EASWARI ENGINEERING COLLEGE, CHENNAI-600 089
DEPARTMENT OF INFORMATION TECHNOLOGY
LESSON PLAN

SUBJECT CODE : **CS 6401**

SUBJECT TITLE : **OPERATING SYSTEMS**

HOURS DISTRIBUTION **:** (L T P C 3 0 0 3)

COURSE/ BRANCH : B.Tech (IT)

SEMESTER : IV

ACADEMIC YEAR : 2014 - 2015

FACULTY NAME : Mrs.K.VARUNI

OBJECTIVE OF COURSE:

- Study the basic concepts and functions of operating systems.
- Understand the structure and functions of OS.
- Learn about Processes, Threads and Scheduling algorithms.
- Understand the principles of concurrency and Deadlocks.
- Learn various memory management schemes.
- Study I/O management and File systems.
- Learn the basics of Linux system and perform administrative tasks on Linux Servers.

OUTCOME OF COURSE:

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

- Design various Scheduling algorithms.
- Apply the principles of concurrency.
- Design deadlock, prevention and avoidance algorithms.
- Compare and contrast various memory management schemes.
- Design and Implement a prototype file systems.
- Perform administrative tasks on Linux Servers.

PREREQUISTE : KNOWLEDGE IN COMPUTER ARCHITECTURE

UNITS	TOPIC NO	TOPIC	PERIOD	BOOKS REFERRED	PAGE NO
I	**UNIT - I (9)**				
	OPERATING SYSTEMS OVERVIEW				
	OBJECTIVE: **To learn the objective, structure, function of an operating system and how an instruction is executing in OS**				
	1	Computer System Overview-Basic Elements	1	R1	8-12
	2	Instruction Execution, Interrupts, Memory Hierarchy	2	R1	12-29
	3	Cache Memory, Direct Memory Access, Multiprocessor and Multicore Organization	3	R1	29-33
	4	Operating system overview-objectives and functions	4	T1	4 – 7
	5	Evolution of Operating System - Computer System Organization	5	T1	7 – 19
	6	Operating System Structure and Operations	6	T1	19 – 24
	7	System Calls	7	T1	62 – 66
	8	System Programs	8	T1	74 – 75
	9	OS Generation and System Boot	9	T1	91 – 92
II	**UNIT - II (9)**				
	PROCESS MANAGEMENT				
	OBJECTIVE: Learning different CPU scheduling algorithms and analyzing their performance and to learn the design solutions for process synchronization problems. Handling and prevention of deadlock for better resource utilization				
	1	Processes-Process Concept, Process Scheduling	10	T1	105 – 115
	2	Operations on Processes, Interprocess Communication	11	T1	115 – 122 122 – 130
	3	Threads- Overview, Multicore Programming, Multithreading Models	12	T1	163 – 171
	4	Windows 7- Thread and SMP Management	13		Handout
	5	Process Synchronization - Critical Section Problem	14	T1	105 – 115
	6	Mutex, Locks, Semophores, Monitors	15	T1	115 – 130
	7	CPU Scheduling	16	T1	163 – 171
	8	CPU Scheduling	17		
	9	Deadlocks	18	T1	115 – 130

III	**UNIT - III (9)**				
	STORAGE MANAGEMENT				
	OBJECTIVE: Objective is to learn different memory management techniques , strategies for implementing virtual memory concepts and understanding the concept of paging and segmentation with 32 and 64 bit architecture				
	1	Main Memory - Contiguous Memory Allocation	19	T1	360 – 364
	2	Segmentation, Paging	20	T1	364 – 378
	3	32 and 64 bit architecture Examples	21	T1	383 – 388
	4	Virtual Memory- Demand Paging	22	T1	401 – 408
	5	Page Replacement	23	T1	409 – 421
	6	Page Replacement	24		
	7	Allocation, Thrashing	25	T1	421 – 430
	8	Allocating Kernel Memory	26	T1	436 – 439
	9	OS Examples	27	T1	445 – 448
IV	**UNIT - IV (9+1)**				
	I/O SYSTEMS				
	OBJECTIVE: To learn file system structure, allocation, access methods and various disk scheduling techniques				
	1	Mass Storage Structure - Overview	28	T1	467 – 470
	2	Disk Scheduling and Management	29	T1	472 – 482
	3	Disk Scheduling and Management	30		
	4	File System Storage-File Concepts	31	T1	503 – 513
	5	Directory and Disk Structure, Sharing and Protection	32	T1	515 – 526 528 – 538
	6	File System Implementation- File System Structure	33	T1	543 – 546
	7	Directory Structure	34	T1	552 – 553
	8	Allocation Methods	35	T1	553 – 561
	9	Free Space Management, I/O Systems	36	T1	587 – 618
	10	CBS	37	Handout	
V	**UNIT - V (9+1)**				
	CASE STUDY				
	OBJECTIVE: **To learn about the requirements of Linux system administrator and how to set up Xen ,VMware on Linux host and adding guest OS**				
	1	Linux System- Basic Concepts	38	Handout	

	2	System Administration-Requirements for Linux System Administrator	39	AR1	1 – 7
	3	Setting up a LINUX Multifunction Server	40	AR1	8 – 31
	4	Domain Name System	41	AR1	38 – 71
	5	Setting Up Local Network Services	42	AR1	163 – 186
	6	Virtualization- Basic Concepts	43	AR1	194 – 198
	7	Setting Up Xen	44	AR1	199 – 203
	8	VMware on Linux Host	45	AR1	204 – 210
	9	Adding Guest OS	46	Handout	
	10	CBS	47	Handout	

ASSIGNMENT TOPICS

Sl. NO	ASSIGNMENT TOPICS	SUBMISSION DATE
1	ASSIGNMENT PROBLEMS IN CPU SCHEDULING ALGORITHM	**January 27, 2015**
2	ASSIGNMENT PROBLEMS IN DEADLOCKS	**February 16, 2015**
3	ASSIGNMENT PROBLEMS IN PAGE REPLACEMENT ALGORITHM	**March 18, 2015**

CONTENT BEYOND SYLLABUS (CBS)

UNIT No	TOPIC	PERIOD	BOOKS REFERRED
4	INTRODUCTION TO HADOOP DISTRIBUTED FILE SYSTEM	1	Handout
5	INTRODUCTION TO ANDROID OS	2	Handout

TEXT BOOK

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

REFERENCES

1. William Stallings, "Operating Systems – Internals and Design Principles", 7th Edition, Prentice Hall, 2011.

2. Andrew S. Tanenbaum, "Modern Operating Systems", Second Edition, Addison Wesley, 2001.

3. Charles Crowley, "Operating Systems: A Design-Oriented Approach", Tata McGraw Hill Education", 1996.

4. D M Dhamdhere, “Operating Systems: A Concept-Based Approach”, Second Edition, Tata McGraw-Hill Education, 2007.

5. http://nptel.ac.in/.

***ADDITIONAL REFERENCES (AR1)**

1. Tom Adelstein and Bill Lubanovic, “LINUX SYSTEM ADMINISTRATION” 1st Edition, O’Reilly, 2007.

FACULTY INCHARGE **HOD**

PROGRAMME EDUCATIONAL OBJECTIVES

1. To provide students with a sound foundation in the mathematical, scientific and engineering fundamentals necessary to formulate, solve and analyze engineering problems and to prepare them for graduate studies.
2. To develop the ability among students to apply current industry practices and technologies to analyse, design, implement, test and verify computing systems and computer based solutions to real world and research problems.
3. To prepare students in communication skills and in leadership for successful careers in industry that meet the needs of Indian and multinational companies.
4. To provide opportunity for students to work as part of teams on multidisciplinary projects.
5. To make students to use appropriate skill sets towards addressing social issues for the benefit of the society with a concern towards the environment.
6. To promote student awareness on life-long learning to be sensitive to the needs of the progressive industrial world.
7. To develop the students as professionals with ethics & responsibility to promote societal transformation.

PROGRAMME OUTCOMES (a-l)

(a) Apply the knowledge of mathematics, science and engineering fundamentals.

(b) Ability to analyze a problem, identify and define the computing requirements appropriate to its solution.

(c) Ability to design, implements, and evaluate a computer-based system, process, component, or program to meet desired needs.

(d) Apply the research-based knowledge and research methods to identify, formulate and solve engineering problems.

(e) Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice, with an understanding of the limitations.

(f) Demonstrate understanding of the societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to engineering practice.

(g) Understand the impact of professional engineering solutions in a societal and environmental context and demonstrate the need for sustainable development.

(h) Understand and commit to professional ethics and responsibilities.

(i) Function effectively as an individual, and as a member in multi-disciplinary settings.

(j) Communicate effectively with the engineering community and with society at large, such as being able to comprehend, write effective reports and design documentation, make effective presentations, and give/ receive clear instructions.

(k) Demonstrate knowledge and understanding of the engineering and management principles, and apply these to one's own work, as a member and leader in a team, to manage projects in multidisciplinary environments.

(l) Recognize the need for, and have the ability to engage in independent and life-long learning.

UNITS	COURSE OUTCOME	PROGRAMME EDUCATIONAL OBJECTIVES							PROGRAMME OUTCOMES											
		1	2	3	4	5	6	7	a	b	c	d	e	f	g	h	i	j	k	l
Unit –I OPERATING SYSTEMS OVERVIEW	Design various Scheduling algorithms	S	S		M	M	M	S	S	S	S	M	M		M	S	S		M	S
Unit –II PROCESS MANAGEMENT	Apply the principles of concurrency	S	S		M	M	M	S	S	S	S	M	M		M	S	S		M	S
Unit-III STORAGE MANAGEMENT	Design deadlock, prevention and avoidance algorithms	S	S		M	M	M	S	S	S	S	M	M		M	S	S		M	S
Unit –IV I/O SYSTEMS	Compare and contrast various memory management schemes	S	S		M	M	M	S	S	S	S	M	M		M	S	S		M	S
Unit –V CASE STUDY	Design and Implement a prototype file systems	S	S		M	M	M	S	S	S	S	M	M		M	S	S		M	S
Content Beyond Syllabus		S	S	M	M	M	M	S	S	S	S	M	M		M	S	S		M	S

MAPPING OF COURSE OUTCOMES WITH PEO & THE PROGRAMME OUTCOME - OPERATING SYSTEMS (CS6401)

STRONG	S
MEDIUM	M
WEAK	W