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Course Outline

Module 1: Overview of Linux

Learning Objectives: In this module, we will learn about Linux distribution, shell scripting, some basic and advanced Linux commands and package management.

Module 2: Linux for Software Development

Learning Objectives: In this module, we will learn about various software development tools available on Linux.

Module 3: Security Administration and Virtualization

Learning Objectives: In this module, we will learn about Linux security administration and Virtualization.

Module 1: Introduction to Python

Learning Objectives: Give a brief idea of what Python is and touch on the basics.

Topics

- Overview of Python
- The Companies using Python
- Other applications in which Python is used
- Discuss Python Scripts on UNIX/Windows
- Variables

- Operands and Expressions
- Conditional Statements

- Loops
- Command Line Arguments
- Writing to the screen

Hands-On

- Creating “Hello World” code
- Variables
- Demonstrating Conditional Statements
- Demonstrating Loops

Module 2: Sequences and File Operations

Learning Objectives: Learn different types of sequence structures, related operations, and their usage. Also learn diverse ways of opening, reading, and writing to files.

Topics

- Python files I/O Functions
- Lists and related operations
- Tuples and related operations
- Strings and related operations
- Sets and related operations
- Dictionaries and related operations

Hands-On

- Tuple - properties, related operations, compared with list
- List - properties, related operations

- Dictionary - properties, related operations
- Set - properties, related operations

Module 3: Deep Dive – Functions, OOPs, Modules, Errors and Exceptions

Learning Objectives: In this Module, you will learn how to create generic python scripts, how to address errors/exceptions in code and finally, how to extract/filter content using regex.

Topics

- Functions
- Function Parameters
- Global variables
- Variable scope and Returning Values
- Lambda Functions
- Object Oriented Concepts
- Standard Libraries
- Modules Used in Python (OS, Sys, Date and Time etc.)
- The Import statements
- Module search path
- Package installation ways
- Errors and Exception Handling
- Handling multiple exceptions

Hands-On

- Functions - syntax, arguments, keyword arguments, return values
- Lambda - features, syntax, options, compared with the functions
- Sorting - sequences, dictionaries, limitations of sorting
- Errors and exceptions - types of issues, remediation
- Packages and module - modules, import options, syspath

Module 4: Introduction to NumPy & Pandas

Learning Objectives: This Module helps you get familiar with basics of statistics, different types of measures and probability distributions, and the supporting libraries in Python that assist in these operations.

Topics

- NumPy - arrays
- Operations on arrays
- Indexing slicing and iterating
- Reading and writing arrays on files
- Pandas - data structures & index operations
- Reading and Writing data from Excel/CSV formats into Pandas

Hands-On

- NumPy library- Installation, Creating NumPy array, operations performed on NumPy array
- Pandas library- Installation, creating series and dataframes, Importing and exporting data

Module 5: Data

Visualisation Learning

Objectives

In this Module, you will learn in detail about Data Visualization.

Topics

- Matplotlib library
- Grids, axes, plots

- Markers, colours, fonts, and styling
- Types of plots - bar graphs, pie charts, histograms
- Contour plots

Hands-On:

- Matplotlib - Installation, Using Scatterplot, histogram, bar graph, pie chart to show information, Styling of Plot.

Course Outline

Module 1: Overview of DevOps

Goal: In this module, you will be introduced to the DevOps environment.

Objectives:

After completing this module, you should be able to

- Understand the benefits of DevOps over other software development processes
 - Gain insights into the DevOps environment
 - Get an overview of different DevOps Tools
 - Get a picture of the working of the DevOps Delivery Pipeline
-
- Introduction to DevOps
 - Benefits of working in a DevOps environment
 - DevOps Lifecycle
 - DevOps Stages
 - DevOps Delivery Pipeline

Module 2: Version Control with Git

Goal: In this module, you will gain insights into Source Control Management and learn the functionalities of Git.

Objectives

After completing this module, you should be able to

- Understand Version Control
- Perform management of files for small as well as large projects
- Perform various Git commands such as git add, git fetch, git commit, git init, etc.
- Work with remote repositories

Topics

- Version Control
- Git Introduction
- Git Installation
- Commonly used commands in Git
- Working with Remote repository

Hands-On

- Git Common Commands
- Working with Remote Repository

Module 3: Git, Jenkins & Maven Integration

Goal: In this module, you will learn about the different actions performed through Git and will be introduced to Jenkins and Maven.

Objectives

After completing this module, you should be able to

- Execute branching and merging operations
- Perform various Git commands
- Understand Maven Architecture and dependencies
- Learn about Continuous Integration & its importance
- Understand Jenkins and its features

Topics

- Branching and merging in Git
- Merge Conflicts
- Stashing, Rebasing, Reverting and Resetting
- Git Workflows

- Introduction to Maven
- Maven Architecture
- Introduction to Continuous Integration
- Introduction to Jenkins

Hands-On

- Branching and Merging
- Merge Conflicts
- Stashing, Rebasing, Reverting, and Reseting
- Configuring Maven

Module 4: Continuous Integration using Jenkins

Goal: In this module, learn how to perform Continuous Integration by building applications with the help of Maven and create deployment pipelines using Jenkins.

Objectives

After completing this module, you should be able to

- Managing authorization in Jenkins
 - Jenkins notification management
 - Master-slave architecture in Jenkins
 - Add a slave node to Jenkins master
-
- Build and deploy codes using Jenkins
 - Build pipeline plugin in Jenkins
 - Use Declarative pipeline in Jenkins

Topics

- Jenkins Architecture
- Plugin Management in Jenkins
- Jenkins Security Management
- Notification in Jenkins
- Jenkins Master-slave architecture
- Jenkins Delivery Pipeline
- Jenkins Declarative pipeline

Hands-On

- Create pipeline view using DevCompile and QUnitTest
- Adding Slave node in Jenkins
- Build Pipeline project using Groovy script

Module 5: Configuration Management Using Ansible

Goal: Learn how to manage and configure your infrastructure using Ansible Ad-Hoc commands, Playbooks, and Roles.

Objectives

After completing this module, you should be able to

- Utilize Ansible CLI
- Execute Ansible Ad-Hoc Commands for one-off tasks
- Automate host servers using Ansible Playbooks
- Use Variables in Playbooks
- Using Handlers

Topics

- Introduction to Configuration Management
 - Infrastructure as Code
 - Introduction to Ansible
 - Ansible Architecture
 - Inventory Management
-
- Ansible Modules
 - AD-HOC Commands
 - Ansible Playbooks
 - Ansible Roles

Hands-On

- Ad-Hoc Commands
- Running a Simple Playbook
- Using Variables and handlers
- Using Ansible Roles

Module 6: Containerization using Docker Part – I

Goal: This module introduces learners to the core concepts and technology behind Docker. Learn in detail about containers and various operations performed on them.

Objectives

After completing this module, you should be able to

- Understand Containerization
- Learn the evolution of virtualization to containers
- Understand the Docker Architecture
- Perform Various actions using Docker CLI
- Bind container ports to the Machine ports
- Run containers in different modes
- Write and build a Dockerfile to create a Docker Image

Topics

- Containerization
- Namespaces
- Docker
- Docker Architecture
- Container Lifecycle
- Docker CLI
- Port Binding
- Detached and Foreground Mode
- Dockerfile
- Dockerfile Instructions
- Docker Image

Hands-On

- Docker CLI Commands
- Port Binding
- Starting Containers in Different Modes
- Writing a Dockerfile to Create an Image

Module 7: Containerization using Docker Part – II

Goal: Learn how to use Docker Hub registry, deploy a multi-tier application using Docker Compose, and create a swarm cluster.

Objectives

After completing this module, you should be able to

- Use Docker Hub to store custom Images
- Store data in Container Volumes for persistent storage

- Setup Docker Compose
- Deploy a multi-container application using Docker Compose
- Deploy a Swarm Cluster

Topics

- Docker Registry
- Container Storage
- Volumes
- Docker Compose
- Docker Swarm

Hands-On

- Setting up Docker Hub
- Docker Volumes
- Installing Docker Compose
- Installing a Multi-Container Application using Compose
- Running Docker in Swarm Mode

Module 8: Orchestration using Kubernetes Part - I

Goal: Learn In this module, you will learn about Container Orchestration and Basic of container management using Kubernetes.

Objectives

After completing this module, you should be able to

- Understand Container Orchestration
- Learn about Kubernetes Core Concept
- Deploy Pods
- Create Deployments to manage Pods
- Launch DaemonSets for Background applications
- Update and Rollback your Deployments
- Scale your containerized Applications

Topics

- Introduction to Container Orchestration
- Kubernetes Core Concepts
- Understanding Pods
- ReplicaSet and Replication Controller
- Deployments
- DaemonSets

- Rolling Updates and Rollbacks
- Scaling Application

Hands-On

- Kubectl Common Commands
- Deployments
- DaemonSets
- Rolling-update and Rollbacks
- Scaling in Kubernetes

Module 9: Orchestration using Kubernetes Part - II

Goal: Learn and deploy different service discovery mechanisms, utilize Volumes for persistent storage and deploy StatefulSets for stateful applications.

Objectives

After completing this module, you should be able to

- Deploy different Kubernetes Services
- Utilize Volumes to store Persistent Data
- Create Persistent Volume Claims to attach volumes to Pods
- Understand Persistent Volume Claims Primitives
- Use Headless Services in Stateful Sets
- Deploy Helm Charts

Topics

- Services
- Persistent Storage in Kubernetes
- Primitives for PersistentVolumeClaims
- Secrets and ConfigMaps
- Headless Services
- StatefulSets
- Helm Charts

Hands-On

- Deploying Services
- Persistent Volumes and Persistent Volume Claims
- StatefulSets
- ConfigMaps and Secrets
- Helm Charts

Module 10: Monitoring using Prometheus and Grafana

Goal: In this module, you will learn how to collect, monitor, and visualize data using Prometheus and Grafana.

Objectives

After completing this module, you should be able to

- Understand Continuous Monitoring
- Use Prometheus to monitor services
- Create an alerting mechanism using Prometheus
- Deploy Grafana dashboards to visualize data
- Integrate Prometheus and Grafana to monitor a full pipeline

Topics

- Introduction to Prometheus and Grafana
- Prometheus and Grafana Setup
- Monitoring using Prometheus
- Dashboard Visualization using Grafana
- Creating a Dashboard to monitor the Pipeline

Hands-On

- Monitoring Service using Prometheus
- Alerting using Prometheus
- Grafana Dashboards
- Monitoring a Pipeline

Module 11: Provisioning using Terraform Part - I

Goal: Learn how to provision and manage infrastructure on a Cloud Platform (AWS) using Terraform Configuration Files.

Objectives

After completing this module, you should be able to

- Understand Provisioning using Terraform
- Learn the Difference between Terraform vs Ansible
- Understand Terraform Architecture
- Deploy a Terraform Configuration File

- Use Basic Terraform Commands
- Manage Terraform Resources

Topics

- Introduction to Terraform
- Terraform vs Ansible
- Terraform Architecture
- Terraform Configuration
- Terraform Common Commands
- Managing Terraform Resources

Hands-On

- Setting Up AWS and Terraform
- Executing a Terraform Configuration
- Managing Terraform Resources
- Referencing Terraform Resources

Module 12: Provisioning using Terraform Part - II

Goal: Use Terraform State commands to manage the current state of your infrastructure. Deploy a fully usable and working infrastructure using Terraform.

Objectives

After completing this module, you should be able to

- Perform Terraform State Commands
- Deploy a Terraform Project on AWS

Topics

- Terraform State
- Terraform Project

Hands-On

- Terraform State Commands
- Terraform Project

Module 13: Selenium (Self -Paced)

Goal: In this module, you will learn about selenium and how to automate your test cases for testing web elements. You will also get

introduced to X-Path, TestNG and integrate Selenium with Jenkins.

Objectives

After completing this module, you should be able to

- Learn and install Selenium
- Create Test Cases in Selenium WebDriver
- Utilize X-Path and TestNG to locate elements
- Execute code on several browsers using Selenium suite of tools
- Integrate Selenium with Jenkins

Topics

- Introduction to Selenium
- Why Selenium?
- Selenium – Webdriver
- Creating Test Cases in Selenium WebDriver (Waits)
- What and why X-Path
- Handling different controls on Webpage

- Framework in Selenium
- Selenium Integration with Jenkins
- Implementation of Selenium in the Edureka's Project

Hands-On

- Installing Selenium
- Creating Test Cases in Selenium WebDriver
- Integrating Selenium with Jenkins

Module 14: Nagios (Self- Paced)

Goal: Learn how to continuously monitor your tasks using various plugins and implementing Nagios Commands

Objectives

After completing this module, you should be able to

- Operate Continuous Monitoring tools
- Use various plugins and objects associated with Nagios
- Implement Nagios commands

Topics

- Introduction to Continuous Monitoring
- Introduction to Nagios
- Installing Nagios
- Nagios Plugins(NRPE) and Objects
- Nagios Commands and Notification

Hands-On

- Installing Nagios
- Monitoring of different servers using Nagios

Module 15: DevOps on Cloud

Goal: Learn about various cloud services and service providers, also get the brief idea of how to implement DevOps using AWS

Objectives

After completing this module, you should be able to

- Understand about cloud and its advantages
- Learn about Various cloud computing services
- Get an idea of how to implement DevOps using AWS

Topics

- Why Cloud?
- Introduction to Cloud Computing
- Why DevOps on Cloud?
- Introduction to AWS
- Various AWS services
- DevOps using AWS

Module 16: AWS EC2 and IAM

Goal: Get a brief idea of how Security and EC2 Compute service works in AWS Cloud.

Objectives

After completing this module, you should be able to

- Describe AWS Global Infrastructure and its Benefits
- Sign-up an AWS free-tier account

- Work with AWS Management Console and AWS CLI
- Work with IAM Service
- Understand Virtualization
- Work with EC2
- Analyze various EC2 box configurations available

Topics

- Virtualization
 - Amazon Web Services (AWS)
 - Benefits of AWS
 - AWS Global Infrastructure
 - AWS: IAM
 - Components of IAM
 - Managing users with IAM
 - Amazon Machine Image (AMI)
-
- Security Groups in AWS Virtualization
 - Amazon Elastic Compute Cloud (EC2) and Its Benefits
 - Networking components associated with EC2
 - Instance Store

Hands-On

- Signing up for a Free Tier Account with AWS
- Creating New User to Log in to AWS Management Console
- Creating Policies for New User to Have All Admin or Limited Privileges
- Different Approaches to connect to an EC2 instance
- Creating a Custom AMI
- Host your Website Inside your EC2 Instance
- To Attach EFS Volume to an EC2 Instance
- Login to AWS Console via MFA