Certiﬁed Kubernetes Administrator

**Duration: 5 days (8hrs/day)**

# Prerequisites:

* Basic knowledge of Linux Server Administration.
* Basic knowledge of Containers

**Course Objective:** This comprehensive Kubernetes course, covering container orchestration, cluster design, installation, resource and application management, security, networking, maintenance, logging, and monitoring, as well as troubleshooting, is designed to equip learners with the skills needed to successfully clear the Certified Kubernetes Administrator exam.

**Kubernetes Version:** Latest

**Module 1 – Core Concepts** Overview of Container Orchestration Introduction to Kubernetes

Understanding Kubernetes Architecture

# Module 2 – Installation, Conﬁguration & Validation

Design a Kubernetes Cluster

**Lab:** Installation of Kubernetes 1-Master and 2-Nodes Cluster

**Lab:** Choose a Network Solution and Configure

**Lab:** Verify Installation with Kubectl command

# Module 3 – Creating Kubernetes Resources

Understanding Pods, Labels & Selectors **Lab:** Deploying Applications as a Pod **Lab:** Managing Labels & Selector

Understanding Replication Controller & Replica Set

**Lab:** Deploying Replication Controller & Replica Set Understanding Services – ClusterIP, NodePort & LoadBalancer **Lab:** Creating & Managing Service

Understanding Daemon Sets

**Lab:** Deploying Applications as Daemon Sets

**Module 4 - Scheduling** Manual Scheduling of Pods Taint and Tolerations

**Lab:** Using Manual Scheduling or Taints and Tolerations

# Module 5 - Application Lifecycle Management

Overview of Deployment

Deployment Strategies – Blue/Green & Canary

**Lab:** Deploying Applications as Deployment

**Lab:** Implementing Deployment Strategies on Deployments

# Module 6 - Environment Variable

Plain Key Config Map Secret

**Lab:** Using Plain Keys, Config Map & Generic Secret as Environment Variables

**Lab:** Mount Environment Variable as Volumes

# Module 7 – Storage

Understanding Volume Management in K8s Types of Volumes Provisioning

Persistent Volumes Persistent Volume Claim

**Lab:** Using PV & PVC to attach Persistent Volume to a Pod as HostPath Understanding Storage Class

# Module 8 – Security

Understanding Kubernetes Authentication

**Lab:** Creating and Managing Users in Kubernetes

**Lab:** Creating Service Accounts

Understanding Role, ClusterRole, RoleBinding& ClusterRoleBinding

**Lab:** Managing Roles and Role Binding

**Lab:** Managing Cluster Role and Cluster Role Binding Understanding Security Context

**Lab:** Adding Security Context to Pod to enable ping

# Module 9 – Cluster Maintenance

Understanding OS Upgrade

**Lab:** Upgrade a Kubernetes Cluster Version Static Pod

**Lab:** Deploying Pods as Static Pod

**Lab:** ETCD Backup

# Module 10 – Logging and Monitoring

Understand how to Monitor Application and Cluster Components **Lab:** Understand how to Read Application & Cluster Component Logs **Lab:** Deploying Prometheus & Grafana to Monitor K8s Cluster

**Module 11 – Networking in Kubernetes** Understand Basics of Kubernetes Networking Understand CNI overview

Understand Pod Networking Concepts CoreDNS overview of K8s Understanding Ingress

**Lab:** Configure and Manage Ingress Rule

Understanding Namespace & Use-Cases

**Lab:** Creating Namespace & Deploying K8s resources in Diﬀerent Namespaces

# Module 12 – Troubleshooting

Ways to Troubleshoot ETCD Failure Ways to Troubleshoot Kubelet Failure

Ways to Troubleshoot Container Runtime Failure Ways to Troubleshoot Scheduler Failure