

## Cloud and DevOps Engineering (Level I + Level II)

(Enterprise Linux Administration + Linux Automation Using Ansible + OpenShift - Containers and Kubernetes + Cloud - AWS / Azure + Python + DevOps tools )

### INTRODUCTION

Cloud and DevOps Engineering is an industry-designed DevOps training program that will help you acquire the key skills needed to be a DevOps expert. You will be able to acquire the complete DevOps methodologies to bridge the gap between IT development (Dev) and operations (Ops) teams.

This industry-oriented course is developed by both the Technical Support division & Training division of **ipsr solutions limited**. IPSR is a **public limited IT company** with 24 years of expertise in [Software product development](#), [Training services](#), [Placement services](#) & [Digital Marketing services](#). During the past 2 decades, IPSR has trained candidates from **60+ countries** and helped **100000+ candidates** to build their IT career. Our IT services division is a pioneer in development of **Academic solution products**, incorporating cutting edge technologies like Artificial Intelligence, Data Analytics, Machine learning and Cloud Computing. Live industry experts from this IT Tech Support division contribute a major role in delivering this course. Our placement division is having **1600+ placement tie-up companies** and we are conducting [recruitment on all days](#).

The Course curriculum is designed and developed by a team of expertise panel lead by following academicians and industry experts

- ❑ **Dr. Mendus Jacob, M.Sc., M.Phil., Ph.D., MIOD**
  - ❑ M.D & C.E.O - IPSR & Valin Technologies, U.K & USA
  - ❑ Director - MCA, Marian College, Kuttikkanam (Autonomous)
  - ❑ Former Director of School of Applicable Mathematics, M.G. University.
  - ❑ Academician and Entrepreneur with 30+ years' experience
  
- ❑ **Dr. Sunil Job K.A, M.Sc, M.Ed, M.Phil, Ph.D., RHCE**
  - ❑ Chief of Academic Solutions - IPSR



- ❑ Former college Principal and a Specialist in Data Analytics & Machine Learning
- ❑ Blogger and a Resource person for National conferences
- ❑ Academician with 25+ years' experience

## What you'll learn

Through this training, you will learn technologies like Linux, Automation, Cloud, Containers, Kubernetes, Openshift, Python and DevOps tools like Jenkins, Terraform and Git through a hands-on learning approach.

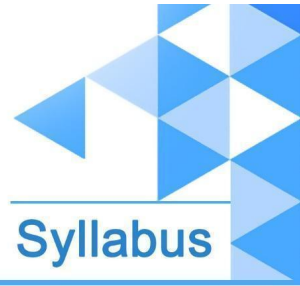
## Course Outcome (CO)

While successfully completing this course, the learner will be able to:

- **Manage Enterprise Linux**
- **Automate Linux Administration Tasks**
- **Deploy and Manage applications in cloud and container platforms**
- **Implement and manage DevOps methodology**
- **Operating a Production Kubernetes Cluster**

## What does this course give you?

Skills required to become DevOps Engineer and Kubernetes Cluster Administrator.



## Units and Syllabuses

### Level I

Duration: 260 hours

#### Unit I - Enterprise Linux Administration

**Module1:** Access the command line, Manage files from the command line, Get help in Enterprise Linux, Create, view, and edit text files, Manage local users and groups, Control access to files, Monitor and manage Linux processes, Control services and daemons

**Module2:** Configure and secure SSH, Analyze and store logs, Manage networking, Archive and transfer files, Install and update software packages

**Module3:** Access Linux files systems, Analyze servers and get support, improve command line productivity, Schedule future tasks

**Module4:** Tune system performance, Manage SELinux security, Manage logical volumes, Access network-attached storage

**Module5:** Control the boot process, Manage network security, Install Red Hat Enterprise Linux, Run Containers

#### Unit II - Linux Automation Using Ansible

**Module1:** Introduce Ansible, Implement an Ansible playbook

**Module2:** Manage variables and facts, Implement task control



**Module3:** Deploy files to managed hosts, Manage complex plays and playbooks

**Module4:** Simplify playbooks with roles, Troubleshoot Ansible

**Module5:** Automate common Linux system administration tasks with Ansible.

## Unit III - OpenShift - Containers and Kubernetes

**Module1:** Describe how software can run in containers orchestrated by Red Hat OpenShift Container Platform.

**Module2:** Creating containerized services, Managing containers

**Module3:** Managing container images, Creating custom container images

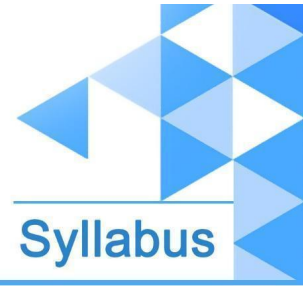
**Module4:** Deploy single container applications on OpenShift Container Platform.

**Module5:** Deploy applications that are containerized using multiple container images, Troubleshooting containerized applications

**Optional Add-on (Duration: 4 days):** [Red Hat OpenShift Developer I: Introduction to Containers with Podman \(DO188\)](#) + [Red Hat Certified Specialist in Containers exam \(EX188\)](#)

## Unit IV - Cloud - AWS / Azure

**Module1:** Implementation of Identity Access Management (IAM) for security and managing



access to various resources in AWS. Creating IAM user, groups, roles and policies

**Module2:** Configure EC2 Instances and implementation of auto scaling for instances. Deploy, Manage and Scale applications using container orchestration service. Speed up hosted websites using Content Delivery Network. Building decoupled applications using SNS, SQS. Understanding Serverless computing services.

**Module3:** Storing files securely using the Object Storage method using S3. Share Storage Disks among Servers via Network. Setup Database Engines and Secure Servers and Services. Implementation of Data Migrations and Data Transfer tools.

**Module4:** Implementation of VPC and its components. Distributing traffic using Load Balancers. Configure DNS using Route53. Configuring VPN to establish secure connections to on-premise networks.

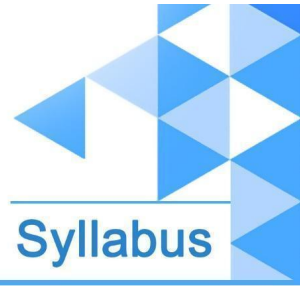
**Module5:** Monitor Server Resources using CloudWatch. Creating backup of instances of other services. Auditing AWS environment with CloudTrail. Schedule Event Rules using Target based services

## OR

**Module1:** Manage Azure Active Directory (Azure AD) objects including user, group and device. Implementation of role-based access control (RBAC). Management of subscription and configuration of governance strategies.

**Module2:** Implementation of Azure Storage account services. Configuring Azure Blob storage and lifecycle management. Creation of Azure file shares and file sync services. Configure network access and authentication to the storage account. Installation and configuration of Storage Explorer and AzCopy tools.

**Module3:** Configure Virtual machines and VMSS. Implementation of Azure App Services.



Implementation of various container services in Azure. Automate deployment of virtual machines (VMs) by using Azure Resource Manager templates

**Module4:** Create and customize Virtual network components. Configuring secure access to virtual networks NSGs, Azure Firewall, Bastion. Configuring load balancing. Understanding methods to Monitor and troubleshoot virtual networks. Integrate an on-premises network with an Azure virtual network with a VPN.

**Module5:** Monitor resources by using Azure Monitor. Implement backup and recovery.

## Unit V - PYTHON PROGRAMMING

**Module1:** Basics of python programming

**Module2:** Python functions and modules

**Module3:** Object-oriented programming in python

**Module4:** Database: MySQL

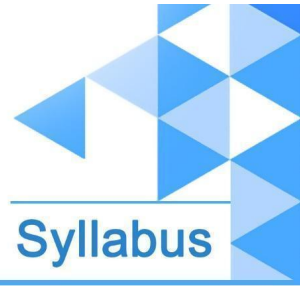
## Unit VI - DEVOPS TOOLS

**Module1:** Introduction to DevOps methodology

**Module2:** Git basics and how it works

**Module3:** Introduction to Continuous Integration(CI), Jenkins basics and how it works

**Module4:** Terraform basics and how it works



## Level II (Optional Add-ons)

### A) Red Hat OpenShift Administration II: Operating a Production Kubernetes Cluster (DO280) (Duration: 5 days) + Red Hat Certified Specialist in OpenShift Administration exam (EX280)

#### **Declarative Resource Management**

Deploy and update applications from resource manifests that are parameterized for different target environments.

#### **Deploy Packaged Applications**

Deploy and update applications from resource manifests that are packaged for sharing and distribution.

#### **Authentication and Authorization**

Configure authentication with the HTTPasswd identity provider and assign roles to users and groups.

#### **Network Security**

Protect network traffic between applications inside and outside the cluster.

#### **Expose non-HTTP/SNI Applications**

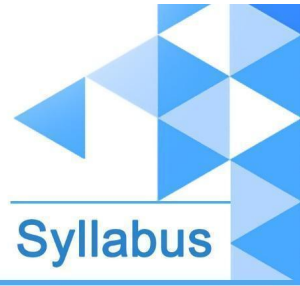
Expose applications to external access without using an Ingress controller.

#### **Enable Developer Self-Service**

Configure clusters for safe self-service by developers from multiple teams and disallow self-service if projects have to be provisioned by the operations staff.

#### **Manage Kubernetes Operators**

Install and update Operators that are managed by the Operator Lifecycle Manager and by the Cluster Version Operator.



### **Application Security**

Run applications that require elevated or special privileges from the host Operating System or Kubernetes.

### **OpenShift Updates**

Update an OpenShift cluster and minimize disruption to deployed applications.

**OR**

## **B) Certified kubernetes Administration (CKA) (Duration: 35 Hrs)**

### Core Concepts

- Cluster Architecture
- API Primitives
- Services & Other Network Primitives

### Scheduling

- Labels & Selectors
- Resource Limits
- Manual Scheduling
- Daemon sets
- Multiple Schedulers
- Scheduler Events
- Configure Kubernetes scheduler

### Logging Monitoring

- Monitoring Cluster Components
- Monitor Cluster Components





- Monitor Application • Application logs

#### Application Lifecycle Management

- Rolling Updates and Roll Backs in Deployment
- Configure Applications
- Scale Applications
- Self Healing Application

#### Cluster Maintenance

- Cluster Upgrade process
- Operating System Upgrades
- Backup and Restore Methodologies

#### Security

- Authentication & Authorization
- Kubernetes Security
- Network Policies
- TLS Certificates for cluster Components
- Image Securely
- Security Contexts
- Secure persistent key value store

#### Storage

- Persistent Volumes
- Access Modes for Volumes
- Persistent Volume Claims



- Kubernetes storage Object
- Configure Application with Persistent Storage

#### Networking

- Prerequisites- Network,switch,Routing Tools
- PreRequisites- Network Namespaces
- PreRequisites- DNS and CoreDNS
- PreRequisite -Network in Docker
- Networking Configuration on Cluster Nodes
- Service Networking
- POD Networking Concepts
- Network Load Balancer
- Ingress
- Cluster DNS
- CNI in Kubernetes

#### Installation,Configuration & Validation

- Design a Kubernetes Cluster
- Secure Cluster Communication
- Provision Infrastructure
- Run & Analyze end to end test
- Install Kubernetes Master and Nodes
- HA Kubernetes Cluster
- Choose a Network Solution
- Node end to end tests
- Kubeadm



## Troubleshooting

- Application failure
- Control Plane Failure
- Worker Node Failure
- Networking

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## Contact Us

ipsr solutions limited

Merchant's Association Building

M.L. Road, Kottayam

Kerala, India, Pin-686001

Phone: +91-481 2561410, 2561420, 2301085

Mobile: +91 9447294635, +91 9447169776

Email: [training@ipsrsolutions.com](mailto:training@ipsrsolutions.com)

Website: <https://www.ipsr.org>

We have branches at Kochi, Calicut, Trivandrum and Bengaluru.