LINUX INTERNALS LABORATORY

IV Semester: IT

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
AITC09	**Core**	0	0	2	1	30	70	100
Contact Classes: 12	**Tutorial Classes: Nil**	**Practical Classes: 24**				**Total Classes: 24**		

Prerequisite: Programming for Problem Solving using C Laboratory

I.   COURSE OVERVIEW:

This course covers operating system concepts in linux environment. It focuses on practice on shell commands and demonstration of process concepts such as creation and establishing communication using linux system calls. The main objective of the course is to teach the students how to work with linux environment and demonstration of operating systems concepts using linux system calls in C programs. This course reaches to student by power point presentations, lecture notes, and lab which involve the problem solving in mathematical and engineering areas.

II.   COURSE OBJECTIVES:
The students will try to learn:
I.   Familiar with the Linux command-line environment.
II.   Understand system administration processes by providing a hands-on experience.
III.   Understand Process management and inter-process communications techniques

III. COURSE SYLLABUS:
Week-1: BASIC COMMANDS I
Study and Practice on various commands like man, passwd, tty, script, clear, date, cal, cp, mv, ln, rm, unlink, mkdir, rmdir, du, df, mount, umount, find, unmask, ulimit, ps, who, w.

Week-2: BASIC COMMANDS II
Study and Practice on various commands like cat, tail, head , sort, nl, uniq, grep, egrep,fgrep, cut, paste, join, tee, pg, comm, cmp, diff, tr, tar, cpio.

Week-3: SHELL PROGRAMMING, I
a) Write a Shell Program to print given number is an Armstrong number or not.
b) Write a Shell program to move a set of files to a specified directory.
c) Write a Shell program to find sum of digits of a given number.
d) Write a Shell Program to wish the user based on the login time.

Week-4 : SHELL PROGRAMMING II
a) Write a Shell program to find whether the given number is palindrome or not.
b) Write a Shell program to count the number of words, lines and characters in a given file.
c) Write a Shell program to calculate the factorial of a given number.
d) Write a Shell program to generate Fibonacci series.

Week-5: SIMULATING COMMANDS I
a) Simulate cat command b) Simulate sort command

Week-6: SIMULATING COMMANDS II
a) Simulate tail command b) Simulate head command

Week-7: SIMULATING COMMANDS III
a) Simulate grep command b) Simulate find command

Week-8: SIGNAL HANDLING
a.   Write a program to handle the signals whenever ctrl + c is pressed a signal SIGINT is sent to the process and display the message " Interrupted the Process"

b.   Write a program to handle the signals whenever ctrl + c is pressed a signal SIGKILL is sent to the process and display the message " terminated the Process"

Week-9: INTERPROCESS COMMUNICATIONS
a. Write a program to implement one way and two way communication using PIPE inter process communication
b. Write a program to implement one way and two way communication using FIFO inter process communication

Week-10: MESSAGE QUEUES
1. Write a C program (sender.c) to create a message queue with read and write permissions to write 3 messages to it with different priority numbers.
2. Write a C program (receiver.c) that receives the messages (from the above message queue as specified and displays them.

Week-11: SHARED MEMORY
Implement shared memory form of IPC.

Week-12: SOCKET PROGRAMMING
1. Write client and server programs (using c) for interaction between server and client processes using TCP Elementary functions.
2. Write client and server programs (using c) for interaction between server and client processes using UDP Elementary functions.

Reference Books:
1. Sumitabha Das, "Your Unix The Ultimate Guide", Tata McGraw-Hill, New Delhi, India, 2007.
2. B. A. Forouzan and R. F. Gilberg, "Unix and Shell Programming", Cengage Learning.
3. Robert Love, "Linux System Programming", O'Reilly, SPD.
4. Stephen G. Kochan, Patrick Wood, "Unix Shell Programming", Sams publications, 3rd Edition, 2007.
5. T. Chan, "Unix System Programming using C++", Prentice Hall India, 1999.

Web References:
1. http://spoken-tutorial.org/tutorial search/?search_foss=Linux&search_language=English
2. https://www.redhat.com/en/files/resources/en-rhel-whats-new-in-rhel-712030417.pdf
3. http:// www.tutorialspoint.com/unix/
4. http://cse09-iiith.virtual-labs.ac.in/