20ITT52 -OPERATING SYSTEMS

Programme & Branch	B. Tech & Information Technology	Sem.	Category	L	T	P	Credit
Prerequisites	Nil	5	PC	3	0	0	3

Preamble	This course describes about operating system abstractions, mechanisms and their implementations such as process management, synchronization, scheduling, deadlock and file systems.	
Unit - I	**Operating Systems Overview**	**9**

Introduction – Computer System Organization – Computer System Architecture – Operations – Resource Management – Security and Protection – Virtualization – Computing Environments. Operating Systems Structures: Services – User and OS Interface – System Calls – Linkers and Loaders – Operating system Structure – Building and Booting OS.

Unit - II	**Process Management**:	**9**

Process Concept, Process Scheduling, Operations on Processes, Interprocess Communication – IPC in Shared Memory and Message Passing Systems. Threads: Overview - Multicore Programming - Multithreading Models. CPU Scheduling: Scheduling Criteria – Scheduling Algorithms.

Unit - III	**Process Synchronization**	**9**

Critical Section Problem – Mutex Locks – Semaphores – Monitors. Deadlocks: Deadlock Characterization – Methods for handling deadlocks – Deadlock Prevention and Avoidance – Deadlock Detection – Recovery from Deadlock.

Unit - IV	**Memory Management**	**9**

Main Memory – Background – Contiguous Memory Allocation – Paging – Segmentation – Structure of the page table – Swapping. Virtual Memory: Background – Demand Paging – Page Replacement – thrashing.

Unit - V	**Storage Management**	**9**

Mass Storage Structure – Overview – HDD Scheduling – File System: File Concept – Access Methods – Directory Structure – Protection – File System Implementation – File System Structure-File System Operations – Directory Implementation – Allocation Methods – Free Space Management – Case study: Linux System.

Total: 45

TEXT BOOK:

1.	Silberschatz A, Peter Baer Galvin and Greg Gagne, "Operating System Concepts", 10th Edition, John Wiley & Sons Inc., 2018.

REFERENCES:

1.	William Stallings, "Operating Systems Internals and Design Principles", 9th Edition, Prentice Hall, 2018.
2.	Andrew S. Tanenbaum, "Modern Operating Systems", 4th Edition, Pearson Education, New Delhi, 2016.

COURSE OUTCOMES: On completion of the course, the students will be able to		BT Mapped (Highest Level)
CO1	outline operating system structure, services and system calls	Understanding (K2)
CO2	demonstrate various process scheduling algorithms and describe multithreading models	Applying (K3)
CO3	apply different methods for process synchronization and for handling deadlocks	Applying (K3)
CO4	illustrate memory management strategies and demonstrate various page replacement algorithms	Applying (K3)
CO5	summarize the features of file systems and apply various disk scheduling algorithms	Applying (K3)

Mapping of COs with POs and PSOs														
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1											2	1
CO2	3	2	1	1									3	2
CO3	3	2	1	1									3	2
CO4	3	2	1	1									3	2
CO5	3	2	1	1									3	2
1 – Slight, 2 – Moderate, 3 – Substantial, BT- Bloom's Taxonomy														

ASSESSMENT PATTERN - THEORY							
Test / Bloom's Category*	Remembering (K1) %	Understanding (K2) %	Applying (K3) %	Analyzing (K4) %	Evaluating (K5) %	Creating (K6) %	Total %
CAT1	25	50	25				100
CAT2	20	20	60				100
CAT3	20	20	60				100
ESE	15	25	60				100

* ±3% may be varied (CAT 1,2,3 – 50 marks & ESE – 100 marks)