Docker & Kubernetes Full Course Syllabus

Duration: **35 hours**

INTRODUCTION TO DOCKERS (1 hour)

- ✔ What is Virtualization
- ✔ What is Containersation
- ✔ Difference between Virtualization & Containersation
- ✔ What is Monolithic and Microservices
- ✔ What is Docker
- ✔ What is container
- ✔ What are difference types of Containers in the market?
- ✔ Before & After Docker containers
- ✔ Key Benefits of Docker containers
- ✔ How containers growth in Current Market.

MODULE (2 hour)

- ✔ Docker Container Life Cycle
- ✔ Docker Family Tree
- ✔ Docker Architecture
- ✔ Docker terminology
- ✔ Docker Hub
- ✔ How to Install Docker
- ✔ Basic Docker Commands
- ✔ How to Create a Docker File
- ✔ Building a Docker Image with a Dockerfile
- ✔ Creating, Starting, Stopping, and Removing Containers
- ✔ Building custom images using Dockerfile and pushing to the Docker hub.
- ✔ Practical session on Dockers containers.

MODULE 3: COE(Container Orchestration Engine) (1 Hour)

- ✔ What is COE(Container Orchestration Engine)
- ✔ Introduction of Difference COE in the Market
- ✔ What is Kubernetes
- ✔ Why Kubernetes
- ✔ Docker Swarm and Kubernetes
- ✔ K8S Growth trends in current Market
- ✔ How K8S works
- ✔ Features of Kubernetes

Module 4: – Installation, Configuration & Validation (3 Hours)

- ✔ Kubernetes Architecture
- ✔ What is Kubernetes Cluster
- ✔ Understand Kubernetes concepts
- ✔ Components of Kubernetes Master
- ✔ Master Components
  - kube-APIserver
  - etcd
  - kube-scheduler
  - kube-controller-manager
- ✔ Introduction to Node Components
- ✔ Node Components
  - kubelet
  - kube-proxy
  - Container runtime
- ✔ How to Install Kubernetes using Kubeadm
- ✔ Installing & Configuring Kubernetes locally via Minikube
- ✔ Creating Kubernetes Cluster in Azure Cloud

Module 5: POD (2 Hour)

- ✔ What Is POD
- ✔ POD Deployment
- ✔ Inter – POD and Intra POD communication
- ✔ POD Life Cycle (Pending, Running, Success, Failed, Crashbackloopoff)
- ✔ How to Write POD Manifest File
- ✔ How to Create a POD using kubectl command
- ✔ How to interact with POD

- ✔ What are common commands in POD.
- ✔ What is Labels and Selectors
- ✔ Troubleshooting POD Issues
- ✔ Practical sessions of POD commands

Module 6: Deployment – Application Lifecycle Management (3 Hours)

- ✔ What is deployment in Kubernetes
- ✔ Creating a Deployment using YAML Script
- ✔ How to Update the Deployment
- ✔ Rolling Back a Deployment
- ✔ Checking Rollout History of a Deployment
- ✔ Rolling Back to a Previous Revision
- ✔ Scaling a Deployment
- ✔ Pausing and Resuming a Deployment
- ✔ Deployment status
- ✔ Reasons for Failed deployment.
- ✔ Hands on session

Module 7: ReplicaSet (2 Hours)

- ✔ What is Replica set
- ✔ How Replica set works
- ✔ In which scenario we need to implement this Replica set
- ✔ Writing a Replica Set manifest file
- ✔ How delete a ReplicaSet and its Pods
- ✔ How to scale a ReplicaSet
- ✔ Hands on session on Replica set configuration.

Module 8: Services (2 Hours)

- ✔ What is service in the Kubernetes
- ✔ Creating a Service
- ✔ Types of Services
- ✔ ClusterIP
- ✔ Nodeport
- ✔ Load Balancer
- ✔ External
- ✔ Using Service to expose App
- ✔ Delete the services created
- ✔ Hands on session on Services configurations.

Module 9: Storage in Kubernetes (2 Hours)

- ✔ What is Volumes
- ✔ Why we need Volumes
- ✔ What is Durable and Ephemeral Volumes
- ✔ What are the storage types Kubernetes Supports
- ✔ What are storage Requirements.
- ✔ What is Persistent Volumes (PV)
- ✔ What is Persistent Volume Claim (PVC)
- ✔ What is difference between PV and PVC.
- ✔ What is Host Path Volume
- ✔ What is EmptyDir Volume
- ✔ Practical session on volumes

Module 10: Environment variables in Kubernetes (1 Hour)

- ✔ Configmaps
- ✔ Secret's
- ✔ Plain Key

Module 11: Namespace in Kubernetes (1 Hour)

- ✔ What is Namespace
- ✔ What is use of Namespace in Kubernetes.
- ✔ How to create a Namespace
- ✔ How to Create a Namespace
- ✔ How to add a POD in New Namespace

Module 12: Scheduling in Kubernetes (2 Hours)

- ✔ Manual Scheduling
- ✔ Taint and Tolerations
- ✔ Node Selector
- ✔ Node Affinity

Module 13: Logging and Monitoring (2 Hours)

- ✔ Understand how to Monitor all Cluster Components
- ✔ Understand how to Monitor Applications
- ✔ Monitor Cluster Components
- ✔ Logs Manage Application Logs

Module 14: Security in Kubernetes (2 Hours)

- ✔ Kubernetes Authentication
- ✔ Managing Users in Kubernetes Service Account
- ✔ Managing Roles and Role Binding
- ✔ Managing Cluster Role and Cluster Role Binding
- ✔ Security Context

Module 15: Networking in Kubernetes(3 Hours)

- ✔ Kubernetes Networking
- ✔ Understand CNI
- ✔ Understand Pod Networking Concepts
- ✔ Configure DNS Configure and Manage Ingress Rule

Module 16: Cluster Maintenance (2 Hours)

- ✔ OS Upgrade
- ✔ Upgrade Cluster Version
- ✔ Static Pod
- ✔ ETCD Backup

Module 17: Troubleshooting (3 Hours)

- ✔ Troubleshoot ETCD Failure
- ✔ Troubleshoot worker Node Failure
- ✔ Troubleshoot Control pane Failure

Module 18 : Mock Exam in Kubernetes (1 Hour)

- ✔ Mock Exam -1
- ✔ Mock Exam – 2