2MCACC2: OPERATING SYSTEMS

Total No. of Hours: 52 **Hours/Week: 04**

Course Objective: To understand the underlying principles, techniques and how the various elements that underlie operating system interact and provides services for execution of application software**.**

Course Outcome: Students will be able to

CO1: Understand the basics of Operating System Structure and various managerial functions of Operating System.

CO2: Apply and analyse the techniques of process scheduling, page replacement and disk scheduling algorithms to solve problems.

CO3: Understand the concepts of the Deadlock and different approaches to memory, file & I/O management.

CO4: Demonstrate the impact of virtualization and cloud through case study.

CO5: Analyse and critique example OS – UNIX, LINUX, Android and Windows.

Unit I	**Introduction** : What is an Operating System - The Operating System as an Extended Machine - The Operating System as a Resource Manager History of Operating System -First – Fifth Generation Computers – Computer Hardware Review – The Operating System Zoo – Operating System Concepts – System Calls – Operating System Structure	4 hrs
Unit II	**Processes and Threads**: Processes - Threads – Interprocess Communication- Scheduling – Classical IPC problems – Research on Processes and Threads. **Memory Management**: A memory Abstraction : Address Spaces – Virtual Memory – Page Replacement Algorithms – Design Issues for Paging Systems – Implementation Issues – Segmentation – Research on Memory Management	14 hrs
Unit III	**File System**: Files – Directories- File System Implementation – File System Management and Optimization – Example File Systems- Research on File Systems. **Input/ Output**: Principles of I/O Hardware – Principles of I/O Software – I/O Software Layers – Disks – Clocks – User Interfaces – Thin Clients – Power Management- Research on Input/output. **Deadlocks:** Resources – Introduction to Deadlocks – The Ostrich Algorithm – Deadlock detection and recovery – Deadlock Avoidance- Deadlock Prevention – Other issues – Research on Deadlocks	14 hrs
Unit IV	**Virtualization and the Cloud**: History – Requirements for Virtualization - Type 1 and Type 2 Hypervisors – Techniques for efficient Virtualization – Memory Virtualization – I/O Virtualization – Clouds – Case Study –	12 hrs

	VMware. **Multiple Processor Systems**: Multiprocessors – Multicomputers – Distributed Systems. **Security**: The Security Environment – Operating Systems Security – Controlling Access to Resources – Formal models of Secure Systems	
Unit V	Case Study 1: UNIX, LINUX and ANDROID Case Study 2: Windows	8 hrs

REFERENCE BOOKS

[1] Andrew S. Tanenbaum, Herbert Bos, "*Modern Operating Systems*", Pearson Education, Fourth Edition.

[2] William Stallings, "*Operating System*", Pearson Education, Eighth Edition.

[3] Abraham Silberschatz, Peter B. Galvin, Greg Gagne, "*Operating System Concepts*", WSE Willey, Eighth Edition.

[4] Andrew S. Tanenbaum, Albert S Woodhull, "*Operating System Design & Implementation*", Pearson Education, Third Edition.

[5] J. Archer Harris, "*Schaum's Outline of Operating Systems*", McGraw-Hill, Nov 2001.

[6] Lubomir F. Bic, Alan C. Shaw, "*Operating systems principles*", Prentice Hall, Nov 2002.