

OPERATING SYSTEMS

Paper Code: ETCS-304
Paper: Operating Systems

L	T/P	C
3	1	4

INSTRUCTIONS TO PAPER SETTERS:

MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

***Objective:** The goal of this course is to provide an introduction to the internal operation of modern operating systems. The course will cover processes and threads, mutual exclusion, CPU scheduling, deadlock, memory management, and file systems.*

UNIT I

Introduction: What is an Operating System, Simple Batch Systems, Multiprogrammed Batches systems, Time-Sharing Systems, Personal-computer systems, Parallel systems, Distributed Systems, Real-Time Systems, OS – A Resource Manager.

Memory Organization & Management: Memory Organization, Memory Hierarchy, Memory Management Strategies, Contiguous versus non- Contiguous memory allocation, Partition Management Techniques, Logical versus Physical Address space, swapping, Paging, Segmentation, Segmentation with Paging

Virtual Memory: Demand Paging, Page Replacement, Page-replacement Algorithms, Performance of Demand Paging, Thrashing, Demand Segmentation, and Overlay Concepts.

[T1] [T2][R2][R3] [No. of hrs. 10]

UNIT II

Processes: Introduction, Process states, process management, Interrupts, Interprocess Communication

Threads: Introduction, Thread states, Thread Operation, Threading Models.

Processor Scheduling: Scheduling levels, pre emptive vs no pre emptive scheduling, priorities, scheduling objective, scheduling criteria, scheduling algorithms, demand scheduling, real time scheduling.

Process Synchronization: Mutual exclusion, software solution to Mutual exclusion problem, hardware solution to Mutual exclusion problem, semaphores, Critical section problems. Case study on Dining philosopher problem, Barber shop problem etc.

[T1][T2][R3] [No. of hrs. 10]

UNIT III

Deadlocks: examples of deadlock, resource concepts, necessary conditions for deadlock, deadlock solution, deadlock prevention, deadlock avoidance with Bankers algorithms, deadlock detection, deadlock recovery.

Device Management: Disk Scheduling Strategies, Rotational Optimization, System Consideration, Caching and Buffering

[T1][T2][R1] [No. of hrs. 10]

UNIT IV

File System: Introduction, File Organization, Logical File System, Physical File System , File Allocation strategy, Free Space Management, File Access Control, Data Access Techniques, Data Integrity Protection, Case study on file system viz FAT32, NTFS, Ext2/Ext3 etc.

[T1] [T2][R4][R5] [No. of hrs. 10]

Text Books:

- [T1] Deitel & Dietel, “Operating System”, Pearson, 3rd Ed., 2011
- [T2] Silberschatz and Galvin, “Operating System Concepts”, Pearson, 5th Ed., 2001
- [T3] Madnick & Donovan, “Operating System”, TMH, 1st Ed., 2001

Reference Books:

- [R1] Tannenbaum, “Operating Systems”, PHI, 4th Edition, 2000
- [R2] Godbole, “Operating Systems”, Tata McGraw Hill, 3rd edition, 2014
- [R3] Chauhan, “Principles of Operating Systems”, Oxford Uni. Press, 2014
- [R4] Dhamdhare, “Operating Systems”, Tata McGraw Hill, 3rd edition, 2012
- [R5] Loomis, “Data Management & File Structure”, PHI, 2nd Ed.