

OPERATING SYSTEM		Semester	4
Course Code	BEC405C	CIE Marks	50
Teaching Hours/Week(L:T:P)	3:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	3
Examination type(SEE)	Theory		

Course objectives:

This course will enable students to:

- Understand the services provided by an operating system.
- Explain how processes are synchronized and scheduled.
- Understand different approaches of memory management and virtual memory management. Describe the structure and organization of the file system
- Understand interprocess communication and deadlock situations.

Teaching-Learning Process(General Instructions)

The samples strategies, which the teacher can use to accelerate the attainment of the various course outcomes are listed in the following:

1. Lecturer method (L) need not to be only traditional lecture method, but alternative effective teaching methods could be adopted to attain the outcomes.
2. Use of Video/Animation to explain functioning of various concepts.
3. Encourage collaborative (Group Learning) Learning in the class.
4. Ask at least three HOT (Higher order Thinking) questions in the class, which promotes critical thinking.
5. Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develop design thinking skills such as the ability to design, evaluate, generalize, and analyze information rather than simply recall it.
6. Introduce Topics in manifold representations.
7. Show the different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them.
8. Discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding.

**RBT
Level**

Module-1

Introduction to Operating Systems: OS, Goals of an OS, Operation of an OS, Computational Structures, Resource allocation techniques, Efficiency, System Performance and User Convenience, Classes operating System, Batch processing, Multi programming, Time Sharing Systems, Real Time and distributed Operating Systems
(Topics from Sections 1.2, 1.3, 2.2 to 2.8 of Text).

L1,L2

Module-2

Process Management: OS View of Processes, PCB, Fundamental State Transitions of a process, Threads, Kernel and User level Threads, Non-preemptive scheduling- FCFS and SRN, Preemptive Scheduling- RR and LCN, Scheduling in Unix and Scheduling in Linux
(Topics from Sections 3.3, 3.3.1 to 3.3.4, 3.4, 3.4.1, 3.4.2 , Selected scheduling topics from 4.2 and 4.3 , 4.6, 4.7 of Text).

**L1,L2,
L3**

Module-3	
Memory Management: Contiguous Memory allocation, Non-Contiguous Memory Allocation, Paging, Segmentation, Segmentation with paging, Virtual Memory Management, Demand Paging, VM handler, FIFO, LRU page replacement policies, Virtual memory in Unix and Linux (Topics from Sections 5.5 to 5.9, 6.1 to 6.3 except Optimal policy and 6.3.1, 6.7,6.8 of Text)	L1,L2, L3
Module-4	
File Systems: File systems and IOCS, File Operations, File Organizations, Directory structures, File Protection, Interface between File system and IOCS, Allocation of disk space, Implementing file access (Topics from Sections 7.1 to 7.8 of Text).	L1,L2
Module5	
Message Passing and Deadlocks: Overview of Message Passing, Implementing message passing, Mailboxes, Deadlocks, Deadlocks in resource allocation, Handling deadlocks, Deadlock detection algorithm, Deadlock Prevention (Topics from Sections 10.1 to 10.3, 11.1 to 11.5 of Text).	L1, L2
Course outcome (Course Skill Set) At the end of the course, students will be able to: <ol style="list-style-type: none"> 1. Explain the goals, structure, operation and types of operating systems. 2. Apply scheduling techniques to find performance factors. 3. Explain organization of file systems and IOCS. 4. Apply suitable techniques for contiguous and non-contiguous memory allocation. 5. Describe message passing, deadlock detection and prevention methods. 	

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks). The student is declared as a pass in the course if he/she secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Continuous Internal Evaluation:

- ☐ There are 25 marks for the CIE's Assignment component and 25 for the Internal Assessment Test component.
- ☐ Each test shall be conducted for 25 marks. The first test will be administered after 40-50% of the coverage of the syllabus, and the second test will be administered after 85-90% of the coverage of the syllabus. The average of the two tests shall be scaled down to 25 marks.
- ☐ Any two assignment methods mentioned in the 22OB2.4, if an assignment is project-based then only one assignment for the courses shall be planned. The schedule for assignments shall be planned properly by the course teacher. The teacher should not conduct two assignments at the end of the semester if two assignments are planned. Each assignment shall be conducted for 25 marks. (If two assignments are conducted then the sum of the two assignments shall be scaled down to 25 marks). The final CIE marks of the course out of 50 will be the sum of the scale-down marks of tests and assignment/s marks.

Internal Assessment Test question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester-End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the course (**duration 03 hours**).

1. The question paper will have ten questions. Each question is set for 20 marks.
2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.
3. The students have to answer 5 full questions, selecting one full question from each module.
4. Marks scored shall be proportionally reduced to 50 marks.

Suggested Learning Resources:

TEXT BOOKS

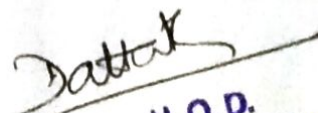
Operating Systems – A concept based approach, by Dhamdhere, TMH, 2nd edition.

REFERENCE BOOKS:

1. Operating systems concepts, Silberschatz and Galvin, John Wiley India Pvt. Ltd, 5th edition, 2001.
2. Operating system—internals and design system, William Stalling, Pearson Education, 4th ed, 2006.
3. Design of operating systems, Tannanbhaum, TMH, 2001.

Web links and Video Lectures(e-Resources):

- <https://archive.nptel.ac.in/courses/106/105/106105214/>
- https://onlinecourses.nptel.ac.in/noc20_cs04/preview
- https://onlinecourses.nptel.ac.in/noc21_cs72/preview
- <https://nptel.ac.in/courses/106106144>


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