Tulsiramji Gaikwad-Patil College of Engineering and Technology
Wardha Road, Nagpur-441 108
NAAC Accredited (A+ Grade)

Second Year (Semester-III) B. Tech. Information Technology

BIT32321 :- Introduction to Operating System

Teaching Scheme		Examination Scheme	
Theory	**3 Hrs/week**	CT-I	15 Marks
Tutorial	**-**	CT-II	15 Marks
Total Credits	**3**	CA	10 Marks
		ESE	60 Marks
		Total	100 Marks
		Duration of ESE: 3 Hrs	

Course Objectives:

1.	To classify the basic role and functions of an operating system.
2.	To explore the concepts of processes, threads, and their lifecycle in a computing system.
3.	To illustrate process coordination, synchronization, and CPU scheduling mechanisms.
4.	To analyze fundamental memory management techniques and the concept of virtual memory.
5.	To examine file system organization, file operations, and basic storage management in modern OS environments.

Course Contents

Unit I	Introduction to Operating Systems Role and Functions of Operating Systems, Types of Operating Systems: Batch, Time-sharing, Real-time, Distributed OS, System Components: Kernel, Shell, System Calls, OS Examples
Unit II	Processes and Threads: Concept of Process and its Lifecycle, Threads: Definition, Benefits of Multithreading, Process vs Thread – Real-World Analogies, Simple Use Cases of Threads in Modern Systems
Unit III	Process Coordination and CPU Management: Introduction to Interprocess Communication (IPC): Shared Memory, Message Passing, Process Synchronization, Deadlocks, Prevention & Avoidance Techniques, CPU Scheduling
Unit IV	Memory Management and Virtual Memory: Role of Memory Management in OS Memory Allocation Techniques: Contiguous Allocation, Paging Virtual Memory: Demand Paging, Use in Modern OS, Page Replacement Concepts
Unit V	File and Storage Management File System Concepts: Files, Directories, Paths, File Operations and Access Rights, Storage Management Basics, Use of File Systems in External Devices, Overview of Cloud Storage and OS-level File Access

Text Books

T.1	Operating Systems: Internals and Design Principles by William Stalling, Pearson, 9th Edition
T.2	Modern Operating Systems by Andrew S. Tanenbaum, Herbert, Pearson, 5th Edition

Reference Books	
R.1	Operating Systems: A Concept-Based Approach by D. M. Dhamdhere, McGraw Hill Education
R.2	An Introduction to Operating Systems – Concepts and Practice by Pramod Chandra P. Bhatt, PHI Learning
Useful Links	
1	https://onlinecourses.nptel.ac.in/noc21_cs88/preview

	Course Outcome	CL	Class Sessions
BIT32321.1	Classify the structure, types, and components of operating systems.	2	9
BIT32321.2	Illustrate process and thread concepts with their real-world applications.	2	9
BIT32321.3	Discuss synchronization and deadlock handling methods in process coordination.	3	9
BIT32321.4	Interpret memory management and virtual memory techniques used in operating systems.	3	9
BIT32321.5	Analyze file systems, file access rights, and storage management techniques.	4	9