FACULTY OF COMPUTER APPLICATIONS
Bachelor of Science (Information Technology)
B.Sc. (IT)

- **Sem.** :3
- **Subject Code** :05BS0304
- **Subject** : Operating System
- **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	**Operating System Overview:** Introduction, Operating System Objectives and functions, Evolution of Operating System, Major achievements, Characteristics of Modern Operating System, Functions of Kernel and shell	8
2	**Process Management and Thread Management:** **Process Management:** Process, Process States, Process Description, Process control **Scheduling:** Types of processor scheduling, Scheduling algorithms **Thread management:** Processes and Threads: Multithreading, Thread Functionality, Process Vs. Threads, User level threads and kernel level threads	12
3	**Concurrency & Deadlocks** **Concurrency:** Key terms related to concurrency, Principles of Concurrency: Requirements of mutual	10

	exclusion, Semaphores **Deadlocks:** Principles Of Deadlock, Deadlock Prevention, Deadlock avoidance, Deadlock Detection, Dinning philosophers problem: Solution using semaphores	
4	**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, Address translation in combined paging segmentation. Operating System Software : Replacement Policy	**10**
5	**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**

Course Outcomes :

Students will be able to

1. Understand the structure and components of Operating System
2. Analyze process and concurrency problem.
3. Understand the working of main memory and virtual memory.
4. Apply various scheduling policies
5. Understand the management of files and I/O devices.

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Course Outcomes – Program Outcomes Mapping Table :

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	H					H	M	M
CO2	H	H				M	M	M
CO3	H	H				M	M	M
CO4	H	H				M	M	M
CO5	H	H				M	M	M

Text Book :

1. "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. "Unix Shell Programming ", Yashvant Kanetkar , BPB Publications , 1st edition.
4. "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

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

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

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PRACTICALS

Unit No	List of Practicals
1	Perform following commands: **Utility Commands:**ps , ls , date , cal , who , uname , pwd, man (getting help) **File and Directory Management Commands:**cat , wc , mkdir , cd , rmdir, mv, rm, sort , find , head , tail, cut ,cp, paste , chmod, diff , grep, sed
2	**Basics Of Shell Programming and Conditional statements :** 1. Create a shell script to print ”Hello”. 2. Write shell script to accept numbers and perform addition, subtraction, multiplication and division. 3. Write a script to calculate gross salary for any number of employees Gross Salary =Basic + HRA + DA.HRA=10% and DA= 15%. 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.
3	**Looping statements:** 1. Write a script for generating a mark sheet after reading data through command line arguments. 2. Create a shell script to reverse the digits of a given 5-digit number. (for eg. , if the no. is 57429 then answer is 92475). 3. Write a script to find the smallest of three numbers as well as largest among three numbers. 4. Write a script to display all the even numbers from 1 to 100.

	5. Write a script to find the square of odd numbers from numbers 1 to 100.
4	**File and Directory Management:** 1. Create a Shell script to read and display content of a file. 2. Fetch the data from file and display data into another file in reverse order. 3.Accept the filename and display the last modification time if file exists, otherwise display appropriate message. 4. Create a Shell script to find numbers of characters, words & lines of a given input file. 5. Write a script to delete zero sized files from a given directory (and all its sub-directories).
5	**File and Directory Management:** 1. Write a script to display the directory in the descending order of the size of each file. 2. 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 3. 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. 4. Write a shell script to check whether the named user is currently logged in or not. 5. Write a script to broadcast a message to a group of users who are currently logged in.