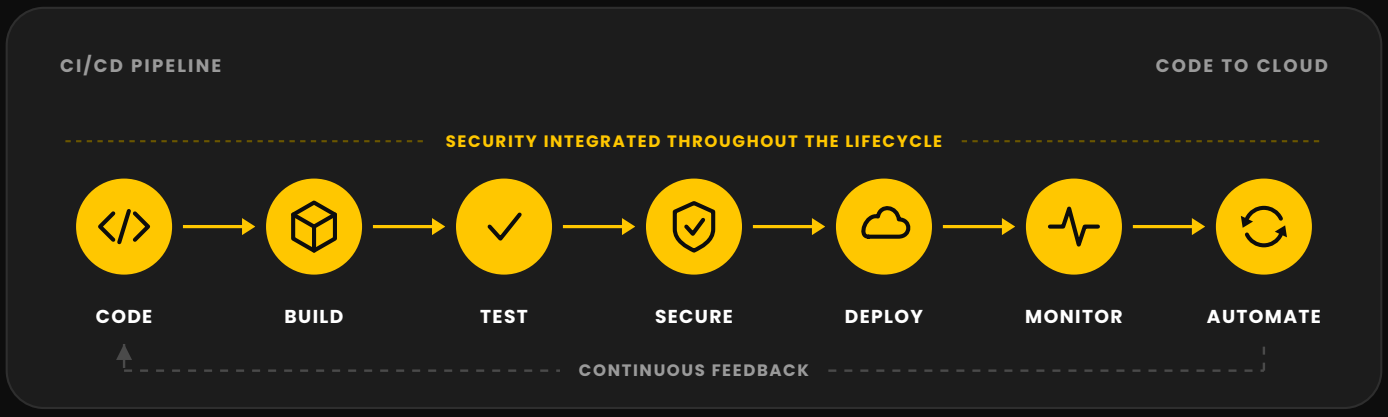
RAISE TECH

CAREER-FOCUSED PROGRAM

# DEVOPS
## with DEVSECOPS & AI

Career-Focused DevOps Engineering Program

Build, Automate, Secure and Operate Modern Cloud Applications.




### WHAT YOU WILL MASTER

- Git
- Jenkins
- Docker
- Kubernetes
- Terraform
- Ansible
- DevSecOps
- AIOps

ENROLL TODAY

## Start your DevOps journey with RaiseTech

☎ 9390271992 8247329739

Flat No. 308, Nilgiri Block, Aditya Enclave, Ameerpet, Hyderabad - 500016

PROGRAM OVERVIEW

# Build, Deploy, Secure & Manage

DevOps with DevSecOps & AI combines DevOps practices such as **Continuous Integration, Continuous Delivery, automation and infrastructure management** with security integrated throughout the development lifecycle.

The program also focuses on multi-cloud environments, including **AWS, Azure and GCP**, to support scalability, flexibility and resilience, helping professionals build, deploy, secure and manage modern applications and infrastructure.

| DEVOPS | DEVSECOPS | SRE | CLOUD | AI |
|---|---|---|---|---|
| CI/CD & Automation | Security Integrated | Site Reliability Engineering | AWS · Azure · GCP | AI-Driven Technologies |

## COURSE OUTCOME

PRIMARY OUTCOME

### DevOps with DevSecOps & AI Engineer

By the end of this program, you will be prepared to work in this role, with practical knowledge of designing cloud architectures, managing infrastructure, implementing CI/CD pipelines, integrating security practices and applying AI-driven solutions across multiple cloud environments.

## WHO CAN LEARN?

YES

### Students

An excellent career-starting path, especially for those pursuing B.Tech, B.Sc, BCA, MCA or M.Tech. Students from other backgrounds can also excel with strong passion and foundational skills.

YES

### Non-IT Professionals

With dedication and guided learning, a transition is possible. Professionals from marketing, banking and teaching backgrounds have moved into roles such as Cloud Engineer and DevOps Engineer.

YES

### Working Professionals

Well suited to career switchers and those looking to upskill. Professionals from BPO, finance, civil and mechanical backgrounds have transitioned into DevOps after 2–10 years in non-IT domains.

YOUR ROADMAP

# Learning Path

### 01 DevOps Foundations
SDLC, Waterfall and Agile, the DevOps lifecycle, goals, roles and roadmap.

### 02 Git & GitHub
Version control, branching and merging, pull requests, forking and repository security.

### 03 CI/CD with Jenkins
Jobs, plugins, pipelines, Jenkinsfile, Linux slaves and AWS EC2 deployment.

### 04 Build & Deployment Tools
Maven goals and plugins, deploying applications on Tomcat.

### 05 Code Quality & Artifacts
SonarQube code scans and quality gates; JFrog artifact management and policies.

### 06 Configuration Management
Ansible architecture, inventory, playbooks, modules, roles and Galaxy.

### 07 Infrastructure as Code
Terraform with HCL, providers, state, variables, modules and AWS EC2 provisioning.

### 08 Containerization
Docker images, networking, Dockerfiles, volumes, Compose and Swarm.

### 09 Kubernetes
Cluster setup, workloads, services, Helm, monitoring and troubleshooting.

### 10 DevSecOps
Shift-left security, SAST, dependency, container, IaC, Kubernetes and AWS security.

### 11 Observability & AIOps
Prometheus, Grafana, CloudWatch, anomaly detection, K8sGPT and root cause analysis.

### 12 Generative AI for DevOps
ChatGPT-assisted commands, YAML, Terraform, pipelines, log analysis and RCA.

### 13 Real-Time Projects
Kubernetes with ArgoCD with GitOps, CI/CD Project and Migration Project.

WHAT YOU WILL LEARN

# Curriculum at a Glance

MODULE 01
## DevOps Foundations
SDLC · Waterfall & Agile · DevOps Lifecycle · DevOps Tools · Roles & Responsibilities

MODULE 02
## Git & GitHub
Version Control · Git Architecture · Branching & Merging · Pull Requests · GitHub Security

MODULE 03
## Jenkins & CI/CD
Jobs & Plugins · Poll SCM & Webhooks · Pipelines & Jenkinsfile · Linux Slave · AWS EC2 Deployment

MODULE 04
## Maven, Tomcat & SonarQube
Maven Goals & Plugins · Tomcat Deployment · SonarQube Scans · Quality Gates · Administration

MODULE 05
## JFrog & Artifact Management
Installation & Configuration · Artifact Management · Artifact Rules · Release · Policies · CI/CD Project

MODULE 06
## Ansible
Architecture · Inventory · Playbooks · Modules · Roles & Galaxy · Docker Deployment

MODULE 07
## Terraform & Infrastructure as Code
IaC & HCL · Providers · State · Variables & Outputs · Modules · AWS EC2 Provisioning

MODULE 08
## Docker
Images & Containers · Networking · Dockerfiles · Volumes · Docker Compose · Docker Swarm

MODULE 09
## Kubernetes
Architecture · Pods & Deployments · Services · Helm · Prometheus & Grafana · Troubleshooting

MODULE 10
## DevSecOps
Shift Left Security · SAST · Snyk · Trivy · Checkov · IAM & CloudTrail

MODULE 11
## AIOps for DevOps & Cloud Engineers
Observability · Anomaly Detection · K8sGPT · AWS CloudWatch · Root Cause Analysis

MODULE 12
## Generative AI for DevOps Engineers
ChatGPT for DevOps · Linux, YAML & Terraform Generation · Jenkins Pipelines · Log Analysis · RCA

MODULE 13
## DevOps Projects
Kubernetes with ArgoCD with GitOps · CI/CD Project · Migration Project

MODULE 01

## DevOps Foundations

### DevOps Fundamentals

- Software Development Life Cycle (SDLC)
- What is DevOps
- Why DevOps
- Need of DevOps
- DevOps History
- Before and After DevOps
- DevOps Goals
- DevOps Advantages

### Development Methodologies

- Waterfall Model
- Waterfall: Advantages & Disadvantages
- Agile Methodology
- Agile: Advantages & Disadvantages

### DevOps in Practice

- DevOps Tools
- DevOps Life Cycle
- Roles & Responsibilities
- DevOps Roadmap

MODULE 02

## Git & GitHub

### Git: Version Control Basics

- Introduction to Version Control Systems (VCS)
- Types of VCS
- Difference between CVCS and DVCS
- What is Git
- Git Architecture
- Git Installation on Windows and Linux
- Git Commands
- Working with Git



### Git: Repository Management

- Creating a Repository
- Cloning a Repository
- Committing Changes
- Fetch, Pull and Remote

### Git: Branching & Merging

- Branching Strategy in Git
- Creating Branches
- Switching Branches
- Merging Branches
- Git Rebase
- Git Stash

### GitHub: Getting Started

- Introduction to GitHub
- Account Creation
- Profile Setup
- Repositories
- Public vs Private Repositories
- Switching Repositories

### GitHub: Collaboration

- Pull Requests
- Forking
- Git Push
- Creating Files in GitHub
- Branch Actions

### GitHub: Management & Security

- Project Creation
- Wiki Pages
- Archiving Repositories
- Branch Protection Rules
- Securing GitHub

MODULE 03
## Jenkins & CI/CD

### Jenkins Fundamentals
- What is Jenkins
- Continuous Integration with Jenkins
- Java Installation and Configuration
- Exploring the Jenkins Dashboard

### Jobs & Administration
- Creating Jobs
- Running Jobs
- Global Environment Variables for Jobs
- Disabling and Deleting Jobs
- Adding and Updating Plugins
- Plugin Management
- Authorization Strategies
- Credentials in Jenkins
- Jenkins Best Practices

### Triggers & Notifications
- Email Notifications
- Scheduling Jobs Automatically
- Poll SCM
- Webhooks

### Pipelines
- Delivery Pipeline with a Java Maven Project
- Creating a Complete Pipeline
- Pipeline Jobs
- Multibranch Pipeline Jobs
- Pipeline as Code (Jenkinsfile) using Groovy

### Distributed Builds & Deployment
- Master–Slave Architecture
- Adding a Linux Slave
- Configuring Jobs on a Linux EC2 Instance
- Deploying to AWS EC2 using a Jenkins Pipeline



### Tool Integrations
- Jenkins + Ansible Integration
- Jenkins + Docker Integration
- Jenkins + Kubernetes Integration

MODULE 04
## Maven, Tomcat & SonarQube

### Maven
- Introduction to Maven
- Installing Maven
- Maven Goals and Plugins
- Hands-On Maven
- Integrating Maven with Other Tools

### Tomcat
- What is Tomcat
- Installing Tomcat on Linux
- Understanding Tomcat XML Configuration Files
- Deploying Applications in Tomcat

### SonarQube: Introduction
- What is SonarQube
- Why SonarQube in DevOps & CI/CD
- Real-Time Use Case Overview

### SonarQube: Setup & Architecture
- Prerequisites
- SonarQube Architecture
- Installation on Linux
- Changing the Default Port Number
- Starting and Stopping Services

MODULE 04 · MAVEN, TOMCAT & SONARQUBE (CONTD.)

### SonarQube: Scans & Administration

- Running SonarQube
- Executing Code Scans
- Administration & Configuration
- Creating Users (Normal and Administrator Roles)
- Creating and Managing Projects
- Important Interview Questions

## MODULE 05
## JFrog & Artifact Management

### JFrog

- Installation and Configuration
- Storing Artifacts
- Artifact Management
- Creating Artifact Rules
- Moving Artifacts to Release
- Enabling Policies

### Hands-On Project

- CI/CD Project

## MODULE 06
## Ansible

### Core Concepts

- Introduction to Ansible
- Ansible Architecture
- Core Concepts
- Configuration Management
- Ansible Features and Benefits
- Push Configuration in Ansible

MODULE 06 · ANSIBLE (CONTD.)

### Installation & Setup

- Installation of Ansible
- Inventory & Setup
- Host Inventory File
- Installing Ansible on Linux
- Verifying the Installation

### CLI & Automation

- Ansible CLI & Commands
- Commonly Used Commands
- Playbooks
- Modules

### Roles

- Roles in Ansible
- Using Roles from Ansible Galaxy
- Creating Custom Roles

### Integration

- Deploying Docker Containers with Ansible
- Deploying Docker Compose with Ansible
- Complete CI/CD on Jenkins with Ansible

## MODULE 07
## Terraform & Infrastructure as Code

### Infrastructure as Code (IaC)

- Introduction to Terraform
- Traditional Infrastructure
- Management Challenges
- What is Infrastructure as Code
- Why Terraform
- Key Advantages
- IaC vs Configuration Management Tools (Ansible, Chef)
- CloudFormation vs Terraform

MODULE 07 · TERRAFORM & INFRASTRUCTURE AS CODE (CONTD.)

### Setup & HCL

- Introduction to HCL (HashiCorp Configuration Language)
- Terraform Installation & Setup
- Installing Terraform on Linux & Windows

### Core Terraform

- Terraform Providers
- Resources and Data Sources
- Changing and Destroying Resources
- Terraform State Commands
- Modules in Terraform
- Version Controlling Terraform Files with Git

### Variables

- Variables in Terraform
- Input Variables
- Declaring Variables
- Passing via CLI, .tfvars and Environment Variables
- Environment Variables in Terraform
- Data Structures: Lists, Maps, Complex Objects
- Handling Sensitive Variables

### Outputs

- Output Values in Terraform
- Output Values: Usage and Referencing

### Hands-On

- Automate Provisioning of an EC2 Instance on AWS with Terraform



MODULE 08

## Docker

### Docker Basics

- What is Docker
- What is a Container

MODULE 08 · DOCKER (CONTD.)

### Containers & Architecture

- Containerization vs Virtualization
- Docker Containers vs VMs
- Docker Images
- Docker Architecture
- Understanding Docker Components

### Working with Docker

- Docker Installation on Linux
- Working with Images
- Docker Containers
- Docker Networking
- Dockerfiles for Building Custom Images
- Docker Volumes for Data Persistence
- Development and Deployment with Docker Containers

### Registry & Jenkins

- Building a Docker Image from a Jenkins Job
- Pushing Images to Docker Hub

### Docker Compose

- What is Docker Compose
- Writing a Docker Compose File
- Configuring Volumes with Compose

### Docker Swarm

- Container Orchestration with Docker Swarm
- Networking in Docker Swarm
- Custom Overlay Networks in a Swarm Cluster

### CI/CD Deployment

- Jenkins Pipeline to EC2 Instance using Docker Run
- Jenkins Pipeline to EC2 Instance using Docker Compose
- Integration with Jenkins and Deploying Applications on Containers

MODULE 09

# Kubernetes

## Architecture & Cluster Setup

- Introduction to Kubernetes
- Kubernetes Architecture
- Spinning up a Kubernetes Cluster on AWS
- Exploring Your Cluster
- Understanding YAML Configuration in Kubernetes

## Workloads

- Creating a Pod
- Creating a Deployment using YAML
- Working with DaemonSets
- Deploying a Database Application using StatefulSets

## Services, Configuration & Storage

- Creating a Service Object
- Headless, NodePort and LoadBalancer Services
- Creating Secrets and ConfigMaps
- Working with Persistent Volumes

## Releases & Deployment Strategies

- Rolling Updates
- Rollbacks
- Blue-Green Deployments

## Helm & Monitoring

- Helm Package Manager for Kubernetes
- Deploying Kubernetes Dashboard with Helm
- Installing Prometheus and Grafana with Helm
- Monitoring the Cluster with Prometheus



## Applications & Integration

- Deploying a Microservice Application using StatefulSets and Persistent Volumes
- Integration with Jenkins and Deploying Applications on Pods

## Real-Time Scenarios & Interview Preparation

- Troubleshooting Common Kubernetes Issues
- Real-Time Project Scenarios & Best Practices
- Kubernetes Interview Questions

MODULE 10

# DevSecOps

## DevSecOps Fundamentals

- What is DevSecOps
- DevOps vs DevSecOps
- Shift Left Security
- Security in CI/CD Pipelines
- DevSecOps Lifecycle

## Git & Source Code Security

- Secure Git Practices
- Branch Protection Rules
- Pull Request Reviews
- Secrets Detection in Source Code
- GitHub Security Features

## SAST: Static Application Security Testing

- Introduction to SAST
- SonarQube Setup and Configuration
- SonarQube Quality Gates
- Code Quality vs Code Security
- Integrating SonarQube with Jenkins
- Integrating SonarQube with GitHub

MODULE 10 · DEVSECOPS (CONTD.)

## Dependency Scanning

- Introduction to Dependency Scanning
- Open Source Vulnerabilities
- CVE and CVSS Basics
- Introduction to Snyk
- Dependency Scanning with Snyk
- Integrating Snyk into CI/CD Pipelines

## Container Security & Trivy

- Docker Security Best Practices
- Container Image Vulnerabilities
- Introduction to Trivy
- Scanning Docker Images with Trivy
- Scanning File Systems and Repositories with Trivy
- Scanning Images in CI/CD Pipelines
- Dockerfile Security Best Practices
- Distroless and Minimal Images
- Running Containers as Non-Root Users

## Kubernetes Security

- Kubernetes Security Basics
- Security Contexts
- Pod Security Standards
- Network Policies
- Kubernetes Image Scanning with Trivy
- Kubernetes Security Best Practices

## Infrastructure as Code Security

- Introduction to IaC Security
- Terraform Security Best Practices
- Terraform Code Scanning
- Introduction to Checkov
- Scanning Terraform with Checkov
- Integrating IaC Scans into CI/CD

MODULE 10 · DEVSECOPS (CONTD.)

## AWS Security for DevSecOps

- IAM Security Best Practices
- Security Groups and Network Security
- AWS CloudTrail

## CI/CD Pipeline Security

- Securing Jenkins Pipelines
- Working with Trivy
- Failing Pipelines on Critical Vulnerabilities
- Secure Artifact Management

MODULE 11

# AIOps for DevOps & Cloud Engineers

## Introduction to AIOps

- What is AIOps
- DevOps vs AIOps
- Why AIOps is Needed
- AIOps Use Cases in DevOps
- AIOps in Cloud and Kubernetes
- AI-Assisted Troubleshooting Basics

## Observability Foundation

- Metrics, Logs and Events
- Prometheus Metrics Basics
- Grafana Dashboards
- Kubernetes Monitoring Basics
- AWS CloudWatch Metrics and Logs

## Anomaly Detection

- Introduction to Anomaly Detection
- CloudWatch Anomaly Detection
- Detecting CPU, Memory and Application Anomalies
- Creating Alarms Using Anomaly Detection
- Understanding Normal vs Abnormal Behaviour
- AIOps-Based Incident Detection

MODULE 11 · AIOPS FOR DEVOPS & CLOUD ENGINEERS (CONTD.)

### K8sGPT

- Introduction to K8sGPT
- Installing K8sGPT
- Connecting K8sGPT to Kubernetes
- Troubleshooting Pods and Deployments
- K8sGPT with EKS

### Real-Time Kubernetes

- Using Prometheus Metrics for Troubleshooting
- Identifying CPU and Memory Anomalies
- Finding High Resource-Consuming Pods
- Grafana Dashboard Analysis
- AI-Assisted Monitoring and Troubleshooting

### AI for AWS Operations

- CloudWatch Logs Analysis
- AI-Assisted Log Summarization
- Finding Root Cause from AWS Metrics and Logs
- AWS Systems Manager for Operational Troubleshooting
- Automating Common Operational Tasks
- Incident Analysis and Recommendations
- CloudWatch AIOps Capabilities: Anomaly Detection, Operational Investigations, Natural-Language Telemetry Queries and Summaries

MODULE 12

## Generative AI for DevOps Engineers

### Generative AI Foundations

- Introduction to Generative AI for DevOps
- Using ChatGPT for DevOps
- AI-Assisted Troubleshooting
- AI Prompting Basics for DevOps Engineers

MODULE 12 · GENERATIVE AI FOR DEVOPS ENGINEERS (CONTD.)

### Code & Configuration Generation

- Generating Linux Commands using AI
- Generating Kubernetes YAML using AI
- Generating Terraform Code using AI
- Generating Jenkins Pipelines using AI

### Analysis & Troubleshooting

- Log Analysis using AI
- Reviewing Errors and RCA with AI

MODULE 13

## DevOps Projects

### Capstone Projects

- Kubernetes with ArgoCD with GitOps
- CI/CD Project
- Migration Project

THE TOOLCHAIN

**Code to Cloud, Secured and Automated**

- **CODE** — Git · GitHub
- **BUILD** — Maven · Jenkins · Tomcat
- **TEST** — SonarQube · Quality Gates
- **SECURE** — Snyk · Trivy · Checkov
- **DEPLOY** — Ansible · Terraform · Docker · Kubernetes
- **MONITOR** — Prometheus · Grafana · CloudWatch
- **AUTOMATE** — AIOps · Generative AI

HANDS-ON LEARNING

# Projects & Career Outcomes

## FEATURED PROJECTS

PROJECT 01
### Kubernetes with ArgoCD with GitOps
CAPSTONE PROJECT

PROJECT 02
### CI/CD Project
CAPSTONE PROJECT

PROJECT 03
### Migration Project
CAPSTONE PROJECT

## SKILLS YOU WILL GAIN

- DevOps Fundamentals
- Version Control with Git & GitHub
- CI/CD with Jenkins
- Build Automation with Maven
- Application Deployment on Tomcat
- Code Quality with SonarQube
- Artifact Management with JFrog
- Configuration Management with Ansible
- Infrastructure as Code with Terraform
- Containerization with Docker
- Docker Compose & Swarm
- Kubernetes Orchestration
- Helm Package Management
- Cloud Deployment on AWS
- DevSecOps Practices
- SAST & Dependency Scanning
- Container & IaC Security
- Monitoring with Prometheus & Grafana
- AIOps & Anomaly Detection
- AI-Assisted Troubleshooting with K8sGPT
- Generative AI for DevOps

PRIMARY OUTCOME

### DevOps with DevSecOps & AI Engineer

Practical knowledge of cloud architecture, infrastructure, CI/CD, security practices and AI-driven solutions.

THE PROGRAM COMBINES

- DevOps
- DevSecOps
- Site Reliability Engineering (SRE)
- Cloud Computing
- AI-Driven Technologies

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