QUANTUM-AI
THE SCHOOL OF DATA AND AI

# Master DevOps Engineering Program

## Build. Automate. Deploy. Scale.

Program Duration: 3 Months

Transform your career with industry-focused DevOps training designed to make you job-ready with real-time projects, cloud tools, and automation practices.
Learn the complete DevOps lifecycle from development to deployment using the most in-demand technologies.



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# WHY QUANTUM AI ?

Quantum-AI focuses on practical, hands-on training with real-time project exposure guided by industry experts.
We provide structured learning paths, career guidance, and interview preparation to ensure job readiness.
Our training methodology emphasizes clarity, confidence building, and mastery of tools used in top IT companies.

# COURSE OVERVIEW

This comprehensive DevOps program is designed to provide hands-on expertise in Cloud Computing, CI/CD, Infrastructure as Code, Containerization, Monitoring, and Automation.
The course covers industry-standard tools including Git, GitHub, Maven, AWS, Terraform, Docker, Jenkins, Ansible, Prometheus, and more.
Students will work on real-time projects that simulate production environments and enterprise workflows.
The curriculum is structured to help beginners build strong fundamentals while enabling professionals to upskill with advanced DevOps practices.
By the end of the program, learners will be able to design, implement, and manage scalable, automated deployment pipelines in real-world scenarios.



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# WHAT YOU WILL LEARN !

## 1.Introduction:

### 1.1 Software Development Life Cycle (SDLC)

- What is SDLC?
- Waterfall vs Agile vs Lean Methodology

### 1.2 DevOps Overview

- DevOps History & Lifecycle
- Need for DevOps
- Roles & Responsibilities
- DevOps Goals
- DevOps Tools
- DevOps Roadmap

### 2. Software Architectures

- Types of Architectures
- Client, Application, and Database Layers
- One-Tier Architecture
- Two-Tier Architecture
- Three-Tier Architecture
- N-Tier Architecture

### 3. Web & Application Servers

- What is a Web Server?
- What is a Web Application Server?
- Apache HTTPD
- Nginx
- IIS
- Tomcat Server

## 4. AWS Cloud

### 4.1 Cloud Fundamentals

- What is Virtualization?
- Advantages & Disadvantages of Virtualization
- What is Cloud Computing?
- What is AWS?
- AWS Services & Deployment Models
- AWS Certifications

### 4.2 AWS Core Services

- Identity and Access Management (IAM)
- Elastic Compute Cloud (EC2) – Service & Security
- Amazon Elastic Block Store (EBS)
- Networking Basics
- Amazon Virtual Private Cloud (VPC) & Components
- Elastic Load Balancing (ELB)
- Amazon EC2 Auto Scaling
- Amazon S3 (Simple Storage Service)
- Amazon RDS (Relational Database Service)
- Amazon Route 53
- CDN
- Key Management Service (KMS)
- Miscellaneous Topics

## 5.Source Code Management – Git

### 5.1 Git Fundamentals

- What is VCS? & Its History
- Types of Source Code Management Tools
- Types of Version Control Systems
- Git vs GitHub
- Git Installation
- Git Lifecycle & Workflow
- Different Stages in Git
- Repositories (Local, Central, Remote)
- Git User Configuration

### 5.2 Git Operations

- Git Pull, Push, Merge, Stash
- Git Checkout, Branch, Commit, Cherry-pick
- Git Logs – Log vs Reflog
- Merge Conflicts
- .gitignore
- Branching Strategies
- Useful Real-Time Git Commands

### 6. Source Code Management – GitHub

- Public & Private Repositories
- Creating Public & Private Repos
- Integrating Repos & Forking
- Linking Projects
- Tokens, Compare & Pull Requests
- Renaming & User Management
- Archiving & Deleting Repos
- Accessing Private Repositories
- Assigning Roles
- Advantages & Disadvantages
- Git vs Other Tools
- Miscellaneous Topics

## 7. Build Tool – Maven

- What is a Build Tool?
- Introduction to Maven
- Maven Objectives & Architecture
- Maven Goals & Build Lifecycle
- Project Information & Features
- Requirements & Plugins
- pom.xml & Types
- Maven Directory Structure
- Java Project Structure
- Problems Without Maven
- Maven vs ANT vs Gradle
- Execution
- Sample Application using MSBuild
- Miscellaneous Topics

## 8. Code & Artifact Storage

### 8.1 JFrog

- Introduction to JFrog
- Use Cases & Setup
- Creating Repositories & Users

## 9. SonarQube – Static Code Analysis

- What is SonarQube?
- Setup & Configuration
- SonarQube Advantages

## 10. LAMP Stack

- What is LAMP Stack?
- LAMP Setup
- Usage of LAMP Stack

## 11. Terraform (Infrastructure as Code – IaC)

- What is IaC?
- What is Terraform?
- Advantages of Terraform
- How Terraform Works
- Terraform State File
- Terraform Installation
- Terraform CLI
- S3 Backend Setup
- Alias & Providers
- State Locking
- Variables, Locals & Comments
- Validate & Plan
- Apply, Destroy, Outputs & Update
- Loops & Workspaces
- Creating VPC, EC2, RDS, S3, EBS, EFS
- Multiple tfvars Files
- Versions & Dynamic Blocks
- Import, Taint
- Refresh, Replace, Target
- Lifecycle
- Create Before Destroy & Prevent Destroy
- Terraform Modules
- Miscellaneous Topics

## 12. Containerization Using Docker

- Microservices Introduction
- Monolithic vs Microservices
- Virtualization Introduction
- What is Containerization?
- Docker vs VMs vs Servers
- Docker Architecture
- Docker Installation
- Docker Client & Daemon
- Dockerfile & Instructions
- Creating Images
- Docker Networks & Types
- Docker Volumes & Types
- Docker Commands
- Run vs CMD vs ENTRYPOINT
- ADD vs COPY
- Pull, Push, Build
- Working with Containers
- Build Image from Container
- Container Creation Methods
- Port Mapping
- Multistage Build
- Creating Jenkins using Docker
- Docker Registry & Types
- Docker Login & Image Push
- Docker Hub Account Creation
- Docker Swarm & Compose Overview
- Docker Stack

## 13. Monitoring – Prometheus & Grafana

- Introduction to Prometheus, Grafana, Node Exporter
- Architecture & Components
- Installation
- Importing Grafana Dashboards
- Server Monitoring & Logging
- Loki & Promtail
- Use Cases

## 14. Monitoring – Nagios

- Introduction to Nagios
- Installation
- Master-Slave Configuration
- Tomcat Server Integration
- Summary

## 15.Configuration Management – Ansible

- Introduction & History
- Architecture & Use Cases
- Inventory & Host Patterns
- Ad-hoc Commands
- Modules
- Playbooks
- Package Installation & Removal
- Variables, Handlers, Loops
- Conditions, Vault, Roles
- Tags, Dry Run, Pip
- Galaxy & Built-in Modules
- Jinja2 Templates
- Creating Local Resources
- Git Integration
- Deploying EC2 & Tomcat
- Admin Activities & Metrics
- Jenkins & Docker Integration
- Static Website using Playbook
- Advantages & Disadvantages
- Alternatives
- Miscellaneous Topics

## 16.Continuous Integration – Jenkins

- Introduction to Jenkins
- Installation & Setup
- Architecture
- Creating & Configuring Jobs
- Version Control Integration
- Master-Slave Setup
- Build Pipelines & Reports
- Agent Setup
- Jenkinsfile & Pipeline as Code
- Continuous Deployment
- Workspaces, Webhooks & Linked Projects
- Environment Variables & Multi-Stage Builds
- Artifact Management
- Integration with Docker, SonarQube, Tomcat
- Triggers, Cron Jobs, Plugins
- Parameterized Builds
- Distributed Builds
- Security
- Troubleshooting
- Backup, Monitoring & Logging
- Miscellaneous Topics

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# Master automation, cloud, and continuous delivery — and become the DevOps engineer every modern organization is looking for.




## Get in Touch

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