A Microsyllabus on:

"Mastering in DevOps"

- DevOps - Micro Checklist
- **Duration:** ~3 Months
- **Class Days:** Weekdays (SUN-FRI)
- **Daily Time:** 1 Hour

Class Start Date: _____

Trainer:_____

Module 1: DevOps Introduction

- ☐ Day 1: Why Learn DevOps? What is DevOps?
    Software development life cycle
    Models of SDLC
- ☐ Day 2: DevOps lifecycle and tools
    What is CI/CD?
- ☐ Day 3: What is Virtualization?VirtualBox, different features in Virtualbox
    VMSetup with Linux OS(UbuntuOS/RHEL OS)
- ☐ **Review on assignments & Discussions**

Module 2: Linux For DevOps

- ☐ Day 4: History of Linux, Linux Filesystem hierarchy
- ☐ Day 5: Linux login types, remote Login Using SSH
    Fundamental Linux Commands date, df, touch, mkdir, cp, ls, etc
- ☐ Day 6: Text editors VIM, NANO, GEDIT
- ☐ Day 7: Contents extraction and filtering with GREP, SED, CUT, AWK
- ☐ Day 8: Package management in Linux
- ☐ Day 9: Managing Users And Groups
- ☐ Day 10: Managing ownership and permission on a File/Directory
- ☐ Day 11, Day 12: Scheduling a Task
    Viewing Logs
    Configuring Network
    Managing Services, creating service
    Process monitoring
- ☐ Day 13, Day 14: Managing Firewall
    Creating a Bash / Shell Script,
    variables, command   substitution,
    conditional statements, loop.
- ☐ Day 15: Compress and Archive (tar, gzip, zip, unzip)
    Downloading Files From FTP/HTTP Server Using wget and curl
    Storage management with LVM

☐ **Review on assignments & Discussions**

Module 3: VM Automation through Vagrant
☐ Day 16: What is Vagrant? Importance of Vagrant. Setup Vagrant with Virtualbox, Docker
☐ Day 17: Writing Vagrantfile, different features in Vagrant.
☐ Day 18: Provisioning Servers and configurations with Vagrant/ file
☐ **Review on assignments & Discussions**

Module 4: Web Server deployment
☐ Day 19, Day 20: Apache/Nginx, MySQL, PHP deployment and configuration
Deploying and hosting application in Wordpress
Web Server Basic Security
☐ **Day 21: Review on assignments & Discussions & Presentations**

Module 5: Git- Version Control System
☐ Day 22: What is Git? Types of VCS, What is GitHub? Creating an account on Github, Explore different features in Github, Configuring Git to Submit Commit Information
☐ Day 23: Creating a Local Git Repository
Link the local Git Repository with Remote Github Repository
Pull Codes from GitHub Repository to Local Repository
Cloning a Remote Repository
Making Changes in the Working Directory
Registering the Changes into Staging Area and Local Repository
☐ Day 24: Push Commits in the Local Repository to Remote (Github) Repository, Git workflow and branching strategy, Git merge, resolving merge conflicts, Git rebase, resolving rebase conflicts
☐ Day 25: Git squash, Git tagging, Git cherry pick, Developer's Collaboration in Github.
☐ **Day 26: Review on assignments & Discussions & Presentations**

Module 6: Docker - The Containerization Platform

☐ Day 27: What is Docker & What is Container

        Containers Vs Virtual Machine

        Benefits of Using Containers, different container runtimes.

        Docker, installation and configuration

☐ Day 28, Day 29: Typical Docker Operations/ commands (Search Image, Download Image, List Image, Create Container from Image, Expose an Application on a Port, Run a Container, Start/Stop a Container, Remove a Container & Image, etc)

☐ Day 30, Day 31: What is Docker image? Creating docker image with Dockerfile. Different instructions in Dockerfiles, General guidelines, best practices and Security best practices in writing Dockerfile and building images. Container networking and types of container networking, Docker volume and persistent storage.

☐ Day 32, Day 33: Docker registry, exploring Docker Hub, Setting up custom registry with docker registry and Harbor registry,integrating with security scanner.

☐ Day 34: Docker compose, provisioning Containerized Services

☐ Day 35: Deploy an Application on Docker Container Using CI/CD Pipeline

☐ Day 36, Day 37: Docker Swarm and container orchestration

☐ **Day 38: Review on assignments & Discussions & Class Presentations**

Module 7: Continuous Integration and Continuous Deployment

☐ Day 39: What is Jenkins

        Jenkins Architecture: Master & Slave

        Installing Jenkins servers

☐ Day 40, Day 41: Exploring Jenkins and administration, different types of jobs and configuration. Configuring Jenkins Server [JA V A_HOME, M2_HOME, Git, NodeJS, Docker], Testing Jenkins Setup

☐ Day 42: Installing Required Plugins [Github Integration, Deploy to Container], Adding Slave Node in Jenkins, Managing Users in Jenkins, Managing Roles in Jenkins

☐ Day 43: Pipeline as the Code(Jenkinsfile)

☐ Day 44, Day 45: Create and Automate CI/CD Pipeline to Deploy Java-Based Web Application on Tomcat Server.

- Jenkins and Docker for CI/CD.
- Create and Automate CI/CD Pipeline to Deploy PHP-Based Application on Apache HTTPD & Nginx Web Servers.
- Create and Automate CI/CD Pipeline to Deploy Python-Based Application on Apache HTTPD & Nginx Web Server.

☐ **Review on assignments & Discussions & class presentations**

Module 8: Ansible - Configuration management

☐ Day 46: What is Ansible? Ansible Architecture

Installing Ansible, features and limitations.

Setting up lab environment for Ansible

☐ Day 47: Project setup inventory, configurations, variables.

Ansible ad-hoc commands

☐ Day 48, Day 49: YAML Basics, Writing Ansible Playbook, ansible modules, decision making, handlers

☐ Day 50: Writing Ansible roles

☐ Day 51: Server configuration through Ansible.

☐ **Review on assignments & Discussions**

Module 9: Kubernetes - Scaling and Managing Containerized Applications

☐ Day 52: Basics of Kubernetes container orchestration

Differences between Docker Swarm and Kubernetes

Kubernetes Architecture

☐ Day 53: Minikube for practicing K8s

Kubernetes cluster setup using Kubeadm and Kubectl

☐ Day 54: Creating Pods using YAML

Replication Controller, ReplicaSet

☐ Day 55: Selectors & Labels in Kubernetes, Deployments & Rolling Updates

☐ Day 56, Day 57: Services in Kubernetes, Namespace, configmap, Working with Jobs, Scheduling the applications on the container

☐ Day 57: Storage

☐ Day 58: EKS setup and app deployment

☐ **Review on assignments & Discussions**

Module 10: Continuous Testing
☐ Day 59: Overview of Continuous Testing
      Software Testing Life cycle
      Different Types of Testing
      Test -Driven Development Approach
☐ Day 60 & Day 61: Testing Web Applications using Selenium
      SonarQube Server setup and administration
      SonarQube Code Analysis, integration with Jenkins
      SonarLint Analysis, integration with Jenkins
☐ Day 62: Github Actions for Code Scanning
☐ **Review on assignments & Discussions**

Module 11: Software Artifactory
☐ Day 63: What is software Artifactory?
      Different types of Artifactory tools
      Setting up Sonar Type Nexus
☐ Day 64: Integrating with Jenkins CI
☐ **Review on assignments & Discussions**

Module 12: AWS Cloud - Cloud DevOps
☐ Day 65: Virtualization Vs Cloud
      What is Cloud Computing?
      Features of Cloud Computing
      Types of Cloud Computing
      Benefits and Risks of Cloud
      Why DevOps on Cloud?
☐ Day 66: AWS infrastructure, different services in AWS
      Setting up AWS account (Web & CLI)
☐ Day 67: IAM(user, group, roles and writing policy documents), EC2, Launching EC2 instance, Types of EC2 instances, Security group, VPC
☐ Day 68: Launch template, Target groups, Auto scaling group, Different types of Load Balancer.

☐ Day 69: S3 bucket, versioning and lifecycle, policy, Static web hosting in S3
   Monitoring with Cloudwatch
☐ Day 70: ECR, ECS, EKS, deploying applications in EKS
☐ Day 71: AWS developer tools(AWS code commit, code build, code deploy, and codepipeline)
☐ **Review on assignments & Discussions & class presentation**

Module 13: Infrastructure as the Code
☐ Day 72: Terraform vs Cloudformation vs OpenTofu
   Installing Terraform
☐ Day 73: Writing terraform configuration language
   Providers in terraform, Variables
☐ Day 74: Provisioners remote, inline and local executions
   Backend in terraform, modules
☐ Day 75 & Day 76: Terraform cloud, registry
   Infrastructure provisioning in AWS with Terraform
☐ Day 77: What is OpenTofu? Setting up and working with Opentofu.
☐ **Review on assignments & Discussions & class presentation**

Module 14: Monitoring and data visualization
☐ Day 78: Prometheus for monitoring,
   Overview of alternative tools
   Promtheus architecture
   Setting up promtheus server
   Configuring agent
☐ Day 79: TLS and authentication
   Monitoring containerized app
   Alertmanager
   Grafana overview, architecture
☐ Day 80: Setting up Grafana for data visualization
   Configuring dashboards
☐ **Review on assignments & Discussions & class presentation**

Final Days: Wrapping up

☐ Day 81 & Day 82: **Future of DevOps**

AI, ML and Prompt Engineering in DevOps

Projects internal discussions and completion

Project & Career Guidance

☐ **Final Project:** End-to-End DevOps pipeline for sample project
☐ **Hands-on:** All the studied tools and technologies
☐ **Resume Building & Career Guidance**
☐ **Interview Preparation**
☐ **Final Presentation & Certification**

Coach/Trainer/Mentor Information:

Name: _____

Date: _____

TechAxis Authority:

Name: _____

Date: _____

Remarks: