

The Maharaja Sayajirao University of Baroda Polytechnic Higher Payment Program Diploma in Computer Engineering			ACADEMIC YEAR 2021-2022		
Year	II	FUNDAMENTALS OF OPERATING SYSTEM (CSE3425)	Lecture Hrs per week	4	
Semester	II		Max marks	100	
Pre-requisite: Linear and nonlinear data structures					
CO1	Explain the structure, components, services, and types of operating systems including system calls and virtual machines.				
CO2	Organizing and manage processes effectively by understanding process states, control blocks and scheduling algorithms and performance evaluation.				
CO3	Apply inter-process communication, solve race conditions and implement synchronization mechanisms to ensure mutual exclusion and deadlock handling strategies.				
CO4	Assessing and apply various memory management techniques including paging, segmentation and describe I/O management concepts.				
CO5	Explain the fundamental concepts of files, including their attributes, types, and the various operations and assess security threats, policies and mechanisms to protect operating system.				
BT	1. Remember 2. Understand 3. Application 4. Analysis 5. Evaluation 6. Creation				
COURSE CONTENT/SYLLABUS					
Unit	Unit Name		Hrs	Weightage	CO
1	Overview of Operating System Basics Of Operating system, Operating system operations, Generation Of Operating System, Types of Operating System, Components of Operating System, Operating System Services, System Calls, OS Structure, Concept of Virtual Machine		08	14	CO1
2	Process Management: Process Concept, Process State Transitions, Process Control Block, Context Switching, Threads, Multithreading Models, Types of Threads Process Scheduling: Objective of Scheduling, Types of Schedulers, Scheduling Criteria, Scheduling Algorithms, Performance Evaluation of Scheduling,		08	14	CO1,CO2
3	Inter-Process Communication Race Conditions, Shared Memory System, Message Passing, Critical Section, Mutual Exclusion, Peterson's Solution, Synchronization Hardware, Semaphores, Monitors, Classical IPC Problems, Readers and Writers Problems, Dinning Philosophers Problem, Deadlock: Deadlock Characteristics, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection and Recovery		12	22	CO3
4	Memory Management Basics of memory management, Logical and Physical address map, Memory allocation types, Internal and External Fragmentation, Compaction, Paging, Segmentation, Virtual Memory: Demand paging, Process creation, Page replacement, Allocation of frames, Thrashing		10	18	CO4
5	File Management and I/O Management File concept, File attributes, File types, Access Methods, File Operations, Directory Structure, File system structure, File system Implementation, Recovery, Disk formatting, File allocation Methods, Free space Management, I/O Management: Principles of I/O Hardware: I/O devices, Device controllers , Direct memory access Principles of I/O Software: Goals of Interrupt handlers , Device drivers ,Device independent I/O software , Secondary-Storage Structure: Disk structure , Disk scheduling algorithm		10	18	CO4, CO5
6	Security and Protection Principles of Security, Security threats, Security Policies and Mechanisms, Authentications, Protection Mechanism		08	14	CO1, CO5
			56	100	

REFERENCE BOOKS:

1.	Operating System - William Stallings Prentice Hall of India, 4th Edition, 2003.
2.	Operating System Concepts - Abraham Silberschatz, and James L. Addison Wesley Pub Company
3.	Introduction to Operating Systems - Harvey M. Deital Addison Wesley Publishing Company
4.	Operating Systems – Design and Implementation - Andrew S. Tanenbaum Prentice Hall of India, New Delhi
5.	Operating Systems , Concepts and Design - Milan Milenkovic TMGH, 2000, New Delhi
6.	Operating Systems – A Concept Based Approach-D.M. Dhamdhare TMGH, 2002, New Delh