

# Advanced Docker Concepts and Container Orchestration

**Duration:** 5 Days

**Skill Level:** Beginners on container technology

**Hands-On Format:** This hands-on class is approximately 80/20 lab to lecture ratio, combining engaging lecture, demos, group activities and discussions with comprehensive machine-based practical programming labs and project work.

## **Module 1 - Installation of Docker**

Introduction to Docker  
Docker Architecture  
Docker Components: Docker Client, Docker Host and Docker Registry  
Installation of Docker

## **Module 2 – Docker Client Operations**

Running a Container  
Container Lifecycle  
Managing Containers  
Executing Commands in Running Containers

## **Module 3 – Building Custom Images and Docker Registry**

Creating Docker Images using Docker Commit  
Building a Dockerfile  
Tagging an Image  
Pull and Push Images  
Creating Private Registries

## **Module 4 – Container Deep Dive**

Cgroups  
Namespaces  
Container Resource Limits

## **Module 5 – Storage & Container Networking**

Storage Overview  
Creating and Managing Volumes  
Using Bind Mounts  
Using tmpfs  
Overview of Container Networking  
Managing Network Bridges

## **Module 6 – Docker Compose**

Understand YAML  
Create Docker Compose Files  
Deploying and configuring applications  
Build Images

### **Module 7 – Docker Swarm**

- Container Orchestration
- Creating Swarm Cluster
- Manage Nodes in Swarm Node Cluster
- Manage Services
- Secrets
- Rolling Service Updates
- Monitoring
- Scaling

### **Module 8 – Core Concepts of Kubernetes**

- Understand the Kubernetes Cluster Architecture
- Master/Node
- Kubectl
- Kubelet
- Kube-Proxy
- Etc
- Controllers

### **Module 9 – Installation of Kubernetes Cluster**

- Design a Kubernetes Cluster
- Install Kubernetes masters and nodes, including the use of TLS Bootstrapping
- Configure Network Solution
- Analyse end-to-end test results

### **Module 10 – Using Kubernetes Features**

- Kubectl
- Understand YAML
- Creating and Managing Pods
- Managing Labels
- Managing Services
- Managing Replica Set & Replication Controller
- Resource Quota

### **Module 11 – Networking in Kubernetes**

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

### **Module 12 – Security in Kubernetes**

- Managing RBAC
- Security Context
- Secrets
- Work with Image Securely
- Configure Network Policies