

# Hemchandracharya North Gujarat University, Patan

## B.E. SEMESTER – IV (CE)

### CE401: OPERATING SYSTEM

#### Teaching Scheme

Theory 4 hrs/week  
Tutorial -  
Practical 02 hrs/week  
Total 06 hrs/week

#### Examination Scheme

Theory 100 Marks  
Practical 25 Marks  
Term Work 25 Marks  
Total 150 Marks

1. **Introduction:** What is an OS?, Evolution Of OS, OS Services, Types Of OS, Concepts of OS, Different Views Of OS
2. **Process Management:** Process, Process Control Block, Process States, Threads, Types of Threads, Multithreading.
3. **Interprocess Communication:** Race Conditions, Critical Section, Mutual Exclusion, Hardware Solution, Strict Alternation, Peterson's Solution, The Producer Consumer Problem, Semaphores, Event Counters, Monitors, Message Passing, Classical IPC Problems: Reader's & Writer Problem, Dining Philosopher Problem etc., Scheduling, Scheduling Algorithms.
4. **Deadlock:** Deadlock Problem, Deadlock Characterization, Deadlock Detection, Deadlock recovery, Deadlock avoidance: Banker's algorithm for single & multiple resources, Deadlock Prevention.
5. **Memory Management:** Paging: Principle of Operation, Page Allocation, H/W Support For Paging, Multiprogramming With Fixed partitions, Segmentation, Swapping, Virtual Memory: Concept, Performance of Demand Paging, Page Replacement Algorithms, Thrashing, Locality.
6. **Input Output Management** Principles of Input/Output H/W: I/O Devices, Device Controllers, Direct Memory Access, Principles of Input/Output S/W: Goals of the I/O S/W, Interrupt Handler, Device Driver, Device Independent I/O Software Disks: RAID levels, Disk Arm Scheduling Algorithm, Error Handling
7. **File Systems Files:** File Naming, File Structure, File Types, File Access, File Attributes, File Operations, Memory Mapped Files, Directories: Hierarchical Directory System, Pathnames, Directory Operations, File System Implementation
8. **Implementing Files:** Contiguous Allocation, Linked List Allocation, Linked List Using Index, Inodes, Implementing Directories In C, MS-DOS, UNIX. Shared Files, Disk Space Mgmt, File System Reliability, File System Performance
9. **Security:** Security Environment, Design Principles Of Security, User Authentication, Protection Mechanism: Protection Domain, Access Control List
10. **Case Study:** UNIX, Linux, Windows 2000.
11. Unix/Linux Operating System Development Of Unix/Linux, Role Of Kernel & Function Of Kernel, System Calls, Elementary Shell Programming, Directory Structure, System Administration
12. Introduction to Multiprocessor and Distributed Operating System

#### **Reference Books:**

1. Modern Operating Systems -By Andrew S. Tanenbaum (PHI)
2. Operating System – Internals & Design Principles -By William Stallings (PHI)
3. Operating Systems By D.M.Dhamdhare (TMH)
4. Unix System Concepts & Applications By Sumitabha Das (TMH)
5. Unix Shell Programming By Yashwant Kanitkar