

# DOCKER SYLLABUS

## Module 1: Introduction to Docker

- What is Docker and why use it
- Virtualization vs containerization
- Docker architecture (Client, Server, Registry)
- Installing Docker
- Running first container

## Module 2: Docker Basics

- Images and containers
- Docker Hub
- Pulling and running images
- Container lifecycle (start, stop, restart, remove)
- Viewing logs

## Module 3: Working with Docker Images

- Creating images
- Dockerfile basics
- Instructions (FROM, RUN, COPY, CMD, ENTRYPOINT)
- Building custom images
- Image versioning and tagging

## Module 4: Container Management

- Managing running containers
- Inspecting containers
- Executing commands inside containers
- Resource limits (CPU, memory)

## Module 5: Volumes & Data Persistence

- What are volumes
- Creating and managing volumes
- Bind mounts
- Data persistence in containers

## Module 6: Networking in Docker

- Docker networking basics
- Bridge network
- Host network
- Custom networks
- Communication between containers

## Module 7: Docker Compose

- Introduction to Docker Compose
- docker-compose.yml file
- Defining services
- Multi-container applications
- Running and managing services

## Module 8: Environment Variables & Configuration

- Using environment variables
- .env files
- Passing configs to containers

## Module 9: Docker Registry

- Docker Hub usage
- Private registries
- Pushing and pulling images
- Image security basics

## Module 10: Logging & Monitoring

- Viewing logs
- Logging drivers
- Monitoring containers

## Module 11: Security Best Practices

- Container security
- Image scanning
- Least privilege principle
- Secure configurations

## Module 12: Docker with Development Stack

- Using Docker with Node.js
- Using Docker with PHP/Laravel
- Using Docker with MySQL/MongoDB
- Full stack container setup

## Module 13: CI/CD Integration

- Introduction to CI/CD
- Docker in CI/CD pipelines
- Automating builds and deployments

## Module 14: Deployment & Scaling

- Deploying containers in production
- Load balancing basics
- Introduction to Docker Swarm
- Scaling containers

## Module 15: Troubleshooting & Debugging

- Debugging containers
- Common errors
- Fixing container issues

## Module 16: Real-World Projects

- Containerizing web application
- Multi-container app (frontend + backend + DB)
- CI/CD pipeline with Docker
- Deployment project