



National Institute of Technology Meghalaya

An Institute of National Importance

CURRICULUM

Programme	Master of Computer Applications
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Year of Regulation

2024-25

Department	Computer Science and Engineering
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Semester

III

Course Code	Course Name	Pre-Requisite	Credit Structure				Marks Distribution			
			L	T	P	C	INT	MID	END	Total
CA505	Operating Systems		3	0	0	3	50	50	100	200
				CO's	Statement					Bloom's Taxonomy

Course Objectives	To introduce the components of operating system	Course Outcomes	CA505.1	Able to learn the fundamentals of Operating Systems	Understand
	To analyse the process scheduling and execution		CA505.2	Able to acquire knowledge about different process scheduling techniques.	Understand
	To describe the structure of main memory, virtual memory		CA505.3	Able to solve process synchronization and deadlock handling strategies	Apply
	To describe the function of file systems		CA505.4	Able to acquire knowledge about different memory management techniques and page replacement algorithms.	Understand
	To explore the structure of an operating system's I/O subsystem and hardware.		CA505.5	Able to describe file concepts and analyse various disk scheduling and storage strategies	Analyse

COs	Mapping with Program Outcomes (POs)												Mapping with PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CA505.1	2												2	1	
CA505.2	2	1	1	1				1			1	1	2	1	1
CA505.3	2	2	2	1								1	2	1	1
CA505.4	2	2	2	2					1		1	1	1	1	1
CA505.5	1		1	1								1	1	1	
CA505	1.80	1.67	1.50	1.25				1.00	1.00		1.00	1.00	1.60	1.00	1.00

SYLLABUS

No.	Content	Hours	COs
I	Introduction Operating Systems Functionalities - Formal Definition - Evolution – Types of operating system, Services, Operating system Design and Implementation, Operating System Structure.	04	CA505.1
II	Process Management Process concept - Process control block, Process Hierarchy, Threads – Single Thread and Multi Thread Model, IPC models: shared memory and message passing. CPU Scheduling algorithms, Multiprocessor Scheduling, Process Synchronization - Peterson's Solution, Process Synchronization - Semaphores, Critical Regions, Monitors - Deadlock prevention- Deadlock avoidance and Deadlock Detection and Recovery - Bankers Algorithm.	14	CA505.2, CA505.3
III	Memory Management Overview of Swapping - Multiple Partitions – Paging, Page table, Segmentation, Demand paging-Fragmentation & Compaction- Page replacement algorithms, Memory allocation algorithms: first fit, Best fit, worst fit.	12	CA505.1, CA505.4
IV	File System Access Methods, Contiguous-Sequential and Indexed Allocation, File system interface - File System implementation, Secondary Storage Structure.	08	CA505.1, CA505.5
V	I/O System RAID-disk scheduling- Device drivers - block and character devices-streams, Character and Block device switch tables	04	CA505.1, CA505.5
Total Hours		42	

Essential Readings

1. Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, "Operating System Concepts", 9th Edition, John Wiley & Sons Inc. 2012.
2. Andrew S Tanenbaum, "Modern Operating Systems", 4th Edition, Prentice Hall. 2014
3. William Stallings, "Operating System: Internals and Design Principles", 9th Edition, Pearson, 2018.

Supplementary Readings

1. Harvey M. Deitel, Paul J. Deitel, David R. Choffnes, “Operating System”, 3rd Edition, Pearson, 2013.
2. D M Dhamdhere, “System Programming and Operating Systems”, 2nd Edition, Tata McGraw Hill, 2009.
3. Gary Nutt, “ Operating Systems: A Modern Perspective”, 2nd Edition, Addison Wesley, 2001.
4. Achyut S Godbole, “Operating Systems”, 3rd Edition, Tata McGraw Hill, 2010.