FACULTY OF COMPUTER APPLICATIONS
Master of Computer Applications

- **Sem.**   :1

- **Subject Code**   :05MC0104

- **Subject**   : Operating Systems

- **Course Objectives**   :

1. To understand the overall structure and components of operating system.
2. To analyze the key concept of process management and concurrency problem.
3. To understand the working of main memory and virtual memory.
4. To understand various scheduling policies used by operating system.
5. To understand the management of files and I/O devices.

- **Prerequisites**   : Basic knowledge of computers.

Unit No	Topics Covered	No of lectures required
1	**Introduction to Operating System:** Introduction, Importance of OS: Objectives and Functions, Evolution of OS, Major achievements **Process and Threads** The concept of Process, Creation and Termination of Process, ProcessStates and Models, PCB, Process and Threads, Types of Threads, Process Vs. Threads **CPU Scheduling** Types Of Scheduling , Different Scheduling Algorithms	15
2	**Process Synchronization & Deadlock** Key terms related to concurrency, Requirements of mutual exclusion, Semaphores, Producer-Consumer problem,Readers-Writers problem **Deadlock:** Principles Of Deadlock, Deadlock Prevention, Deadlock avoidance, Deadlock Detection, Dinning philosophers problem: Solution using semaphores	10

3	**Memory Management & Virtual Memory:** **Memory Management:** Requirements of memory management, Memory Partitioning, Simple Paging and Simple segmentation **Virtual Memory:** Hardware and Control Structures: Need of virtual memory, Virtual Memory paging, Virtual memory segmentation, Address translation in paging, Address translation in segmentation, Operating System Software : Replacement Policy	10
4	**Input/ Output and Files** I/O Management and Disk Scheduling: I/O Devices, Organization of I/O function, I/O buffering, Disk Scheduling, RAID **File Management:** Overview, File organization and access, File directories, File sharing, Record blocking, secondary storage management	10
5	**Computer Security Threats** Computer Security Concepts, Threats, Attacks, Assets, Intruders	5

Course Outcomes:

1. Students will be able to demonstrate understanding of the concepts, structure and design of operating Systems

2.Students will be able to demonstrate understanding of operating system design and its impact on application system design and performance

3.Students will be able to apply different solutions for Memory Partitioning

4.Students will be able to understand about interactions between user application, hardware and OS

5.Students will be able to design program in Unix for file and directory management

Course Outcomes – Program Outcomes Mapping Table :

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	H	M		H					H		
CO2	H	H	M					H			
CO3	H	L		H							M
CO4			H	H					H		
CO5		H	H	M							H

Text Book   :

 "Operating Systems", Stalling W, Prentice Hall India, 7th edition

Reference Books :

1. "Operating System Principles",Silberschatz A., Peter B. Galvin and Greg Gagne,Wiley-Indian, 8TH edition.
2."Modern Operating Systems", Tanenbaum A.S., PHI, 4th Edition

3."Understanding Operating Systems", Flynn I.M, Cengage India Publication

4."The Design of UNIX Operating System", Bach M J ,Prentice Hall India, 1993.
5. "Unix Shell Programming ", Yashvant Kanetkar , BPB Publications , 1st edition.
6. "Unix Concepts and Applications ", Sumitabha Das , McGraw-Hill Publications, 4th edition.

Web References :

1.https://www.javatpoint.com/os-tutorial

2.https://www.geeksforgeeks.org/operating-systems/

App References :

1. Operating System Tutorials
2. AnLinux : Run Linux on Android
3. Linux Tutorial

Syllabus Coverage from text /reference book & web/app reference:

Unit #	Chapter Numbers
1	2-2.1 ,2.2, 2.3 3-3.1,3.2 4-4.1 , 4.2 9-9.1 , 9.2
2	5 – 5.1, 5.3, 5.6 6 – 6.1, 6.2, 6.3 , 6.4 , 6.6
3	7-7.1,7.2,7.3,7.4 8 – 8.1 , 8.2
4	11-11.1,11.2,11.4,11.5,11.6 12-12.1,12.2,12.3,12.4,12.5,12.6
5	14 – 14.1, 14.2 , 14.3

PRACTICALS

Sr. No.	List of Practical
UNIT-1	
1	Check the output of following commands: oDate, ls, who, cal,ps ,wc ,cat ,uname ,pwd ,mkdir ,rmdir ,cd ,cp ,rm ,mv, chmod,
2	Check the output of following filter commands: diff,grep, sed, head, tail ,cut , paste, sort, find
3	Write shell script to accept numbers and perform addition, subtraction, multiplication and division
4	Write shell script to accept the string and check whether the string is palindrome or not.
5	Write shell script to accept the number and check whether the no. is odd or even. Find length of no. and sum of digits in the number.
6	Write shell script to accept the string and replace it by another string.
7	Accept the filename and display the last modification time if file exists, otherwise display appropriate message.
8	Fetch the data from file and display data into another file in reverse order.
9	Write a script to delete zero sized files from a given directory (and all its sub-directories).
10	Write a shell script print all the prime numbers from 1 to 300. (Use nested loops, break and continue)
UNIT - 2	
11	Write a script that lists files by modification time when called with 1m and by access time when called with 1a. By default the script should show the listing of all the files in current directory.
12	Write a script that behaves both in interactive and noninteractive mode. When no arguments are supplied, it picks up each C program from the current directory and lists the first 10 lines. It then prompts for deletion of a file. If the user supplies arguments with the script then it works on those files only.
13	Display the processes in the system every 30 seconds five times using a (i)while loop , (ii) for loop.
14	Write a script which looks up every .c file in the current directory for the strings printf or fprintf. If

	found, the script adds the statement #include <stdio.h> at the beginning of the file.
15	Write a script that uses find to look for a file and echo a suitable message if the file is not found.
16	Write a script for generating a mark sheet after reading data from a file. File contains student roll no, name , marks of three subjects.
17	The distance between two cities (in k.m.) is input through the keyboard. Write a shell script to convert and print the distance in meters, feet, inches and centimeters.
18	Write a script to display all words of a file in ascending order and to display the last modified file.
19	Ramesh's basic salary is input through the keyboard. His DA is 40% of basic salary, and HRA is 20% of basic salary. Write a script to calculate his gross salary.
20	The length and Breadth of a rectangle and radius of a circle are input through the keyboard. Write a shell script to calculate area of rectangle and circumference of the circle.
UNIT-3	
21	Write a script to make following file and directory management operations menu based: oDisplay current directory oList directory oMake directory oChange directory oCopy a file oRename a file oDelete a file oEdit a file
22	Write a script which reads a text file and output the following: oCount of character, words and lines. oFile in reverse. oFrequency of particular word in the file. oLower case letter in place of upper case letter.
23	Write a shell script to check whether the named user is currently logged in or not.
24	Write a Script for Simple Database Management System Operation. Database File Contains Following fields.

	EMP_NO, EMP_NAME, EMP_ADDRESS, EMP_AGE, EMP_GENDER EMP_DESIGNATION EMP_BASIC_SALARY Provide Menu Driven Facility For oVIEW RECORDS oADD RECORD oDELETE RECORD oMODIFY RECORD. oCOUNT TOTAL NUMBER OF RECORDS oEXIT
25	Write shell script for simple library management system. Database with fields: Accno, Title, Author, Edition,Publisher oView records based on query oAdd record oDelete record oCount total no. of records oExit
26	Accept filename and displays the permission of that file if file exists otherwise print message
27	Write a script to display the date, time and a welcome message (like Good Morning should be displayed with 24 hours notation)
28	Write a script to display the name of those files (in the given directory) which are having multiple links.
29	Write a script to display the name of all executable files in the given directory.
30	Write a script to display the last modified file.
UNIT -4	
31	Write a Shell Script to take user data as command line argument and display a greetings message
32	Write a script that deletes all leading and trailing

	spaces in all lines in a file. Also remove blank lines from a file.
33	Write Menu driven program for
	oDisplay all the words of file in ascending order.
	oRemove all space from file –
	oDisplay zero size files
	Perform Find and replace operation
34	Write a Script for Simple Database Management System Operation. Database File Contains Following fields. EMP_NO, EMP_NAME, EMP_ADDRESS, EMP_AGE, EMP_GENDER EMP_DESIGNATION EMP_BASIC_SALARY Provide Menu Driven Facility For oVIEW RECORD
	oADD RECORD
	oDELETE RECORD -
	oMODIFY RECORD. –
	oCOUNT TOTAL NUMBER OF RECORDS
	oEXIT
35	Write a shell script which will receive either the filename or the filename with its full path during execution. This script should obtain information about this file as given by ls –l and display it in proper format.
36	Write a shell script which receives year from the keyboard and determines whether the year is leap year or not. If no argument is supplied the current year should be assumed.
37	Write shell script for simple library management system. Database with fields: Accno, Title, Author,

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	Edition,Publisher oView records oAddrecord - oDelete record oCount total no. of records – oExit
38	If Cost price and selling price of an item is input through the keyboard, write a program to determine whether the seller has made profit or incurred loss. Also determine how much profit was made or loss incurred.
39	Write a shell script which deletes all lines containing the word unix in the files supplied as arguments to this shell script.
40	Write a shell script which displays a list of all the files in the current directory to which you have read , write and execute permissions.