Course Code	Course Name	Teaching Scheme			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/ Practical	Tutorial	Total
TEITC502	Operating Systems	04 Hrs./Week	02 Hrs./Week	---	04	01	---	05

Course Code	Course Name	Examination Scheme							
		Theory Marks				Term Work	Practical	Oral	Total
		Internal assessment			End Sem. Exam				
		Test1	Test2	Avg. of 2 Tests					
TEITC502	Operating Systems	20	20	20	80	25	---	25	150

Pre-requisites: Data structures, Programming Language (C / JAVA), Computer Organization & Architecture.

Course Objectives:

- To understand the main components of an OS & their functions.
- To understand the working of an OS as a resource manager, file system manager, process manager, memory manager and I/O manager and methods used to implement the different parts of OS.
- To understand the concepts and implementation of virtual memory.
- To understand various issues in Inter Process Communication (IPC) and the role of OS in IPC.
- To study different file systems of OS like Linux, Windows and overview of OS for mobile & hand held devices.

Course Outcomes:

- Student will learn important computer system resources and their management policies, algorithms used by operating systems.
- Student will understand what makes a computer system function and the primary PC components.
- Student will understand the working of an OS as a manager of various resources.
- Student will implement some of the functions of OS such as scheduling policies, page replacement algorithms, IPC.

DETAILED SYLLABUS:

Sr. No.	Module	Detailed Content	Hours
1	**Overview of Operating System**	Operating system objectives and functions, Evolution of OS, Characteristics of modern OS, Basic concepts: Processes, Files, System calls, Shell, Kernel architectures: Monolithic, Micro-kernel, Layered, Kernel mode of operations.	**4**
2	**Process Management**	Process description: Process, Process States, Process Control Block (PCB), Threads, Thread management. Process Scheduling: Types, Comparison of different scheduling policies.	**10**
3	**Process Co-ordination**	Principles of Concurrency, Race condition and critical section, Mutual Exclusion- Hardware and Software approaches, Semaphores, Monitors, Message Passing, Producer Consumer Problem. Deadlock: Principles of Deadlock, Deadlock Detection, Deadlock Avoidance, Deadlock Prevention**.**	**10**
4	**Memory Management**	Memory Management Requirements, Memory Partitioning, Virtual memory: Paging; Segmentation; Page replacement policies, page faults.	**6**
5	**Input Output Management**	I/O Devices, Organization of the I/O Function, Operating System Design Issues, I/O Buffering, Disk Scheduling and disk scheduling algorithms, Disk cache.	**6**
6	**File Management**	Overview, File Organization, File Sharing; Record Blocking; Secondary Storage Management.	**6**
7	**Case Studies**	Producer Consumer Problem, Multithreading, RAID, File systems of Windows and Linux , Overview of Android OS.	**6**

Text Books:

1. Modern Operating Systems, Tanenbaum, IIIrd Edition, PHI
2. Operating System-Internal & Design Principles, VIth Edition, William Stallings, Pearson
3. Operating Systems Concepts, Silberschatz A., Galvin P., Gagne G, VIIIth Edition Wiley.
4. Principles of Operating Systems, Naresh Chauhan, First Edition , Oxford university press.

References:

1. Operating Systems in Depth, Thomas W. Doeppner, Wiley.
2. Operating System Programming and Operating Systems, D M Dhamdhere, IInd Revised Edition, Tata McGraw.
3. Operating Systems, *Achyut S. Godbole,* 2nd edition, Tata McGraw Hill.
4. Application development using Android, Hello, Android, mobile development platform, Ed Burnette, 3rd Edition.
5. Linux Command Line & Shell Scripting, Richard Blum and Christine Bresnahan, 2nd edition, Wiley.

Term work: Term Work shall consist of programs based on the given list. Journal must include at least 2 assignments.

Term Work Marks: 25 Marks (Total marks) = 15 Marks (Experiment) + 5 Marks (Assignments) + 5 Marks (Attendance)
Oral Examination will be based on the above syllabus.
Suggested Practical List:

1. Implementation of System Calls (at least five).
2. Implementation of CPU Scheduling Policies (both pre-emptive and non pre-emptive).
3. Implementation of Page Replacement Algorithms.
4. Implementation of IPC (Producer Consumer problem) .
5. Implementation of Multithreading.
6. Implementation of Deadlock Avoidance algorithm (Bankers algorithm).

Theory Examination:

- Question paper will comprise of 6 questions, each carrying 20 marks.
- Total 4 questions need to be solved.
- Q.1 will be compulsory, based on entire syllabus.
- Remaining question will be randomly selected from all the modules.
- Weightage of marks should be proportional to number of hours assigned to each module.