**Course Outline:**

1. Docker Overview
   1. What is Docker
   2. Datacenter evolution (Monolithic to containers)
   3. Container concepts
   4. Docker platform
   5. Container start/stop signals
2. Container deep dive
   1. Cgroups
   2. Namespaces
   3. Container resources limits
3. Interact with Docker Engine
   1. Docker commands
   2. Docker Hub
   3. Run a container
4. Docker monitoring
   1. Native monitoring tools
      1. Docker ps
      2. Docker logs
      3. Docker top
      4. Docker stats
      5. Docker inspect
   2. 3rd party tools
      1. Portainer
      2. cAdvisor
5. Docker images
   1. Anatomy of a Docker image
   2. Docker storage driver
   3. Manually build a Docker image
   4. Dockerfiles
   5. Automate build of Docker images
6. Advanced Docker builds
   1. Optimizations
   2. Dockerfiles
   3. Images
   4. Best practices
7. Docker Compose
   1. Overview
   2. Use-cases
   3. Compose syntax
   4. Compose CLI
8. Docker security
   1. Host security
   2. Base image security
   3. Storing secrets
   4. Signed images

**Kubernetes:**

1. Kubernetes: Containers at Scale
   1. Story of Kubernetes
   2. Kubernetes at Google
2. Use-Cases
   1. Cloud-Native Applications
   2. Elastic Services
   3. CI/CD Pipeline Integration
   4. CI in Production at Scale
      1. Case Study (Yahoo Japan)
   5. Platform as a Service
3. Architecture
   1. Cluster Architecture
   2. Master Components
   3. Node Components
   4. Cluster Deployment Options
4. Workload Introduction
   1. Pods
   2. Application Pattern Controllers
   3. ReplicaSets
   4. Services
5. Pod Deep Dive
   1. What is a Pod?
   2. Pod Features
   3. Pod Manifest Syntax
   4. Pod Command-Line Management
6. Pod Scheduling
   1. Overview
   2. Node Labels
7. Advanced Pod Scheduling
   1. Pod Placement
   2. Taints
   3. Custom Schedulers
8. Managing Deployment State
   1. StatefulSets
   2. Features
   3. Running Stateful applications on Kubernetes
   4. Use-Cases
9. Network Models
   1. Network Design
   2. Same Pod Communication
   3. Abstraction Through Services
   4. Network Addons
   5. Detailed Packet Flow
10. Services
    1. Design Goals
    2. Service Manifest Syntax
    3. Different Types of Services
    4. Label Selectors
    5. Command-Line Management
    6. Service Discovery
       1. DNS
       2. Environment Variables
    7. Advanced Options
       1. Mapping to a string
       2. Services without Selectors
11. Deployments
    1. Overview
    2. Stateful Application Schemes
    3. ReplicaSet Controller
    4. Deployment Manifest Syntax
    5. Command-Line Management
12. Scaling Deployments
    1. Microservices
    2. Pod Scaling
       1. Manual
       2. Autoscaling
       3. Horizontal Pod Autoscaler (HPA)
    3. Cluster scaling
13. Deployment Strategies
    1. Recreate
    2. RollingUpdate
    3. Canary
    4. Blue/Green
14. Health Checks
    1. Liveness Probe
    2. Readiness Probe
    3. Implementing Health Checks
15. Persistent Volumes
    1. Types of Storage
    2. Volumes
    3. Claims
16. API and Security
    1. Authorization Flow
    2. Authentication
    3. External Identity Provider
    4. Admission Controllers
17. ConfigMap
    1. Overview
    2. Manifest Syntax
    3. Using ConfigMap values
    4. ConfigMap Restrictions
18. Secrets
    1. Overview
    2. Manifest Syntax
    3. Using Secret Values
19. Role Based Access Controls
    1. Roles
    2. ClusterRole
    3. RoleBinding
    4. Manifest Syntax
20. Monitoring
    1. Overview
    2. Challenges
    3. Internal Services
    4. Prometheus
    5. Grafana
21. Container Orchestration
    1. Init-containers
       1. Overview
       2. Syntax
       3. Use-Cases
22. Helm & Tiller
    1. Installation
    2. Features
    3. Architecture
    4. Charts
    5. Chart Templates
    6. Security