Introduction:

This course provides a comprehensive and practical introduction to Kubernetes, the leading container orchestration platform. Through a structured and modular approach, participants will gain a deep understanding of Kubernetes architecture, core components, networking, storage, security, observability, and operations. The course includes real-world deployment patterns, debugging techniques, and advanced capabilities such as CRDs, operators, and multi-tenant clusters, preparing learners to manage Kubernetes in production environments with confidence.

You must know!

Hours:
40 academic hours

Our lecturers:
INT College has a faculty of instructors and training experts, leading in their fields, with extensive practical experience in applying and teaching the subjects in the hi-tech industry in Israel and worldwide.

Eligibility for INT College's Certificate:
An INT College certificate will be awarded to graduates who meet the course's regulations, submit all exercises and assignments, and attend at least 85% of the lessons.

Course Objectives
By the end of this course, participants will be able to:

- Understand the fundamentals of container orchestration and Kubernetes architecture
- Work with key Kubernetes objects including Pods, Deployments, Services, and Ingress
- Manage configuration, storage, and secrets in Kubernetes environments
- Implement network policies, authentication, and RBAC for secure access control
- Monitor and debug workloads using native Kubernetes tools
- Operate clusters with high availability, upgrades, and disaster recovery

- Extend Kubernetes functionality with CRDs, operators, and APIs
- Evaluate and deploy Kubernetes platforms in real-world scenarios

Target Audience:

This course is ideal for DevOps engineers, system administrators, platform engineers, cloud architects, and backend developers seeking to deploy, manage, and scale applications using Kubernetes.

Prerequisites:

Participants should have basic experience with containers (e.g., Docker), command-line tools, and general system administration. Familiarity with YAML, Linux, and networking concepts is recommended.

Course Topics:

Containers & Orchestration

- Why containers exist
- chroot & cgroups
- Container security limits
- Orchestration problem

Kubernetes Mental Model

- Declarative vs imperative
- Desired state & reconciliation loops
- Controllers and control loops
- Ownership & garbage collection
- Labels & selectors

Kubernetes Core

- Why Kubernetes won
- Control plane overview
- etcd
- Worker nodes
- API server

Objects & Networking

- Namespaces
- YAML basics
- Pods
- Deployments
- Services
- Ingress controllers

Config, Storage & Ops

- ConfigMaps
- Secrets
- PVCs & volumes
- Deployment strategies
- Rollbacks
- Helm basics
- Debugging workloads

Networking Internals

- Kubernetes networking model
- CNI overview
- kube-proxy & service routing
- ClusterIP vs NodePort vs LoadBalancer
- DNS & service discovery

Security & Access Control

- Authentication in Kubernetes
- Authorization & RBAC
- Service accounts
- Pod security context
- Network policies

Storage Deep Dive

- Storage classes
- Dynamic provisioning
- Stateful workloads
- Backup strategies

Observability & Debugging

- Metrics in Kubernetes
- Logging patterns
- Events & auditing
- Debugging crash loops
- Debugging networking issues

Cluster Ops

- Upgrading clusters
- Node maintenance & draining
- High availability control plane
- Disaster recovery

Advanced Topics

- Custom Resource Definitions (CRDs)
- Operators
- Admission controllers
- Extending Kubernetes API

Kubernetes Platforms

- Kubernetes as a Service (EKS/GKE/AKS)
- Self-managed clusters
- Tradeoffs & decision criteria

Real-World K8s

- Common Kubernetes failure patterns

- Multi-tenant clusters
- Production reference architectures

The college reserves the right to make changes to the curriculum, course duration, teaching staff, and other related aspects at its sole discretion. Any information provided in the college's informational materials shall not be considered binding or constitute any form of commitment by the college.

תל אביב

המרץ 2