Infrastructure as Code

Introduction:

This course provides a comprehensive, hands-on overview of Infrastructure as Code (IaC) principles and tools, focusing on real-world usage of Terraform and Ansible. Participants will learn foundational concepts, IaC best practices, security considerations, automation strategies, and advanced deployment patterns. Through a modular and tool-specific approach, learners will gain practical skills to define, manage, and scale infrastructure in modern cloud-native environments.

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 principles behind Infrastructure as Code and its benefits
- Use Terraform to define, deploy, and manage infrastructure across environments
- Apply Terraform internals like backends, reconciliation, and module design
- Secure secrets and state in Terraform with best practices and tools
- Validate and test infrastructure changes with policy and automation
- Implement configuration management using Ansible and Ansible Vault
- Automate infrastructure workflows with CI/CD pipelines
- Combine Terraform and Ansible in real-world IaC deployments

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Target Audience:

DevOps engineers, cloud engineers, SREs, and infrastructure architects who manage cloud environments and want to improve automation, consistency, and scalability using Infrastructure as Code tools.

Prerequisites:

Basic knowledge of cloud computing (e.g., AWS), Linux command-line, and familiarity with YAML and scripting concepts. No prior experience with Terraform or Ansible is required.

Course Topics:

IaC Fundamentals & Principles

- Why IaC exists
- Provision vs configuration vs deployment
- Declarative vs imperative infrastructure
- Idempotency & convergence
- Infrastructure drift
- Mutable vs immutable infrastructure
- IaC failure patterns

Terraform

- Terraform mental model
- Providers & resources
- State & backends
- Variables
- Modules
- Secrets handling

Terraform Internals

- Terraform workflow (init/plan/apply)
- Resource graph & dependency resolution
- State locking
- Remote state backends (S3, DynamoDB)

- State drift & reconciliation
- Importing existing resources

Terraform Environments

- Workspaces
- Environment isolation strategies
- Reusable module design
- Versioning Terraform modules
- Terraform registry usage

Terraform Security

- Provider authentication methods
- Managing secrets securely
- Sensitive values & state encryption
- Vault integration

Terraform Quality

- terraform fmt & validate
- terraform plan review practices
- Policy as Code (OPA / Sentinel overview)
- Terraform testing strategies

Ansible

- Configuration management concepts
- Inventory
- Playbooks
- Roles
- Variables
- SSH & Python requirements
- Ansible.cfg
- Vault

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Ansible Internals

- How Ansible executes tasks
- Push vs pull configuration
- Inventory execution flow
- Handlers & notifications
- Facts & fact gathering

Advanced Ansible

- Dynamic inventory
- Roles best practices
- Variable precedence
- Templating with Jinja2
- Performance & parallelism

IaC Automation

- Running Terraform in CI/CD
- Change review & approvals
- Drift detection in pipelines
- Rollbacks & safe recovery

Real-World IaC

- Multi-account AWS with Terraform
- Terraform + Ansible together
- Bootstrapping new environments
- Common IaC disasters

Infrastructure as Code

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.

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