

Linux

Course outline

Module 1: Introduction to Linux

Module 1: Introduction to Linux is an introductory course designed to provide students with a basic understanding of the Linux operating system. It covers topics such as the Linux command line, file system, and basic system administration. It also provides an overview of the different distributions of Linux and how to install and configure them.

Lessons

- Overview of Linux Operating System
- Linux File System Hierarchy
- Working with the Linux Command Line
- Managing Users and Groups
- Installing and Updating Software
- Working with Text Editors
- Managing Processes
- Configuring Networking
- Securing Linux Systems
- Troubleshooting Linux Systems

After completing this module, students will be able to:

- Understand the basic concepts of the Linux operating system, such as the file system, user accounts, and system administration.
- Be able to navigate the Linux command line and use basic commands to manage files and directories.
- Be able to install and configure software packages on a Linux system.
- Be able to troubleshoot common Linux system issues.

Module 2: Command Line Basics

Module 2: Command Line Basics is a module in a Linux course that covers the fundamentals of using the command line interface. It covers topics such as navigating the file system, creating and managing files and directories, and using basic commands to manipulate files. It also covers more advanced topics such as using pipes and redirects, and using regular expressions.

Lessons

- Introduction to the Command Line Interface
- Navigating the File System
- Working with Files and Directories
- Permissions and Ownership
- Wildcards and Redirection
- Searching and Sorting
- Text Processing
- Advanced Command Line Tools
- Scripting Basics
- Automating Tasks with Cron

After completing this module, students will be able to:

- Navigate the Linux file system using the command line.
- Create, delete, and modify files and directories.
- Use basic Linux commands such as ls, cd, cp, mv, and rm.
- Understand the basic structure of the Linux command line and how to use it to execute commands.

Module 3: File System Management

Module 3 of the Linux course covers the basics of file system management. It covers topics such as file permissions, file system structure, and the Linux command line. It also covers topics such as creating, deleting, and managing files and directories, as well as using the Linux file system to store and retrieve data.

Lessons

- Introduction to the Linux File System
- Understanding File Permissions and Ownership
- Working with Directories and Files
- Managing File System Security
- Automating File System Tasks with Scripts
- Troubleshooting File System Issues
- Optimizing File System Performance
- Backing Up and Restoring File Systems
- Configuring Network File Systems
- Working with Logical Volume Management (LVM)

After completing this module, students will be able to:

- Understand the Linux file system hierarchy and be able to navigate it.
- Create, delete, and modify files and directories.
- Utilize the command line to manage files and directories.
- Understand the concepts of file permissions and be able to set them.

Module 4: System Administration

Module 4 of the Linux course covers the basics of system administration, including topics such as user and group management, file permissions, system security, and system monitoring. It also covers the installation and configuration of various services, such as web servers, databases, and mail servers. This module provides a comprehensive overview of the system administration tasks required to maintain a Linux system.

Lessons

- Introduction to Linux System Administration
- Managing Users and Groups
- Configuring Network Services
- Managing File Systems
- System Security and Access Control
- Automating System Administration Tasks
- Troubleshooting and Performance Tuning
- System Logging and Auditing
- Backup and Recovery
- Virtualization and Cloud Computing

After completing this module, students will be able to:

- Understand the fundamentals of Linux system administration, including user and group management, file permissions, and system security.
- Install, configure, and maintain Linux systems, including the installation of software packages and system updates.
- Troubleshoot and diagnose system issues, including network and hardware problems.
- Monitor system performance and optimize system resources for maximum efficiency.

Module 5: Networking

Module 5 of the Linux course covers the basics of networking in Linux. It covers topics such as network configuration, network services, network security, and troubleshooting. It also covers the use of tools such as ping, traceroute, and netstat. This module provides a comprehensive overview of networking in Linux and is essential for anyone wanting to learn more about networking in Linux.

Lessons

- Introduction to Networking
- Network Protocols and Services
- Network Configuration and Troubleshooting
- Network Security
- Network Monitoring and Performance Tuning
- Network Automation and Scripting
- Network Virtualization
- Network Storage and Backup
- Network Performance Optimization
- Network Troubleshooting and Diagnostics

After completing this module, students will be able to:

- Understand the fundamentals of networking, including the OSI model, IP addressing, and routing.
- Configure and troubleshoot network services such as DHCP, DNS, and NTP.
- Set up and manage network security, including firewalls and access control lists.
- Utilize network monitoring tools to identify and resolve network issues.

Module 6: Security

Module 6 of the Linux course focuses on security. It covers topics such as authentication, authorization, encryption, and network security. It also covers the basics of Linux security, including file permissions, user accounts, and system hardening.

Lessons

- Introduction to Linux Security
- Understanding Linux Security Permissions
- Securing Linux Systems with Firewalls
- Securing Linux Systems with SELinux
- Securing Linux Systems with AppArmor
- Securing Linux Systems with PAM
- Securing Linux Systems with Encryption
- Securing Linux Systems with Auditing
- Securing Linux Systems with Intrusion Detection
- Securing Linux Systems with Logging and Monitoring

After completing this module, students will be able to:

- Understand the fundamentals of Linux security, including user authentication, file permissions, and network security.
- Implement security measures such as firewalls, intrusion detection systems, and encryption.
- Monitor system logs and identify potential security threats.
- Develop and implement security policies and procedures for Linux systems.

Module 7: Scripting

Module 7 of the Linux course covers scripting, which is the process of writing scripts to automate tasks. It covers topics such as shell scripting, scripting languages, and scripting tools. It also covers how to debug scripts and how to use scripting to manage system resources.

Lessons

- Introduction to Bash Scripting
- Writing and Executing Scripts
- Variables and Parameters
- Conditional Statements

- Loops and Iterations
- Functions
- Debugging Scripts
- Working with Text Files
- Working with Databases
- Automating Tasks with Cron

After completing this module, students will be able to:

- Understand the fundamentals of scripting in Linux, including the Bash shell, variables, and loops.
- Create and execute scripts to automate tasks in Linux.
- Utilize scripting to create and modify files, directories, and other system objects.
- Troubleshoot and debug scripts to ensure they are functioning correctly.

Module 8: Package Management

Module 8: Package Management is a module in a Linux course that covers the basics of package management in Linux. It covers topics such as package managers, package repositories, package installation, package removal, and package updates. It also covers topics such as dependency resolution, package integrity, and package security.

Lessons

- Overview of Package Management Systems
- Installing and Updating Packages
- Managing Dependencies
- Troubleshooting Package Management Issues
- Working with Repositories
- Creating and Managing Custom Repositories
- Automating Package Management
- Security Considerations for Package Management

After completing this module, students will be able to:

- Understand the different types of package management systems available for Linux systems.
- Install, update, and remove packages using the appropriate package management system.
- Create and manage custom repositories for packages.
- Troubleshoot package management issues.

Module 9: System Performance Tuning

Module 9 of the Linux course focuses on system performance tuning. It covers topics such as system monitoring, system optimization, and troubleshooting. Students will learn how to identify and address performance issues, as well as how to use tools to improve system performance.

Lessons

- Introduction to System Performance Tuning
- Understanding System Performance Metrics
- Analyzing System Performance with Tools
- Optimizing System Performance with Tuning Parameters
- Troubleshooting System Performance Issues
- Automating System Performance Tuning
- Monitoring System Performance
- System Performance Tuning Best Practices
- Advanced System Performance Tuning Techniques
- System Performance Tuning in the Cloud

After completing this module, students will be able to:

- Understand the principles of system performance tuning and optimization.
- Identify and troubleshoot system performance issues.
- Utilize system performance monitoring tools to analyze system performance.
- Implement system performance tuning techniques to improve system performance.

Module 10: Virtualization

Module 10 of the Linux course covers virtualization, which is the process of creating a virtual version of a computer system, operating system, or network resources. This module will teach students how to use virtualization technologies such as KVM, Xen, and Docker to create and manage virtual machines, as well as how to use virtualization to improve system performance and security.

Lessons

- Introduction to Virtualization
- Types of Virtualization
- Benefits of Virtualization
- Setting up a Virtual Machine
- Configuring Virtual Machines
- Managing Virtual Machines
- Troubleshooting Virtual Machines
- Security Considerations for Virtualization
- Performance Tuning for Virtualization
- Best Practices for Virtualization

After completing this module, students will be able to:

- Understand the concept of virtualization and its benefits
- Install and configure virtualization software such as KVM, Xen, and VirtualBox
- Create and manage virtual machines and their resources
- Troubleshoot and optimize virtualization performance

Module 11: Cloud Computing

Module 11 of the Linux course covers the fundamentals of cloud computing. It provides an overview of cloud computing concepts, architectures, and services, and explores the various cloud computing platforms available. It also covers the security and privacy considerations of cloud computing, as well as the different deployment models and cloud service models.

Lessons

- Introduction to Cloud Computing
- Cloud Computing Architecture
- Cloud Computing Services
- Cloud Computing Security
- Cloud Computing Deployment Models
- Cloud Computing Service Models
- Cloud Computing Storage Solutions
- Cloud Computing Networking Solutions
- Cloud Computing Platforms
- Cloud Computing Cost Analysis
- Cloud Computing Performance Optimization
- Cloud Computing Automation
- Cloud Computing Disaster Recovery
- Cloud Computing Compliance and Governance
- Cloud Computing Best Practices

After completing this module, students will be able to:

- Understand the fundamentals of cloud computing and its various components.
- Identify the different types of cloud computing services and their use cases.
- Set up and configure cloud computing services such as Amazon Web Services (AWS), Microsoft Azure, and Google Cloud Platform.
- Utilize cloud computing services to deploy and manage applications in the cloud.

Module 12: Troubleshooting

Module 12 of the Linux course covers troubleshooting techniques for Linux systems. It covers topics such as identifying and resolving common problems, using system logs, and using command-line tools to diagnose and fix issues. It also covers best practices for troubleshooting and how to use system monitoring tools to detect and prevent problems.

Lessons

- Common Troubleshooting Tools
- Troubleshooting Network Connectivity Issues
- Troubleshooting System Performance Issues
- Troubleshooting System Logs
- Troubleshooting System Crashes

- Troubleshooting Boot Issues
- Troubleshooting Security Issues
- Troubleshooting User Access Issues
- Troubleshooting Software Installation Issues
- Troubleshooting Hardware Issues

After completing this module, students will be able to:

- Identify and resolve common Linux system issues.
- Utilize command-line tools to diagnose and troubleshoot Linux systems.
- Analyze system logs to identify and resolve system issues.
- Implement best practices for system maintenance and troubleshooting.