



Department of Computer Science & Engineering

National Institute of Technology, Jamshedpur

(An Institution of national importance under MHRD, Govt. of India)

SPRING SEMESTER (B.Tech 4th Sem.) 2019 - 2020

Course Handout

Course No.	: CS1404
Course Title	: Operating System (3-1-0)
Credit	: 4
Instructor-In-Charge	: Dr. Subrata Dutta

COURSE OBJECTIVE:

An operating system is the most important software that runs on a computer. It manages the computer's memory and processes, as well as all of its software and hardware. It also allows you to communicate with the computer without knowing how to speak the computer's language.

PREREQUISITES:

Student needs to know the basic computer fundamentals and any Programming language.

Sl no	Topic	No of lecture
1	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.	1-5
2	System Structure Computer system operation, I/O structure, storage structure, storage hierarchy, different types of protections, operating system structure (simple, layered, virtual machine), O/S services, system calls.	6-15
3	Process Management Processes: Concept of processes, process scheduling, operations on processes, co-operating processes, inter-process communication.	16-30

	<p>Threads : overview, benefits of threads, user and kernel threads.</p> <p>CPU scheduling: scheduling criteria, preemptive & non-preemptive scheduling, scheduling algorithms (FCFS, SJF, RR, priority), algorithm evaluation, multi-processor scheduling.</p> <p>Process Synchronization: background, critical section problem, critical region, synchronization hardware, classical problems of synchronization, semaphores.</p> <p>Deadlocks: system model, deadlock characterization, methods for handling deadlocks, deadlock prevention, deadlock avoidance, deadlock detection, recovery from deadlock</p>	
4	<p>Storage Management</p> <p>Memory Management: background, logical vs. physical address space, swapping, contiguous memory allocation, paging, segmentation, segmentation with paging.</p> <p>Virtual Memory: background, demand paging, performance, page replacement, page replacement algorithms (FCFS, LRU), allocation of frames, thrashing.</p> <p>File Systems: file concept, access methods, directory structure, file system structure, allocation methods (contiguous, linked, indexed), free-space management (bit vector, linked list, grouping), directory implementation (linear list, hash table), efficiency & performance.</p> <p>I/O Management : I/O hardware, polling, interrupts, DMA, application I/O interface (block and character devices, network devices, clocks and timers, blocking and nonblocking I/O), kernel I/O subsystem (scheduling, buffering, caching, spooling and device reservation, error handling), performance.</p> <p>Disk Management: disk structure, disk scheduling (FCFS, SSTF, SCAN,C-SCAN) , disk reliability, disk formatting, boot block, bad blocks.</p>	31-40

Text Books / References :

1. Milenkovic M., "Operating System: Concept & Design", McGraw Hill.
2. Tanenbaum A.S., "Operating System Design & Implementation", Practice Hall NJ.
3. Silberschatz A. and Peterson J. L., "Operating System Concepts", Wiley.
4. Dhamdhare: Operating System TMH
5. Stalling, William, "Operating Systems", Maxwell McMillan International Editions, 1992.
6. Dietel H. N., "An Introduction to Operating Systems", Addison Wesley.

EVALUATION SCHEME:

EC No.	Evaluation Component	Duration	Weightage	Nature of Component
1.	Mid Sem	2 Hrs	30%	Closed Book
2.	End Sem Exam	3 Hrs	50%	Closed Book
3.	Surprise Quizzes/ Project/ Teacher assessment		20%	Presentation/ Take home

Instructor In-Charge