INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPT./CENTRE: **Electronics and Computer Engineering**

1. Subject Code: **EC - 353** Course Title: **Operating Systems**

2. Contact Hours: **L: 3** **T: 1** **P: 2**

3. Examination Duration (Hrs.): **Theory** 0 | 3 **Practical** 0 | 0

4. Relative Weightage: **CWS** 15 **PRS** 15 **MTE** 30 **ETE** 40 **PRE** 00

5. Credits: 0 | 5 6. Semester √ **Autumn** ☐ **Spring** ☐ **Both**

7. Pre-requisite: **EC-252**

8. Subject Area: **DCC**

9. Objective: To provide an understanding of the functions and modules of an operating system and study the concepts underlying its design and implementation.

10. Details of the Course:

Sl. No.	Contents	Contact Hours
1.	**Fundamental Concepts of Operating System:** Operating system functions and characteristics, historical evolution of operating systems, issuess in operating system design.	5
2.	**Process Management:** Process abstraction, process address space, process management, system calls, threads, process hierarchy.	6
3.	**CPU Scheduling:** Levels of scheduling, comparative study of scheduling algorithms, multiple processor scheduling.	4
4.	**Deadlocks:** Characterization, prevention and avoidance, deadlock detection and recovery.	4
5.	**Concurrent Processes:** Critical section problem, semaphores, monitors, inter-process communication, message passing mechanisms.	5
6.	**Memory Management:** Storage allocation methods, virtual memory concept, demand paging, page replacement algorithms, segmentation, thrashing.	5
7.	**File Systems:** Functions, file access and allocation methods, directory system, file protection mechanisms, implementation issues, file system hierarchy.	5
8.	**Device Management:** Hardware organization, device scheduling policies, device drivers.	5

9.	**Case Studies:** Windows, Unix, Linux.	3
	Total	**42**
	Laboratory component Creating processes in Unix with commands like Fork and Exec; Pipes and process communication; Performance study of various CPU scheduling algorithms; Process synchronization using semaphores, and threading.	**14x2**

11. Suggested Books:

Sl. No.	Name of Books / Authors	Year of Publication
1.	Silberscharz, A. and Galvin, P.B., "Operating System Concepts", 7th Ed., Addison-Wesley.	2006
2.	Tanenbaum, A., "Modern Operating Systems", Prentice-Hall of India.	2004
3.	Nutt, G., "Operating Systems", Addison-Wesley.	2004
4.	Joshi, R. C. and Tapaswi, S., "Operating Systems", Wiley Dreamtech.	2005