PARUL UNIVERSITY - Faculty of IT & Computer Science

Department of Computer Application

SYLLABUS FOR 4th Sem B.Sc. (IT), BCA, IMCA, IMCA (A.Y.-IV) PROGRAMME

Operating System (05101252)

Type of Course: B.Sc. (IT), BCA, IMCA, IMCA (A.Y.-IV)

Prerequisite: • Basic knowledge of computer hardware and software. • Knowledge of programming languages like C, C++ etc.

Rationale: To understand and learn the fundamentals of Operating System including Deal with memory management, process management, CPU scheduling, deadlocks and file management.

Teaching and Examination Scheme:

Teaching Scheme			Credit	Examination Scheme					Total
				External		Internal			
Lect Hrs/ Week	Tut Hrs/ Week	Lab Hrs/ Week		T	P	T	CE	P	
3	1	2	5	60	30	20	20	20	150

Lect - Lecture, **Tut** - Tutorial, **Lab** - Lab, **T** - Theory, **P** - Practical, **CE** - CE, **T** - Theory, **P** - Practical

Contents:

Sr.	Topic	Weightage	Teaching Hrs.
1	**Operating System Overview & Processes**: Operating system objectives and functions Types of OS: real-time, batch, multiprogramming/multitasking, multiprocessing, multithreading. Process management: Process, Process state diagram, Control and execution Threads: Threads, Types of threads	14%	7
2	**Scheduling**: **Uni-processor Scheduling:** Types of scheduling, Scheduling algorithms, **Multiprocessor and Real-time scheduling:** Multi processor scheduling, Real time scheduling	17%	8
3	**Memory Management**: Memory management requirements,Memory partitioning, Paging, Segmentation, Virtual Memory: Virtual Memory, Demand paging, Page replacement algorithms	17%	8

4	**Input/output and Files**: **I/O Management and Disk Scheduling:** I/O Devices, Organization of the I/O Function, OS Design Issues, I/O Buffering, Disk Scheduling, RAID, Disk cache. **File Management:** Overview, File Organization, File Directories, File Sharing, Record Blocking, Secondary Storage Management.	17%	8
5	**Concurrency control and Dead Lock**: Mutual Exclusion and Synchronization: Principles of concurrency, Mutual exclusion: Mutual exclusion, hardware support, Semaphores, Monitors, Message passing, Reader/writer problem. Deadlock and Starvation: Principles of deadlock, Deadlock prevention, Deadlock avoidance, Deadlock detection, Dining Philosophers problem.	17%	8
6	**Linux**: Introduction to Linux System & History, Features of Linux, Basic Commands: login, logout, date, man, pwd, who, whoami, dir, ls, cd, mkdir, rmdir Use of Wild card characters and introduction to vi editor Introduction to environment variable like HOME, PATH, PS1 Types of FAP, use of chmod command Basic commands like cp, mv, rm, rev, file redirection, grep, cut, paste, find sort commands with example Introduction to shell script: execution of it, shell script variable, expr, test commands Control structure: if, if..else, case structure Iteration: while, for construct, break, continue, exit commands	18%	9

***Continuous Evaluation:**

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests (Summative/MCQ) etc.

Reference Books:

1. Operating Systems
   Stalling W,; Prentice Hall India; Seventh Edition
2. Operating System Principles
   Silberschatz, A., Peter B. Galvin and Greg Gagne; Wiley-Indian Edition; Eighth Edition
3. Modern Operating Systems
   Tanenbaum A.S; PHI; Third Edition
4. Understanding Operating Systems
   Flynn I.M; Cengage India Publication; Seventh Edition
5. The Design of UNIX Operating System
   Bach M J; Prentice Hall India; First Edition

Course Outcome:

After Learning the course the students shall be able to:

1. Explain role and purpose of operating system
2. Describe process life cycle and threading models with help of relevant system calls

3. Conceptualize knowledge of I/O, file system and disk scheduling
4. Create shell scripts to accomplish various computing assignments

List of Practical:

1. General Purpose & File system

GENERAL-PURPOSE UTILITIES

1. cal
2. date
3. echo
4. banner
5. bc
6. script
7. passwd
8. who
9. uname
10. tty
11. stty
12. exit
13. clear

THE FILE SYSTEM

1. pwd
2. cd
3. mkdir
4. rmdir
5. ls

2. Handling ordinary files and Process

HANDLING ORDINARY FILES

1. cat
2. cp
3. rm
4. mv
5. more
6. lp
7. file
8. wc
9. od
10. cmp
11. comm
12. diff

THE PROCESS

1. Ps
2. kill
3. at
4. batch
5. time

3. SIMPLE FILTERS

1. pr
2. head
3. tail
4. cut
5. paste
6. sort
7. uniq
8. tr

4. File attributes & FILTERS USING REGULAR EXPRESSION

FILTERS USING REGULAR EXPRESSION- GREP AND SED

1. grep
2. sed
3. egrep
4. fgrep

BASIC FILE ATTRIBUTES

1. chmod
2. chown
3. chgrp

5. Basic programming using shell script

1. Write a script to read four integer numbers from the user and find sum, product and average of these four numbers.
2. Write a script to implement simple calculator, which can perform basic mathematical operations to implement using menu driven:

a. Addition

b. Subtraction

c. Multiplication

d. Divison

3. Write a script to calculate gross salary.

4. Write a script to find factorial of given number.

5. Write a script to find max and min number from the data passed through command line.

6. Shell programming based on use of loops

1. Write a script to calculate sum of series. 1+x+x^2+x^3+x^4
2. Write a script to find sum of any no. from command line argument.
3. Write a script to print reverse string.
4. Write a script to sum of digits of an entered number.
5. Write a script to perform following string operation :

a. Find length of string

b. Extract substring

c. Find location of any character

7. Shell programming based on control structure

1. Write a script to check given string is palindrome or not.
2. Write a script to check whether a number is prime or not.
3. Write a script to read a character from user. Determine whether it is uppercase letter, lower case letter or digit.
4. Write a script to sort the given numbers in ascending order.
5. Write a script to check whether the file is ordinary or not.

8. Shell programming based on use of files & database

1. Write shell script to manage(add/update/view/delete) Judge database with Fields: JudgeName, CourtName, City,Cases_ judged,TotalCasses :

a. Display No of records

b. Find Judge with highest cases judged

c. Calculate total Cases of Court Ahmedabad

d. List All Judge Names

e. Exit

9. Shell programming based on file & database

1. Write a Script for Simple LIBRARY Management System Operation. Database File Contains Following Fields. AccNo, Title, Author, Edition, Publisher.

a. VIEW RECORD BASED ON QUERY

b. ADD RECORD

c. DELETE RECORD

d. COUNT TOTAL NUMBER OF RECORDS

e. EXIT