B.Tech *Computer Science and Engineering*

COURSE PLAN: THEORY COURSE

Department :	**Computer Science and Engineering**			
Course Name & code :	Operating Systems			CSE 3123
Semester & branch :	**V**	**CSE**		
Name of the faculty :	**Dr. Tanuja Shailesh**			
No of contact hours/week:	**L**	**T**	**P**	**C**
	3	**0**	**0**	**3**

Course Outcomes (COs) to PO, PSO, BL Mapping

At the end of this course, the student should be able to:		**No. of Contact Hours**	**Marks**	**Program Outcomes (POs)**	**PSOs**	**BL (Recommended)**
CO1	Outline the concepts of threads and process.	10	26	1,3,12	1,2,4	2,3
CO2	Implement different types of process synchronization problems.	3	8	1,3,12	1,2,4	2,3,4
CO3	Implement different CPU scheduling and deadlock algorithms.	7	19	1,3	1,2,4	2,3,4
CO4	Understand main memory, virtual memory concepts of operating system.	9	26	1	1,2,4	2,3
CO5	Understand file systems and protection related to a general operating system.	7	16	1, 12	1,2,4	2,3
CO6	Apply and identify concepts to make the operating system efficient.	SDL	5	1,3, 12	1,2,4	3,4
	Total	**36**	**100**			

Course Articulation Matrix

CO/PO	Engineering knowledge	Problem analysis	Design/development of solutions	Investigations of complex problems	Modern tool usage	Engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning	PSO1	PSO2	PSO3	PSO4
CO1	**1**		**2**									**1**	**2**	**1**		**1**
CO2	**2**		**3**									**2**	**3**	**1**		**3**
CO3	**2**		**3**										**3**	**1**		**3**
CO4	**1**												**2**	**1**		**1**
CO5	**1**											**1**	**3**	**1**		**1**
CO6	1		3									2	1	1		1
Average Articulation Level	**1**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**3**	**1**	**0**	**2**

ICT Tools used in delivery and assessment

Sl. No	Name of the ICT tool used	Details of how it is used

Course Outcomes (COs)/Course Learning Outcomes (CLOs) to PO, PSO, LO, BL Mapping

At the end of this course, the student should be able to:		No. of Contact Hours	Marks	Program Outcomes(POs)	Learning Outcomes (LOs)	BL (Recommended)
CLO1	Know the concepts of threads and process.	10	26	1,3,12	C1	2,3
CLO2	Implement different types of process	3	8	1,3,12	C2	2,3,4

	synchronization problems.					
CLO3	Implement different CPU scheduling and deadlock algorithms.	7	19	1,3	C2	2,3,4
CLO4	Understand main memory, virtual memory concepts of operating system.	9	26	1	C3	2,3
CLO5	Understand file systems and protection related to a general operating system.	7	16	1, 12	C1	2,3
CLO6	Apply and identify concepts to make the operating system efficient.	SDL	5	1,3, 12	C2	3,4
	Total	**36**	**100**			

 # Applicable to IET Accredited Programs

Delivery and assessment Plan of LOs #

Learning Outcome (LO) mapped to the course		**Delivery and assessment Plan**
LO	**LO statement**	
C1	Apply knowledge of mathematics, statistics, natural science and engineering principles to the solution of complex problems. Some of the knowledge will be at the forefront of the particular subject of study	Classroom Session and Online Quiz, In-semester and End-Sem Examination
C2	Analyse complex problems to reach substantiated conclusions using first principles of mathematics, statistics, natural science and engineering principles	Classroom Session and Online Quiz, In-semester and End-Sem Examination
C3	Select and apply appropriate computational and analytical techniques to model complex problems, recognising the limitations of the techniques employed	Classroom Session and Online Quiz, In-semester and End-Sem Examination

 # Applicable to IET Accredited Programs

Assessment Plan

IN – SEMESTER ASSESSMENTS								
Sl. No.	**Assessment Mode**		**Assessment Method**	****Time Duration**	****Marks**	**** Weightage**	**Typology of Questions (Recommended)**	****Schedule**	****Topics Covered**
IA		**1**	**Quiz**	**20 minutes**	**5**	**Objective:** 5M 10 MCQs × ½ = 5 marks	Bloom's taxonomy (B) level of the question should be L3 and above.	August , 2025	July – Aug 2025 L1-L6, T1-T3 (CO1)
		2	**Quiz**	**20 minutes**	**5**	**Objective:** 5M 10 MCQs × ½ = 5 marks	Bloom's taxonomy (BT) level of the question should be L3 and above.	September, 2025	Aug – Aug , 2025 L7-L11, T4-T5 (CO1 and CO2)
		3	**Quiz**	**20 minutes**	**5**	**Objective:** 5M 10 MCQs × ½ = 5 marks	Bloom's taxonomy (BT) level of the question should be L3 and above.	October , 2025	Sep –Oct , 2025 L12-L18, T6-T8 (CO3 and CO4)
		4	**Quiz**	**20 minutes**	**5**	**Objective:** 5M 10 MCQs × ½ = 5 marks	Bloom's taxonomy (BT) level of the question should be L3 and above.	October , 2025	Oct – Oct , 2025 L19-L21, T9 + SDL (CO5 and CO6)
		2	**Mid-Term Examination**	**90 minutes**	**30**	**Objective:** 5M 10 MCQs × ½ = 5 marks **Descriptive:** 25 M (1 Questions of 2 marks +5 Questions	Bloom's taxonomy (BT) level of the question should be L3 and above.	September 12-18, 2025	July – Sep ,2025 L1-L16, T1-T7 (CO1, CO2, CO3 and CO4)

					of 3 marks+2 Question of 4 marks)			
END – SEMESTER ASSESSMENT								
1	**Regular/Make–Up Exam**	180 Mins	50		Answer all 5 full questions of 10 marks each. Each question can have 3 parts of 2/3/4/5/6 marks.	Bloom's taxonomy (BT) level of the question should be L3 and above.	17th week of the semester	Comprehensive examination covering full syllabus.

Note: Fine tune the assessment plan as per the guidelines, issued by AD(A), notified from time to time.

******* ***Individual faculty will be entering the details***

****** Individual faculty shall identify the assessment method from FISAC Assessment method (Table 1 below) and fill in the details.***

NOTE: ***Information provided in the table is as per the In-semester assessment plan notified by Associate Director (Academics).***

Lesson Plan

Lecture No.	Topic	CO's addressed
L0	Introductory class(Introduction between teacher & students. Overview of the subject).	-
L1	What Operating Systems Do, Operating System Structure.	CO1
L2	Operating System Operations, Process Management	CO1
T1	Memory Management, Storage Management. Operating System Service	CO1
L3	User and Operating System Interface, System Call	CO1
L4	Types of System Calls, System Programs	CO1
T2	Operating System Structure	CO1
L5	System Boot	CO1
T3	Processes: Overview, Process Scheduling	CO1
L6	Operations on Processes, Interprocess Communication	CO1
L7	Threads: Overview, Multithreaded Models, Thread Libraries	CO1
L8	Process Scheduling: Basic Concepts, Scheduling Criteria	CO3
T4	Scheduling Algorithms	CO3
L9	Thread Scheduling	CO3
L10	Process Synchronization: Background,	CO2
T5	The Critical Section Problem	CO2
L11	Peterson's Solution ,Synchronization hardware, Mutex Locks, Semaphores	CO2
L12	Deadlocks : System Model, Deadlock Characterization	CO3
T6	Methods for handling deadlock	CO3
L13	Deadlock prevention	CO3
L14	Deadlock Avoidance	CO3
T7	Memory-Management Strategies - Logical Versus Physical Address Space	CO4
L15	Swapping, Contiguous Memory Allocation	CO4
L16	Segmentation, Paging, Structure of Page Table	CO4
T8	Virtual Memory :Background, Demand Paging	CO4
L17	Copy-On-Write, Page Replacement	CO4

L18	Allocation of Frame	CO4
L19	Thrashing	CO5
T9	Disk Structure, Disk Scheduling:	CO5
L20	Swap-Space Management	CO5
L21	File Concept	CO5
T10	Access Methods	CO5
L22	Directory and Disk structure ,File Sharing	CO5
T11	File System Mounting	CO5
L23	Protection:Goals of protection and Principle of protection	CO5
L24	Domain of Protection, Access Matrix	CO5
T12	Implementation of Access matrix	CO5

Faculty members teaching the course (if multiple sections exist):

FACULTY NAME	**SECTION**
Mr Govardhan Hegde K(A)	
Mr. Anirudhan Adukkathayar	
Dr. Tanuja Shailesh	

References:

References	
1	A. Silberschatz, P. B. Galvin and G. Gagne, Operating System Concepts, (9e), Wiley and Sons (Asia) Pte Ltd, 2013.
2	Milan Milenkovic, Operating systems: Concepts and Design, McGraw Hill, New York, 1987
3	Behrouz A. Forouzan, Firouz Mosharraf, Computer Networks A top Down Approach , Mc-Graw Hill, 2012
4	Andrew S. Tannebaum, Operating System: Design and Implementation, (3e), Prentice Hall of India, 2008
5	Maurice J Bach, Design of Unix Operating System, Prentice Hall of India, 1988

Submitted by:

Dr. Tanuja Shailesh

(Signature of the faculty)

Date: 21-07-2025

Approved by:

(Signature of HOD)

Flexible In-semester Assessment Component (FISAC):

i) The FISAC 1 & FISAC 2 may be any of the types given in Table 1. However, tne two components should be of different type.

ii) The type of assessment should be informed to the students well in advance.

iii) Syllabus for the last component of In-semester Assessment (ISAC) i.e. FISAC 2 should cover the topics mentioned for self-study if any / topics which are not covered till MISAC 4: In-Semester Exam 2.

Table 1: Flexible In-semester Assessment Component (FISAC)

No	Type	Description
A.	Quiz/MCQs	Same as MISAC 2: Quiz/MCQs
B.	Surprise Assignment	Same as MISAC 3: Surprise assignment.
C.	Take Home Assignment	*10 questions are to be given to each student. *Questions must be of Blooms Taxonomy Level 3 for first year and Level 4 for higher semesters. *Questions are to be given TWO weeks in advance. *Students have to write the answers to all the questions.
D.	Group Assignment	*The students are to be grouped in such a way that there are 3 – 4 students in each group. *Each group is to be given one question. *The questions should be of Blooms Taxonomy Level 4 for first year and Level 5 for higher semesters. *Questions are to be given TWO weeks in advance. *The questions may be in the form of case studies, design, report writing, etc.
E.	Seminar	*Students may be given the topics for seminar relevant to the course of study. *Topics are to be given TWO weeks in advance. *Should be of Blooms Taxonomy Level 4 for first year and Level 5 for higher semesters. *Topics should be related to the courses of study. *Topics should be in the field of recent developments in the courses of study. *Students have to collect the data regarding the seminar topic and submit a report. *Students should make a presentation for about TEN minutes using Power Point.
F.	Quiz / Assignment based on invited talks	*Faculty have to arrange for the invited talk in the emerging areas in the courses of study. *Quiz / Assignment is to be conducted on the topic of the invited talk. *Questions should be at Blooms Taxonomy Level 4 for first year and Level 5 for higher semesters.
G.	Development of Software / Apps	*Faculty has to define the problem statement. *Problem Statements are to be given TWO weeks in advance. *Should be at Blooms Taxonomy Level 4 for first year and Level 5 for higher semesters. *Students have to develop the software / mobile apps using the appropriate software language / platform.
H.	Mini Project	*Faculty has to define the problem statement. *Problem Statements are to be given TWO weeks in advance. *Should be at Blooms Taxonomy Level 4 for first year and Level 5 for higher semesters. *Students have to develop prototypes.