M.Sc. (Computer Science)

Semester-2

MSCS-2-01T: Operating Systems

Total Marks: 100
External Marks: 70
Internal Marks: 30
Credits: 4
Pass Percentage: 40%

INSTRUCTIONS FOR THE PAPER SETTER/EXAMINER

1. The syllabus prescribed should be strictly adhered to.
2. The question paper will consist of three sections: A, B, and C. Sections A and B will have four questions from the respective sections of the syllabus and will carry 10 marks each. The candidates will attempt two questions from each section.
3. Section C will have fifteen short answer questions covering the entire syllabus. Each question will carry 3 marks. Candidates will attempt any ten questions from this section.
4. The examiner shall give a clear instruction to the candidates to attempt questions only at one place and only once. Second or subsequent attempts, unless the earlier ones have been crossed out, shall not be evaluated.
5. The duration of each paper will be three hours.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt any two questions each from the sections A and B of the question paper and any ten short q questions from Section C. They have to attempt questions only at one place and only once. Second or subsequent attempts, unless the earlier ones have been crossed out, shall not be evaluated.

Course: Operating Systems	
Course Code: MSCS-2-01T	
Course Outcomes (COs) After the completion of this course, the students will be able to:	
CO1	Understand the structure of computing systems, from the hardware level through the operating system level and onto the applications level.
CO2	Understand basics of operating system viz. system programs, system calls, user mode and kernel mode.
CO3	Learn the working with CPU scheduling algorithms for specific situation, and analyze the environment leading to deadlock and its rectification.
CO4	Explore the memory management techniques viz. caching, paging, segmentation, virtual memory, and thrashing.
CO5	Apply Methods for Handling Deadlocks, Deadlock Prevention, and Recovery from Deadlock.

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SECTION-A

Unit I: Introduction and System Structures: Computer-System Organization, Computer-System Architecture, Operating-System Structure, Operating-System Operations, Process Management, Memory Management, Storage Management, Protection and Security, Computing Environments, Operating-System Services, User and Operating-System Interface, System Calls, Types of System Calls, System Programs.

Unit II: Process Management: Process Concept, Process Scheduling, Operations on Processes, Multi-threaded programming: Multithreading Models, Process Scheduling: Basic Concepts, Scheduling Criteria, and Scheduling Algorithms.

Unit III: Deadlock: System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock.

Unit IV: Memory Management: Basic Hardware, Address Binding, Logical and Physical Address, Dynamic linking and loading, Swapping, Contiguous Memory Allocation, Segmentation, Paging, Demand Paging, Page Replacement algorithms

SECTION-B

Unit V: File Systems: File Concept, Access Methods, Directory and Disk Structure, File-System Structure, File-System Implementation, Directory Implementation, Allocation Methods, Free-Space Management.

Unit VI: **Introduction to Linux:** Linux's shell, Kernel, Features of Linux, using file system: Filenames, Introduction to different types of directories: Parent, Subdirectory, Home directory; rules to name a directory, Important directories in Linux File System.

Unit VII: Linux Commands: Cal, date, echo, bc, who, cd, mkdir, rmdir, ls, cat cp, rm, mv, more, gzip, tar, File ownership, file permissions, chmod, Directory permission, change file ownership,

Unit VIII: Shell Scripting: Creating and Executing Shell Programs, using variables: Assigning a value to a variable, Accessing the value of a variable, Positional Parameters and other Built-In Shell Variables; Special Characters, Conditional Statements: if Statement, case Statement; Iteration Statements: for Statement, while Statement, until Statement

Reference Books:

- Silberschatz and Galvin, "Operating System Concepts", Addison-Wesley publishing.
- Nutt Gary, "Operating Systems", Addison Wesley Publication.
- Hansen, Per Brinch, "Operating System Principles", Prentice-Hall.
- N. Haberman, "Introduction to Operating System Design", Galgotia Publications.
- Hansen, PerBrich, "The Architecture of Concurrent Programs", PHI.

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- Shaw, "Logical Design of Operating System", PHI.

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