

Department of Computer Science and Engineering			LP: CS16302
B.E/B.Tech	: CS / IT	Regulation : 2016	Rev. No: 00
Sub. Code / Sub. Name	: CS16302 – Operating Systems		Date:27/06/2017
Unit	: I		

Unit Syllabus

Unit I OPERATING SYSTEMS OVERVIEW

9

Computer System Overview-Basic Elements, Instruction Execution, Interrupts, Memory Hierarchy, Cache Memory, Direct Memory Access, Multiprocessor and Multicore Organization. Operating system overview-objectives and functions, Evolution of Operating System.- Computer System Organization- Operating System Structure and Operations- System Calls, System Programs, OS Generation and System Boot.

Objective

Students will study the basic concepts and functions of operating systems and able to understand the structure and functions of OS.

Session No *	Topics to be covered	Ref	Teaching Aids
1	Computer System Overview – Basic Elements, Instruction Execution, Interrupts	T1(Chap-1,P 3-9) R2(Chap-2,P 20-21)	BB/LCD
2	Memory Hierarchy, Cache Memory, Direct Memory Access	T1(Chap-1,P 9-12) R1(Chap-1,P 470-472, 446-448)	BB/LCD
3	Multiprocessor and Multicore Organization.	T1(Chap-1,P 14-16) T2(Chap-1,P 33-35) R2(Chap-6, P 183-193)	BB/LCD
4	Operating system overview-objectives and functions, Evolution of Operating System	T2(Chap-1,P 8-18) R2(Chap-1, P 4-8)	BB/LCD
5	Computer System Organization	T1(Chap-1,P 7-12) R1(Chap-1,P 20 - 34)	BB/LCD
6	Operating System Structure and Operations	T1(Chap-1,P 19-24, 76-84)	BB/LCD
7	System Calls – Process Control, File Management, Device Management, Information Maintenance, Communication,	T1(Chap-2,P 60-71) R1(Chap-1,P 44-56) R2(Chap-3,P 26-29)	BB/LCD
8	System Programs	T1(Chap-2,P 72-75)	BB/LCD
9	OS Generation and System Boot	T1(Chap-2,P 89-91)	BB/LCD

Content beyond syllabus covered (if any): MAC OS & Micro kernel features



Sub. Code / Sub. Name: CS16302 – Operating Systems
Unit : II

Unit Syllabus**Unit II PROCESS MANAGEMENT**

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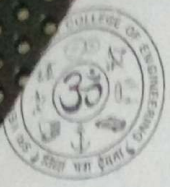
Processes-Process Concept, Process Scheduling, Operations on Processes, Interprocess Communication; Threads- Overview, Multicore Programming, Multithreading Models; Windows 7 - Thread and SMP Management. CPU Scheduling: Scheduling criteria – Scheduling algorithms – Multiple-processor scheduling – Real time scheduling – Algorithm Evaluation. Case study: Process scheduling in Linux.

Objective

Students understand about Processes, Threads and Scheduling algorithms.

Session No *	Topics to be covered	Ref	Teaching Aids
10	Process Concept - The Process, Process State, Process Control Block, Threads, Process Scheduling – Scheduling Queues, Schedulers and Context Switch	T1(Chap-3,P 103-113) T2(Chap-2,P 65-83) R1(Chap-2, P 71-72)	BB/LCD
11	Operations on Processes – Process Creation, Process Termination, Interprocess Communication – Shared Memory System, Message Passing System	T1(Chap-3,P 113-128) T2(Chap-2,P 92-97) R1(Chap-2, P 73-77)	BB/LCD
12	Threads – Overview, Motivation, Benefits Multicore Programming, Multithreading Models – Many-to-One model, One-to-One Model, Many-to-Many Model, Windows 7 Thread and SMP Management.	T1(Chap-4,P 161-169) T2(Chap-4, 134-139) R1(Chap-2, P 81-89)	BB/LCD
13	CPU Scheduling- Basic Concepts, CPU-I/O burst cycle, CPU schedulers, Scheduling Criteria	T1(Chap-5,P 201-206)	BB/LCD
14	Scheduling Algorithms – FCFS, SJF	T1(Chap-5,P 206-210) T2(Chap-8,P 360-379)	BB/LCD
15	Scheduling Algorithms –Priority, Round Robin	T1(Chap-5,P 210-213) T2(Chap-8,P 360-379)	BB/LCD
16	Multi level queue, Multilevel feedback queue scheduling	T1(Chap-5,P 213-217) T2(Chap-8,P 360-379)	BB/LCD
17	Multiple-processor scheduling, Real time scheduling	T2(Chap-9,P 397-423) R4,R5	BB/LCD
18	Case study: Process scheduling in Linux	T2(Chap-9,P 434-435) R6	BB/LCD

Content beyond syllabus covered (if any): SRR Scheduling



Sub. Code / Sub. Name: CS16302 – Operating Systems
Unit : III

Unit Syllabus

9

UNIT III PROCESS SCHEDULING AND SYNCHRONIZATION

Process Synchronization: The critical-section problem – Synchronization hardware – Semaphores – Classic problems of synchronization – critical regions – Monitors. Deadlock: System model – Deadlock characterization – Methods for handling deadlocks – Deadlock prevention – Deadlock avoidance – Deadlock detection – Recovery from deadlock.

Objective

Students acquire knowledge on the principles of concurrency and deadlocks.

Session No *	Topics to be covered	Ref	Teaching Aids
19	Process Synchronization – Background	T1(Chap-6,P 253-256) T2(Chap-4,P 159-169)	BB/LCD
20	Critical-section problem Mutex Locks	T1(Chap-6,P 256-263) T2(Chap-4,P 169-173)	BB/LCD
21	Process Semaphores, Classical Problems of Synchronization, Process Critical regions	T1(Chap-6,P 264-273) T2(Chap-4,P 173-186)	BB/LCD
22	Process Monitors	T1(Chap-6,P 273-282) T2(Chap-4,P 186-192)	BB/LCD
23	Deadlock – System model, Deadlock characterization	T1(Chap-7,P 311-318) T2(Chap-5,P 221-230)	BB/LCD
24	Methods for Handling Deadlocks, Deadlock Prevention	T1(Chap-7,P 318-323) T2(Chap-5,P 230-231)	BB/LCD
25	Deadlock Avoidance	T1(Chap-7,P 323-329) T2(Chap-5,P 232-237)	BB/LCD
26	Deadlock detection	T1(Chap-7,P 329-333) T2(Chap-5,P 238-240)	BB/LCD
27	Recovery from Deadlock	T1(Chap-7,P 333-334)	BB/LCD
Content beyond syllabus covered (if any): Deadlock with various scenarios			

* Session duration: 50 Minutes



Sub. Code / Sub. Name: CS16302 – Operating Systems

Unit : IV

Unit Syllabus

9

Unit IV STORAGE MANAGEMENT

Main Memory-Contiguous Memory Allocation, Segmentation, Paging, 32 and 64 bit architecture Examples; Virtual Memory- Demand Paging, Page Replacement, Allocation, Thrashing; Allocating Kernel Memory, OS Examples.

Objective

To impart a thorough knowledge on various memory management schemes.

Session No *	Topics to be covered	Ref	Teaching Aids
28	Main Memory Contiguous Memory Allocation-Memory Protection, memory allocation, Fragmentation	T1(Chap-8,P 345-358)	BB/LCD
29	Segmentation- Method, Segmentation Hardware	T1(Chap-8,P 358-360) T2(Chap-7,P 320-324)	BB/LCD
30	Paging- Page method, Hardware support, Protection, Structure of page table, Shared pages	T1(Chap-8,P 361-377) T2(Chap-7,P 309-320)	BB/LCD
31	32 and 64 bit architecture Examples	T1(Chap-8,P 377-381)	BB/LCD
32	Virtual Memory-Demand Paging	T1(Chap-9,P 389-399)	BB/LCD
33	Page Replacement- FIFO, Optimal, LRU, Counting based, page buffering	T1(Chap-9,P 401-413) T2(Chap-7,P 326-328)	BB/LCD
34	Allocation of frames – Allocation Algorithms, local versus global replacement, Non-uniform memory access	T1(Chap-9,P 413-417)	BB/LCD
35	Thrashing- Causes, Working set model, page fault frequency	T1(Chap-9,P 417-422)	BB/LCD
36	Allocating Kernel Memory OS Examples- Windows, Solaris	T1(Chap-9,P 437-440)	BB/LCD
Content beyond syllabus covered (if any): Frame allocation in windows, Slab allocator			



Sub. Code / Sub. Name: CS16302 - Operating Systems
Unit : V

Unit Syllabus

Unit V I/O SYSTEMS

9

Mass Storage Structure- Overview, Disk Scheduling and Management; File System Storage-File Concepts, Directory and Disk Structure, Sharing and Protection; File System Implementation- File System Structure, Directory Structure, Allocation Methods, Free Space Management, I/O Systems.

Objective

Students will learn the concepts of I/O management and File systems.

Session No *	Topics to be covered	Ref	Teaching Aids
37	Mass Storage Structure - Overview Disk Scheduling- FCFS, SSTF, SCAN, C-SCAN, Disk Management	T1(Chap-12,P 539-554) T2(Chap-10,P 455-462)	BB/LCD
38	File System Storage - File Concept	T1(Chap-10,P 455-467) T2(Chap-11,P 492-497)	BB/LCD
39	Directory and Disk Structure- Storage Structure, Directory Overview, File System Mounting	T1(Chap-10,P 467-480)	BB/LCD
40	File Sharing- Multiple Users, Remote File System, Consistency Semantics File Protection - Types of Access, Access Control	T1(Chap-10,P 480-490)	BB/LCD
41	File System Implementation-File System Structure, Directory Structure	T1(Chap-11,P 495-505)	BB/LCD
42	Allocation Methods-Contiguous, Linked and Indexed	T1(Chap-11,P 505-513)	BB/LCD
43	Free-space management-Bit Vector, List, Grouping, Counting, Space Maps	T1(Chap-11,P 513-516)	BB/LCD
44	I/O Systems-Overview, I/O Hardware, Application I/O Interface	T1(Chap-13,P 575-592)	BB/LCD
45	Kernel I/O Subsystem, Transforming I/O requests, Streams, Performance	T1(Chap-13,P 592-606)	BB/LCD

Content beyond syllabus covered (if any):

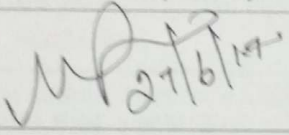
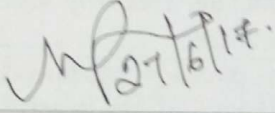
* Session duration: 50 mins

**TEXT BOOK**

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, "Operating System Concepts", 9th Edition, John Wiley and Sons Inc., 2012.
2. William Stallings, "Operating Systems – Internals and Design Principles", 7th Edition, Prentice Hall, 2011.

REFERENCES

1. Andrew S. Tanenbaum, "Modern Operating Systems", Second Edition, Addison Wesley, 2001.
2. Charles Crowley, "Operating Systems: A Design-Oriented Approach", Tata McGraw Hill Education", 1996.
3. <http://nptel.ac.in/>.
4. <http://www.cs.toronto.edu/~demke/469F.06/Lectures/Lecture11.pdf>
5. <http://www.cse.wustl.edu/~lu/cse467s/slides/scheduling.pdf>
6. <https://users.soe.ucsc.edu/~sbrandt/111/Slides/chapter10.pdf>

	Prepared by	Approved by
Signature		
Name	Dr. R. Anitha	Dr. R. Anitha
Designation	Professor & Head	Professor & Head
Date	27/06/2017	27/06/2017
Remarks *:		

* If the same lesson plan is followed in the subsequent semester/year it should be mentioned and signed by the Faculty and the HOD