

Linux For DevOps + Docker + Kubernetes

Class No	Module Details	Duration
Module 01: Introduction to Linux Operating System		
01	<ul style="list-style-type: none">• What is Linux ?• History of Linux• Distributions of Linux• Architecture of Linux• Basic Components of Operating Systems• Linux Boot Sequences	02 Hours
Module 02: Linux Installation and Configuration		
02	<ul style="list-style-type: none">• Install VirtualBox and create a VM instance• Install a Linux operating system• Configure network interfaces and IPv4 address settings• Update packages and change the hostname• Edit the /etc/hosts file for local DNS• Understand Linux runlevels• Learn the Linux file system hierarchy• Lab 01:	02 Hours
Module 03: Working with Command Line Interface		
03	<ul style="list-style-type: none">• Introduce basic commands (ls, cp, mkdir, cd, mv, rm, touch, echo, less, head, tail).• List of Linux shells.• Text editors and file compression and archival tools.• Search for files and patterns for system troubleshooting.• Important system performance and process monitoring commands.• Lab 02:	02 Hours
Module 04: User, Group and Password Management		
04	<ul style="list-style-type: none">• Create a user and group in Linux.• Add a user to the sudo group.• Change the password policy.• Explore the /etc/passwd, /etc/shadow, and /etc/group files.• Configure the SSH server for remote access.• Create SSH key pairs and configure passwordless authentication.• Edit the /etc/sudoers file.• Lab 03:	02 Hours

Module 05: File permissions, Ownership and ACL		
05	<ul style="list-style-type: none"> • Default Linux file and folder permissions. • Change file and folder permissions. • Change file and folder ownership. • Linux special permissions and the sticky bit. • Default UMASK value. • Implement ACL on a Linux system. • Lab 04: 	02 Hours
Module 06: Linux Package Management and Firewall		
06	<ul style="list-style-type: none"> • Various Linux package management tools (yum, dnf, apt, apt-get, rpm, dpkg). • Install and configure Apache web server and PHP. • Configure Apache for virtual hosting using IP-based, port-based, and name-based methods. • Install and configure SSL self-signed certificates. • Install and configure Tomcat server for Java-based applications. • Install and configure MySQL database server. • Create a user and database, and allow remote access. • Enable and disable the firewall. • Allow services through the firewall. • Lab 05: 	02 Hours
Module 07: Cron job and Bash scripting		
07	<ul style="list-style-type: none"> • Install cron job packages. • Schedule a job to execute at a specific time and date. • Explore the /etc/crontab file. • Basics of Bash scripting. • Write a Bash script to install Apache2, PHP, and Node.js packages. • Write a Bash script to take a database backup. • Lab 06: 	02 Hours
Module 08: Linux Filesystem,LVM and Networking		
08	<ul style="list-style-type: none"> • Disk partitioning and mounting the file system. • Formatting disk partitions and /etc/fstab file entry. • Mounting and unmounting filesystem commands. • Auto-mounting of the file system. • Logical Volume Manager (LVM). 	02 Hours

	<ul style="list-style-type: none"> ● Install the net-tools package and various network-related commands. ● How to monitor listening ports and services. ● IPv4 address classes. ● Static and dynamic IP settings on a Linux server. ● Lab 07: 	
Module 09: Git and Jenkins Installation & Configuration		
09	<ul style="list-style-type: none"> ● Install Git on a Linux server. ● Create a repository on a GitHub account. ● Clone a repository from GitHub. ● Push and pull a repository. ● Install and configure a Jenkins server. ● Integrate Jenkins with GitHub. ● Create a CI/CD pipeline in Jenkins. ● Lab 08: 	
Module 09: Introduction to Docker		
10	<ul style="list-style-type: none"> ● Docker overview ● Docker vs VMs ● Docker architecture ● Images, containers, Docker registry ● Installing Docker ● Running a container ● Docker commands ● Lab 01: 	02 Hours
Module 10: Container and Image management		
11	<ul style="list-style-type: none"> ● Understanding Dockerfile. ● Format of Dockerfile. ● ENTRYPOINT vs. CMD command. ● Building images. ● Tagging images with a Docker Hub account. ● Docker Hub and Docker registry. ● Push images to a Docker Hub account. ● Inspect images and containers. ● Create a Docker image from a running container. ● Lab 02: 	02 Hours
Module 11: Docker Compose and Docker Volume		
	<ul style="list-style-type: none"> ● Docker Storage Driver ● Docker Volume Types 	

12	<ul style="list-style-type: none"> ● How to use Volume with Docker container ● Install Docker Compose ● Writing docker-compose file ● Deploy application using docker-compose ● Docker-compose Commands ● Lab 03: 	02 Hours
Module 13: Docker Networking		
13	<ul style="list-style-type: none"> ● Overview of Docker Network Drivers ● Different Types of Docker Network ● Creating Custom Network ● Docker Network Commands ● Lab 04: 	02 Hours
Module 14: Docker Swarm Cluster		
14	<ul style="list-style-type: none"> ● Introduction to Container Orchestration Tools ● Initializing Docker Swarm Cluster ● Adding the master node and worker nodes in the cluster ● Leave the node from Cluster ● Administer and maintain a swarm cluster ● Maintain the quorum of managers ● Backup the swarm cluster ● Lab 05: 	02 Hours
Module 15: Docker Services and Docker Stack		
15	<ul style="list-style-type: none"> ● What is a Docker service? ● Creating a service in a swarm cluster. ● Scale up and scale down services. ● Placement constraints and rolling updates. ● Deploy an application stack using Docker stack. ● Docker Compose vs. Docker stack. ● Lab 06: 	02 Hours
Module 16: CICD Pipeline using Docker and Jenkins		
	<ul style="list-style-type: none"> ● Install and configure Jenkins plugins. ● Integrate GitHub and Docker host server with Jenkins. ● Create a pipeline and deploy the application using Docker containers. ● Lab 07: 	02 Hours
Module 17: Introduction to Kubernetes		
	<ul style="list-style-type: none"> ● What is Kubernetes? ● Docker Swarm vs Kubernetes ● Kubernetes architecture & components 	02 Hours

	<ul style="list-style-type: none"> ● Kubernetes installation and configuration ● Add Kubernetes Masters and Worker nodes ● Know where to get the Kubernetes release binaries ● Lab 01: 	
Module 18: Concepts on Kubernetes various objects		
	<ul style="list-style-type: none"> ● Pod, container, Deployments, DaemonSets, ReplicaSets ● Static Pod, labels, annotations ● Different type of Services ● Pod vs Deployment vs StatefulSets ● Namespace, ConfigMap & Secret ● Managing kubernetes object ● Imperative command and Declarative configuration files approaches ● Lab 02: 	02 Hours
Module 19: Application Lifecycle Management		
	<ul style="list-style-type: none"> ● Understand deployments ● How to perform rolling update and rollbacks ● Know various ways to configure applications ● Know how to scale applications ● Creating different type of services ● Install and configure bare metalLB load balancer ● Understand Readiness probes, Liveness probes, Startup probes ● Lab 03: 	02 Hours
Module 20: Scheduling		
	<ul style="list-style-type: none"> ● Use label selectors to schedule Pods ● Taints & Tolerations, Node affinity ● Understand how resource limits can affect Pod scheduling ● Manually schedule a pod without a scheduler ● Display scheduler events ● Lab 04: 	02 Hours
Module 21: RBAC Authorization & ServiceAccount		
	<ul style="list-style-type: none"> ● Understand API Groups in Kubernetes ● Understand ServiceAccount ● Role & Rolebinding ● ClusterRole & ClusterRoleBinding ● Create ConfigMap & Secret ● Inject configmap & secret in pods ● Lab 05: 	02 Hours
Module 22: Storage & Data Persistent		
	<ul style="list-style-type: none"> ● Understand persistent volumes and know how to create them 	02 Hours

	<ul style="list-style-type: none"> • Understand access modes for volumes • Understand persistent volume claims primitive • Understand Kubernetes storage objects • Know how to configure applications with persistent storage • NFS server configure for storage solution • Lab 06: 	
Module 23: Networking		
	<ul style="list-style-type: none"> • Understand the networking configuration on the cluster nodes • Understand Pod networking concepts • Understand Service Networking • Know how to use Ingress controllers and Ingress resources • Know how to configure and use the cluster DNS • Understand CNI • Install Nginx ingress controller • Lab 07: 	02 Hours
Module 24: Security		
	<ul style="list-style-type: none"> • Know how to secure hosts • Secure Kubernetes • Understand authentication & authorization • Manage TLS certificates for cluster components • View certificate details • Create certificate for user • Work with images securely • Define security contexts • Secure persistent key value store • Lab 08: 	02 Hours
Module 25: Cluster Maintenance		
	<ul style="list-style-type: none"> • Kubernetes Software Versions • Understand Kubernetes cluster upgrade process • Facilitate operating system upgrades • Implement backup and restore methodologies • Implement etcd backup and restore • Lab 09: 	02 Hours
Module 26: Logging and Monitoring		
	<ul style="list-style-type: none"> • Understand how to monitor all cluster components • Understand how to monitor applications • Manage cluster component logs • Manage application logs • Install and configure metric server • Install and configure Kubernetes dashboard • Lab 10: 	02 Hours

Module 27: Troubleshooting & Network Policies		
	<ul style="list-style-type: none"> • Troubleshoot application failure • Troubleshoot control plane failure • Troubleshoot worker node failure • Troubleshoot networking • Basic of network policies • Prerequisites of network policy • policyTypes: Ingress and Egress • Default policies • Know how to use Ingress & Egress policy • Lab 11: 	02 Hours
Module 28: CKA Exam Sample Questions and CICD Pipeline Demo		
	<ul style="list-style-type: none"> • CKA Exam Sample Questions & Solutions • Lab 12: Demo CICD full process in kubernetes cluster 	02 Hours
Details		
	Total Course Length	60 Hours