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## Kubernetes Fundamentals and Cluster Operations

**Duration: 4 Days**    **Course Code: VMKFCO**    **Delivery Method: Company Event**

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### Overview:

This four-day course is the first step in learning about Containers and Kubernetes Fundamentals and Cluster Operations. Through a series of lectures and lab exercises, the fundamental concepts of containers and Kubernetes are presented and put to practice by containerizing and deploying a two-tier application into Kubernetes.

#### Company Events

These events can be delivered exclusively for your company at our locations or yours, specifically for your delegates and your needs. The Company Events can be tailored or standard course deliveries.

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### Target Audience:

Anyone who is preparing to build and run Kubernetes clusters

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### Objectives:

- By the end of the course, you should be able to meet the following objectives:
    - Build, test, and publish Docker container images
    - Become familiar with YAML files that define Kubernetes objects
    - Understand Kubernetes core user-facing concepts, including pods, services, and deployments
    - Use kubectl, the Kubernetes CLI, and become familiar with its commands and options
    - Understand the architecture of Kubernetes (Control plane and its components, worker nodes, and kubelet)
  - Learn how to troubleshoot issues with deployments on Kubernetes
  - Apply resource requests, limits, and probes to deployments
  - Manage dynamic application configuration using ConfigMaps and Secrets
  - Deploy other workloads, including DaemonSets, Jobs, and CronJobs
  - Learn about user-facing security using SecurityContext, RBAC, and NetworkPolicies
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### Prerequisites:

- Linux concepts and command line proficiency
  - General networking proficiency
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## Content:

### 1 Course Introduction

- Introductions and objectives

### 2 Containers

- What and Why containers
- Building images
- Running containers
- Registry and image management

### 3 Kubernetes Overview

- Kubernetes project
- Plugin interfaces
- Building Kubernetes
- Kubectl CLI

### 4 Beyond Kubernetes Basics

- Kubernetes objects
- YAML
- Pods, replicas, and deployments
- Services
- Deployment management
- Rolling updates
- Controlling deployments
- Pod and container configurations

### 5 Kubernetes Networking

- Networking within a pod
- Pod-to-Pod Networking
- Services to Pods
- ClusterIP, NodePort, and LoadBalancer
- Ingress controllers
- Service Discovery via DNS

### 6 Stateful Applications in Kubernetes

- Stateless versus Stateful
- Volumes
- Persistent volumes claims
- StorageClasses
- StatefulSets

### 7 Additional Kubernetes Considerations

- Dynamic configuration
- ConfigMaps
- Secrets
- Jobs, CronJobs

### 8 Security

- Network policy
- Applying a NetworkPolicy
- SecurityContext
- runAsUser/Group
- Service accounts
- Role-based access control

### 9 Logging and Monitoring

- Logging for various objects
- Sidecar logging
- Node logging
- Audit logging
- Monitoring architecture
- Monitoring solutions
- Octant
- VMware vRealize® Operations Manager™

### 10 Cluster Operations

- Onboarding new applications
- Backups
- Upgrading
- Drain and cordon commands
- Impact of an upgrade to running applications
- Troubleshooting commands
- VMware Tanzu™ portfolio overview

## Further Information:

For More information, or to book your course, please call us on 00 971 4 446 4987

[training@globalknowledge.ae](mailto:training@globalknowledge.ae)

[www.globalknowledge.com/en-ae/](http://www.globalknowledge.com/en-ae/)

Global Knowledge, Dubai Knowledge Village, Block 2A, First Floor, Office F68, Dubai, UAE