**DevOps Course – Total: ~40 Hours**

| **Module** | **Topic** | **Duration (Hours)** |
| --- | --- | --- |
| 1 | Introduction to DevOps | 2 |
| 2 | Git & GitHub | 4 |
| 3 | Continuous Integration with Jenkins | 4 |
| 4 | Continuous Delivery & Deployment | 4 |
| 5 | Configuration Management (Ansible/Chef) | 4 |
| 6 | Docker & Containerization | 5 |
| 7 | Kubernetes Orchestration | 6 |
| 8 | DevOps in the Cloud (AWS/GCP/Azure) | 4 |
| 9 | Monitoring & Logging | 4 |
| 10 | DevSecOps (Optional) | 3 |

### ****Module 1: Introduction to DevOps (2 hrs)****

* DevOps principles: CALMS model
* Waterfall vs Agile vs DevOps
* DevOps lifecycle: Plan, Develop, Test, Release, Deploy, Operate, Monitor
* Key roles and responsibilities
* DevOps toolchain overview

### ****Module 2: Version Control with Git & GitHub (4 hrs)****

* Installing Git and configuring repositories
* Git basics: init, clone, add, commit, push, pull
* Branching and merging strategies (Git Flow)
* Resolving merge conflicts
* GitHub/GitLab basics: forks, pull requests, issues

### ****Module 3: Continuous Integration (CI) with Jenkins (4 hrs)****

* CI/CD concepts
* Installing Jenkins
* Creating Jenkins jobs
* Pipelines: Scripted vs Declarative
* Integrating Jenkins with Git
* Unit testing automation
* Notification setup (email, Slack)

### ****Module 4: Continuous Delivery & Deployment (4 hrs)****

* CD pipeline structure
* Deployment strategies: Blue-Green, Rolling, Canary
* Jenkins + Docker for CD
* Automated testing in CD
* Environment segregation (Dev/Test/Prod)

### ****Module 5: Configuration Management (Ansible/Chef) (4 hrs)****

* Infrastructure as Code (IaC) overview
* Introduction to Ansible
* Inventory, Playbooks, Modules, Roles
* Writing idempotent scripts
* Ansible Vault (securing sensitive data)

### ****Module 6: Containerization with Docker (5 hrs)****

* Docker architecture
* Docker CLI: build, run, ps, exec, logs
* Writing Dockerfiles
* Docker Compose for multi-container apps
* Docker volumes and networks
* DockerHub & tagging

### ****Module 7: Orchestration with Kubernetes (6 hrs)****

* Kubernetes architecture: master, worker nodes, etcd
* Pods, ReplicaSets, Deployments, Services
* YAML manifests
* kubectl basics
* ConfigMaps and Secrets
* Helm: packages for Kubernetes
* Monitoring with Prometheus

### ****Module 8: DevOps in the Cloud (AWS/GCP/Azure) (4 hrs)****

* EC2, S3, IAM (AWS basics)
* AWS CodePipeline overview
* Using Terraform for IaC
* Deploying Jenkins on the cloud
* Cost management basics

### ****Module 9: Monitoring & Logging (4 hrs)****

* Why monitoring/logging is critical
* Log aggregation tools: ELK (Elasticsearch, Logstash, Kibana)
* Application monitoring: Prometheus & Grafana
* Metrics, alerts, dashboards

### ****Module 10: DevSecOps (Optional) (3 hrs)****

* Shift-left testing
* Security scanning tools (SonarQube, Snyk)
* Container scanning
* Secrets management
* Compliance as Code basics