Docker Training Course Curriculum

Prerequisites

- Basic understanding of Linux/Unix systems
- Familiarity with command-line interface
- Basic knowledge of networking concepts
- Understanding of virtualization concepts

Lab Setup Requirements

- Docker Engine latest version
- Docker Desktop (for Windows/macOS)
- Text editor (VS Code, Vim, or any preferred editor)
- Git for version control
- Docker Compose
- Sample applications for containerization

Course Duration: 5 Days

Day 1: Docker Fundamentals

- Introduction to Docker
  - What is Docker?
  - Docker architecture
  - Docker components
  - Docker ecosystem
- Docker Installation and Setup
  - Installation methods
  - System requirements
  - Configuration
  - Basic commands
- Docker Hub and Registries
  - Public vs private registries
  - Image tagging
  - Image versioning
  - Registry best practices
- Lab Exercise: Basic Docker setup and operations

Day 2: Container Management

- Container Basics
  - Container lifecycle
  - Container states
  - Container operations
  - Resource management

- Container Configuration
  - Environment variables
  - Port mapping
  - Volume mounting
  - Resource limits
- Container Orchestration
  - Container networking
  - Container linking
  - Container dependencies
  - Container health checks
- Container Best Practices
  - Security considerations
  - Performance optimization
  - Logging and monitoring
  - Error handling
- Lab Exercise: Container management and optimization

Day 3: Image Creation and Management

- Docker Images Basics
  - Image concepts
  - Image layers
  - Image registry
  - Basic image operations
- Dockerfile Fundamentals
  - Dockerfile syntax
  - Basic instructions
  - Best practices
  - Common patterns
- Image Building Commands
  - `FROM` instruction
  - `RUN` instruction
  - `COPY` and `ADD`
  - `ENV` and `ARG`
- Advanced Image Building
  - Multi-stage builds
  - Layer optimization
  - Build context
  - Build caching
- Lab Exercise: Creating and managing Docker images

Day 4: Docker Compose and Networking

- Docker Compose Fundamentals
  - Compose file structure
  - Service definitions
  - Network configuration

    - Volume configuration
- Advanced Docker Compose
    - Environment variables
    - Service dependencies
    - Health checks
    - Scaling services
- Docker Networking
    - Network drivers
    - Network types
    - Network configuration
    - Network security
- Service Discovery
    - DNS configuration
    - Load balancing
    - Service communication
    - Network troubleshooting
- Lab Exercise: Multi-container applications with Docker Compose

Day 5: Volumes and Advanced Topics

- Docker Volumes
    - Volume types
    - Volume drivers
    - Volume management
    - Data persistence
- Storage Management
    - Volume backup
    - Volume restore
    - Data migration
    - Storage optimization
- Security and Best Practices
    - Container security
    - Image security
    - Network security
    - Access control
- Production Deployment
    - Deployment strategies
    - Monitoring
    - Logging
    - Backup and recovery
- Final Project
    - Complete application containerization
    - Multi-service deployment
    - Security implementation
    - Q&A session