

**Course Description:** This course equips participants with the necessary tools to insure the well-being of a Linux system. Lab sessions include the installation, troubleshooting, and maintenance of a Linux system.

**Who Should Attend:** This course is intended for those people who will be responsible for the operation and management of a Linux system.

**Prerequisites:** Students are expected to have completed the Introduction to Unix course or have equivalent experience.

**Benefits of Attendance:** Upon completion of this course, students will be able to:

- Provide user guidance
- Carry out startup and shutdown procedures
- Use the administrator files and commands in the /etc directory
- Provide basic security for users
- Perform system administration tasks including adding and deleting users, adding devices, partitioning the disk, and other administrative functions
- Add or remove software
- Manage disk space and filesystems
- Check file system integrity
- Backup and restore all or parts of the system
- Configure local printers
- Monitor system performance, and establish and maintain network connectivity
- Use the Network File System (NFS)
- Use the Domain Name System (DNS)
- Install the LINUX system from distribution media

### Course Outline:

#### Introduction to Linux

History of Unix  
Contemporary Products  
Advantages of Linux  
Components of the Linux Environment  
Important Parts of the Kernel  
Shells with Red Hat Linux  
Major Linux Services  
Organization of the Red Hat Filesystem  
Responsibilities of a System Administrator  
Getting Help  
Exercises

#### What You Should Already Know

Beginning Linux Topics  
Shell Variables  
The PATH Variable  
Exporting Variables  
The Command Line  
The PS2 Variable  
Command History  
Command Substitution  
cut, paste  
expand, fmt, unexpand  
head, tail, nl, od  
wc, split  
pr, tac, tr  
xargs, join  
sed  
Directory Manipulation Commands  
File Manipulation Commands - cp  
File Manipulation Commands - mv  
File Manipulation Commands - rm, touch  
Using Filename Expansion Characters  
Special I/O Files  
Standard I/O Files  
Pipes  
Process Management  
ps, pstree  
top  
Signals  
Job Control  
nice, renice  
Regular Expressions  
Shells  
Shell Variables

Shell Aliases  
Functions  
Startup Files  
Key Mappings  
Writing Shell Scripts  
Executing Your Script  
A Script's Environment  
Exit Status  
Programming the Shell

#### System Startup and Shutdown

Introduction to the Boot Process  
Stages of the Boot Process  
Linux System Runlevels  
Linux System Initialization Scripts (/etc/init.d)  
Red Hat Linux ntsysv and serviceconf Tools  
The chkconfig Command  
xinetd  
X Windows  
Shutting Down the System  
Exercises

#### System Security

Important System Files... /etc/passwd  
Important System Files... /etc/shadow  
Important System Files... /etc/group  
Important System Files... /etc/gshadow  
The superuser (root) Account  
The su Command  
How to Use the su Command  
The whoami and id Commands  
The who Command  
File and Directory Permissions  
Types of Permissions  
Changing Permissions  
The Octal Mode  
Special File Permissions ... suid and sgid  
Special File Permissions ... Sticky Bit  
Adminstrating Ownership  
Exercises

#### Adding Users

Manually Creating a User Account  
Password Management

The chsh Command  
Additional Commands  
Adding a User  
Deleting a User  
Exercises

#### Software Package Administration

The RedHat Package Manager (RPM)  
Standard Commands and Options  
Installing Packages  
Naming Conventions for RPM Packages  
Installing a Package  
Upgrading Packages  
Uninstalling Packages  
Querying Packages  
Verifying Packages  
Installing Packages with Package Manager  
Exercises

#### Linux System Processes

Linux Process Components  
Linux Process Creation  
The ps (Process Status) Command  
The top (Top Jobs) Command  
The kill Command  
The at Command  
How to Execute the at Command  
Scheduling Tasks Using cron  
The crontab File Format  
Creating a cron Entry  
Exercises

#### Kernel Configuration

Overview of the Linux Kernel  
Configuring the Linux Kernel  
Configuration Options  
Building and Installing the Kernel  
Building the Kernel  
Installing a New Kernel  
Configuring your Boot Manager  
Troubleshooting the New Kernel  
Troubleshooting and Recovery  
Exercises

#### Disk Management

Disk Drive Geometry  
Introduction to Partitions

Devices and Drivers  
Linux Standard Naming Conventions  
Partitioning a Disk  
Using fdisk  
The mkfs Command  
The e2fsck Command  
Introduction to Mounting File Systems  
Mount Options  
Mounting a File System  
Exercises

#### Backup and Restore

Backup Devices and Media  
Backup Strategies  
Example of a Backup Strategy  
The dump Command  
The restore Command  
The tar Command  
The cpio Command  
Exercises

#### Printing

Overview of Red Hat Printing  
Printer Configuration  
Print Commands  
CUPS  
Exercises

#### Network Basics

Network Terminology  
LAN Topology  
Network Transmission Media  
Network Access Methods  
Network Hardware  
Standards and Protocols  
Packets  
The ISO/OSI Model  
TCP/IP Network Model  
Network Configuration  
Exercises

#### Unix Network Applications

The Extended Internet Services Daemon  
ftp  
vsFTP  
The telnet Command  
Simple telnet Session  
The r\* Commands  
Trusted Hosts

sendmail  
Filesystems  
Network File System  
/etc/exports  
NIS  
Exercises

#### The Network File System (NSF)

Introduction to NFS  
The NFS Server  
TCP Wrappers  
The NFS Client  
Configuring the NFS Environment  
Exercises

#### Naming Services

Naming Services Overview  
The Domain Name Service (DNS)  
Installing a DNS Server with Red Hat  
Configuring a DNS Server Using bind-config  
The NIS+ Environment  
The NIS Environment  
NIS Servers and Clients  
NIS Components  
Installing the Software  
Configuring a NIS Master Server  
Configuring a NIS Client  
Configuring an NIS Slave Server  
Name Service Switch Configuration File  
Exercises

#### Installation of Red Hat Linux

Optimization of Usage  
Server Installation  
The Installation Process  
Installation Diskette(s)  
Part 1: Getting Started  
Installation