

COURSE HANDOUT

B.Tech- IV Semester

Course Title : OPERATING SYSTEMS

Dated: 04-12-2017

Course Code : 16IT406

Academic Year 2017-18

Course Structure : 3-1-0-3

Course coordinator : Mr. M. Ramachandra

Instructor(s) : Dr. R. Priya Vijayanthi, A. K. Sahu, M. Suneetha

Course Description: This course is an introduction to the theory behind modern computer operating systems. Topics will include what an operating system does (and doesn't) do, system calls and interfaces, processes, concurrent programming, resource scheduling and management (of the CPU, memory, etc.), virtual memory, deadlocks, distributed systems and algorithms, programming, and security. We will approach the subject from a theoretical perspective (what are the abstractions and algorithms?)

Scope and Objective:

The course content enables students to:

- Understand Objectives, Functions, Services of Operating Systems and Learn the Concepts of Process and Process Scheduling
- Understand issues related to Process Synchronization and focus on principles of Deadlock and related problems of Starvation
- Comprehend the mechanisms used in Memory Management and Virtual Memory.
- Understand the concepts of File System and Disk Scheduling

Text Books:

1. Operating System Concepts- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 7th Edition, John Wiley
2. Operating Systems Internal and Design Principles, Stallings, 6th Edition–2005, Pearson education

Reference Books:

1. Operating systems- A Concept based Approach-D.M.Dhamdhare, 2nd Edition, TMH
2. Operating System A Design Approach-Crowley, 1ST edition, TMH.
3. Modern Operating Systems, Andrew S Tanenbaum, 3rd edition, PHI.

SYLLABUS:

UNIT – I

12 Hrs

OPERATING SYSTEMS OVERVIEW: Introduction to Operating Systems, Operating System Structure, Operating System Operations, Operating System Services, System calls, Types of System Calls.

PROCESS MANAGEMENT: Introduction to Process, Process Scheduling, Operations on Processes, Inter Process Communication, Process Scheduling Criteria, and Scheduling Algorithms and its Evaluation.

UNIT – II 11 Hrs

PROCESS SYNCHRONIZATION: Introduction to Process synchronization, The Critical-Section Problem, Peterson's Solution, Synchronization Hardware, Semaphores, and Classical Problems of Synchronization using Semaphores

DEADLOCKS: System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, and Recovery from Deadlock.

UNIT-III 11 Hrs

MEMORY MANAGEMENT: Introduction to Memory Management, Swapping, Contiguous Memory Allocation, Paging, Segmentation.

VIRTUAL MEMORY MANAGEMENT: Introduction to Virtual Memory Concept, Demand Paging, Copy on Write, Page Replacement Algorithms, Allocation of Frames, Thrashing.

UNIT-IV 11 Hrs

File System and Secondary Storage Structure

File Concept - Access Methods - Directory Structure - File System Structure - Allocation Methods - Free-Space

Management.

Overview of Mass Storage Structure - Disk Structure - Disk Scheduling - RAID structures

UNIX File System

Course outcomes:

At the end of the course students will be able to:

1. Understand the various concepts of process
2. Implement concurrency mechanisms
3. Implement Bankers Algorithms to handle deadlocks
4. Design and analyze mechanisms used in memory management
5. Develop processor scheduling algorithms.
6. Elaborate paging technique Algorithms

Course Plan:

No. Lecture	Learning objectives	Topic(s) to be covered	Chapter in the textbook/reference
UNIT – I			
1	Understand the Overview of operating systems	OPERATING SYSTEMS OVERVIEW: Introduction to Operating Systems	T-1,C1
2	Describe the Operating System Structure, and its Operations	Operating System Structure, OperatingSystem Operations	T-1,C-1
3		Tutorial-1	
4	To know about Operating System Services, System calls	Operating System Services, System calls	T-1,C-2
5	To Recognize various types of System Calls	Types of System Calls.	T-1,C-2
6		Tutorial-2	
7	Understand the concept of Process	PROCESS MANAGEMENT: Introduction to Process	T-1,C-3
8	Describe the various Scheduling algorithms	Process Scheduling, Operations on Processes	T-1,C-3
9		Tutorial-3	
10	To know about Inter Process Communication	Inter ProcessCommunication	T-1,C-3
11	Gain knowledge on Process Scheduling Criteria	Process Scheduling Criteria	T-1,C-5
12	Learning of Scheduling Algorithms and its Evaluation	Scheduling Algorithms and its Evaluation	T-1,C-5
13		Tutorial-4	
UNIT-II			
14	Understand the importance Process synchronization	PROCESS SYNCHRONIZATION: Introduction to Process synchronization	T-1,C-6
15	Recognize the Critical-Section problem	The Critical-Section Problem	T-1,C-6
16	Significance of Peterson's Solution	Peterson's Solution	T-1,C-6
17		Tutorial-5	
18	Study about Synchronization Hardware	Synchronization Hardware	T-1,C-6
19	Understand the concept of Semaphores	Semaphores	T-1,C-6
20	Find of Classical Problems of	Classical Problems of	T-1,C-6

	Synchronization	Synchronization using Semaphores	
21		Tutorial-6	
22	Knowing about Deadlock	DEADLOCKS: System Model	T-1,C-7
23	Understand deadlock Characterization	Deadlock Characterization	T-1,C-7
24	Describe the various methods for handling Deadlocks	Methods for handling Deadlocks	T-1,C-7
25		Tutorial-7	
26	Learning deadlock Prevention	Deadlock Prevention	T-1,C-7
27	Describe the deadlock Avoidance	Deadlock Avoidance	T-1,C-7
28	Knowing about deadlock Recovery	Recovery from Deadlock.	T-1,C-7
29		Tutorial-8	
UNIT-III			
30	Understand the concept of Memory Management.	MEMORY MANAGEMENT: Introduction to Memory Management.	T-1,C-8
31	Knowing about Swapping	Swapping	T-1,C-8
32	Describe how Continuous Memory Allocation done in memory management	Continuous Memory Allocation	T-1,C-8
33		Tutorial-9	
34	Gaining knowledge on Paging	Paging	T-1,C-8
35	Learning about Segmentation	Segmentation	T-1,C-8
36		Tutorial-10	
37	Understand Virtual Memory Concept	VIRTUAL MEMORY MANAGEMENT: Introduction to Virtual Memory Concept	T-1,C-9
38	Describe Demand Paging	Demand Paging	T-1,C-9
39	Describe Demand Paging	Demand Paging	T-1,C-9
40	Learning Copy on Write	Copy on Write	T-1,C-9
41		Tutorial-11	
42	To study different Page Replacement Algorithms	Page Replacement Algorithms	T-1,C-9
43	To study different Page Replacement Algorithms	Page Replacement Algorithms	T-1,C-9
44	To Learn about various Frames allocation methods	Allocation of Frames	T-1,C-9
45	Understand the concept of Thrashing	Thrashing	T-1,C-9
46		Tutorial-12	
UNIT-IV			
47	To obtain the knowledge of File systems.	FILE SYSTEM: File Concept, Access Methods	T-1,C-10

48	To know about Directory Structure	Directory Structure	T-1,C-10
49	To understand the concept of File System Structure	File System Structure	T-1,C-10
50		Tutorial-13	
51	To recognize various File Allocation Methods	Allocation Methods	T-1,C-11
52	To recognize various File Allocation Methods	Allocation Methods	T-1,C-11
53	Learn about Free-Space Management.	Free-Space Management.	T-1,C-11
54		Tutorial-14	
55	To study the secondary storage structure	Overview of Mass Storage Structure	T-1,C-12
56	To obtain the knowledge of Disk Structure	Disk Structure	T-1, C-12
57	To obtain the knowledge of Disk Structure	Disk Scheduling.	T-1,C-12
58	To know various Disk Scheduling policies	Disk Scheduling.	T-1,C-12
59	To RAID levels and File system of UNIX	RAID, Unix File System	T-1,C-12
60		Tutorial-15	

Evaluation scheme:

Component	Duration (minutes)	Marks	% of weightage	Date & Time	Venue
Sessional Test – 1	90	80%*Best	30	29.01.2018 to 03.02.2018 9:00AM-10:30AM	CLASS ROOM
Sessional Test – 2	90	+20%*Rest		26.03.2018 to 31.03.2018 9:00AM-10:30AM	CLASS ROOM
Comprehensive quiz	20	10%	10	9.04.2018 to 14.04.2018	CLASS ROOM
Semester end examination	180	60%	60	23.04.2018 to 25.05.2018 10:00AM-1:00PM	CLASS ROOM

Chamber Consultation Hour:

Venue: Staff cabins

Notices: Dept.Notice board

Signature of the Instructor

Signature of the course-coordinator