



Linux Systems & Shell Programming Internship

Course Objectives

1. Understand Unix/Linux fundamentals: Navigate file systems, use standard commands, manage processes and permissions.
2. Develop shell scripts: Automate tasks using conditional statements, loops, and arrays in Bash.
3. Simulate scheduling algorithms: Implement and evaluate CPU scheduling techniques (FCFS, SJF, Priority).
4. Manage processes: Understand fork, exec, wait, zombie/orphan states via C and shell.
5. Explore file systems and system calls: Understand mounting, I/O redirection, pipes, and system-level programming.
6. Build hands-on OS familiarity: Gain practical exposure to commands, programming, and debugging in Ubuntu/Linux.

Prerequisites

- Basic Programming Skills: Familiarity with C programming language.
- Fundamentals of Operating Systems: Understanding of concepts like processes, memory, CPU scheduling.
- Logical Thinking: For scripting and debugging.
- Basic Command Line Usage: Preferably experience with Windows CMD, PowerShell.

Tools & Environment

- **OS:** Ubuntu Linux (18.04 or later) via VirtualBox or WSL
- **Editor:** Vim / VS Code
- **Compiler:** GCC for C programs
- **Shell:** Bash (default shell on Ubuntu)

Module Breakdown

- Module 1: Linux Installation & Basics
- Module 2: Shell Scripting Essentials
- Module 3: Scheduling Algorithms
- Module 4: Process Management
- Module 5: File System & Syscalls

Beyond Objectives Learning

1. Frame these as "By the end of this course, learners will be able to..." but in practical outcomes:
2. Troubleshoot and debug shell scripts.
3. Perform basic systems programming in C on Linux.
4. Analyse and compare scheduling algorithms based on real outputs.
5. Work in real-world Linux environments (including WSL & VirtualBox setups)



Sr.	Title	Topic	Objective
1	Installation of Ubuntu on Windows10 Part 1	Setup	Install Ubuntu via WSL or VM
2	Installation of Ubuntu on Windows10 Part 2	Setup	Complete Ubuntu installation
3	Interacting with Linux Operating System	Basics	Navigate Linux terminal & basic commands
4	Installation of VirtualBox	Setup	Install VirtualBox for Linux environment
5	Manual 1: Operating System Lab	Orientation	Understand lab flow and requirements
6	Manual 2: Operating Systems Lab	Shell Basics	Introduction to shell scripting
7	Manual2: Linux commands part 1	Shell Basics	Basic terminal commands (ls, cd, pwd, etc.)
8	Manual2: Linux commands part 2	File Operations	File handling (cp, mv, rm, touch)
9	Manual2: Linux commands part 3	Text Processing	grep, head, tail, cat
10	Manual2: Linux commands problems	Practice	Solve real-world terminal command problems
11	UNIX File System Explanation	File System	Understand inode, superblock, structure
12	CC-311L OS Overview	Orientation	Short intro to lab contents
13	Install Ubuntu in VirtualBox Part 1	Setup	Create Ubuntu VM
14	Install Ubuntu in VirtualBox Part 2	Setup	Finalize and test VM setup
15	Basic Commands on Ubuntu Terminal	Command Practice	Real examples of command execution
16	Install snap and VS Code	Tools	Setup code editor on Ubuntu
17	Manual 3: Date Commands	Time Commands	Use date, cal, etc.
18	Manual 3: echo, banner, who, whoami	User Info	Understand user environment utilities
19	Manual 3: bc, file create, move, remove	File Ops + Math	Use bc and file handling
20	Manual 3: Filter and Pipes	Redirection	Use pipe (
21	Manual 4: Vim Editor	Editor	Create/edit files using Vim
22	Manual 4: Temp Conversion	Programming	Create temperature converter in shell



#	Title	Topic	Objective
23	Manual 4: Simple Calculator	Programming	Script to add/subtract/multiply numbers
24	Manual 5: Intro to Shell Programming	Scripting Intro	Learn basics of shell scripting
25	Manual 5: Task1 - Run Bash Scripts	Scripting	Writing and executing scripts
26	Manual 5: Wildcards	Shell Features	Use *, ?, [], etc.
27	Manual 5: Arithmetic Ops	Math	Perform arithmetic in shell
28	Manual 5: if-else	Control Flow	Conditional logic in shell
29	Manual 5: else-if and case	Control Flow	Using case and else-if constructs
30	Manual 5: Loops	Loops	For, while, until loops
31	Manual 6: Arrays	Arrays	Declare and use arrays in shell
32	Manual 6: Compare, Concat, Max	Array Ops	String comparison, concatenation, and max finding
33	Manual 7: FCFS Avg Time	Scheduling	Simulate FCFS and compute average waiting time
34	Manual 7: FCFS in C	Scheduling	FCFS scheduling implemented in C
35	Manual 7: SJF Algorithm	Scheduling	Implement SJF (Shortest Job First) algorithm
36	Manual 8: Priority Scheduling T1-T2	Scheduling	Basics of priority-based scheduling
37	Manual 8: Priority Scheduling T3-T4	Scheduling	Advanced tasks of priority scheduling
38	Manual 8: Output Discussion	Scheduling	Discuss and verify expected outputs
39	Linux Syscalls: GCC Demo	Syscalls	Compile/run using system calls
40	Process Control: getpid(), fork()	Processes	Parent-child process relationships
41	Process Control: wait(), exec()	Processes	Use wait and exec for child control
42	Manual 9: Process Tasks	Processes	Handle zombie/orphan process scenarios
43	File System Mounting Part 1	File System	Mount partitions, explore filesystem
44	File System Integrity	File System	Ensure filesystem consistency and integrity
45	Manual 10: kill, wait, signal, zombie processes, exec()	Signals	Use kill, handle signals, detect zombies



Minimum Completion Criteria:

- Complete all modules and MCQs
- Attempt weekly marathons
- Submit at least 2 out of 5 mini-projects in the final level
- Attend minimum 80% of lessons

Certificate Details

- Upon successful completion of the Internship, learners will receive a Government-Recognized Certificate from Vidyawan, a registered MSME enterprise (*Udyam Registration No: UDYAM-WB-14-0205610*).



One Month Internship Certificate



Weekly Marathon Participation Certificate

Performance-Based Badge System

- Gold Badge – For Top Performers (90%+ score, completed 4+ projects)
- Silver Badge – For consistent performance (70–89%)
- Copper/Participant Badge – For all learners who complete the program

Contact Information

For queries, registration, or collaboration, feel free to contact us:

Vidyawan – Internship & Skill Development Platform

(A Government-registered MSME – UDYAM-WB-14-0205610)

- Email: contact.vidyawan@gmail.com
- Website: www.vidyawan.in (Get in touch section)
- Location: West Bengal, India
- Follow us for updates and upcoming internships