GUJARAT TECHNOLOGICAL UNIVERSITY

MASTERS IN COMPUTER APPLICATION (Integrated MCA)

Year – II (Semester – IV) (W.E.F. January 2014)

Subject Name: Operating Systems

Subject Code: 4440603

1. **Learning Objectives:**

This course is intended to give students basic concepts modern Operating System. This will give conceptual insight about how OS design and implementation takes place. Also, gives insight about interactions between user application, hardware and OS.

2. **Pre-requisites:**

- Basic knowledge of computr hardware and software.
- Knowledge of programming languages like C, C++ etc.

3. **Contents:**

Serial No.	Course Content	Number of Lectures
1	**Operating System Overview & Processes** **Operating system Overview:** Operating system objectives and Functions, Evolution of OS, Major Achievements of OS, Developments Leading to Modern OS, Virtual Machines, OS design considerations for multiprocessor and multi core **Process Description and Control:** Process, Process State, Description, Control and Execution. **Threads:** Threads, Types of threads	**10**
2	**Concurrency Control and Dead Locks** **Concurrency: Mutual Exclusion and Synchronization:** Principles of Concurrency, Mutual Exclusion, Mutual Exclusion: Hardware Support, Semaphores, Monitors, Message Passing, Reader/Writer Problem.	**10**

	Concurrency: Deadlock and Starvation: Principles of Deadlock, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, An Integrated Deadlock Strategy, Dining Philosophers Problem	
3	**Memory** **Memory Management:** Memory Management Requirements, Memory Partitioning, Paging, Segmentation. **Virtual Memory:** Hardware and Control Structures, OS Software	**8**
4	**Scheduling** **Uni-processor Scheduling:** Types of Scheduling, Scheduling, Algorithms, Traditional UNIX Scheduling. **Multiprocessor and Real-time Management:** Multiprocessor Scheduling, Real-Time Scheduling	**8**
5	**Input/Output and Files** **I/O Management and Disk Scheduling:** I/O Devices, Organization of the I/O Function, OS Design Issues, I/O Buffering, Disk Scheduling, RAID, Disk cache. **File Management:** Overview, File Organization, File Directories, File Sharing, Record Blocking, Secondary Storage Management.	**7**
6	**Distributed Processing, Client/Server and Clusters:** Client/Server Computing, Service Oriented Architecture, Distributed Message Passing, Remote Procedure Calls, Clusters	**5**

4. Main Reference Book(s):

1. Stalling W, "Operating Systems", 7th edition, Prentice Hall India.

5. Suggested Additional Reading:

1. Silberschatz, A., Peter B. Galvin and Greg Gagne, "Operating System Principles", Wiley-Indian Edition, 8th Ed., 2009
2. Tanenbaum A.S., "Modern Operating Systems", 4th Edition, PHI, 2001
3. Flynn I.M, "Understanding Operating Systems", Cengage India Publication
4. Bach M J, "The Design of UNIX Operating System", Prentice Hall India, 1993.

6. Chapter wise Coverage from Main Reference Book:

Book#	Serial#	Topics
1	**1**	**Chapter 1 (1 to 6), Chapter 2(1 to 5), Chapter 3 (1 & 2) ,**
1	**2**	**Chapter 4(1 to 6), Chapter 5(1 to 6)**

1	**3**	**Chapter 6(1 to 4), Chapter 7(1 & 2)**
1	**4**	**Chapter 8(1 to 3), Chapter 9(1 & 2)**
1	**5**	**Chapter 10(1 to 7), Chapter 11(1,2,4,5,6,7)**
1	**6**	**Chapter 15(1 to 5)**