15CS302J	Operating Systems	L	T	P	C
		3	0	2	4
Co-requisite:	Nil				
Prerequisite:	Nil				
Data Book / Codes/Standards	Nil				
Course Category	P Professional Core				
Course designed by	Department of Computer Science and Engineering				
Approval	32nd Academic Council Meeting , 23rd July 2016				

PURPOSE	To acquire analytical ability in solving mathematical problems as applied to the respective branches of Engineering.							
INSTRUCTIONAL OBJECTIVES		**STUDENT OUTCOMES**						
At the end of the course, student will be able to								
1.	Understand the structure and functions of OS	a						
2.	Learn about Processes and Threads	a	b					
3.	Understand and Implement the principles of concurrency Scheduling algorithms and Deadlocks and Implement them	a	b					
4.	Learn and Implement the different memory management schemes	a	b					
5.	Understand and Implement the different Input , Output and File management schemes	a	b					

Session	Description of Topic (Theory)	Contact hours	C-D-I-O	IOs	Reference
UNIT I: INTRODUCTION		**9**			
1.	Computer System Overview-Basic Elements, Basic Linux commands.	2	C,I	1	2,6
2.	Instruction Execution, Memory Hierarchy	2	C	1	2
3.	Interrupts, Cache Memory, Direct Memory Access	2	C,D	1	2
4.	Operating system overview-objectives and functions	1	C,D	1	1,2
5.	Evolution of Operating System.	2	C	1	1,2
UNIT II: PROCESSES AND THREADS		**9**			
6.	Definition of process and Process Control Block	1	C,D	2	1,2,3,5
7.	Process States-Two state, Five state, Suspended Processes	2	C,D	2	1,2,3,5
8.	Process Description and Process Control	2	C	2	1,2,3,5
9.	Processes and Threads	2	C,D	2	1,3,5
10.	Types of Threads	1	C,D	2	1,2
11.	Windows 7 - Thread and SMP Management.	1	C,D,I	2	1
UNIT III: CONCURRENCY AND SCHEDULING		**9**			
12.	Principles of Concurrency	1	C	3	1,3,5
13.	Mutual Exclusion, Semaphores	2	C,D,I	3	1,3,5
14.	Monitors, Readers/Writers problem	1	C,D,I	3	1,3,5
15.	Principles of Deadlock	1	C	3	1,3,5
16.	Deadlocks – prevention- avoidance – detection	1	C,I	3	1,3,5
17.	Scheduling- Types of Scheduling	2	C,I	3	1,3,5
18.	Scheduling algorithms.	1	C,I	3	1,3,5
UNIT IV: MEMORY		**9**			
19.	Memory management requirements, Partitioning	1	C,D,I	4	1,3,5
20.	Paging and Segmentation	2	C,D,I	4	1,3,5
21.	Virtual memory - Hardware and control structures	1	C,D	4	1
22	Operating system software	3	C	4	1
23	Linux memory management,	1	D,I	4	1
24	Windows memory management.	1	D,I	4	1
UNIT V: INPUT/OUTPUT AND FILE SYSTEMS		**9**			
25	I/O management and disk scheduling – I/O devices, organization of I/O functions	2	C,D	5	1,3,5
26	OS design issues, I/O buffering	1	C,D	5	1,3,5
27	Disk scheduling,	1	D,I	5	1,3,5

Session	Description of Topic (Theory)	Contact hours	C-D-I-O	IOs	Reference
28	Disk cache	1	C	5	1,3,5
29	File management-Overview, Organization and Access	2	C,D,I	5	1,3,5
30	Directories, File sharing	1	C	5	1,3,5
31	Record Blocking, secondary storage management.	1	C,D	5	1,3,5
Total contact hours		**45***			

Sl. No.	Description of experiments	Contact hours	C-D-I-O	IOs	Reference
1.	Write programs using the following system calls of Linux operating system: Fork, exec, getpid, exit, wait, close, stat, opendir, readdir	2	D,I	1	6
2.	Write programs using the I/O system calls of Linux operating system (open, read, write,etc), ls, grep Commands	2	D,I	1	6
3.	Simulate the following CPU scheduling algorithms a. Round Robin b) SJF c) FCFS d) Priority	4	D,I	2	1,3,5
4.	Simulate file allocation strategies a). Sequential b) Indexed c) Linked	4	D,I	4	1
5.	Simulate Memory partitioning using MVT and MFT	2	D,I	4	1,3,5
6.	Implementation of Bankers Algorithm for Dead Lock Avoidance	2	D,I	3	1,3,5
7.	Simulate an Algorithm for Dead Lock Detection	2	D,I	3	1,3,5
8.	Simulate page replacement algorithms a. FIFO b) LRU c) LFU	4	D,I	4	1,3,5
9.	Simulate File Organization Techniques a. Single level directory b) Two level c) Hierarchical	2	D,I	5	1
10.	Simulate Paging Technique of memory management.	2	D,I	4	1,3,5
11.	Simulate Shared memory and IPC	2	D,I	4	1
12.	Implement Threading & Synchronization Applications	2	D,I	2	1
Total contact hours		**30***			

LEARNING RESOURCES	
Sl. No.	**TEXT BOOKS**
1.	William Stallings, "Operating Systems – internals and design principles", Prentice Hall, 7thEdition, 2011.(Ch 1-9,11,12).
2.	William Stallings "Operating Systems – Internals and design principles", Pearson Education, 5th Edition.
	REFERENCE BOOKS/OTHER READING MATERIAL
3.	Andrew S. Tannenbaum & Albert S. Woodhull, "Operating System Design and Implementation", Prentice Hall , 3rd Edition, 2006.
4.	Andrew S. Tannenbaum, "Modern Operating Systems", Prentice Hall,3rd Edition,2007.
5.	Silberschatz, Peter Galvin, Greg gagne "Operating System Principles", Wiley India,7th Edition, 2006.
6.	Unix Command Reference Guide

Course nature		**Theory + Practical**					
Assessment Method – Theory Component (Weightage 50%)							
In-semester	**Assessment tool**	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	**Total**
	Weightage	**10%**	**15%**	**15%**	**5%**	**5%**	**50%**
End semester examination Weightage :							**50%**
Assessment Method – Practical Component (Weightage 50%)							
In-semester	**Assessment tool**	Experiments	Record	MCQ/Quiz/Viva Voce	Model examination		**Total**
	Weightage	**40%**	**5%**	**5%**	**10%**		**60%**
End semester examination Weightage :							**40%**

* Excluding Assessment Hours