COURSE TITLE	**OPERATING SYSTEM**
COURSE CODE	**01CT1409**
COURSE CREDITS	**3**

Objective:

1. Student will understand Modern Operating System and their principles. The course will cover theory as well as practice aspects of a subject through scheduled lectures and labs, course will cover details of processes, CPU scheduling, memory management, file system, storage subsystem, and input/output management.
2. Student will understand Modern Operating System and their principles. The course will cover theory as well as practice aspects of a subject through scheduled lectures and labs, course will cover details of processes, CPU scheduling, memory management, file system, storage subsystem, and input/output management.

Course Outcomes: After completion of this course, student will be able to:

1. Understanding the role of operating system with its function andservices.
2. Compare Various Algorithm used for CPU Scheduling, Memory management and Disk Scheduling Algorithm.
3. Apply Various Concepts related with Deadlock to solve Problems.
4. Analyze Protection and Security Mechanism in Operating System.
5. Analyze and illustrate shell commands and scripts that can manipulate text-based data, either in files or data streams.

Pre-requisite of course:..Data structures like stack, queue, linked list, tree, graph, hashing, file structures, any structured programming language

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
3	0	0	50	30	20	0	0

Contents : Unit	Topics	Contact Hours
1	**Operating Systems** Operating Systems Overview- Overview and Functions of operating systems, protection and security, distributed systems, operating systems structures, services, system calls and their working. History and generationof operating system.	3
2	**Process and Threads** Process and Threads - Process concepts, threads, scheduling-criteria,algorithms, and their evaluation, Process Scheduling, Thread scheduling,, Case studies UNIX. Linux. Windows	6

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Digitally signed by (Name of Dean/ Principal)

Contents : Unit	Topics	Contact Hours
3	**Concurrency Control (IPC)** Process synchronization, critical- section problem, classic problems of synchronization,, Software Solutions for synchronization problem, Hardware Solutions for synchronization problem., Synchronization and their applications., [Understanding of Semaphore – Mutex – Monitor –Event Counters]	8
4	**Memory Management** Memory: Swapping, contiguous memory allocation, paging, page table, segmentation, virtual memory, demand paging, page-replacement, , Allocation of frames, Basics of Virtual Memory – Hardware and control structures , Locality of reference, Page fault, Working Set, Dirty page/Dirty bit – Demand paging (Concepts only), Page Replacement policies : Least Recently used (LRU), Optimal (OPT) ,Second Chance (SC), , First in First Out (FIFO), Not recently used (NRU).	12
5	**Principles of deadlock** Deadlock - system model, deadlock and its characterization with example, deadlock prevention techniques with example, detection and avoidance of a deadlock, methods to get recovery form deadlock.	6
6	**File system Interface** File system Interface- the concept of a file, Access Methods. Directory structure., File system mounting, file protection and sharing mechanism. File System implementation, File system structure, file/directory implementation, efficiency and performance, file allocation methods, free- space management.	3
7	**Mass-storage structure & I/O systems** Mass-storage structure- RAID structure, Disk structure, disk attachment, disk scheduling, swap-space management., stable-storage implementation. overview of Mass-storage structure., Tertiary storage structure. I/O systems- Hardware, application l/o interface, kernel I/O subsystem, Transforming I/O requests to Hardware operations.STREAMS, performance.	4
Total Hours		**42**

Textbook :

1 Operating System Concepts, Abraham Silberchatz, Wiley, 2009

2 Operating Systems - Internals and Design Principles., Stallings, Pearson, 2009

3 Operating systems- A Concept based Approach, Operating systems- A Concept based D.M.Dhamdhere., TMH, 2009

References:

1 Modern Operating Systems, Modern Operating Systems, Andrew S Tanenbaum, PHI, 2015

2 Principles of Operating Systems, Principles of Operating Systems, B.L.Stuart., Cengage learning,, 2010

References:

3 Operating Systems., Operating Systems., A.S. Godboie, TMH, 2012

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery					
Remember / Knowledge	**Understand**	**Apply**	**Analyze**	**Evaluate**	**Higher order Thinking / Creative**
20.00	25.00	25.00	15.00	10.00	5.00

Instructional Method:

1 The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory and class-room.

2 Practical examination will be conducted at the end of the semester for evaluation of performance of students in laboratory.

3 Students may use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory, etc.

4 The course delivery method will depend upon the requirement of content and need of the students. The teacher in addition to conventional teaching method (Chalk and Talk) may use any of the tools such as demonstration, role play, Quiz, brainstorming, Flipped class, Project based learning, Collaborative learning, MOOCs etc. for effective teaching.

Supplementary Resources:

1 http://williamstallings.com/OS/Animation/Animations.html

2 http://nptel.ac.in/courses/106106144/

3 http://nptel.ac.in/courses/106108101/

4 http://codex.cs.yale.edu/avi/os-book/OS9/slide-dir