

Operating System

Lectures: 4Hrs/week

Practical: 3 Hrs/week

One paper 100 marks/3Hrs

Practical exam: 50 marks

Term Work: 25 marks

- 1. System software** 2 hrs
 - Overview of all system software
 - Operating system
 - I/O Manager
 - Assembler
 - Compiler
 - Linker
 - Loader

- 2 Fundamentals of OS** 3 hrs
 - OS services and components
 - multitasking
 - multiprogramming
 - time sharing
 - buffering
 - spooling

- 3 Process & thread management** 5 hrs
 - Concept of process and threads
 - process states
 - process management
 - context switching
 - interaction between processes and OS
 - multithreading

- 4 Concurrency control** 7 hrs
 - Concurrency and race conditions
 - mutual exclusion requirements
 - s/w and h/w solutions
 - semaphores
 - monitors
 - classical IPC problem and solutions
 - Dead locks - characterization , detection ,recovery, avoidance and prevention7 hrs

- 5 Memory management**
 - Memory partitioning
 - swapping
 - paging
 - segmentation
 - virtual memory - Concepts, Overlays, Demand paging, Performance of demand paging
 - page replacement algorithm
 - Allocation algorithms

- 6 I/O Systems** 7 hrs
 - **Principles of I/O hardware**
 - I/O devices
 - device controller
 - direct memory access
 - **Principles of I/O software**
 - Goals
 - interrupt handlers

- device drivers
- device independent I/O software
- **Secondary-storage structure**
 - Disk structure
 - Disk scheduling
 - Disk Management
 - Swap-space management
 - Disk reliability
 - Stable storage implementation
- **Introduction to cloc**
 - Clock hardware
 - Clock software

7 File Systems

5 hrs

- File concept
- File support
- Access methods
- Allocation methods
- Directory systems
- File Protection
- Free Space management

8 Protection & security

4 hrs

- **Protection**
 - Goals of protection
 - Domain of protection
 - Access matrix
 - Implementation of access matrix
 - Revocation of access rights
- **Security**
 - the security problem
 - authentication
 - one-time passwords
 - program threats
 - System threats
 - Threat monitoring
 - Encryption
 - Computer-security classification

9 Linux System

5 hrs

- Linux introduction and file system - Basic features, advt, installing requirements, basic architecture of unix/linux system, kernel, shell(understanding shell)
- Commands for files & directories: cd, ls, cp, md, rm, mkdir, rmdir, more, less. Creating and viewing files using cat. File comparisons. Disk related commands: checking disk free spaces. Processes in linux, process fundamentals, connecting processes with pipes, redirecting i/p o/p, background processing, managing multiple processes. Manual help. Background process: changing process priority, scheduling of processes at command, batch commands, kill, ps, who, sleep. Printing commands, grep, fgrep, find, sort, cal, banner, touch, file. File related commands ws, sat, cut, grep, dd. Mathematical commands bc, expr, factor, units. vi, joe, vim editor
- Shell Programming (SP) Basic of shell programming, various types of shell, Shell Programming in bash, conditional & looping statement, case statements, parameter passing and arguments, shell variables, shell keywords, creating shell programs for automate system tasks, report printing, use of grep in shell, awk programming

Term work/ Practical: Each candidate will submit a journal in which at least 10 practical assignments based on the above syllabus along with the flow chart and program listing will be submitted with the internal test paper. Test graded for 10 marks and Practical graded for 15 marks.

References:

1. Operating Systems Achyut S. Godbole Tata Mc Graw Hill 2nd Ed.
2. Operating Systems D. M. Dhamdhare Tata Mc Graw Hill 2nd Ed.
3. Understanding Operating System Flynn & Metioes Thomsan 4th Ed.
4. Operating Systems Design & Implementation Andrew Tanenbam, Albert S. Woodhull Pearson
5. Operating System Concepts Silberschatz & Galvin Wiley 2000 7th Ed.
6. Operating System(5th) – Internals & Design Principles by William Stallings, Prentice Hall, 2000
7. Operating System Concepts James Peterson, Abraham Silberschatz, Addison-Wesley 2nd Ed.
8. Computer Organization & Architecture William Stallings, Prentice Hall India, 1996
9. Modern Operating Systems Andrew Tanenbam, Prentice Hall India, 1992
10. Unix – Sumitaba Das
11. Unix Shell Programming – Yashwant Kanitkar, BPB publications.