**NIRMA UNIVERSITY**

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| **Institute:** | Institute of Technology |
| **Name of Programme:** | B.Tech.(CSE), Integrated B.Tech. (CSE)-MBA |
| **Course Code:** | 2CS506 |
| **Course Title:** | Operating Systems |
| **Course Type:** | Core |
| **Year of Introduction:** | 2023-24 |

| L | T | Practical Component | | | | C |
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**Course Learning Outcomes (CLO):**

At the end of the course, students will be able to –

1. explain the services and functionalities of operating systems (BL- 2)
2. apply the concepts of processes and memory management for problem solving (BL-3)
3. appraise the mechanisms of operating systems to handle I/O devices and file management (BL-4)
4. make use of shell scripts to demonstrate various concepts of operating system (BL-3)

**Syllabus:** **Total Teaching hours: 30**

| Unit | Syllabus | Teaching hours |
|---|---|---|
| Unit-I | **Introduction to Operating System:** Operating system services, Operating system objectives, and functions, types of operating system | 03 |
| Unit-II | **Process Management:** Process states, process description, process control, process control block, scheduling algorithms, performance evaluation of the algorithms | 08 |
| Unit-III | **Threads and Concurrency:** Threads, Mutual exclusion, inter-process communication, deadlock | 07 |
| Unit-IV | **Memory Management:** Memory management requirements, partitioning, paging, segmentation, virtual memory | 08 |
| Unit-V | **I/O Management and Files:** disk scheduling, RAID, file management | 04 |

Self-Study: The self-study contents will be declared at the commencement of semester. Around 10% of the questions will be asked from self-study contents

Suggested Readings/ References:


1. A.S.Tannenbaum, Modern Operating Systems, TMH Publications.
2. William Stallings, Operating Systems, PHI.
3. Silberschiltz, Galvin and Greg Gange, Operating System, Willey India.
4. Peterson, Operating System Concepts, Addition-Wesley

Longman Publishing Co.
5. Milan Milenkovic, Operating System Design & Concepts, Mc Graw Hill.
6. Sumitabha Das,UNIX : Concepts and Applications, McGraw Hill Education
7. Yashwant Kanetkar, UNIX Shell Programming, BPB Publications

Suggested List of Experiments:

| Sr. No. | Title | Hours |
|---|---|---|
| 1 | a) Getting acquainted with basic UNIX commands.<br>b) Getting acquainted with UNIX filters. | 04 |
| 2 | Write a shell script for performing the functions of a basic calculator. (Using decision-making, case-control structure, and bc command). | 02 |
| 3 | a) Write a shell script to compare the contents of two files.<br>b) Write a shell script to generate all the combinations of 1, 2 and 3. | 02 |
| 4 | (a)Write a shell script to keep on accepting lines of text and write the text into a data file until the user inputs "end". The script should count the number of lines input and display them.<br>(b) Write a shell script which receives two filenames as arguments and compare two files and delete the second file if both files are same | 02 |
| 5 | Write a shell script that imitates head and tail commands (without using head and tail commands). | 02 |
| 6 | a) Write a shell script to delete all the lines containing the word entered by the user in the files supplied as arguments to this shell script.<br>b) Write a shell script to concatenate all given file into a single file. | 02 |
| 7 | Write a shell script for implementing directory management. | 04 |
| 8 | Write a shell script for performing basic functions related to information retrieval. | 04 |
| 9 | Write a C program to implement a system call using the fork () and Exec () function. | 04 |
| 10 | Write a C program to implement grep command. | 04 |

Suggested Case List: -NA-