# Kubernetes Training Course Curriculum

## Prerequisites

- Basic understanding of containerization concepts
- Familiarity with Docker
- Basic knowledge of Linux/Unix systems
- Understanding of networking concepts

## Lab Setup Requirements

- Kubernetes cluster (Minikube or a cloud provider)
- kubectl command-line tool
- Text editor (VS Code, Vim, or any preferred editor)
- Git for version control
- Sample applications for deployment

## Course Duration: 5 Days

### Day 1: Kubernetes Fundamentals

- Introduction to Kubernetes
  - What is Kubernetes?
  - Kubernetes architecture
  - Key components
  - Kubernetes ecosystem
- Understanding Objects
  - Pods
  - Deployments
  - Daemon sets
  - Replica sets
- Events and Operators
  - Hooks
  - Resource handling
  - Health checks
  - Operators
- Probes
  - Readiness
  - Liveness
  - Startup
- Lab Exercise: Basic Kubernetes setup and object management

### Day 2: Logs, HPA, and Networking

- Logs and HPA
  - Configuring Horizontal Pod Autoscaling

    - Monitoring and scaling
    - Log management
- Services and Networking
    - Managing Kubernetes services
    - Networking basics
    - Service types
    - Ingress controllers
- ConfigMaps and Secrets
    - Handling configuration
    - Managing sensitive data
    - Best practices
- Lab Exercise: Configuring services and managing data

## Day 3: RBAC and Deployment Strategies

- RBAC
    - Implementing Role-Based Access Control
    - User roles and permissions
    - Security best practices
- Deployment Strategies
    - Rolling updates
    - Blue-green deployments
    - Canary releases
    - Client management
- Volumes and Mounts
    - Volume types
    - Persistent volumes
    - Volume claims
    - Data persistence
- Lab Exercise: Implementing RBAC and deployment strategies

## Day 4: Observability and Logging

- Observability
    - Using Prometheus for monitoring
    - Grafana dashboards
    - Metrics collection
    - Alerting
- Logging
    - Centralized logging with ELK stack
    - Elasticsearch
    - Logstash
    - Kibana
- Monitoring Best Practices
    - Performance optimization
    - Security considerations
    - Troubleshooting

- Lab Exercise: Setting up observability and logging

## Day 5: Advanced Topics and Final Project

- Advanced Networking
  - Network policies
  - Service mesh
  - Network security
  - Traffic management
- Security and Best Practices
  - Pod security policies
  - Image security
  - Access control
  - Compliance
- Final Project
  - Complete application deployment
  - Security implementation
  - Monitoring and logging setup
  - Q&A session