



B Sc	Semester: IV	Credits: 4
Course: 5	OPERATING SYSTEMS	Hrs/Wk: 4

Aim and objectives of Course:

- This course aims to introduce the structure and organization of a file system. It emphasizes various functions of an operating system like memory management, process management, device management, etc.

Learning outcomes of Course:

Upon successful completion of the course, a student will be able to:

- Know Computer system resources and the role of operating system in resource management with algorithms
- Understand Operating System Architectural design and its services.
- Gain knowledge of various types of operating systems including Unix and Android.
- Understand various process management concepts including scheduling, synchronization, and deadlocks.
- Have a basic knowledge about multithreading.
- Comprehend different approaches for memory management.
- Understand and identify potential threats to operating systems and the security features design to guard against them.
- Specify objectives of modern operating systems and describe how operating systems have evolved over time.
- Describe the functions of a contemporary operating system

Detailed Syllabus: (Five units with each unit having 12 hours of class work)

UNIT I:

What is Operating System? History and Evolution of OS, Basic OS functions, Resource Abstraction, Types of Operating Systems– Multiprogramming Systems, Batch Systems, Time Sharing Systems; Operating Systems for Personal Computers, Workstations and Hand-held Devices, Process Control & Real time Systems.

UNIT II:

Processor and User Modes, Kernels, System Calls and System Programs, System View of the Process and Resources, Process Abstraction, Process Hierarchy, Threads, Threading Issues, Thread Libraries; Process Scheduling, Non-Preemptive and Preemptive Scheduling Algorithms.

UNIT III:

Process Management: Deadlock, Deadlock Characterization, Necessary and Sufficient Conditions for Deadlock, Deadlock Handling Approaches: Deadlock Prevention, Deadlock Avoidance and Deadlock Detection and Recovery. Concurrent and Dependent Processes, Critical Section, Semaphores, Methods for Inter- process Communication; Process Synchronization, Classical Process Synchronization Problems: Producer-Consumer, Reader-Writer.

UNIT IV:

Memory Management: Physical and Virtual Address Space; Memory Allocation Strategies– Fixed and -Variable Partitions, Paging, Segmentation, Virtual Memory.

UNIT V:

File and I/O Management, OS security : Directory Structure, File Operations, File Allocation Methods, Device Management, Pipes, Buffer, Shared Memory, Security Policy Mechanism, Protection, Authentication and Internal Access Authorization Introduction to Android Operating System, Android Development Framework, Android Application Architecture, Android Process Management and File System, Small Application Development using Android Development Framework.



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B Sc Computer Science Syllabus(w.e.f: 2020-21 A.Y)

B Sc	Semester: IV	Credits: 1
Course: 5(L)	Operating Systems Lab using C/Java	Hrs/Wk: 2

Details of Lab Syllabus: **Operating Systems Lab using C/Java**

1. Write a program to implement Round Robin CPU Scheduling algorithm
2. Simulate SJF CPU Scheduling algorithm
3. Write a program the FCFS CPU Scheduling algorithm
4. Write a program to Priority CPU Scheduling algorithm
5. Simulate Sequential file allocation strategies
6. Simulate Indexed file allocation strategies
7. Simulate Linked file allocation strategies
8. Simulate MVT and MFT memory management techniques
9. Simulate Single level directory File organization techniques
10. Simulate Two level File organization techniques
11. Simulate Hierarchical File organization techniques
12. Write a program for Bankers Algorithm for Dead Lock Avoidance
13. Implement Bankers Algorithm Dead Lock Prevention.
14. Simulate all Page replacement algorithms.
 - a) FIFO
 - b) LRU
 - c) LFU
15. Simulate Paging Techniques of memory management



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**MODEL QUESTION PAPER (Sem-end.
Exam)B.Sc DEGREE EXAMINATIONS**

Semester - IV

Course 5: OPERATING SYSTEMS

Time: 3Hrs

Max.marks:75

Section - A

Answer any FIVE question

5X5 = 25M

1. Write about Resource Abstraction.
2. Write about the process and the process state.
3. Explain threading issues.
4. Explain about process Synchronization.
5. Discuss some necessary and sufficient conditions for deadlock.
6. Explain about Virtual memory.
7. Explain about shared memory.
8. Write about file types.

Section - B

Answer ALL following question

5X10 = 50M

9. a) Explain various types of Operating Systems.

(OR)

- b) What is Operating System? Explain functions of Operating System.

10. a) Explain in detail about Process Scheduling.

(OR)

- b) Explain system view of the process and resources.

11. a) Explain about deadlock Detection and recovery.

(OR)

- b) Discuss classical process synchronization problems.

12. a) Explain the following

i) Segmentation

ii) Fixed and variable partitions.

(OR)

- b) Explain in detail about Demand-paging.

13. a) Explain Authentication and Internal Access Authorization.

(OR)

- b) Explain Android Development Framework.