Course Code	Course Name	ECTS Credit
CSC302	Operating Systems	7.5

Pre-Requisite	Course Type	Language of Instruction
	Compulsory	English

Year of Study	Level of Course	Mode of Delivery
3rd / 5th	BSc/1st Cycle	On Campus

Course Objectives:

To provide students with the basic understanding of what an operating system is and how it works. The lesson demonstrates the problems encountered by operating systems, and focuses on applications of specialized software in a real environment

Learning Outcomes:

Upon successful completion of the course, students will be able to:

- Explain the role and main functions of the operating system.
- Describe the various functions of the procedures as well as the process programming algorithms.
- Analyze critical segment problem and software and material solutions to this problem.
- Provide a description of the deadlocks and methods to prevent or avoid dead ends in a computer system.
- Describe various memory management techniques and explain the concepts of the virtual memory system.
- Explain the operation of file systems, file system design, and system protection.
- Describe the new trends in operating system design.

Teaching Methodology:

Lectures 42 hours

Labs 30 hours

Course Content

Introduction and overview of the operating system. Meaning of operating systems. Operating systems, as resource managers. The need for Operating Systems, what they do and how they are designed. Protection of Operating Systems.

The main resources of the system:

The Material: Hardware Overview. Main memory. Central processing unit, memory registers. Input and output devices. Secondary storage devices. Interfaces. Control unit. Channels.

Process Management:

The concept of process and synchronization. Process programming,

Process intercom, process synchronization, and deadlock handling. Critical section: Problem and solutions (software, markers, etc.) Classical synchronization problems (readers and writers, philosophers, etc). Characterization of deadlock. Methods for handling deadlock. Preventing deadlocks. Avoiding deadlocks. Banker's Algorithm. Deadlock Detection.

Multiprogramming and Time Sharing:

Software for multiprogramming and time allocation. Time allocation of central processing unit. Main memory allocation. Process planning. Memory registers. Distribution of input / output devices. Checking data resources. Manage secondary storage.

Memory Management:

Memory allocation and management. Processor management and priorities. Switches and control flow. Distribution of input / output devices. Segmentation. Paging and Virtual Memory. Partitioning systems. Paging systems. Virtual memory. Virtual memory application.

File Systems:

Physical data storage. File tasks (create, record, read, delete). Access methods (sequential, index, etc.). Cataloging systems (single level, tree-structured). File Protection.

Trends in the design of the operating system. Case study of typical operating system (Windows, Unix, Solaris).

Recent developments and contemporary issues related to the subject matter of the course.

Assessment Methods:

Final Exam

Mid-term/Lab Exam

Assignments

Required Textbooks/Reading:

Title	Author(s)	Publisher	Year
Operating System Concepts	A.Silberschatz	Wiley	2017
Operating Systems: Principles and Practice	T.Anderson, M.Dahlin.	Recursive Books	2014