

Devi Ahilya University, Indore, India Institute of Engineering & Technology				IV Year B.E. (Electronics and Instrumentation)			
Subject Code & Name	Instructions Hours per Week			Credits			
7EIRC2 OPERATING SYSTEM	L	T	P	L	T	P	Total
	3	1	0	3	1	0	4
Duration of Theory Paper: 3 Hours							

### Course Learning Objectives:

The course contents are aimed to provide:

1. Students will learn how Operating System is Important for Computer System.
2. To make aware of different types of Operating System and their services.
3. To learn different process scheduling algorithms and synchronization techniques to achieve better performance of a computer system.
4. To know virtual memory concepts.
5. To learn secondary memory management

**Prerequisites:** Basic knowledge of Data Structures and Computer Organization.

## COURSE CONTENTS

### UNIT-I

**Introduction:** Role of OS: Types of OS, Batch Systems; Multiprogramming; Time Sharing; Distributed & Real time OS. Computer structure and OS: System Architecture – I/O, Storage, Processors; System components- OS Services, System Calls, System Programs; System Design, Implementation and Generation.

### UNIT-II

**Process Management:** Concepts of process: Process status, Process description, Process model. Process Scheduling: Concepts, Scheduler organization, preemptive and non-preemptive scheduler strategies, scheduling algorithms: FCFS, SJN, Priority Scheduling, Round Robin Scheduling, Multiple Processor scheduling, Thread Concepts and Multiple threaded OS.

### UNIT-III

**Process Synchronization and Deadlock:** Process Co-operation, Concepts of Inter-process communication, Process Synchronization, Synchronization Issues, Critical Section problem, Mutual exclusion Primitives and Algorithms, Process Synchronization with semaphores. Concepts of Deadlock, Conditions for Deadlocks, Resource Concepts & Abstractions, Deadlock Prevention, Avoidance and Recovery, Banker Algorithms for Deadlock Avoidance.

#### **UNIT-IV**

**Memory Management and File system:** Paging, Segmentation and Contiguous memory allocation. Virtual Memory: Demand Paging, Page replacement and Frame Allocation policies, Thrashing. File System: Concepts, Access Method, Directory Structure, and File System Management.

#### **UNIT-V**

**Disk management and other issues:** Disk management: Disk Structure and Scheduling. File systems, and operating system support for distributed systems. Protection and Security related issues. Case studies of contemporary operating systems.

#### **BOOKS RECOMMENDED:**

- [1]. Silberschatz, Galvin and Gagne, Operating System Principles, 7th Ed. Addison Wesley.
- [2]. Gary Nutt, Operating Systems, 3rd Ed. Pearson Education, India
- [3]. Tanenbaum, Modern Operating Systems, PHI.
- [4]. W. Stalling, Operating Systems, Macmillan.
- [5]. H. M. Dietel, Operating Systems, Addison Wesley Longman.
- [6]. Maurice J. Bach, The design of Unix Operating system, Pearson Education, India.
- [7]. Sumitabha Das, Unix Concepts & Applications: includes SCO UNIX & Linux, Tata McGraw Hill.

#### **Course Outcome:**

CO.No.	CO
CO1	Understand the role of an Operating System, its various types (Batch, Time- sharing, etc.), components, and services.
CO2	Analyze process management concepts, including process scheduling algorithms (FCFS, RR, etc.), and threading models.
CO3	Apply synchronization principles to solve critical section problems and analyze deadlock conditions, prevention, and avoidance techniques.

CO4	Evaluate various memory management techniques, including paging, segmentation, virtual memory, and page replacement policies.
CO5	Understand disk management, file systems, and the principles of system protection and security.

Students earned credits will develop ability to

### **CO-PO-PSO Relationship**

<b>CO</b>	<b>PO-1</b>	<b>PO-2</b>	<b>PO-3</b>	<b>PO-4</b>	<b>PO-5</b>	<b>PO-6</b>	<b>PO-7</b>	<b>PO-8</b>	<b>PO-9</b>	<b>PO-10</b>	<b>PO-11</b>	<b>PO-12</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>
<b>CO1</b>	3	2	1	-	-	1	-	-	-	-	-	1			1
<b>CO2</b>	3	3	3	1	-	-	-	-	-	-	-	2	1		
<b>CO3</b>	3	3	3	2	-	-	-	1	-	-	-	2		1	
<b>CO4</b>	3	3	3	1	-	-	-	-	-	-	-	2	2		
<b>CO5</b>	3	2	2	1	1	2	-	2	-	-	-	3			2