|  |  |
| --- | --- |
| MONO | **DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING**  **NATIONAL INSTITUTE OF TECHNOLOGY PATNA**  Ashok Raj Path, PATNA 800 005 (Bihar), India |
| Phone No.: 0612 – 2372715, 2370419, 2370843, 2371929, 2371930, 2371715 Fax – 0612- 2670631 Website: [www.nitp.ac.in](http://www.nitp.ac.in/) |

***CS4404 Operating Systems***

**L-T-P-Cr: 3-1-0-4**

**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