TEACHING PLAN: Operating System

<table>
<tr><td colspan="2">SCHOOL OF ENGINEERING AND TECHNOLOGY</td><td>ACADEMIC SESSION: 2022-2023</td><td>FOR STUDENTS BATCH: 2021-2024</td></tr>
<tr><td>1.</td><td>Course Code</td><td colspan="2">PCC-CSE-213</td></tr>
<tr><td>2.</td><td>Course Title</td><td colspan="2">Operating System</td></tr>
<tr><td>3.</td><td>Credits</td><td colspan="2">4</td></tr>
<tr><td>4.</td><td>Learning Hours</td><td colspan="2"><table>
<tr><td>Contact Hours</td><td>6</td></tr>
<tr><td>Practical Teaching</td><td>1</td></tr>
<tr><td>Project, Tutorial and Assessment</td><td>1</td></tr>
<tr><td>Total Hours</td><td>8</td></tr>
</table></td></tr>
<tr><td>5.</td><td>Course Objectives</td><td colspan="2">1. To understand the services provided by and the design of an operating system.
2. To understand the structure and organization of the file system.
3. To understand what a process is and how processes are synchronized and scheduled.
4. To understand different approaches to memory management.
5. Students should be able to use system calls for managing processes, memory and the file system.
6. Students should understand the data structures and algorithms used to implement an OS.</td></tr>
<tr><td>6.</td><td>Course Outcomes</td><td colspan="2">1. Identify the role of Operating System. To understand the design of control unit. 2. Understanding CPU Scheduling, Synchronization, Deadlock Handling and Comparing CPU Scheduling Algorithms. Solve Deadlock Detection Problems. 3. Describe the role of paging, segmentation and virtual memory in operating systems. 4. Description of protection and security and also the Comparison of UNIX and Windows based OS. 5. Defining I/O systems, Device Management Policies and Secondary Storage Structure and</td></tr>
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		Evaluation of various Disk Scheduling Algorithms.				
7.	**Outline syllabus**					
7.01	**Paper Code:** **PCC-CSE-213**		**Unit**	**Introduction**	**Reference Number**	**Teaching Methodology**
			I	**Evolution of OS, Types of OS, Basic h/w support necessary for modern operating systems, services provided by OS, system programs and system calls, system design and implementation**	(6Hrs)	**Whiteboard, PPT slides, Tutorials, Demonstration**
			II	**File systems: File concept, Access methods, Disk space management and space allocation strategies, directory structures, Recovery, Log-structured File System, disk arm scheduling strategies.**.		**Whiteboard, PPT slides, Tutorials, Demonstration**
			III	**Process concept, process control block, Types of scheduler, context switch, threads, multithreading model, goals of scheduling and different scheduling algorithms.**		**Whiteboard, PPT slides, Tutorials, Demonstration**

			IV	**Contiguous allocation, Relocation, Paging, Segmentation, Segmentation with paging, demand paging , Virtual Memory Concepts, page faults and instruction restart , page replacement algorithms , working sets ,Locality of reference, Thrashing, Garbage Collection.**		**Whiteboard, PPT slides, Tutorials, Demonstration**	
			V	**Concurrency conditions, Critical section problem, software and hardware solution, semaphores, conditional critical regions and monitors, classical inter process communication problems.**		**Whiteboard, PPT slides, Tutorials, Demonstration**	
			VI	**Deadlock definitions, Prevention, Avoidance, detection and Recovery, Goals of Protection, access matrix, Deadlock implementation.**		**Whiteboard, PPT slides, Tutorials, Demonstration LL**	

8	**Course Evaluation**	
8.10	**CA: 20%**	
8.1	**Attendance**	**10%**
8.12	**Homework**	**10%**
8.13	**Quizzes**	
8.14	**Projects**	
8.15	**Presentation**	
8.16	**Any other**	
8.2	**MTE(IA)**	**20%**
8.3	**End Term Examination**	**60%**

9	**Text book and References**	**1. Operating System concepts – Silberchatz & Galvin, Addison Wesley, 6th Edn.** **2. Modern Operating Systems – Tanenbaum, Pearson Edn. 2ndedn.** **Reference Books:** **1. Operating Systems – S R Sathe, Macmillan Publishers, India, 2008** **2. Operating System –Milan Milenkovik, McGraw-Hill, 1987** **3. Operating Systems - 3 rd Edition by Gary Nutt, Pearson Education.**
9.1	**Text books**	
9.2	**References**	
9.3	**Video References**	

Mapping of Outcomes vs Topics

Course Outcome	Program Outcome												PSO			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4
CO1	3	3	2	3	1	2	1		2	2	1	2	3	3	2	2
CO2	3	3	3	3	2	2	1		1	1	1	1	3	3	2	2
CO3	3	3	3	3	3	2	2		2	2	2	2	3	3	2	2
CO4	3	3	3	3	3	2	2		2	1	1	1	3	2	2	1
CO5	3	2	1	1	3	3	2		1	1	1	2	3	2	3	2

QUESTION BANK

1. **What are the various objectives and functions of Operating systems?**
2. **What are the major activities of an operating systems with regard to process management?**
3. **What is an operating system? What are operating system services?**
4. **Explain simple batch system?**

5. **Explain time sharing operating system?**
6. **Describe distributed operating system?**
7. **What is the purpose of system programs/system calls?**
8. **What is real time system?**
9. **Distinguish between batch systems and time sharing systems.**
10. **Discuss the criteria for choosing a file organization.**
11. **Describe indexed file, indexed sequential file organization.**
12. **Discuss the objectives for file management systems.**
13. **Explain the file system. Explain about single-level, two-level directory structure?**
14. **Explain different free space management techniques in detail.**
15. **Compare the functionalities of FCFS, SSTF, C-SCAN and CLOOK with example.**
16. **What are files and explain the access methods for files?**
17. **What are the various disk-scheduling algorithms?**
18. **Explain Real Time and Distributed operating systems and their characteristics.**
19. **What is demand paging? Describe the process of demand paging in operating system.**
20. **Explain the purpose and importance of system calls in detail with examples.**