

Course Title and Code	CS222-Operating Systems
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I. Course Identification and General Information:

Course Title	Operating Systems	Course Code	CS222	Pre-requisite	CS182
Department	Computer Science, IT, and COE.	Course Level	6	Credit Hours	3(3+0)

II. Course Description/Topics: The following course topics will be covered.

- Overview of operating systems principles and concepts, components, structure.
- Operating systems services, system calls, APIs, interrupts, system mode and user mode, system programs, security, protection, OS design and implementation, processes & threads.
- Process, operation on process, PCB, process synchronization (concurrency).
- CPU Scheduling: Basic concepts, scheduling criteria, states diagram, dispatching, context switching, CPU performance, resource allocation, and schedulers.
- Scheduling algorithms, preemptive and non-preemptive scheduling, SJF, Round Robin.
- Main memory, virtual memory, algorithms, swapping, contiguous memory allocation, segmentation, paging, page replacement, allocation of frames, memory-mapped files.
- File-Systems, File Concept, naming, searching, access, backups, File Sharing, protection, directories, contents and structures.

III. Course Outcomes: Summary of the main learning outcomes for students enrolled in the course.

- Learn and understand the OS concepts and fundamentals, OS structure, I/O system, CPU management, process management, memory management, virtual memory, file system.
- Install, apply basic theoretical concepts using the Linux operating system.
- Study and analyze various algorithms of CPU management and memory management.
- Improving student's skills in thinking based on discussions and problem solving.
- Learn and discover the main features, the main functionalities and services of OS.
- Describe the reasons for using interrupts, dispatching, context switching and describe the difference between processes and threads.
- Study the process scheduling types such as short-term, medium-term, long-term.
- Create state and transition diagrams for simple problem domains.
- Describe relationships between scheduling algorithms and application domains.
- Understand and describe the mechanism of swapping, contiguous memory allocation, segmentation, memory paging.

IV. Required Text:

- Operating System Concepts, 9th Edition, (2012), AviSilberschatz, Peter Baer Galvin, Greg Gagne, ISBN-13: 9781118063330.

V. References:

- Operating Systems: Internals and Design Principles, William Stallings, 7th Edition, (2011), ISBN-13: 9780132309981.
- Operating Systems Design and Implementation, 3rd Edition, (2011), Kindle Edition, Andrew S. Tanenbaum, Albert S Woodhull, ISBN: 0-13-142938-8.