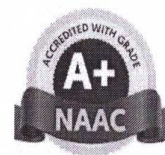


# SHRI GNANAMBICA DEGREE COLLEGE: MADANAPALLE



(AUTONOMOUS)  
Course 8: OPERATING SYSTEMS (MAJOR)  
SEMESTER III  
(W.E.F.2024-25)  
Program: BSC (CS)



Hours per week: 4

Credits: 3

## Course Objectives

To gain knowledge about various functions of an operating system like memory management, process management, device management, etc.

## Course Outcomes:

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

1. Demonstrate knowledge and comprehension of operating system functions.
2. Analyze different process scheduling algorithms and apply them to manage processes and threads effectively
3. Create strategies to prevent, detect, and recover from deadlocks, and design solutions for inter-process communication and synchronization problems.
4. Compare and contrast different memory allocation strategies and evaluate their effectiveness
5. Evaluate disk scheduling algorithms while implementing OS security measures

## 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.



*c Mahesh Babu*  
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#### UNIT IV

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

#### UNIT V

File and I/O Management, OS security: Directory Structure, File Operations, File Allocation Methods, Device Management, Pipes, Buffer, Shared Memory, Disk Scheduling algorithms.

#### References:

##### Online references:

1. [https://www.tutorialspoint.com/operating\\_system/](https://www.tutorialspoint.com/operating_system/)
2. <https://www.geeksforgeeks.org/operating-systems/>
3. <https://www.scaler.com/topics/operating-system/>

##### Reference Books:

1. Operating System Principles by Abraham Silberschatz, Peter Baer Galvin and Greg Gagne (7th Edition) Wiley India Edition.
2. Operating Systems: Internals and Design Principles by Stallings (Pearson)
3. Operating Systems by J. Archer Harris (Author), Jyoti Singh (Author) (TMH)
4. Understanding operating systems Flynn, Ida M., McHoes, Ann McIver
5. Modern Operating Systems, by Andrew S. Tanenbaum, Third Edition, Prentice Hall, 2008.



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# SHRI GNANAMBICA DEGREE COLLEGE: MADANAPALLE



(AUTONOMOUS)  
Course 8: OPERATING SYSTEMS (MAJOR) - Practicals  
SEMESTER III  
(W.E.F.2024-25)  
Program: BSC (CS)



Hours per week: 2

Credits: 1

## List of Experiments

Experiment 1: Illustrate the LINUX commands

Problem Statement:

- |        |          |          |         |          |
|--------|----------|----------|---------|----------|
| a. pwd | b. mkdir | c. rmdir | d. grep | e. chmod |
| f. ls  | g.rm     | h.cp     |         |          |

Experiment 2: Write a program to calculate average waiting time and turn around time of each process using the following CPU Scheduling algorithm for the given process schedules

Problem Statement:

- a) FCFS
- b) SJF
- c) Priority
- d) Round Robin

Experiment 3: Simulate MVT and MFT memory management techniques

Experiment 4: Write a program for Bankers Algorithm for Dead Lock Avoidance

Experiment 5: Implement Bankers Algorithm Dead Lock Prevention.

Experiment 6: Write a program to simulate Producer-Consumer problem.

Experiment 7: Simulate all Page replacement algorithms.

Problem Statement: a. FIFO b. LRU c. LFU d. Optimal

Experiment 8: Simulate Paging Techniques of memory management

Experiment 9: Simulate the following disk scheduling algorithms

Problem Statement:

- a. FCFS, b. SSTF c. SCAN d. CSCAN

Experiment 10: Simulate all File Organization Techniques

Problem Statement: a) Single level directory b) Two level directory



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# SHRI GNANAMBICA DEGREE COLLEGE: MADANAPALLE

(AUTONOMOUS)

Course 8: OPERATING SYSTEMS (MAJOR)

SEMESTER III

(W.E.F.2024-25)

Program: BSC (CS)

Question Paper – Blue Print

Time : 3 Hrs

Marks : 70

## PART-A

Answer any 4 of the 8. Each Question Carries 5 marks.

(4 x 5 =20)

1. Question
2. Question
3. Question
4. Question
5. Question
6. Question
7. Question
8. Question

## PART-B

Answer one from each unit. Each Question Carries 10 marks.

(5X10=50)

### UNIT 1

9. Question

OR

10. Question

### UNIT 2

11. Question

OR

12. Question

### UNIT 3

13. Question

OR

14. Question

### UNIT 4

15. Question

OR

16. Question

### UNIT 5

17. Question

OR

18. Question



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