



MARRI LAXMAN REDDY INSTITUTE OF TECHNOLOGY AND MANAGEMENT

(AN AUTONOMOUS INSTITUTION)

(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)

Accredited by NAAC with 'A' Grade & Recognized Under Section 2(f) & 12(B) of the UGC act, 1956

COURSE CONTENT

OPERATING SYSTEMS

III Semester: CSM

IV Semester: CSD / CSE

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P		CIA	SEE	Total
24X0510	Core							
		3	0	0	3	40	60	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil			Total Classes: 45			

Prerequisites: Problem solving Using c and c++

Course Overview:

Operating Systems course provides theoretical knowledge about the structure of operating systems, process, memory management and virtual memory implementation principles, input-output management and deadlock avoidance, file system structure. The Operating System manages the computer's software and hardware as well as its memory and processes. Computer operating systems also allow users to see information, create and save files, and use applications such as email and web browsers. Various applications of operating systems include security, job accounting, error detection aids, coordination between other software's and users.

Course Objectives:

1. Describes functionalities of main components in operating systems.
2. Analyze the algorithms used in process management.
3. Gives synchronization and deadlock concepts.
4. Analyze the algorithms used in memory management.
5. Interpret the concepts of input and output storage for file management

Course Outcomes: After Completion of the Course, Students should be able to

- Explain the fundamental concepts of operating systems including system organization, architecture, OS structure, services, and various types of system calls.
- Analyze process management mechanisms including process scheduling algorithms, multithreading models, inter-process communication, and multiprocessor scheduling.
- Apply synchronization techniques and deadlock handling methods for solving critical section problems and ensure safe process execution in concurrent systems.
- Demonstrate understanding of memory management techniques including paging, segmentation, virtual memory, demand paging, and page replacement algorithms.
- Describe file system concepts including file organization, directory structures, allocation methods, free-space management, performance optimization, recovery mechanisms, and distributed file systems like NFS.

Module-I

[10]

Operating System Introduction: What is an operating system do, computer system organization, computer system architecture, operating system structure- operating system operations, process management, memory management, operating system services, System

Calls, types of system calls.

Module –II

[9]

Process: process concepts, process scheduling, operations on processes, Interprocesses communication, multithreading models, thread libraries. Process Scheduling: Scheduling criteria, scheduling algorithms, thread scheduling MultipleProcessor Scheduling.

Module –III

[9]

Deadlocks- System Model, Deadlocks Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, and Recovery from Deadlock. Synchronization: background, the critical section problem, peter’s solution, Synchronization hardware, semaphores, Classical Problems of Synchronization, Monitors.

Module –IV

[8]

Memory Management and Virtual Memory –background, Swapping, Contiguous Allocation, Paging structure of the page table, Segmentation. Virtual memory: background, demand paging page replacement allocation of frames thrashing.

Module –V

[8]

File System : File system and implementing file system, file concept access methods, directory and file system structure, File system implementation, Directory implementation, Allocation methods, Free-space Management, efficiency and performance, recovery, NFS.

TEXT BOOKS:

1. Operating System Principles- Abraham Silberchatz, Peter B. Galvin,Greg Gagne 7th Edition, JohnWiley
2. Advanced programming in the Unix environment, W.R.Stevens, Pearson education.

REFERENCE BOOKS:

1. Operating Systems – Internals and Design Principles, Stallings, 5th Edition, Pearson Education/PHI,2005.
2. Operating System A Design Approach-Crowley,TMH
3. Modern Operating Systems, Andrew S Tanenbaum 2nd edition, Pearson/PHI
4. Unix programming environment, Kernighan and Pike, PHI. / Pearson Education
5. Unix Internals The New Frontiers, U.Vahalia, Pearson Education

ELECTRONIC RESOURCES:

1. <https://www.geeksforgeeks.org/operating-systems/operating-systems/>
2. <https://www.guvi.in/hub/operating-system-tutorial/>
3. <https://www.w3schools.in/operating-system/intro>
4. https://en.wikipedia.org/wiki/Operating_system
5. <https://pdos.csail.mit.edu/6.828/>

MATERIALS ONLINE:

1. Course template
2. Tutorial question bank
3. Tech talk and Concept Video topics
4. Open-ended experiments
5. Definitions and terminology
6. Assignments
7. Model question paper – I
8. Model question paper – II
9. Lecture notes
10. E-Learning Readiness Videos