UNIX SHELL PROGRAMMING AND SYSTEM ADMINISTRATION

SUB CODE: CE 406

Teaching Scheme (Credits and Hours)

Teaching scheme				Total Credit	Evaluation Scheme					
L	T	P	Total		Theory		Mid Sem Exam	CIA	Pract.	Total
Hrs	Hrs	Hrs	Hrs		Hrs	Marks	Marks	Marks	Marks	Marks
03	00	02	05	04	03	70	30	20	30	150

Learning Objectives:

The education objectives of this course are:

- Explain basic unix concepts related to concurrency and control of programs
- Identify and define key terms related to operating system
- Capability to name and state the function of unix commands

Outline Of the Course:

Sr. No	Title of the Unit	Minimum Hours
1	**General Overview of the System**	06
2	**Internal Representation of files**	10
3	**Structures of process and process control**	10
4	**Introduction to shell scrips**	06
5	**Awk and Perl Programming**	08
6	**Linux**	05

Total hours (Theory): 45

Total hours (Lab): 30

Total hours: 75

Detailed Syllabus

Sr. No	Topic	Lecture Hours	Weightage(%)
1	**General Overview of the System:** • System structure, user perspective • O/S services assumption about Hardware: The Kernel and buffer cache architecture of Unix O/S • System concepts, Kernel data Structure, • System administration • Buffer headers, Structure of the buffer pool • Scenarios for retrieval of the buffer, Reading and writing disk block, Advantage and disadvantage of buffer cache.	06	16
2	**Internal Representation of Files:** • INODES, Structure of regular, Directories conversions of a path name to an inode, Super block, Inode assignment to a new file, Allocation of disk blocks. • System Calls for the System: Open read write file and record close, File creation, Operation of special files change directory and change root, change owner and change mode, STAT and FSTAT, PIPES Mounting and unmounting files system, Link Unlink**.**	10	18
3	**Structures of Processes and process control:** • Process states and transitions layout of system memory, the context of a process, manipulation of process address space, Sleep process creation/termination. The user Id of a process, changing the size of a process. The SHELL • Interprocess Communication and multiprocessor system: Process tracing system V IPO network communication sockets problem of multiprocessors systems, solution with master and hare process, and solution with semaphores.	10	19
4	**Introduction to shell scripts:** • Shell Bourne shell, C shell, Unix commands, permissions, editors, filters,sed, grep family, shell variables, scripts, metacharacters and environment, if and case statements, for while and until loops. Shell programming.	06	19
5	**Awk and perl Programming:** • Awk pattern scanning and processing language, BEGIN and END patterns, Awk arithmetic and variables, Awk built in variable names and operators, arrays, strings, functions, perl; the chop() function, variable and operators, $_ and $. , Lists, arrays, regular expression and substitution, file handling, subroutines, formatted printing.	08	19

6	**Linux:** • History & Features of Linux, Linux structure, various flavours of linux.	05	09
	TOTAL	**45**	**100**

Instructional Method and Pedagogy:

- At the start of course, the course delivery pattern, prerequisite of the subject will be discussed.
- Lectures will be conducted with the aid of multi-media projector, black board, OHP etc.
- Attendance is compulsory in lecture and laboratory which carries 10 marks in overall evaluation.
- One internal exam will be conducted as a part of internal theory evaluation.
- Assignments based on the course content will be given to the students for each unit and will be evaluated at regular interval evaluation.
- Surprise tests/Quizzes/Seminar/tutorial will be conducted having a share of five marks in the overall internal evaluation.
- The course includes a laboratory, where students have an opportunity to build an appreciation for the concepts being taught in lectures.
- Experiments shall be performed in the laboratory related to course contents.

Students Learning Outcome:

On successful completion of the course, the student will:

- Be able to understanding basic operating system fundamentals
- Know how an operating system can be used as a service
- Familiarity with linux programming concepts
- Have a foundation stone to understand operating systems working

Reference Books:

1. M.J. Bach “Design of UNIX O.S. “, Prentice Hall of India.
2. Y.Kanetkar “Unix shell programming”, BPB Pub.
3. B.W. Kernighan & R. Pike, “The UNIX Programming Environment”, Prentice Hall of India, 1995.
4. S. Prata “Advanced UNIX: A Programming’s Guide”, BPB Publications, New Delhi.

List of experiments:

Sr. No	Name of Experiment
1	Study of UNIX basic commands: cal, date, echo, printf, bc, script, mailx, passwd, who, uname, tty, stty, pwd, cd, mkdir, rmdir, ls, cat, cp, rm, mv, more, file, wc, od, cmp,comm, diff, chmod, vi
2	Study of vi editor
3	Write a Script to print “hello world”
4	Write a script to create function.
5	Write a script to study local variables
6	Write a script to study if...else
7	Write a script to study for, while and until
8	Write a script yhat finds the prime factors of a given number.
9	Write a script to check if the two strings are same or not.
10	Write a script that will print a message “Good Morning” or “Good Afternoon” according to the user login time.
11	Linux Commands: cmp, find, grep, od, tar, ps, df, du, finge, kill, nice, nonhup, sleep, test, umask, who, cal, tee, expr, uname, fsck, xargs. Filters for stream handling features of the shell for input and output. E.g. pr, head, tail, cut, paste, sort, nl, uniq, tr.