Lesson Plan

Course: MCA-105 – Operating Systems with Linux		
MCA – 1st Semester	**No. of Theory Hours per Week: 04**	**No. of Practical Hours per Week: 02**

Course Outcomes (COs):

Detailed Statement of the COs for Theory (MCA-105)	
CO1	Explain the structure and functions of operating systems along with their components, types and working. (BTL2)
CO2	Make use of appropriate Linux commands for memory management, file management and directory management. (BTL3)
CO3	Analyze the performance of different scheduling algorithms along with the policies for concurrency and deadlock management. (BTL4)
CO4	Elaborate the system calls for process management and file management. (BTL6)

Recommended Books:

Books	S. No.	Details of the Books
Text Books	1.	Silberschatz, Galvin, Greg, "Operating System Concepts", Wiley and Sons, 9th Edition, 2015. **[TB1]**
	2.	Sumitabha Das, "Unix concept and Programming", McGraw Hill education, 4th Edition, 2015. **[TB2]**
	3.	W. Richard Stevens Stephen A. Rago" Advanced Programming in the UNIX® Environment", Addison-Wesley, 3rd Edition, 2013. **[TB3]**
	4.	Milan Milenkovic, "Operating Systems Concepts and Design", Tata McGraw-Hill, 2nd Edition, 1995. **[TB4]**
Reference Books	1.	Godbole, Achyut, "Operating System", McGraw-Hill Education, 2nd Edition, 2005. **[RB1]**
	2.	William Stallings, "Operating System: Internals and Design Principles", Person, 9th Edition, 2018. **[RB2]**
	3.	A. S. Tanenbaum, "Modern Operating Systems ", Pearson, 3rd Edition, 2007. **[RB3]**
	4.	Kenneth H. Rosenet al, "UNIX: The Complete Reference", McGraw-Hill/Osborne, 6th Edition, 2017. **[RB4]**

Books	S. No.	Details of the Books
	5.	Dhanjay M. Dhamdhere, "Operating System A concept based approach", Tata McGraw-Hill, 2nd Edition, 2006. **[RB5]**
	6.	Madnick E. and Donovan J., "Operating Systems", Tata McGraw Hill, 2001. **[RB6]**

Lesson Plan for Theory:

Lecture No.	Topics/Concepts to be Covered	Reference of the Book and its Chapter
UNIT - I		
1.	Operating System Concept, Abstract View of OS - User view, System View, Components of Operating System	TB1 [Chapter 1, 2, 3] TB2 [Chapter 2, 3] TB4 [Chapter 1]
2.	Operating System Operations, Operating System Services	
3.	Protection and Security, Computing Environment	
4.	System Calls - Concept, Types of System Calls	
5.	Computer System Architecture - Single-Processor Systems, Multiprocessor Systems	
6.	Batch Operating System, Multi-Programmed Operating System, Time-Shared Operating System	
7.	Real Time Operating System, Distributed Operating Systems.	
8.	Process Concept, Operation on Processes, Cooperating Processes	
9.	Inter-Process Communication, Threads.	
10.	Introduction to Linux OS	
11.	Basic Commands of Linux OS	
12.	Buffer Reserved for Revision	
UNIT – II		
13.	Introduction to Process Synchronization	TB1 [Chapter 5, 6] TB2 [Chapter 9] TB3 [Chapter-7, 15]
14.	The Critical-Section Problem with Solution	
15.	Bakery Algorithm, Synchronization Hardware	
16.	Semaphores, Semaphores Implementation	
17.	Classical Problems of Synchronization with Algorithms	

Lecture No.	Topics/Concepts to be Covered	Reference of the Book and its Chapter
18.	Critical Regions, Monitors	
19.	Basic Concepts of CPU Scheduling, Scheduling Criteria	
20.	Scheduling Algorithms	
21.	Multilevel Queue Scheduling, Multilevel Feedback Queue Scheduling	
22.	Process Management Commands and System Calls	
23.	Process Management Commands and System Calls	
24.	Buffer Reserved for Revision	
UNIT – III		
25.	Deadlock, System Models	TB1 [Chapter 7, 8, 9] TB3 [Chapter 15]
26.	Deadlock Characterization	
27.	Resource Allocation Graph	
28.	Deadlock Prevention, Avoidance, Detection and Recovery	
29.	Banker's Algorithm	
30.	Main Memory, Contiguous Memory Allocation	
31.	Fragmentation, Paging and Segmentation.	
32.	Virtual Memory - Demand Paging, Page Replacement	
33.	Page Replacement Algorithm	
34.	Allocation of Frames, Thrashing	
35.	Memory Management Commands and System Calls	
36.	Memory Management Commands and System Calls	
37.	Buffer Reserved for Revision	
UNIT - IV		
38.	File-System Concepts, Access Methods	TB1[Chapter 9, 10, 11, 12] TB2 [Chapter 5, 11] TB3[Chapter 3, 7]
39.	Directory and Disk Structure, File-System Structure	
40.	File-System Implementation, Directory Implementation	
41.	Allocation Methods, Free-Space Management	

Lecture No.	Topics/Concepts to be Covered	Reference of the Book and its Chapter
42.	Types of Devices, Channels and Control Unit, Multiple Paths, Block Multiplexing	
43.	Mass-Storage Structure, Disk Structure	
44.	Disk Scheduling Algorithms	
45.	Disk Management, RAID Structure of Disk	
46.	File Management Commands and System Calls	
47.	File Management Commands and System Calls	
48.	Buffer Reserved for Revision	

Course: MCA-163 – Operating Systems with Linux Lab.	
MCA – 1st Semester	No. of Practical Hours per Week: 02

Course/Lab Outcomes (COs):

Detailed Statement of the COs for Lab. (MCA-163)	
CO1	Build the Linux operating system and configure it. (BTL3)
CO2	Discover Linux commands for working with Linux Environment. (BTL4)
CO3	Appraise the Process Management algorithms, Process Management system calls, Inter Process Communication and CPU Scheduling algorithms. (BTL5)
CO4	Create programs using systems calls for memory management and File Management in C programming, also simulate Deadlock avoidance algorithm using C. (BTL6)

Lesson Plan for Practical:

Week No.	Lab. No.	Topics/Concepts to be Covered
1.	1.	Installation of VirtualBox and Linux
2.	2.	Basic Commands of Linux OS.
3.	3.	Basic Commands of Linux OS.
4.	4.	Process Management Commands and System Calls
5.	5.	Process Management Commands and System Calls
6.	6.	Memory Management Commands and System Calls
7.	7.	Memory Management Commands and System Calls
8.	8.	File Management Commands and System Calls
9.	9.	File Management Commands and System Calls

Week No.	Lab. No.	Topics/Concepts to be Covered
10.	10.	File Management in C programming
11.	11.	File Management in C programming
12.	12.	File Management in C programming
13.	13.	Buffer reserved for revision

Testing Schedule:

Nature of Test	September	October	November	December
Surprise Test (ST)	ST in 2nd Week	-	-	-
Mid Term Test (MT)	-	MT in $2^{nd}/3^{rd}$ Week	-	-
Class Test (CT)	-	CT in 1st Week	CT in 1st Week	-
Supplementary Test (Sp. T)	-	-	Sp. T in 3rd Week	
Assignment Submission Schedule	**Assignment-1** is to be submitted One Week after completion of Unit-1 and Unit-2. **Assignment-2** is to be submitted One Week after completion of Unit-3. **Assignment-3** is to be submitted One Week after completion of Unit-4.			