

COURSE CODE	COURSE TITLE	L	T	P	C
UCS1402	OPERATING SYSTEMS	3	0	0	3

OBJECTIVES

- Understand the structure and functions of OS
- Learn about Processes, Threads and Scheduling algorithms
- Understand the principles of concurrency and Deadlocks
- Learn various memory management schemes
- Study I/O management and File systems.

UNIT I OPERATING SYSTEMS OVERVIEW 9

Computer System Overview: Basic elements -- Instruction execution -- Interrupts -- Memory hierarchy -- Cache memory -- Direct memory access -- Multiprocessor and multicore organization; Operating System Overview: Objectives and functions -- Evolution of operating system; Computer system organization; Operating System Structure and Operations: System calls -- System programs -- OS generation and system boot.

UNIT II PROCESS MANAGEMENT 12

Processes: Process concept -- Process scheduling -- Operations on processes -- Interprocess communication; Threads: Overview -- Multithreading models -- Thread issues; Process synchronization -- Critical section problem -- Mutex locks -- Semaphores -- Monitors; CPU Scheduling: FCFS, SJF, Priority, Round robin, Rate Monotonic and EDF scheduling; Deadlocks -- Avoidance -- Prevention -- Detection and Recovery.

UNIT III MEMORY MANAGEMENT 8

Main Memory: Contiguous memory allocation -- Segmentation -- Paging -- 32 and 64bit architecture Examples; Virtual Memory: Demand paging -- Page replacement algorithms -- Allocation -- Thrashing.

UNIT IV STORAGE MANAGEMENT 9

Mass Storage Structure: Overview -- Disk scheduling and management; File System Storage: File concepts -- Directory and disk structure -- Sharing and protection; File System Implementation: File system structure -- Directory structure -- Allocation methods -- Free space management -- I/O systems.

UNIT V CASE STUDY 7

Linux Vs Windows: Design principles -- Process management -- Scheduling -- Memory management -- File systems; Mobile OS: iOS and Android -- Introduction and architecture.

TOTAL PERIODS: 45

OUTCOMES

On successful completion of this course, the student will be able to:

- Describe the basic services and functionalities of operating systems (K2)
- Analyze various scheduling algorithms, and understand the different deadlock, prevention and avoidance schemes (K4)

- Understand the different memory management schemes (K2)
- Understand the functionality of file systems (K2)
- Compare and contrast Linux, Windows and mobile operating systems (K3).

TEXTBOOKS

1. Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, "Operating System Concepts", 9th Edition, John Wiley and Sons Inc, 2012.
2. Neil Smyth, "iPhone iOS 4 Development Essentials - XCode", 4th Edition, Payload media, 2011.

REFERENCE BOOKS

1. Ramaz Elmasri, A Gil Carrick, David Levine, "Operating Systems A Spiral Approach", Tata McGraw-Hill Edition, 2010.
2. Achyut S Godbole, Atul Kahate, "Operating Systems", McGraw-Hill Education, 2016.
3. Andrew S Tanenbaum, "Modern Operating Systems", 2nd Edition, Pearson Education, 2004.
4. Harvey M Deitel, "Operating Systems", 3rd Edition, Pearson Education, 2004.
5. Daniel P Bovet, Marco Cesati, "Understanding the Linux Kernel", 3rd Edition, O'Reilly, 2005.