COURSE PLAN

Subject code: CS8493	**Branch/Year/Sem/Section: B.E CSE/II/IV**
Subject Name: OPERATING SYSTEMS	**Batch:2018-2022**
Staff Name:J.Britto Dennis	**Academic year:2019-2020**

COURSE OBJECTIVE

1. To understand the basic concepts and functions of operating systems.
2. To understand Processes and Threads
3. To analyze Scheduling algorithms.
4. To understand the concept of Deadlocks.
5. To analyze various memory management schemes.
6. To understand I/O management and File systems.
7. To be familiar with the basics of Linux system and Mobile OS like iOS and Android.

TEXT BOOK:

T1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, ―Operating System Concepts‖, 9th Edition, John Wiley and Sons Inc., 2012.

REFERENCES:

R1. Ramaz Elmasri, A. Gil Carrick, David Levine, ―Operating Systems – A Spiral Approach‖, Tata McGraw Hill Edition, 2010

R2. Achyut S.Godbole, Atul Kahate, ―Operating Systems‖, McGraw Hill Education, 2016

R3. Andrew S. Tanenbaum, ―Modern Operating Systems‖, Second Edition, Pearson Education, 2004

R4. Gary Nutt, ―Operating Systems‖, Third Edition, Pearson Education, 2004

R5. Harvey M. Deitel, ―Operating Systems‖, Third Edition, Pearson Education, 2004

R6. Daniel P Bovet and Marco Cesati, ―Understanding the Linux kernel‖, 3rd edition, O‘Reilly, 2005

R7. Neil Smyth, ―iPhone iOS 4 Development Essentials – Xcode‖, Fourth Edition, Payload media, 2011

WEB RESOURCES

W1: https://www.webopedia.com/DidYouKnow/Hardware_Software/mobile-operating-systems-mobile-os-explained.html (TOPIC NO: 43)

W2: https://www.techotopia.com/index.php/IOS_6_Architecture_and_SDK_Frameworks (TOPIC NO: 44)

W3: https://developer.apple.com/library/archive/documentation/MacOSX/Conceptual/OSX_Technology_Overview/CoreOSLayer/CoreOSLayer.html (TOPIC NO: 45)

TEACHING METHODOLOGIES:

- BB - BLACK BOARD
- VIDEO - VIDEO TUTORIAL
- PPT - POWER POINT PRESENTATION

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CS8493	OPERATING SYSTEMS	L	T	P	C
		3	0	0	3

UNIT I OPERATING SYSTEM 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.

UNIT II OPERATING SYSTEMS **9**

Processes - Process Concept, Process Scheduling, Operations on Processes, Inter-process Communication; CPU Scheduling - Scheduling criteria, Scheduling algorithms, Multiple-processor scheduling, Real time scheduling; Threads- Overview, Multithreading models, Threading issues; Process Synchronization - The critical-section problem, Synchronization hardware, Mutex locks, 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.

. **UNIT III STORAGE MANAGEMENT** **9**

Main Memory – Background, Swapping, Contiguous Memory Allocation, Paging, Segmentation, Segmentation with paging, 32 and 64 bit architecture Examples; Virtual Memory – Background, Demand Paging, Page Replacement, Allocation, Thrashing; Allocating Kernel Memory, OS Examples.

UNIT IV FILE SYSTEMS AND I/O SYSTEMS **9**

Mass Storage system – Overview of Mass Storage Structure, Disk Structure, Disk Scheduling and Management, swap space management; File-System Interface - File concept, Access methods, Directory Structure, Directory organization, File system mounting, File Sharing and Protection; File System Implementation- File System Structure, Directory implementation, Allocation Methods, Free Space Management, Efficiency and Performance, Recovery; I/O Systems – I/O Hardware, Application I/O interface, Kernel I/O subsystem, Streams, Performance.

UNIT V CASE STUDY **9**

Linux System - Design Principles, Kernel Modules, Process Management, Scheduling, Memory Management, Input-Output Management, File System, Inter-process Communication; Mobile OS - iOS and Android - Architecture and SDK Framework, Media Layer, Services Layer, Core OS Layer, File System.

TOTAL: 45 PERIODS

Topic No	Topic Name	Books For reference	Page No	Teaching Methodology	No of periods required	Cumulative periods
UNIT I	**OPERATING SYSTEM OVERVIEW**				**(9)**	
1.	Computer System Overview-Basic Elements	T1	4	BB	1	1
2.	Instruction Execution, interrupts	T1	8	BB	1	2
3.	Memory Hierarchy, Cache Memory, Direct Memory Access	T1	11	BB	1	3
4.	Multiprocessor and Multicore Organization	T1	14	BB	1	4
5.	Operating system overview-objectives and functions	T1	5	BB	1	5
6.	Evolution of Operating System.-Computer System Organization	T1	7	BB	1	6
7.	Operating System Structure and Operations	T1	78-86	BB	1	7
8.	System Calls, System Programs	T1	66-74	BB	1	8
9.	OS Generation and System Boot	T1	91-92	BB	1	9
LEARNING OUTCOME: **At the end of unit , the students will be able to** • Know the fundamentals of OPERATING SYSTEMS. • Understand the concept of System Calls. • Define the types of Memory Hierarchy.						
UNIT II	**OPERATING SYSTEMS**					**(9)**
10.	Processes - Process Concept Process Scheduling.	T1	105-110	BB	1	10
11.	Operations on Processes, Inter-process Communication	T1	115-122	BB	1	11
12.	CPU Scheduling - Scheduling criteria, Scheduling algorithms, Multiple -processor scheduling, Real time scheduling	T1	261-283	BB	1	12
13.	Threads- Overview, Multithreading models, Threading issues	T1	163-183	BB	1	13
14.	Process Synchronization - The critical-section problem, Synchronization hardware, Mutex locks	T1	203-212	BB	1	14
15.	Semaphores, Classic problems of synchronization, Critical regions, Monitors	T1	213-223	BB	1	15
16.	Deadlock - System model, Deadlock characterization	T1	315-317	BB & VIDEO	1	16

17.	Methods for handling deadlocks, Deadlock prevention, Deadlock avoidance	T1	322-327	BB	1	17
18.	Deadlock detection, Recovery from deadlock	T1	333-337	BB	1	18

LEARNING OUTCOME:

At the end of unit , the students will be able to

- Understand the concept of Processes, CPU Scheduling.
- Define Semaphores, Threads.
- Gain the knowledge about Deadlock

UNIT – III	**STORAGE MANAGEMENT**					**(9)**
19.	Main Memory – Background	T1	351-357	BB	1	19
20.	Swapping, Contiguous Memory Allocation	T1	358-363	BB & VIDEO	1	20
21.	Paging	T1	366-377	BB	1	21
22.	Segmentation	T1	364-365	BB	1	22
23.	Segmentation with paging, 32 and 64 bit architecture Examples	T1	383-387	BB	1	23
24.	Virtual Memory – Background	T1	397-400	BB	1	24
25.	Demand Paging, Page Replacement, Allocation	T1	401-420	BB	1	25
26.	Thrashing	T1	425-430	BB	1	26
27.	Allocating Kernel Memory, OS Examples	T1	436-445	BB	1	27

LEARNING OUTCOME:

At the end of unit , the students will be able to

- Understand the concept of Storage Management.
- Gain knowledge about Paging, Segmentation.
- Define Thrashing.

UNIT IV	**FILE SYSTEMS AND I/O SYSTEMS**					**(9)**
28.	Mass Storage system – Overview of Mass Storage Structure	T1	467-469	BB	1	28
29.	Disk Structure, Disk Scheduling and Management	T1	470-478	BB & VIDEO	1	29
30.	Swap space management	T1	482-483	BB	1	30
31.	File-System Interface - File concept, Access methods, Directory Structure	T1	503-515	BB	1	31
32.	Directory organization, File system mounting, File Sharing and Protection	T1	526-533	BB	1	32
33.	File System Implementation- File System Structure, Directory implementation	T1	543-552	BB	1	33
34.	Allocation Methods, Free Space Management, Efficiency and Performance, Recovery	T1	553-568	BB	1	34

35.	I/O Systems – I/O Hardware, Application I/O interface	T1	587-600	BB	1	35
36.	Kernel I/O subsystem, Streams, Performance	T1	604-617	BB	1	36

LEARNING OUTCOME:

At the end of unit , the students will be able to

- Understand the concept of File Systems.
- Known about Disk Scheduling and Management.
- Get the knowledge about Mass Storage system and I/O Systems .

UNIT V	**CASE STUDY**					**(9)**
37.	Linux System - Design Principles	T1	781-786	BB	1	37
38.	Kernel Modules	T1	789-791	BB	1	38
39.	Process Management, Scheduling	T1	792-799	BB	1	39
40.	Memory Management	T1	800-808	BB	1	40
41.	Input-Output Management	T1	815-817	BB	1	41
42.	File System, Inter-process Communication	T1	809-818	BB	1	42
43.	Mobile OS - IOS and Android Architecture	W1	-	PPT	1	43
44.	SDK Framework, Media Layer	W2	-	PPT	1	44
45.	Services Layer, Core OS Layer, File System	W3	-	PPT	1	45

LEARNING OUTCOME:

At the end of unit , the students will be able to

COURSE OUTCOME

At the end of the course, the student should be able to:

- Analyze various scheduling algorithms.
- Understand deadlock, prevention and avoidance algorithms
- Compare and contrast various memory management schemes
- Understand the functionality of file systems.
- Perform administrative tasks on Linux Servers
- Compare iOS and Android Operating Systems

CONTENT BEYOND THE SYLLABUS

Windows 8 Process

INTERNAL ASSESSMENT DETAILS

ASSESMENT NUMBER	**I**	**II**	**MODEL**
TOPIC NO.	1-18	19-36	1-45

ASSIGNMENT DETAILS

ASSIGNMENT NUMBER	**I**	**II**	**III**
TOPIC NUMBER FOR REFERENCE	1-18	19-36	1-45
DEAD LINE			

ASSIGNMENT NUMBER	BATCH	DESCRIPTIVE QUESTIONS/TOPIC (Minimum of 8 Pages)
I	B1 (R.Nos 52-69) Written	1. Explain system call, system program and os generation 2. Describe evaluation of operating System 3. Explain IPC and Operations on Processes
	B2 (R.Nos 70-88) Seminar	1. Multiprocessor and multicore organization 2. Direct Memory Access 3. Computer System Organization
	B3 (R.Nos 89-302) PPT	1. Structure of an OS 2. Client-server and peer to peer models of distributed systems 3. Process Scheduling
II	B1 (R.Nos 52-69) PPT	1. Memory mapped files 2. Buddy system allocation 3. Methods for handling deadlocks
	B2 (R.Nos 70-88) Written	1. Explain the difference between internal and external fragmentation 2. Discuss the given memory management techniques with neat diagram 3. Explain Semaphores and Critical regions
	B3 (R.Nos 89-302) Seminar	1. Logical address is translated into physical address using passing mechanism 2. Recovery from deadlock 3. Free space management on I/O buffering and blocking
III	B1 (R.Nos 52-69) Seminar	1. RAID structure in disk management 2. Directory Structure 3. Disk Scheduling and Management
	B2 (R.Nos 70-88) PPT	1. File Implementation 2. Space Management 3. IOS and Android Architecture
	B3 (R.Nos 89-302) Written	1. Write about Linux architecture and Linux kernel with neat sketch 2. Explain in detail about LINUX multifunction server, DNS VMware on Linux host 3. Explain File system mounting, File Sharing and Protection

PREPARED BY **VERIFIED BY**

J.BRITTO DENNIS, AP/CSE **HOD/CSE**

APPROVED BY

PRINCIPAL