

Lovely Professional University

INSTRUCTIONAL PLAN (for Lectures)

Term: II

Course Code: **CSE257** Course Title: **PROGRAMMING IN LINUX ENVIRONMENT** L:3 T:0 P:3

Textbook:

1. **Beginning Linux Programming 2/E** by Neil Matthew & Richard Stones (Wrox Press Ltd.)

Other specific books:

2. **Network Professional's Library: Linux Administration - A beginners' guide** (Mc Graw Hill)
3. **Linux Cookbook** by Michael Stutz, Carla Schroder (O'Reilly Media)
4. **Beginning Red Hat Linux 9** (Wrox Press Ltd.)

Other readings:

S.No.	Journal articles as compulsory readings (<i>Complete reference</i>)
5.	www.cd.cf.ac.uk/Dave/c
6.	http://m.linuxjournal.com/topics

Relevant websites: (***** These sites provide content for leading number of lectures of the IP *****)

S.No	Web address (<i>Exact page address</i>)	Salient Features
7.	http://www.comptechdoc.org/os/linux/userguide	A comprehensive guide to everything in Linux – from Basics to shell scripting and more...
8.	http://www.ss64.com/index.html	An A-Z of the Bash command line for Linux
9.	http://www.reallylinux.com	Commands for routine operations & Server Administration in Linux
10.	http://goinglinux.com/shownotes.html	Practical Information for Using Linux To Get Things Done
11.	http://tldp.org/LDP/intro-linux/html/chap_01.html	A hands on Guide to Linux Administration
12.	http://www.linuxquestions.org/linux/answers/Programming	A community site for Linux resources
13.	http://www.aboutdebian.com/linux.htm	Home to various Linux Guides
14.	http://en.wikipedia.org/wiki/GNU_Project	Community resource on GNU Project
15.	http://en.wikipedia.org/wiki/Linux	Community guide to Linux
16.	http://www.linux-tutorial.info/index.php	All in-one Tutorial on Linux
17.	http://www.freeos.com/guides/lsst/index.html	Linux Shell Scripting Tutorial
18.	http://linuxbasics.org	Comprehensive site for free Linux courses and tutorials

Detailed Plan for Lectures

Plan for 12×L lectures: 6×L for before the MTE, 6×L for after the MTE. Provide for at least 2×L spill-over lecture.

Lect No.	Topic	Chapters/ Sections of Textbook/ other reference ¹	Assignment/ Task to be assigned to students		Pedagogical aid Demonstration/ case study/ images/ animations etc. ⁵	Date Delivered ²
			3	DoS ⁴		
1	Open Source Software; EULA & GPL; Linux Distributions; Directory Structure & File System Hierarchy	Ch 1 of Ref. 1, Ch 1 of Ref. 2, Ch 2 of Ref 3&4	1		Animation/PPT on Installation & Dir. Structure	
2	Linux Desktop & GUI Managers; Intro to GNOME & KDE	Ch _ of Ref. 2,			Images: Linux Desktop & others	
3	GNOME & KDE Control Panels	Ch _ of Ref. 2			Images: Ctrl Panel	

4	Intro To Command-Line: Terminal, Virtual Console, & Shells	Ch _ of Ref. 2, Ch 6 of Ref. 4, Ch 4 of Ref. 3	2		Diagram: Shell-Kernel Integration, Images:Terminals	
5	File/Directory Commands: ls, pwd, cd, mkdir, rmdir, touch, cat, cp, rm, mv	Ch _ of Ref. 2, Ch 6 of Ref. 3			Whizlabs simulator for Learning Linux	
6	Intro to Users & Groups; File Permission & Ownership Concepts	Ch _ of Ref. 2, Ch 6 of Ref. 3, Ch 2, 8 of Ref. 4			Images: GUI for User/Group Mgt, File Prop. & Perm.	
7	Environment Variables & Text Editors	Ch 10 of Ref 3			Images:TextEditor	
8	C Programming under Linux	Ch 1 of Ref. 1	3		Whizlabs RHCE (Red Hat Linux Certification) Learning Toolkit	
9	Intro to Shell Programming; Creating & Executing Shell Scripts; Shell Syntax; Working with Variables; User Data I/O (read and echo)	Ch 2 of Ref. 1			Diagram: Shells organization in Linux OS Layers	
10	Conditional Control: Comparison, test & [] commands; if, elif, case	Ch 2 of Ref. 1			Whizlabs RHCE (Red Hat Linux Certification) Learning Toolkit	
11	Looping Control: for, while, until; Other Control commands: break, continue, : (null)	Ch 2 of Ref. 1			Whizlabs simulator for Learning Linux	
12	Working with Functions & Returning values	Ch 2 of Ref. 1			Diag.: Fn. Call/Ret	
13	Directories, Files & devices; System Calls, Device Drivers	Ch 3 of Ref. 1	4		Images: Directory Structure Org.	
14	Low Level File Access Functions: open, read, write, close, umask	Ch 3 of Ref. 1			Image: File Access Fns. Org.	
15	Standard I/O Library: Streams, Functions, Errors & File Descriptors	Ch 3 of Ref. 1			Red Hat Linux Certification Exam Simulator 4.0.0	
16	File & Directory Management: chmod, chown, link, unlink, symlink, mkdir, chdir, rmdir, getcwd, opendir, closedir, readdir, telldir, seekdir	Ch 3 of Ref. 1			Whizlabs simulator for Learning Linux	
17	Program Arguments & getopt command	Ch 4 of Ref. 1	5		Whizlabs RHCE (Red Hat Linux Certification) Learning Toolkit	
18	Environment Variables: environ, getenv, putenv commands	Ch 4 of Ref. 1			Red Hat Linux Certification Exam Simulator 4.0.0	
19	Time & Date: time, gtime, ctime, strftime, strptime commands	Ch 4 of Ref. 1			Table: Conversion Specifiers	
20	Temporary Files; Getting user & Host Logging information	Ch 4 of Ref. 1			Whizlabs simulator for Learning Linux	
21	Terminals: Overview, Reading/Writing,, Redirection; /dev/tty Terminal	Ch 5 of Ref. 1			Whizlabs RHCE (Red Hat Linux Certification) Learning Toolkit	
22	Terminal Driver & GTI; The termios Structure	Ch 5 of Ref. 1			Image: H/w Model	
23	Terminal Output & Detecting Keystrokes;	Ch 5 of Ref. 1			NA	

	Pseudo-terminals					
24	Dynamic Memory Management (Allocation & Release), Memory Abuse	Ch 7 of Ref. 1	6			Whizlabs simulator for Learning Linux
25	File Locking: Creating Lock Files, Co-op Lock files, Locking Regions	Ch 7 of Ref. 1				Whizlabs simulator for Learning Linux
26	Read/Write with Locking; Competing Locks; Deadlocks	Ch 7 of Ref. 1				Images: Deadlocks
27	Databases: The dbm database, Routines & Access functions	Ch 7 of Ref. 1				Red Hat Linux Certification Exam Simulator 4.0.0
28	Handling multiple source files; The make command; Makefiles overview	Ch 8 of Ref. 1	7			Whizlabs RHCE (Red Hat Linux Certification) Learning Toolkit
29	Source Code Control: Overview of RSC, SCCS, CVS	Ch 8 of Ref. 1				Whizlabs RHCE (Red Hat Linux Certification) Learning Toolkit
30	Manual Pages: Introduction & Structure; Debugging: Introduction & Tools; Memory Debugging: ElectricFence	Ch 8 of Ref. 1				Whizlabs RHCE (Red Hat Linux Certification) Learning Toolkit
31	Process: Concept, Structure and Scheduling	Ch 10 of Ref 1	8			Images:Pro-Struct
32	Starting New Process, Replace/Duplicate Process Image, Waiting for Process	Ch 10 of Ref 1				Diagram: Fork a Process
33	Zombies: Signal Handling: Sending Signals & Signal Sets	Ch 10 of Ref 1				Red Hat Linux Certification Exam Simulator 4.0.0
34	Threads: Overview, Advantages & Drawbacks; Verifying Thread Support	Ch 11 of Ref 1				Image: Multi-Threaded Process
35	Creating simple Threads & Simultaneous Execution	Ch 11 of Ref 1				Red Hat Linux Certification Exam Simulator 4.0.0
36	Thread Synhronization & Cancellation	Ch 11 of Ref 1				Red Hat Linux Certification Exam Simulator 4.0.0
37	X Windows: Intro & Programming Model	Ch 16 of Ref 1				Red Hat Linux Certification Exam Simulator 4.0.0
38	FastTrack X Programming; Intro to Tk toolkit	Ch 16 of Ref 1				Images: Tk Cont.
39	Intro to GNOME Programming with GTK+	Ch 17 of Ref 1				Images: GNOME
Additional material for spill over						

(The images & demonstrations be shown through Projector during lecture or in practical)

- Notes: 1. Use S. No. Of the readings above
 2. To be filled in on the date of delivery of lecture by the instructor
 3. Put assignment number from Assignment Table (below) against the lecture in which planned to be assigned (by co-ordinator). **(Put here the Date of Allocation of assignment to the class)**
 4. DOS To be filled in on the date of assignment allocation (by the instructor) for the class
 5. Do not write Lecture, OHP, LCD projector etc. Instructor can design & share PPTs for demos with group.

Details of Assignments Planned:

Assignment No.	Details	Nature of Assignment	Expected outcome
1	Linux Basics	Class	Have the knowledge of Linux Environment & interface
2	Linux Command line	Class	Practice different commands of Linux Environment
3	Programming under Linux	Class	Develop interactive programs using C and Linux Shell interfaces
4	I/O Programming in Linux	Class	Perform file and directory management operations using Linux Programming models
5	Interacting with Linux Environment & Terminal I/O	Class	Programming user-defined command-line applications; working with environment variables and reading/writing terminal applications
6	Data Management	Class	Understanding effective Dynamic Memory Management & File Locking Mechanism
7	Development Tools & Debugging	Class	Understanding various mechanisms for application development, debugging and Source-code protection
8	Processes, Signals & Threads	Class	Understanding Process Control , Signal sets and Thread based applications and Introduce Programming for X Windows and GNOME
Term paper to be allotted by lecture no. __12__		Due date of term paper submission: <i>2 weeks before the close of term</i>	

Scheme for CA: (out of 100)

Sr. No	Component	Frequency in term	Marks
1	Attendance	Calculated at the end of the term	10
2	Assignment Based Tests	8 in No.	48
3	Minor Project (Pract.)/ Term Paper	Once in a Term	12
4	Lab assessments	Once in a Week	30

List of suggested topics for Term Paper

(Student to spend about 15 hrs on any one specified assignment)

Sr. No.	Title (Domain Area of Implementation)
1	Comparative Analysis of various Linux Distributions
2	Linux Boot Loaders (namely: GRUB, LILO & configuration scripts)
3	The detailed specifications of GNU Project & Open Source
4	Programming Tools built-into Linux (viz. C, Perl, CGI, Java, etc.)
5	Linux Window Managers (like: twm, IceWM, etc.) & GUI Managers (GNOME, KDE, etc.)

6	Critical Analysis of Linux and Windows (Who's better? When, Where, and Why?)
7	Linux as a Free & Open Source OS
8	Comparing Linux CUI and GUI tools (for performing routine tasks like text editing, user mgt, file mgt etc.)
9	Networking Services & their configuration under Linux
10	Linux as a Server Operating System
11	Linux as a Personal Desktop Operating System
12	Software support for Linux (in the context of application software and system software)
13	Linux File Systems (Like: ext3fs, ReiserFS; journaling concepts & their implementation in Linux)
14	Linux & Windows Based applications (Various emulators for Linux eg. WINE)
15	Shells for Linux (Details of specifications & services of different old & new shell interfaces of Linux)
16	Text Editors in Linux (both CUI & GUI Based)
17	Text Manipulation services in Linux (viz. Grammar & Spell-check utilities, Regular expressions, etc.)
18	Managing Multimedia (Audio & Video) content & services (hardware & software) in Linux
19	Core System Services in Linux (viz. cron, inetd, xinetd, syslog, init, etc.)
20	Printing services in Linux (eg. CUPS, LPRng, etc)
21	Linux Security Services
22	Managing User/Group accounts in Linux (using both GUI and Command-line services)
23	Critique of Linux Operating System (What's good and What's not in Linux)
24	Services for Process management & Job Control in Linux
25	Programming for X Windows System (using tk Toolkit) & GNOME (using GTK+)

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CSE207: LINUX PROGRAMMING

Instructional Plan for Lab Component (PRACTICAL)

List of experiments (Should plan for 12 weeks of teaching: 6 before MTE and 6 after MTE)

Expt. No.	Title*	Equipment used
1	Installation of Linux (Can be demonstrated with Projector)	PC/ PROJECTOR
2	Linux Directory Structure	PC
3	Working with Files and Linux Desktop	PC
4	Configuring using GNOME and KDE Control Centres	PC
5	Command Line and Command-line Shortcuts	PC
6	File Management Commands (cat, cp, mv, rm, find, grep, touch, etc.)	PC
7	Directory Management Commands (cd, mkdir, rmdir, pwd, ls, etc.)	PC
8	User/Group Management in Linux (CUI & GUI)	PC
9	Permissions & Ownership: chown, chgrp, chmod, etc.	PC
10	Environment Variables: PATH, SHELL., TERM, PWD, USER, LANG, etc. & Text Editors	PC
11	Executing C programs in Linux, Creating Custom Library	PC
12	Creating & Executing simple shell scripts, Working with Variables	PC
13	Using read, echo, if, elif, case	PC
14	Using for, while, until, break, continue and : (null)	PC
15	Implementing Functions: Call & Return	PC
16	Read/Write/Copy files using Low Level I/O functions	PC
17	Read/Write/Copy files using Standard Library I/O functions	PC
18	Programs using File Management Commands	PC
19	Programs using Directory Management Commands	PC
20	Programs with Command Line arguments	PC
21	Programs using Environment Variables	PC
22	Using Time & Date Functions	PC
23	Using tmpname, tmpfile; getuid, uname, gethostid, syslog	PC
24	Program to interact with terminal /dev/tty	PC
25	Identifying Terminal Type: \$TERM; terminfo Capabilities	PC
26	Using malloc, NULL pointer and free	PC
27	File Locking Program	PC
28	Program to Read/Write files with locking	PC
29	Using make command	PC
30	Writing custom manual pages	PC
31	Using gdb for debugging and efence.c program	PC
32	Using ps command	PC
33	Using fork, excelp and wait system calls	PC
34	Creating simple threaded programs	PC
35	Simple Program(s) to demonstrate Programming for X Windows System using Tk Toolkit	PC
36	Simple Program(s) to demonstrate Programming for GNOME using GTK+	PC

Break-up of CA marks for each lab experiment

Component	Recommended	Proposed
Written Record	20%	
Execution/Job Work	50%	
Viva – Voce	30%	
Any other component	0%	

Plan of experiments: Fill exp number to be performed by each group on each lab turn

Lab. Turn	Date	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	Group 9	Group 10
1.											
2.											
3.											
4.											
5.											
6.											
7.											
8.											
9.											
10.											
11.											
12.											

NA

Proposed Changes from the standard pedagogy for the course:

1. The Instructor should conduct **Closing Quizzes (CQ)** at regular intervals throughout the course. The CQs can be designed by different members of the Group teaching the course and shared with each other to get the best feedback of students’ performance. The frequency of the CQ is left on the Course Co-ordination Group Head. At least 3 CQs to be conducted over the term.
2. Students can easily grasp the course if the instructor follows a teaching methodology that implies a **Comparative analysis of Linux operations with those in Windows and DOS** (as the student is familiar to these environments).
3. Following Tools Needed to be Bundled with→

Red Hat Linux Certification Exam Simulator 4.0.0

Whizlabs RHCE (Red Hat Linux Certification) Learning Toolkit

Whizlabs simulator for Learning Linux

Prepared by (Instructional Planner: Name, signature & date)

Comments of HoD (Chief Academic Officer)

Whizlabs RHCE (Red Hat Linux Certification) Learning Toolkit/Exam Simulator Specifically introduced for getting student certified as LINUX ADMINISTRATOR→ Ultimate Objective of this Subject.

Signature & Date

Comments of Dean of Faculty

Signature & Date

Syllabus Coverage Report

Syllabus coverage by one week before MTE

Satisfactory/ Lagging by ____ lectures.

Syllabus coverage by two week before ETE

Satisfactory/ Lagging by ____ lectures.

Signature of Instructor & Date

Signature of HoD & Date