CS – 22 : Operating Systems Concepts With Unix / Linux

Objectives:
- To provide the basic feature, function and interface with the hardware and application software to run the computer smoothly.

Prerequisites:
Basic knowledge of operating system and it's functionality along with its types.

Sr. No	Topic	Details	Marks in Weight %	Min. Lec.

1	**Introduction,**
	
	Process and Thread,
	
	Process Scheduling
		• Meaning of OS
		 • Functions of OS
		 • Features of OS
		 • OS Types (User Point of View)
		 • OS Types (Features Point of View)
		
		 • Process Definition ,
		 • Processstates ,
		 • Process State transitions ,
		 • Process Control Block ,
		 • Context switching ,
		
		 • Threads,
		 • Concept of multithreads ,
		 • Benefits of threads,
		 • Types of threads.
		
		 • Types of Schedulers
		 • CPU scheduling algorithms
		    ◦ FCFS
		    ◦ SJN
		    ◦ Round Robin
		    ◦ Priority Base Non Preemptive
		    ◦ Priority Base Preemptive
			20	18

2	**Deadlocks** **Memory management**	• Deadlocks: Definition, • Deadlock Prevention • Deadlock Avoidance • Deadlock Detection	20	12
		• Physical Memory and Virtual Memory • Memory Allocation • Internal and External fragmentation • Contiguous Memory Allocation • Noncontiguous Memory Allocation • Virtual Memory Using Paging • Virtual Memory Using Segmentation		

3	**Getting Started with Unix** **Unix Shell Command**	• Unix Architecture
		• Unix Features
		• Types Of Shell (C, Bourn, Korn)
		• Unix File System
		• Types Of Files
		   o Ordinary Files
		   o Directory Files
		   o Device Files
		• Unix File & Directory Permissions
			20	15

		• Connecting Unix Shell : Telnet
		• Login Commands
		   o passwd, logout, who, who am i, clear,uname
		• File / Directory Related Command
		   o ls, cat, cd, pwd, mv, cp, ln, rm, rmdir, mkdir, chmod, chown, chgrp, find,more,less,head,tail,wc,touch, stat, alias,type		

		• Operators in Redirection & Piping
		  o <, >, <<, >>, |
		• Finding Patterns in Files
		   o grep,fgrep,egrep
		• Working with columns and fields
		   o cut,paste,join		

		• Tools for sorting :sort,uniq • Comparing files : cmp,comm,diff • Changing Information in Files : tr,sed, • Examining File Contents : od • Tools for mathematical calculations: bc,factor • Monitoring Input and Output :tee,script • Tools For Displaying Date and Time : cal,date • Co • mmunications : telnet,wall,write,mail,finger,mesg, ping • Process Related Commands : • ps, command to run process in background, nice,kill,at,batch,wait,sleep,top,jobs • Concept of Mounting a File System : mount command • Concept of DeMounting a File System : umount command		
4	**Text Editing With vi and nano Editor, Shell Programming**	• Introduction of vi editor • Modes in vi • Switching mode in vi • Cursor movement • Screen control commands • Entering text, cut, copy, paste in vi editor • Introduction of nano editor	20	08

		• Shell Keywords
		• Shell Variables
		• System variables
		   o PS2, PATH, HOME,LOGNAME, MAIL, IFS, SHELL, TERM, MAILCHECK
		• User variables
		   o set, unset and echo command with shell variables
		• Positional Parameters
		• Interactive shell script using read and echo
		• Decision Statements
		   o if then fi
		   o if then else fi		

		- if then elif else fi - case esac - test command - Logical Operators - Looping statements - for loop - while loop - until loop - break, continue command - Array - Function - Various shell script examples		
5	**Getting Started with Linux, Linux Booting, Linux Admin (Ubuntu)**	- History of Linux - GNU, GPL Concept - Open Source & Freeware - Structure and Features of Linux - Installation and Configuration of Linux - Using with Ubuntu - Startup, Shutdown and boot loaders of Linux - Linux Booting Process - LILO Configuration - GRUB Configuration - Creating Linux User Account and Password - Installing and Managing Samba Server - Installing and Managing Apache Server - Optimizing LDAP Services - Optimizing DNS Services - Optimizing FTP Services - Optimizing Web Services - Configure Ubuntu's Built-In Firewall - Working with WINE	20	07

Students seminar   - 5 Lectures.
Expert Talk   - 5 Lectures
Students Test   - 5 Lectures.
TOTAL LECTURES 60+15=75

Course outcomes:

- Understand design and implementation aspects of modern operating system
- Acquire knowledge of four major OS components: process management, memory management, file systems, and input/output mechanisms
- Analyze and Compare various process scheduling algorithms
- Learn the concepts, design, and structure of the UNIX operating system
- Design Shell scripts using various UNIX utilities

Reference Books

1. Operating System Concept , Abraham Silberschatz, Peter B. Galvineg Gagne, Wiley-Indian Edition, 9th Edition
2. Operating Systems, Internals And Design Principles , William Stallings, Seventh Edition
3. Unix Shell Programming - Y. Kanetkar- Bpb Publications
4. Unix Concepts And Applications- Sumitabha Das
5. The complete reference Linux, Richard Petersen, McGraw Hill, Sixth Edition.

Hands-On (Not to be asked in the examination)

- Installation of Unix / Linux
- User and Group Creation
- Demo of Various Applications available in Unix / Linux like Star Office, Games and other productivity tools.
- Demo of GNOME, KDE Desktops in Linux.