GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY,
EAST DELHI CAMPUS,
SURAJMAL VIHAR-110092

Paper code : ARD 204	L	T/P	C
Subject : Operating System	4	0	4

Marking Scheme

1. Teachers Continuous Evaluation: 25 Marks
2. End Term Theory Examination: 75 Marks

INSTRUCTIONS TO PAPER SETTERS: **Maximum Marks : 75**

1. There should be 9 questions in the end term examination question paper
2. 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 15 marks.
3. 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 15 marks.
4. The questions are to be framed keeping in view the learning outcomes of course/paper. The standard/ level of the questions to be asked should be at the level of the prescribed textbooks.
5. The requirement of (scientific) calculators/ log-tables/ data-tables may be specified if required

Course Outcomes:

CO1:	Ability of students to understand the basic concepts of Operating System and memory management
CO2:	Ability of students to understand the concept of process management
CO3:	Ability of students to understand the concept of device management
CO4:	Ability of students to understand the concept of virtualization

Course Outcomes (CO) to Programme Outcomes (PO) Mapping (Scale 1: Low, 2: Medium, 3: High

CO/PO	PO01	PO02	PO03	PO04	PO05	PO06	PO07	PO08	PO09	PO10	PO11	PO12
CO1	3	3	3	3	3	-	-	-	-	1	1	2
CO2	3	3	3	3	3	-	-	-	-	1	1	2
CO3	3	3	3	3	3	-	-	-	-	1	1	3
CO4	3	3	3	3	3	-	-	-	-	1	1	3

Unit I **[12]**

Introduction: Introduction: What is an Operating System, Simple Batch Systems, Multiprogrammed Batches systems, TimeSharing 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

Unit II **[12]**

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

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Communication

Threads: Introduction, Thread states, Thread Operation, Threading Models. Processor Scheduling: Scheduling levels, preemptive vs nonpreemptive 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.

Unit III **[10]**

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

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.

Unit IV **[6]**

Virtualization : Introduction to Virtualization, Virtual Machine, Type of virtualization, Hypervisors

Text Books:

1. Deitel, H. M. (1990). *An introduction to operating systems*. Addison-Wesley Longman Publishing Co., Inc..
2. Silberschatz, A., Galvin, P. B., & Gagne, G. (2006). *Operating system concepts*. John Wiley & Sons.
3. Portnoy, M. (2012). *Virtualization essentials* (Vol. 19). John Wiley & Sons.

Reference Books:

1. Tannenbaum (2000).*Operating Systems*. PHI, 4th Edition,
2. Godbole, A. S. (2005). *Operating systems*. Tata McGraw-Hill Education.
3. Dhamdhere, D. M. (2006). *Operating systems: a concept-based approach*, 2E. Tata McGraw-Hill Education.

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