DevOps Course Content

Module 1. Lab Setup (Tools Installation and Configuration)
- Git Bash installation and Git hub account setup
- Java installation and Configuration
- Tomcat installation and Configuration
- Jfrog Artifactory/Nexus installation and Configuration
- Maven Installation and Configuration
- Jenkins installation and Configuration
- Ansible Installation and Configuration
- SonarQube installation and Configuration
- Docker Installation and configuration
- Environmental variable setup

Module 2. Introduction to DevOps
- What is DevOps
- SDLC, ITIL and Agile Model
- Why DevOps
- DevOps Goals
- What is Configuration Management
- Continuous Integration and Deployment

Module 3. Linux Administration
- Introduction to Linux Families (ex: Red hat & Debian Family)
- Working with Package Manager (YUM,APT,RPM,Deb)
- Working with text editor command
- Installation and package selection with Package manager
- Introduction to Bash Shell
- Writing few bash shell script to automate daily work
- Shutting down and rebooting the system
- Understanding different types of groups and creation of groups
- Creation of users in different groups

- Understanding Passwd, Shadow Files
- Working with Crontab
- Working with commands tar,find,grep, etc
- Understanding the different types of run-levels
- Understanding different types of shutdown commands

Module 4. Version Control System Git and Github
- Introduction to Git
- Installation of Git Client
- Creating Git Repository
- Git Branching strategy
- Working with Tags stash
- Creating and Merging Branches
- Understanding Git merge conflicts and how to avoid those
- Working with GitHub Workflow
- Create workflow file to trigger GitHub action (Amazon RDS)
- Working with GitHub Secrets
- integrate Terraform with GitHub action
- integrate Ansible with GitHub action

Module 5. Maven
- Understanding the Maven Build tools
- Maven Objective and Environment setup
- Understanding POM and Super POM
- Maven Build life cycle
- Creating Maven Project
- Maven Dependencies and Plugins
- Maven Build automation with CI service
- Understanding Maven Snapshots and Version
- Maven Web application creation with pom.xml
- Understanding Maven Repository
- Working with Local Repo
- Working with Central Repo

Module 6. Continuous Integration and Contentious Deployment – Jenkins
- Introduction to Jenkins-CI/CD
- Installation and Configuration of Jenkins
- Run Jenkins using Tomcat Web Application
- Creating Jenkins as a Linux Systemctl Service
- Configure Jenkins and User Management

- Securing Jenkins
- Create New Jenkins User
- Run Jenkins with Jenkins user
- How to run Jenkins with a different user
- Generate ssh key for Jenkins user
- Jenkins Plugin management
- Create Jenkins Job (Freestyle, Maven)
- Create Jenkins pipeline
- Jenkins parameterized jobs setup (choice params,boolean params etc.)
- Setting up Email Notification on Jenkins
- Parallel Job Configuration
- Jenkins Slave configuration
- Jenkins Integration with Git, Maven, Artifactory/Nexus, SonarQube, Ansible, etc.

Module 7. Configuration Management – Ansible
- Introduction to Ansible
- Overview of Ansible Components
- Ansible Requirements Specification
- Installation and setup Ansible Environment
- Understanding Ansible Play and Playbook
- Working with Ansible Ad-hoc command
- Understanding Ansible Task(s)
- Directory Structure of Ansible Module
- Working with Ansible Module
- Working with Variables
- Working with Facts
- Working with Jinja2 Templates
- Understanding how Ansible Handlers Work

Module 8. Infrastructure as Code – Terraform
- Introduction to terraform
- IaC vs Configuration Management CI/CD Concepts
- Understanding Infrastructure Automation
- Install Terraform
- Terraform Directory Structure
- Understand Providers
- Understand Resources
- Create your First Project & Understand Terraform Lifecycle
- Exploring Terraform Registry
- Terraform Variables
- Introduction to Terraform Modules
- Create First Basic Module
- Invoking the module from main.tf

- Using git repositories to save modules
- Understand Remote state
- Working with Remote state
- Understand Data Source
- Working with Data Sources Projects

Module 9. Containerization – Docker
- Introduction to Docker
- Understanding Virtualization
- Understanding Namespaces,Cgroups and OverlayFS
- Docker Installation
- Introduction to Docker Images
- Introduction to Docker File
- Building a Docker Image with a Docker file
- Sharing Data in Your Docker Host with Containers
- Sharing Data Between Containers
- Copying Data to and from Containers
- Introduction to Docker hub
- Creating Docker Hub Account
- Pull and Push Images From/To Docker Hub
- Introduction to Docker Networking
- Working with Container IP address
- Understanding Docker Bridge Network
- Setting up a Custom Bridge Network
- Port Mapping to access docker application
- Life cycle of Docker Container
- Inspecting Docker Containerization
- Limiting CPU and Memory to Docker container
- Introduction to Docker compose
- Create and Execute Docker compose file

Module 10. Container Orchestration – Kubernetes
- Introduction to Kubernetes
- Why Container Orchestration
- Kubernetes Architecture
- Components of Kubernetes
- Setting Up Kubernetes Environment
- Working with Namespaces
- Introduction to pod
- Working with Pod spec
- Create a pod and login into it
- Working with Volume
- Attaching a Volume to a pod

- Write pod spec to launch multi containers pod
- Working with Replica Sets and Deployments
- Working with Kubernetes Secrets
- Working with Service Discovery and Load Balancing
- Working with Configmaps, Storage, Network, RBAC
- Working with Stateful sets, Crons and Jobs
- Setting up Weave CNI
- Launching Kubernetes Dashboard
- Setting up a Kubernetes Visualizer
- Understanding Kubernetes network policy

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