

राष्ट्रीय प्रौद्योगिकी संस्थान पटना / NATIONAL INSTITUE OF TECHNOLOGY PATNA

संगणक विज्ञान एंव अभियांत्रिकी विभाग / DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING अशोक राजपथ, पटना-८०००५, बिहार / ASHOK RAJPATH. PATNA-800005, BIHAR

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| No:- | Date: |
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CS34111 Operating Systems

L-T-P-Cr: 3-0-2-4

Pre-requisites: Algorithms and computer organizational architecture

Objectives:

- To understand concepts of OS, process & process scheduling.
- To understand process synchronization and deadlocks handling methods.
- To learn about File Systems, Disk Management and Memory Management.

Course Outcomes:

| S.NO | Outcomes | Mapping to PO |
|------|--|----------------|
| CO-1 | Familiarize with the basic concepts of OS, process, process scheduling | PO1, PO2, PO3 |
| CO-2 | Learn about process synchronization and deadlock handling methods | PO2, PO3, PO4, |
| CO-3 | Understand the concept of memory management and virtual memory | PO2, PO3 |
| CO-4 | Learn about various file systems and disk management techniques | PO2, PO3, PO4 |

UNIT I Lectures: 14

Introduction: Introduction to OS. Operating system functions, evaluation of O.S., Different types of O.S.: batch, multi-programmed, time-sharing, real-time, distributed, parallel.

Processes: Concept of processes, process scheduling, operations on processes, inter-process communication, Communication in Client-Server Systems, overview & benefits of threads.

Process scheduling: scheduling criteria, preemptive & non-preemptive scheduling, scheduling algorithms.

UNIT II Lectures: 10

Process Synchronization: background, critical section problem, critical region, synchronization hardware, classical problems of synchronization, semaphores.

Deadlocks: system model, deadlock characterization, methods for handling deadlocks, deadlock prevention, deadlock avoidance, deadlock detection, recovery from deadlock.

UNIT III Lectures: 10

Memory Management: background, logical vs. physical address space, swapping, contiguous memory allocation, paging, segmentation.

Virtual Memory: background, demand paging, page replacement, page replacement algorithms, allocation of frames, thrashing.

UNIT IV Lectures: 8

File Systems: File concept, access methods, directory structure

Disk Management: disk structure, disk scheduling (FCFS, SSTF, SCAN, C-SCAN)

Text/Reference Books:

- 1) Operating System Principles by Silberschatz A. and Peterson J. L., Wiley
- 2) Operating Systems by Dhamdhere, TMH
- 3) Operating Systems by Deitel, Deitel & Choffnes.
- 4) Operating Systems by Stalling, Pearson