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Operating Systems — Complete Syllabus

BTEUP Diploma in Computer Science & Engineering • 3rd Semester • Session 2026–27

Subject 3.1 (Theory) + 3.5 (Lab) • Total 200 Marks • 4 Credits

About this document: Operating Systems appears twice in the 3rd semester — as a theory paper (3.1) and as a lab (3.5). Both are covered here, completely, in the official order.

Examination Scheme

Code	Paper	Type	L - P	Credits	Internal	External	Total
3.1	Operating Systems	Theory	3 - 0	3	Theory 40	Theory 60 (3 hrs)	100
3.5	Operating Systems (Lab)	Practical	0 - 2	1	Practical 60	Practical 40 (3 hrs)	100
Operating Systems Total				4	100	100	200

What This Subject Aims To Do

To give a general introduction to how operating systems are actually built — the ideas behind them and the choices available — so that you can compare different designs and judge the trade-offs between them. By the end you should be able to: explain the functional architecture of an OS; explain process management and compare CPU scheduling algorithms; explain memory management; explain the I/O system and compare disk scheduling algorithms; and classify file systems and directory implementations.

Unit-Wise Complete Topic List

Unit	Topic	Periods	Marks Share
1	Overview of Operating System	6	14%
2	Process Management	10	25%
3	Memory Management	10	25%
4	I/O System	8	18%
5	File Management	8	18%

Unit 1 — Overview of Operating System (6 Periods, 14%)

Topics: Introduction; different types of operating systems; functions and services of an OS; UNIX/Linux architecture; kernel; services and system calls; system programs.

In simple words: What an operating system is, what jobs it does, and how it is built inside — the kernel, system calls, and the UNIX/Linux way of organising it all.

Unit 2 — Process Management (10 Periods, 25%)

Topics: Process concepts; operations on processes; CPU scheduling; scheduling algorithms; IPC (inter-process communication); process synchronisation; critical section; deadlock — condition, avoidance and prevention.

In simple words: A running program is a process, and a computer juggles many at once. How the CPU is shared fairly, how processes share data safely, and the deadlock problem — when processes wait forever on each other — and how to avoid or prevent it.

Unit 3 — Memory Management (10 Periods, 25%)

Topics: Memory allocation; First Fit, Best Fit and Worst Fit; swapping; paging and segmentation; page faults; page replacement algorithms; fragmentation and compaction; concept of virtual memory.

In simple words: RAM is limited, so the OS must decide which process gets which part of memory — allocation strategies, paging, page faults and replacement, fragmentation, and virtual memory, the trick that lets programs behave as if they have more memory than the machine really has.

Unit 4 — I/O System (8 Periods, 18%)

Topics: Mass storage structure — overview; disk structure; disk attachment; disk scheduling algorithms; swap space management; RAID types.

In simple words: Storage hardware, mainly hard disks: how a disk is organised, how the OS orders disk requests, how swap space is managed, and RAID — combining several disks for speed or safety.

Unit 5 — File Management (8 Periods, 18%)

Topics: Concept of a file; access methods; directory structure; file system mounting; file sharing and protection; file system structure and implementation; directory implementation; free-space management; efficiency and performance; different types of file systems.

In simple words: Files and folders look simple to a user, but underneath the OS must organise them, find them fast, share them safely, protect them, and track free disk space.

Practical Work

- Practice of various Linux/Unix commands — man, cp, mv, ln, rm, unlink, mkdir, rmdir, etc.
- Format and install the Windows Operating System.
- Use Task Manager to monitor and terminate processes; understand process priorities.
- Simulate CPU scheduling algorithms: FCFS, SJF, Round Robin, Priority.
- Simulate the Dining Philosophers problem.
- Simulate Banker's Algorithm for Deadlock Avoidance.
- Simulate Banker's Algorithm for Deadlock Prevention.
- Simulate contiguous memory allocation: Worst Fit, Best Fit, First Fit.
- Simulate page replacement algorithms: FIFO, LRU, Optimal.
- Simulate disk scheduling algorithms: FCFS, SCAN, C-SCAN.
- Simulate file organisation techniques: Single-level directory, Two-level directory.
- Simulate file allocation strategies: Sequential, Indexed, Linked.

Reference Books (as listed in the syllabus)

- Operating System Concepts — Silberschatz and Galvin, Wiley India
- UNIX Concepts and Applications — Sumitabha Das, McGraw-Hill Education
- Operating Systems, Internals and Design Principles — Stallings, Pearson Education, India
- Operating System Concepts — Ekta Walia, Khanna Publishing House
- Modern Operating Systems — Andrew S. Tanenbaum, Prentice Hall of India

KAMALDNP • kamaldnp.com • support@kamaldnp.com • +91 8318013442 • Varanasi, UP

Source: BTEUP 2nd Year curriculum (folder2627), approved in C.D.C. meeting held on 16.07.2026. Topic lists follow the official syllabus; short explanations are the author's own plain-English summaries, not syllabus text.

Please confirm with your own polytechnic for any local changes.

