



SRI VENKATESWARA UNIVERSITY
II Year Syllabus for 4-Year UG Honours in BCA. (General) as Major
in consonance with the Curriculum framework w.e.f. AY 2026-27

II Year IV Semester

Sl. No.	Category	Course No.	Course Name	No. of Hours		Total No. of Hours	No. of Credits		Total No. of Credits
				Theory	Practical		Theory	Practical	
1	Major-Core	8	Python Programming	3	2	5	3	1	4
2	Major-Core	9	Operating Systems	3	2	5	3	1	4
3	Major-Core	10	Software Engineering	3	2	5	3	1	4
4	Minor	2		4	0	4	4	0	4
5	MDC	3	-	2	0	2	2	0	2
6	SEC	4	SEC: Design Thinking/Problem solving/ others	2	0	2	2	0	2
				17	6	23	17	3	20

Note:

The number of instructional hours shall be five (5) for courses involving problem-solving, and four (4) for courses comprising only theory.


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II Year Syllabus for 4-Year UG Honours in BCA General as Major in consonance with Curriculum framework w.e.f. AY 2026-27

Year	Semester	Course	Title of the Course	No. of Hrs /Week	No. of Credits
II	IV	8	Python Programming	3	3
			Python Programming Lab	2	1
		9	Operating Systems	3	3
			Operating Systems – Practical	2	1
		10	Software Engineering	3	3
			Software Engineering – Practical	2	1

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SEMESTER-IV
BCA General Honours
II Year IV Semester
COURSE 9 : OPERATING SYSTEMS

Theory

Credits: 3

3 hrs/week

Course Objectives:

- Understand the evolution and core functions of operating systems, including resource management and system types.
- Analyze process and thread management, focusing on system calls, kernel modes, scheduling algorithms, and threading models.
- Evaluate process synchronization and deadlock handling, using classical problems and inter-process communication methods.
- Apply memory management techniques, including paging, segmentation, and virtual memory implementation.
- Examine file, I/O, and device management strategies, along with basic OS-level security features.

Course Outcomes:

At the End of the Course, The Students will be able to:

- Explain the foundational principles and evolution of operating systems, including resource abstraction and core management functions.
- Classify and compare different types of operating systems, such as multiprogramming, batch, time-sharing, real-time, and personal device-based systems.
- Analyze process and thread management techniques, including processor modes, system calls, kernel functions, and scheduling algorithms.
- Evaluate process synchronization and deadlock handling approaches, applying classical concurrency solutions and inter-process communication methods.
- Apply memory, file, and I/O management strategies, incorporating allocation techniques, virtual memory models, disk scheduling, and OS-level security features.

Unit 1. Operating System Fundamentals:

Operating System Definition, History and Evolution of OS, Basic OS functions, 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 2. Process & Thread:

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 3. Process Management:

Concurrent and Dependent Processes, Critical Section, Semaphores, Methods for Inter process Communication; Process Synchronization, Classical Process Synchronization Problems: Producer-Consumer, Reader-Writer.

Deadlock, Deadlock Characterization, Necessary and Sufficient Conditions for Deadlock, Deadlock Handling Approaches: Deadlock Prevention, Deadlock Avoidance and Deadlock Detection and Recovery.

Unit 4. Memory Management:

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

Unit 5. File and I/O Management:

Directory Structure, File Operations, File Allocation Methods, Device Management, Pipes, Buffer, Shared Memory, Disk Scheduling algorithms.

Text Books:

1. Operating System Principles, Abraham Silberschatz, Peter Baer Galvin and GregGagne, 7th Edition, Wiley India Edition.
2. Operating Systems: Internals and Design Principles, Stallings , Pearson edition

Reference Books:

1. Operating Systems Design and Implementation, Andrew S. Tanenbaum, 3rd Edition, Pearson
2. A Text Book of Operating Systems, Singh, Kaur and Gupta, Khanna Publishers

Activities:

Outcome: Explain Foundational Principles and Evolution of Operating Systems

Activity: Timeline Creation & Concept Mapping - Students will collaboratively build a visual timeline showing the evolution of operating systems from early batch systems to modern distributed and mobile OS. They will also create a concept map illustrating core management functions (e.g., process, memory, file, device management).

Evaluation Method: Rubric-based assessment of timeline and concept map:

- Historical accuracy
- Inclusion of core OS functions
- Presentation and teamwork

Outcome: Classify and Compare Types of Operating Systems

Activity: Comparative Analysis Table & Case Study Discussion - Students will research and fill out a comparison table for OS types (multiprogramming, batch, time-sharing, real-time, personal device-based), focusing on architecture, scheduling, responsiveness, and use cases.

Followed by a group discussion using real-world examples (e.g., RTOS in pacemakers vs. Android in smartphones).

Evaluation Method: Students will be evaluated on a 10-point scale based on

- Individual submission of comparison table
- Group participation score in discussion

Outcome: Analyze Process and Thread Management Techniques

Activity: Simulation & Code Walkthrough - Students will simulate process scheduling using tools or pseudocode (e.g., Round Robin, Priority Scheduling). They will also analyze thread creation and system calls using a simple multithreaded program in Java.

Evaluation Method: Students will be assessed on a 10-point scale based on

- Scheduling algorithm simulation results
- Explanation of processor modes and system calls
- Code annotations for kernel functions

Outcome: Evaluate Process Synchronization and Deadlock Handling

Activity: Role-play & Coding Challenge - Students will role-play classical problems (e.g., Dining Philosophers, Producer-Consumer) to understand synchronization. Then, they'll implement semaphore or monitor-based solutions in code and simulate deadlock detection or avoidance.

Evaluation Method: Students will be evaluated for 10 marks based on

- Code review for correctness and use of synchronization primitives
- Peer evaluation of role-play clarity and engagement
- Written test with deadlock scenarios and solution strategies

Outcome: Apply Memory, File, and I/O Management Strategies

Activity: Interactive Lab & Design Task - Students will use OS simulators to experiment with memory allocation (paging, segmentation), disk scheduling (FCFS, SSTF, SCAN), and file system operations.

Evaluation Method: Students will be evaluated for 10 points based on

- Correct use of allocation techniques
- Disk scheduling output analysis
- Virtual memory behaviour observation


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SEMESTER-IV

COURSE 9: OPERATING SYSTEMS

Practical

Credits: 1

2 hrs/week

List of Experiments:

1. Illustrate the LINUX commands
 - a) pwd
 - b) mkdir
 - c) rmdir
 - d) grep
 - e) chmod
 - f) ls
 - g) rm
 - h) cp
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.
 - a) FCFS
 - b) SJF
 - c) Priority
 - d) Round Robin
3. Simulate MVT and MFT memory management technique
4. Write a program for Bankers Algorithm for Dead Lock Avoidance
5. Implement Bankers Algorithm Dead Lock Prevention.
6. Write a program to simulate Producer-Consumer problem.
7. Simulate all Page replacement algorithms.
 - a) FIFO
 - b) LRU
 - c) LFU
 - d) Optimal
8. Simulate Paging Techniques of memory management
9. Simulate the following disk scheduling algorithms
 - a) FCFS
 - b) SSTF
 - c) SCAN
 - d) CSCAN

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BCA General Honours
II Year IV Semester
COURSE 9 : OPERATING SYSTEMS

Time : 3 Hrs

Max Marks : 75

SECTION - A

Answer any FIVE of the following

5 X 3= 15 Marks

1. Short answer question from unit-I
2. Short answer question from unit-I
3. Short answer question from unit-II
4. Short answer question from unit-II
5. Short answer question from unit-III
6. Short answer question from unit-III
7. Short answer question from unit-IV
8. Short answer question from unit-IV
9. Short answer question from unit-V
10. Short answer question from unit-V

SECTION-B

Answer FIVE of the following.

5 X 12=60 Marks

11. a) Essay question from Unit-I
OR
b) Essay question from Unit-I
12. a) Essay question from Unit-II
OR
b) Essay question from Unit-II
13. a) Essay question from Unit-III
OR
b) Essay question from Unit-III
14. a) Essay question from Unit-IV
OR
b) Essay question from Unit-IV
15. a) Essay question from Unit-V
OR
b) Essay question from Unit-V


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