# Infrastructure Automation With OpenTofu

**Duration: 4 days (8hrs/day)**

**Prerequisites:** Basic knowledge of Cloud.

**Course Objective:** This Infrastructure Automation with OpenTofu course is designed for absolute beginners to experts looking to learn OpenTofu. It introduces the basic fundamental blocks needed to get started with OpenTofu. The course begins with an introduction to OpenTofu, explaining how it differs from OpenTofu, followed by real time OpenTofu setup, OpenTofu Configuration Language, Providers, Resources and OpenTofu Workflow. This course also covers the core critical concepts such as Input variables, Output block, Provisioners and Datasources, Modules, Backends, State File management followed by other topics like workspaces, Graphs, Taints, Dependencies and much more. We will also learn how existing OpenTofu code can be migrated to the OpenTofu ecosystem with ease. Don't worry if you are new to OpenTofu, we are going to get started with the absolute basics..

**Cloud Platform:** Azure/AWS

**Lab Requirement:** Participant Azure/AWS Trial Account Required

## Module 1 - Getting Started & Setting Up Labs

Introduction to Infrastructure as Code and OpenTofu

**Lab:** Installation of OpenTofu

Comparison between OpenTofu and Terraform

Introduction to Azure/AWS CLI

Understanding OpenTofu Providers

Authenticate Azure/AWS with OpenTofu

**Lab:** Setting Up OpenTofu on Windows and Azure Authentication

Basic OpenTofu commands: init, plan, apply

**Lab:** Defining Provider & Using Basic OpenTofu commands

## Module 2 – Building Cloud Infrastructure with OpenTofu

**Lab:** Creating Resources in Azure/AWS

**Lab:** Provisioning Virtual Networks, Subnets, Public IPs, and Network Interfaces

**Lab:** Deploying Windows and Linux VMs

**Lab:** Configuring Storage, Security Groups and Load Balancers

Understanding OpenTofu State file

Understanding Working of State file – Desired State & Current State

OpenTofu Provider Versioning

**Lab:** Methods to define OpenTofu Provider Versions

## Module 3 - Read, Generate, Modify Configurations

Understanding Attributes and Output Values in OpenTofu

**Lab:** Handling OpenTofu attributes and output values

**Lab:** Referencing attributes across resources

Understanding OpenTofu Variables and Data Types – (String, Number, Boolean, List, Map)

**Lab:** Methods to Define Variables & Variable Arguments

**Lab:** Fetching Data from List & Map in Variables

Understanding Meta-Arguments – (for_each & count)

**Lab:** Using Meta-Arguments

Understanding conditional expression and locals

**Lab:** Using Conditional expression and Locals

Understanding Expressions – for & Splat expression

**Lab:** Using for and Splat expression

Understanding Data Sources & Dynamic Blocks

**Lab:** Using Data Sources

**Lab:** Using Dynamic Blocks

**Lab:** Exploring debugging techniques in OpenTofu

OpenTofu Commands – validate, fmt

**Lab:** Using OpenTofu validate and OpenTofu fmt

**Lab:** Replacing Resource in OpenTofu manually – taint and replace

**Lab:** Using OpenTofu Graph utility

**Lab:** Saving OpenTofu Plan to a file and apply from plan file

## Module 4 - OpenTofu Provisioners

Understanding provisioners in OpenTofu

Understanding Connection Block

Types of provisioners

**Lab:** Implementing file, remote-exec and local-exec provisioners

## Module 5 - OpenTofu Modules & Workspaces

Applying the DRY (Don't Repeat Yourself) principle

Understanding Usage of OpenTofu Modules

Standard Structure of OpenTofu Modules

**Lab:** Creating and Using local Modules

**Lab:** Utilizing Modules from OpenTofu Registry

Understanding and implementing OpenTofu workspaces

**Lab:** Working with OpenTofu Workspaces

## Module 6 - Remote State Management

Integrating OpenTofu with Git for team collaboration

Understanding Basic Working of Git

**Lab:** Handling Git commands (initialize, commit, push, tagging, branching)

Challenges and security considerations in OpenTofu state

**Lab:** Remote state management with OpenTofu, including importing existing resourcesOpenTofu

State Backend Configuration

**Lab:** Putting OpenTofu state file on Azure Blob Container