

Gujarat University
K. S. School of Business Management and Information Technology
[Five Years' (Full – Time) M.Sc. (CA&IT) Integrated Degree Course]
Second Year M.Sc. (CA&IT) (Semester - III)

Course Name: Operating System Concepts-Practical

Course Code: DSC-C-IMSCIT-233P

Course Credit: 4

Objective:

Understanding the fundamental concepts and practical aspects of operating systems. The practical components of the subject aims to equip students with the skills necessary to work with operating systems, perform system administration tasks, develop system-level programs, and apply algorithms for process management, synchronization, deadlock avoidance and file system operations.

Course Outcomes:

- Enhance problem-solving abilities by applying algorithms and techniques for process synchronization, deadlock avoidance, and process scheduling.
- Demonstrate proficiency in programming using C language in a Linux environment, including process creation, termination, synchronization, and file system operations.
- Gain hands-on experience in managing system resources, including processes, memory, files, and permissions, using shell commands and system utilities.

Contents:

Unit No.	Course Content	Hours	Credits
1	Basics of Linux Environment Introduction to C Programming in Linux Process Creation in Linux: fork() and exec() functions Process Termination: exit() function and termination status Write C programs to demonstrate process creation and termination. Implement parent-child process communication using pipes.	30	1
2	Implement Process Synchronization Solve producer-consumer synchronization problems. Solve reader-writer synchronization problems. Solve Dining Philosopher problems. Implement Banker's Algorithm for Deadlock Avoidance	30	1
3	Implement Process Scheduling Algorithms Using C Programs Compare and analyze the performance of different scheduling algorithms.	30	1

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4	File system, File handling commands & Filters: pwd, cd, mkdir,rmdir, ls, cat, cp, rm, mv, more, wc, cmp,comm,diff File Attributes and permissions: chmod, chown, chgrp, umask, ls The Shell: Input and Output redirection, Quoting and Escaping, command substitution, Pattern matching, wild-card characters. Simple Filters: pr, head, tail, cut, paste, sort with various options, uniq, tr. Filters using Regular Expressions: grep, Basic Regular Expression (BRE), Extended Regular Expression (ERE), Sed:-Line and context Addressing, using multiple instructions, substitution.	30	1
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Reference Books:

1. Linux System Programming by Robert Love
2. Unix and Linux System Administration Handbook by Evi Nemeth, Garth Snyder, Trent R. Hein, and Ben Whaley
3. Advanced Programming in the Unix Environment by W. Richard Stevens and Stephen A. Rago
4. Operating Systems (5th Ed) – Internals and Design Principles by William Stallings, Prentice Hall India,

Accomplishments of the student after completing the Course:-

- Developed a strong foundation in operating system concepts and practical skills in Linux environment usage and system programming.
- Acquired proficiency in C programming for implementing process management, synchronization, and scheduling algorithms.
- Gained hands-on experience in solving synchronization problems, implementing deadlock avoidance strategies, and analyzing scheduling algorithms' performance.
- Mastered file system operations, file handling commands, and shell scripting for system administration tasks.
- Acquired skills in using regular expressions and filters for efficient text processing and data manipulation tasks.