Subject Name:	Operating Systems	Subject Code:	TMC 103
Course Name:	Master of Computer Applications (MCA)		

1	**Contact Hours:**	45						L	3	T	0	P	0
2	**Examination Duration (Hrs):**		**Theory**	0	3		**Practical**	0	0				
3	**Relative Weightage:**		**CWE:**	25	**MTE:**	25	**ETE:**	50					
4	**Credits:**	0	3										
5	**Semester:**	*											
		Autumn	**Spring**	**Both**									

6	**Pre-Requisite:**	Basic knowledge of Computer fundamental.
7	**Subject Area:**	Computer Science.
8	**Objective:**	This course is study of the Operating system Concepts such as Management of process, memory, file systems and various security mechanism used by an Operating system.
9	**Course Outcome:**	
	CO 1	Classify operating systems as per user or process requirements
	CO 2	Evaluate and Implement an appropriate CPU scheduling algorithm to improve overall system throughput along with improved average turnaround time, waiting and response time.
	CO 3	Identify and Design a suitable solution for different issues, such as process synchronization and deadlock, that are associated with simultaneous execution of multiple processes.
	CO 4	Analyze and compare different algorithms given for management of the primary memory (RAM).
	CO 5	Evaluate and select an appropriate mechanism for improved management of files and directories.
	CO 6	Analyze and select a suitable security solution for protection of system's resources.
10	**Details of the Course:**	

Unit No.	CONTENT	CONTACT HOURS
1	**Introduction**: Definition and history of Operating System, types of operating systems, Operating system structure, Operating system components, services of Operating System, Introduction to multi-threading.	5
2	Process concept, PCB, scheduling queues and schedulers, CPU	6

	scheduling criteria, Process scheduling, Scheduling algorithms, Multiple-processor scheduling, **Rate monotonic and Earliest Deadline first Algorithms.**	
3	Inter-process communication, Process Synchronization, The Critical-Section problem, synchronization hardware, Semaphores, Classical problems of synchronization, Monitors, Threads: creation, deletion and synchronization. Deadlock, System model, Characterization, Deadlock prevention, Avoidance and Detection, Recovery from deadlock. **Deadlock solution used in Linux OS.**	9
4	Memory management, Logical and Physical Address Space, Swapping, Paging, Segmentation, Virtual Memory, Demand paging, Page replacement algorithms, Allocation of frames, Thrashing, Page Size and other considerations, Demand segmentation. File systems, File concept, access methods, directory implementation. File system structure, **Unix File System (UFS), extended file system (ext)**, Disk structure, Disk scheduling methods.	10
5	Protection and Security, Goals of protection, Domain of protection, Access matrix, Implementation of access Matrix, Revocation of Access Rights, Language based protection, Authentication, Program threats, System threats, Threat Monitoring, Encryption. Case study of Windows and Unix/Linux.	15
	TOTAL	**45**

11	**Suggested Books:**	
Sl. NO.	**NAME OF AUTHERS/BOOKS/PUBLISHERS**	**YEAR OF PUBLICATION**
1	Abraham Siberschatz and Peter Baer Galvin, “Operating System Concepts”, Fifth Edition, Addision-Wesley,	2010
2	Milan Milankovic, “Operating Systems, Concepts and Design”, McGraw-Hill.	2010
3	Harvey M Deital, "Operating Systems", Addison Wesley	2009
4	Richard Peterson, “Linux: The Complete Reference”, Osborne McGraw-Hill.	2010