# Fundamentals of UNIX

UNIX has long been the operating system of many server and application environments in companies worldwide. This comprehensive hands-on course provides users the knowledge and skills needed to effectively use Unix. In this course you will learn how to use Unix user commands and develop shell scripts. This is also a first course for system administrators and programmers who are new to Unix and Linux.

**Course Objectives:**

- Manage files and directories: create, copy, rename, remove, edit, and perform other operations.
- Create and modify files using the vi editor.
- Use many UNIX utilities for text file manipulation, personal workspace management, file system management, and communication with other users.
- Take advantage of UNIX security mechanisms to protect files and programs from unauthorized access and to configure shared access among work groups.
- Use the UNIX shell (command interpreter) to control the flow and processing of data through pipelines.
- Increase your productivity by generating file names using "wild card" pattern matching.
- Look up commands and other information in the on-line UNIX reference manuals.
- Explain the purpose of shell programs.
- Recognize applications for shell programs.
- Design and write shell programs of moderate complexity.
- Manage multiple concurrent processes to achieve higher utilization of UNIX.

**Audience:** End-users and programmers who are new to the UNIX environment.

**Prerequisites:** None

**Number of Days:** 4 days


**1 Course Introduction**
Course Overview
Course Objectives
Suggested References

**2 Getting Started**
What is UNIX?
A Brief History of UNIX
Logging In
Logging Out
Try a Few More Commands
Changing Your Password
Using Online Manuals

**3 The File System – Files**
What is a File?
The ls Command
The cat Command
The more and pg Commands
The head and tail Commands
The cp Command
The mv Command
The rm Command
File names

**4 The File System – Directories**
Hierarchical File System
Pathnames
The pwd Command – Print Working Directory
The cd Command – Change Directory


© Batky-Howell, LLC

The mkdir Command – Make Directories
The rmdir Command – Remove Directories
The cp Command (again) – Copy Files
Two useful directory names – . and ..

**5 Editing With vi**
What is vi?
The vi Buffering Process
Command Mode and Insert Mode
Modes Diagram
Getting Started
Moving the Cursor Around
Inserting Text
Deleting a Character or Line
Undo Last Command
Opening a New Line
Save Your Work or Abort the Session
Review of vi Commands

**6 More Editing With vi**
Scrolling the Buffer
Cursor Motion Commands – w, W, b, B, e, E
Cursor Motion Commands - $, ^, 0, G
Cursor Motion Commands – f, t, F, T
Delete Operator - d
Change Operator - c
Yank Operator - y
Put Commands – p, P
Searching For a Pattern - /, n, N, ?
The join Command
The file Command - :f
Edit file Command - :e
Cut and Paste Between Files
Read file Command - :r
Set options Command
Set options Command - .exrc file

**7 Personal Utilities**
The date Utility
The bc Utility
The expr Utility
The cal Utility
The news Utility
The id Utility
The uname Utility
The finger Utility
The script Utility
The clear Utility
The at Utility
The crontab Utility

**8 Text Handling Utilities**
The grep Utility
The tr Utility
The cut Utility
The paste Utility
The sort Utility
The wc Utility
The diff Utility
The lp Utility

**9 File System Security**
File Permissions
The chmod Utility
Directory Permissions
The umask Command

**10 File System Management Utilities**
The find Utility
The df Utility
The du Utility
Compressing Files
The ln Utility
The ulimit Utility
The tar Utility

**11 Communication Utilities**
The write and talk Utilities
The mesg Utility
Mail Overview
The mail Utility
The mailx Utility

**12 Using the Shell**
What is a Shell?
Which Shell?
The Command Line
Standard Input, Standard Output and Standard Error
Using Default Standard In and Standard Output
I/O Redirection
Appending Output of a File
Pipes
The tee Utility


© Batky-Howell, LLC

**13 Filename Generation**
The ? special Character
The * special Character
The [ ] special Characters
The ! special Characters
**14 UNIX Processes**
What is a Process?
Process Structure
The ps Utility
Options to the ps Utility
Background Commands (&)
Killing Background Processes
Redirecting the Standard Error
**15 Shell Programming Concepts**
What is a Shell?
What is a Shell Script?
Why Use Shell Scripts?
**16 Flow Control**
The Exit Status of Commands
Command Line Examples
The test Command
The if-then-else Construct
The elif Construct
A loop Example
**17 Variables**
Aliases
User Created Variables
The read Command
The Shell Environment
The export Command
Sub-shells
Command Substitution
Quoting Mechanisms
Assigning Variables – Summary
**18 Special Variables**
Command Line Arguments
$# - Number of Arguments
The shift Command
$* - All Arguments
$$ - PID of Shell
**19 More Flow Control**
The for Loop
The while Loop
The Case Construct
**20 Appendix – Korn shell features**
Viewing your Command History
Editing and Re-executing Commands
Aliases