

Subject Code: 1ET1100401	Subject Title: Unix Operating System and Shell Programming
Prerequisite	--

Course 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

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture	Tutorial	Practical	Credit	Theory		Practical		Total
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
3	1	2	5	70	30	30	20	150

Subject Contents			
Sr. No	Topic	Total Hours	Weight (%)
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 ● Inter process Communication and multiprocessor system: Process tracing system V IPO network communication sockets problem of multiprocessors systems, solution with master and slave 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, meta characters and environment, if any 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	08	19

	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.		
6	Linux: History & Features of Linux, Linux structure, various flavours of linux.	05	09

Course Outcome:

After learning the course, the students should be able to:

- 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

Course Learning Outcomes (CLO): On completion of this course, the students will be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	Understand the foundations of the operating system	Understanding
CLO2	Understand how an operating system can be used to provide a service.	Understanding, Applying
CLO3	Understanding of Linux programming fundamentals	Applying
CLO4	Have a solid foundation for understanding how operating systems work.	Analyzing
CLO5	Understands the many services provided by the operating system	Analyzing, Evaluating

Mapping of CLOs with POs & PSOs

Course Learning Outcomes	Program Outcomes (POs)												Program Specific Outcomes(PSOs)			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CLO1	M	H	M	H	H	M	L		M	M	M	M	M	H	L	L
CLO2	M	M	H	M	M	M	L		M	M	L	L	H	M	M	M
CLO3	H	M	H	M	H	H	M		M	L	M	M	H	M	M	M

CLO4	H	H	M	H	H	H	L		M	M	M	L	H	M	M	M
CLO5	M	H	H	H	M	M	L		M	M	M	L	M	H	M	M

H:High, M:Medium, L:Low

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:

- (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.