Course Title	Operating Systems				
Course Code	CSC625				
Course Type	Compulsory				
Level	Master (2nd Cycle)				
Year / Semester	1st year/2nd semester				
Teacher's Name	TBA				
ECTS	10	Lectures / week	3 hours / 14 weeks	Laboratories / week	N/A
Course Purpose and Objectives	This course will provide a student with the necessary understanding of how operating systems are and how they work. The course will illustrate the problems handled by operating systems, discuss solutions to those problems and also present more advanced issues handled by operating systems like virtual machines distributed systems and security.				
Learning Outcomes	Upon succesful completion of this course students should be able to: • Describe the various features of processes as well as CPU-scheduling algorithms. • Analyse the critical-section problem and provide a description of deadlocks and methods for preventing or avoiding deadlocks in a computer system. • Describe and compare various memory-management techniques and explain the concepts of a virtual memory system. • Explain the function of file systems, file system design and file system protection. • Describe and critically evaluate advanced technologies such as virtual machines and distributed systems • Identify security concerns and implement solutions.				
Prerequisites	CSC620	Co-requisites	None		
Course Content	Introduction: Overview of an operating system; importance of operating systems; operating systems as resource managers; The need of Operating Systems, what they do and how they are designed. Operating system protection. Basic system resources: The hardware; an overview; main memory; the central processing unit, the registers; input and output devices; the secondary storage devices; interfaces; control unit; and channels. Process Management: The process concept and concurrency. Process scheduling, interprocess communication, process synchronization, and deadlock handling. Critical-Section; Problem and solutions (software, semaphores etc). Classical Problems of Synchronization (The Readers and Writers, Dining-Philosophers etc). Deadlock characterization. Methods for handling Deadlocks. Deadlock Prevention. Deadlock Avoidance. The Banker's Algorithm. Deadlock Detection.				

	Multiprogramming and Time-sharing: Software for multiprogramming and Time-sharing; allocating CPU time; main memory allocations; job scheduling; registers; Input/Output device allocation; control of data resources; secondary storage space management. Memory Management: Memory allocation and memory management; processor management and priorities; interrupts and the flow of control; input/output device allocation; Segmentation; Paging and Virtual memory; segmentation systems; paging systems; virtual memory; implementing virtual memory. File Systems: Physical storage of data. File operations (create, write, read, delete). Access methods (sequential, index etc.). Directory Systems (single-level, tree-structured). File Protection. Advanced operating system concepts: Virtual machines types and implementations, benefits and features. Network and distributed operating systems. Design issues and advantages of distributed systems. Security and protection: System threats, implementing security defenses, protection techniques and implementation.
Teaching Methodology	Face-to-Face
Bibliography	"OPERATING SYSTEM CONCEPTS" by Silberschatz/Galvin, Addison-Wesley "OPERATING SYSTEMS INTERNALS AND DESIGN PRINCIPLES" by William Stallings, Prentice Hall "OPERATING SYSTEMS" by Gary Nutt, Addison-Wesley "OPERATING SYSTEMS-DESIGN AND IMPLEMENTATION" by Andrew Tanenbaum, S., Prentice Hall
Assessment	Midterm Examination 30% Final Examination 40% Assignments/Lab 20% Class Participation and Attendance 10% 100%
Language	English