COURSE NAME : COMPUTER ENGINEERING GROUP

COURSE CODE : CO/CM/IF/CD

SEMESTER : FIFTH FOR CO/CM/IF AND SIXTH FOR CD

SUBJECT TITLE : OPERATING SYSTEM

SUBJECT CODE : 9115

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme						
TH	TU	PR	PAPER HRS	TH	TEST	PR	OR	TW	TOTAL
03	-	02	03	80	20	-	--	25@	125

Rationale:

To meet the ever increasing need of computers, networks and internet study of operating system is compulsory. Operating system is the interface between the user and the computer system .It is the first piece of software to run on a computer system when it is booted .Its job is to co-ordinate and provide services for the execution of application software. This is core technology subject and the knowledge of which is absolutely essential for Computer Engineers .It familiarizes the students with the concepts and functions of operating system. This subject provides knowledge to develop systems using advanced operating system concepts.

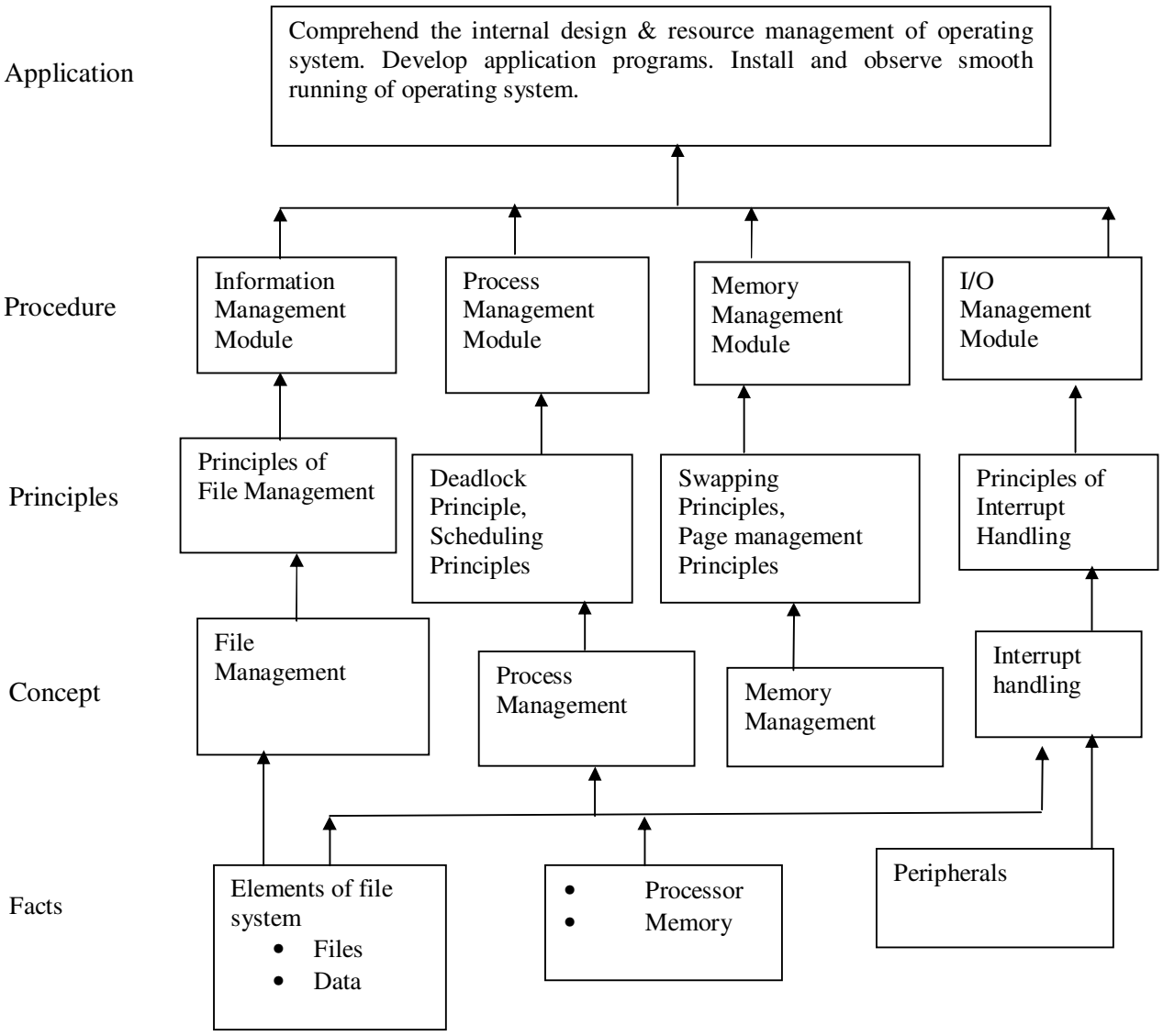
This subject gives overview of Unix operating system as a case study.

Objectives:

Student will be able to:

1. Learn the various milestones in the history of operating system and the modern trends in operating system.
2. Understand the features and functions of operating systems provided by various system calls.
3. Understand a process, deadlock & the concept of context switching & multiprogramming.
4. Learn various memory management and file management techniques.
    a. Understand the tools and the components of the operating system.
5. Implement various algorithms of scheduling.
6. Compare and contrast the various standard solutions to operating system problems.
7. Make best use of facilities that computer system offer them for solving problems.
8. Understand the Unix vi editor and Unix utilities.
9. Lean the concept of shell programming and develop programs on it.

Learning Structure:



Contents: Theory

Chapter	Name of the Topic	Hours	Marks
01	**Introduction** 1.1 Operating system, Evolution, Generations –1st, 2nd, 3rd, 4th. 1.2 Mainframe Systems – Batch, Multi programmed, Multitasking, Time sharing, Desktop. 1.3 Multiprocessor Systems 1.4 Distributed Systems. 1.5 Clustered Systems. 1.6 Real Time Systems.	06	10
02	**Operating System Structures** 2.1 System components - Process management, Main memory management, File management, I/O system management, Secondary storage management. 2.2 Operating system services. 2.3 System calls – Uses, process control, file management, Device management, Information maintenance, communication**.** 2.4 Operating system structure. Simple structure, layered, monolithic, microkernel. 2.5 Booting	10	16
03	**Process Management** 3.1 Processes - Concept, process, state, process control block. 3.2 Process scheduling - Scheduling queues, scheduler, context switch. 3.3 Operations on processes - creation, termination. 3.4 Inter process communication. 3.5 Threads - Benefits, user and kernel threads. 3.6 Multithreading Models - Many to one, one to one, many to many.	10	18
04	**Scheduling** 4.1 Scheduling – Objectives, concept, criteria, CPU and I/O burst cycle. 4.2 Types of Scheduling-Pre-emptive, Non pre- emptive. 4.3 Scheduling Algorithms. First come first served (FCFS), Shortest job first (SJF), Round Robin (RR), Priority. 4.4 Other Scheduling. Multilevel, Multiprocessor, real-time. 4.5 Deadlock. System model, principle necessary conditions, mutual exclusion, critical region. 4.6 Deadlock handling. Prevention and avoidence.	12	18

05	**File System and Memory Management** 5.1 File- Concept, Attributes, Operations, Types, Structure 5.2 Access Methods – Sequential, Direct. 5.3 Swapping 5.4 Allocation Methods – Contiguous, Linked, Indexed. 5.5 Directory Structure – Single level, Two level, Tree Structure. 5.6 Protection –Types of accesses, Access control. 5.7 Basic Memory Management –Partitioning, Fixed & Variable. 5.8 Free Space management techniques –Bitmap, Linked List. 5.9 Virtual Memory – Concept , Paging, Page fault , Page Table. 5.10 Page Replacement algorithms – FIFO(First in First out) ,Optimal Page replacement, LRU (Least recently used), NRU (Not recently used)	10	18
	Total	**48**	**80**

Practical:
Skills to be developed:

Intellectual skills:

- Understanding syntax of commands
- Interpretation of commands
- Execution of commands

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Motor skills:

- Proper handling of Computer System**.**

List of Practical:

1) Identify the major desktop components, interfaces and their functions .Differentiate the various Windows Operating system.(Windows 9x,Windows NT, Windows 2000& Windows XP.

2) Use of file and directory manipulation commands – ls, rm, mv, cp, join, split, cat, head, tail, touch, diff, comm., pr, chmod, mkdir, rmdir, cd, pwd, dir, cmp.

3) Use of text processing and communication commands – tr, wc, cut, paste, spell, sort, grep, mesg, talk, wall, write, who, who am i ,news, mail.

4) Use of general purpose and process commands- ps, wait, sleep, exit, kill, bc, date, time, cal, clear, banner, tty, script, su, man.

5) Use of vi editor & perform all editor commands.

6) Write and execute shell script to display the following output.
   i) Menu:

a) List of files.
b) Processes of user.
c) Todays date
d) Users of the system
e) Quit to Unix

ii) To check every argument and carry out the following.
a) Argument is a directory, then display the number of files and directories present in that directory.
b) If argument is a file, then display the size of file.
c) If argument does not exist then create the directory.

7) Write and execute the programme to implement round robin scheduling Algorithm.

Learning Resources:

1. Books:

Sr.No.	Author	Title	Publication
01	Silberschatz Galvin, Gagne	Operating System Concepts	John Wiley & Sons (Asia) Pte ltd.
02	Achyut S. Godbole	Opearating Systems	Tata McGraw-Hill
03	Andrew S. Tanenbaum	Modern Opearating Systems	Prentice Hall of India
04	Sumitabha Das	Unix Concepts and Applications	Tata McGraw-Hill
05	Murugan Sethuraman	Unix Concepts and Programming	Denett & Co.
06	Yashwant Kanetkar	Unix Shell Programming	BPB Publication

2. Websites

8) www.denett.com
9) www.tatamcgrawhill.com
10) www.phindia.com
11) www.wiley.com/college/silberschatz6e/0471417432/slides/ppt
12) www.en.wikipedia.org
13) www.computerworld.com
14) www.computer.howstuffworks.com
15) www.willamstallings.com/os4e.html
16) www.deitel.com/books/os3e/slides.html