

1. Programme	:	Bachelor of Science in Computer Science (B.Sc.)
2. Department	:	Computer Science
3. Course Title	:	Operating System
4. Course Code	:	351 CS 34
5. Course Duration	:	Semester III
6. Lecturer Hours per Week	:	3
Tutorial Hours per Week	:	-
Practical Hours per Week	:	2
7. Course Credit	:	15
8. Methods of Assessment	:	Assignments 20%
		Continuous Assessment Test 20%
		End Semester Examination 60%

9. Course Description:

This course is an introduction to the concept behind modern computer operating systems. Topics will include what an operating system does (and doesn't) do, system calls and interfaces, processes, concurrent programming, resource scheduling and management (of the CPU, memory, etc.), virtual memory, deadlocks, distributed systems and algorithms, networked computing and programming, and security.

10. Aim of the Course:

The aim is to introduce students to basic functions and the theoretical underpinnings of modern operating systems

11. Learning Objectives:

At the end of the course students will be able to:

- Explain the services provided by and the design of an operating system;
- Discuss the structure and organization of the file system;
- Explain what a process is and how processes are synchronized and scheduled;
- Discuss different approaches to memory management;
- Discuss use system calls for managing processes, memory and the file system;
- Explain the data structures and algorithms used to implement an OS.

12. Topics of Study:

Unit I Introduction:

Views - Goals - OS Structure - Components - Services – system calls - System Structure - Virtual Machines - System Design and Implementation. Process Management: Introduction - Process - Process Scheduling – Operations on processes - Cooperating Process - Inter-process Communication. – Threads.

Unit II CPU Scheduling:

CPU Schedulers - Scheduling Criteria - Scheduling Algorithms. Process Synchronization: Critical - Section Problem – Semaphores. Deadlocks: Characterization - Methods for Handling Deadlocks - Deadlock Prevention - Avoidance - Detection - Recovery.

Unit III Memory Management:

Introduction- Address Binding - Dynamic Loading and Linking - Overlays - Logical and Physical Address Space – swapping - Contiguous Allocation - Internal & External Fragmentation. Non Contiguous Allocation: Paging and Segmentation Schemes.

Unit IV Virtual Memory:

Demand Paging - Page Replacement - Page Replacement Algorithms - Thrashing. File System: Introduction - File Concepts -. Access Methods - Directory Structures – Protection.

Unit V File System:

Structures - Allocation Methods - Free Space Management. I/O System: Introduction - I/O Hardware - Application I/O Interface - Kernel I/O Subsystem - Disk Structure – Disk Scheduling - Disk Management – Swap-Space Management.

13. Mode of Assessment:

Attendance is Compulsory. A student should secure 85% of attendance in the course to be eligible for appearing End Semester Examination. Minimum 2 assignments carrying 10 marks each shall be submitted for evaluation (Refer Assignment Policy). 2 Continuous Assessment Test covering 2.5 units are conducted at 6th week and 12th week respectively for 10 marks each. There shall be a End Semester Examination at the end of 15th week covering all 5 units for a 3 hour duration and evaluated for 60 marks. (Refer Examination Guidelines).

14. Prescribed Textbooks:

1. Tanenbaum S. Andrew, 2008, Modern Operating Systems, Third Edition, Prentice-Hall Inc, New Delhi.
2. Stallings William, 2011, Operating Systems, Seventh Edition, Pearson Education, New Delhi.
3. Dietel H.M, 2004, Operating System. 3rd Edition. Pearson Education, New Delhi
4. Silberschatz Abraham, Galvin Baer Peter and Gagne Greg, 2012, Operating System Concepts, Ninth Edition, John Wiley & Sons Pvt. Ltd.
5. Naresh Chauhan, 2014, Principles of Operating Systems, Oxford University Press

15. Reference Materials:

1. Dhamdhare D.M, 2007, Operating Systems A concept - based Approach, 2nd Edition, TMH, New Delhi
2. Stuart B. L, 2008, Principles of Operating Systems, Cengage learning, India Edition, New Delhi.
3. Godbole A.S, 2009, Operating Systems, 2nd Edition, TMH, New Delhi.

4. Pramod Chandra P. Bhatt, 2007, An Introduction to Operating Systems, 2nd Edition, Prentice Hall India, New Delhi.