Course Code	Course Title
COMP 3511	**Operating System**

Course Description

This is an introductory course on operating systems. The topics will include the basic concepts of operating systems, process and threads, inter-process communications, process synchronization, scheduling, memory allocation, page and segmentation, secondary storage, I/O systems, file systems, and protection. It contains the key concepts as well as examples drawn from a variety of real systems such as Microsoft Windows and Linux. Prerequisite(s): COMP 2611 OR [(ELEC 2300 OR ELEC 2350) AND (COMP 2011 OR COMP 2012H)]

List of Topics

Chapter 1: Introduction
Chapter 2: Operating System Structures
Chapter 3: Processes
Chapter 4: Threads and Concurrency
Chapter 5: CPU Scheduling
Chapter 6: Synchronization tools
Chapter 7: Synchronization examples
Chapter 8: Deadlocks
Chapter 9: Memory Management Strategies
Chapter 10: Virtual-Memory Management
Chapter 11: Mass Storage Systems
Chapter 12: I/O Systems
Chapter 13: File-System Interface
Chapter 14: File-System Implementation
Chapter 17: Protection

Textbooks

Operating System Concepts, 10th Edition
Abraham Silberschatz, Peter B. Galvin, Greg Gagne
John Wiley & Sons Ltd, April 2018
ISBN: 978-1-118-09375-7

Reference books

Operating Systems: Three Easy Pieces
Remzi Arpaci-Dusseau & Andrea Arpaci-Dusseau
ISBN: 978-1-985-08659-3

Grading Scheme

Midterm Exam	20%
Final Exam	30%
Homework	20%
Project	30%

Course Intended Learning Outcomes

- Describe what is an operating system and the role it plays. Recognize different types of operating systems and know the basic architecture of an operating system.
- Understand the concepts related to processes and threads, including their creation, communication and scheduling. Identify and address deadlock, and can design algorithmic solutions to synchronization problems.
- Explain how main memory and virtual memory are managed. Master algorithms involved in memory allocation and page replacement.
- Know about the concepts and implementations of file systems. Comprehend the technologies like disk operations and RAID in mass-storage systems.

Assessment Rubrics

Course Learning Outcome	Exemplary (A– to A+)	Competent (C to B+)	Needs Work (D to C–)	Unsatisfied (F)
Describe what is an operating system and the role it plays. Recognize different types of operating systems and know the basic architecture of an operating system.	Demonstrates thorough understanding of operating system and its roles. Is able to accurately identify various operating systems. Can design a simple operating system independently.	Demonstrates sufficient understanding of operating system and its roles. Is able to identify multiple operating systems. Can design a simple operating system with instructions.	Demonstrates some preliminary understanding of operating system and its roles. Is able to identify only several operating systems. Only can design a simple operating system partially.	Demonstrates deficient understanding of operating system and its roles. Is not able to distinguish between different operating systems. Not able to design a simple operating system.
Understand the concepts related to processes and threads, including their creation, communication and scheduling. Identify and address deadlock, and can design algorithmic solutions to synchronization problems.	Demonstrates thorough understanding of processes and threads. Can accurately identify and address complex deadlock problems, and can design algorithmic solutions to sophisticated synchronization problems.	Demonstrates sufficient understanding of processes and threads. Can identify and address most deadlock problems, and can design algorithmic solutions to most synchronization problems.	Demonstrates basic understanding of processes and threads. Can identify and address some deadlock problems, and can design algorithmic solutions to some synchronization problems.	Demonstrates deficient knowledge of processes and threads. Can not identify and address deadlock problems, and can hardly design algorithmic solutions to any synchronization problems.
Explain how main memory and virtual memory are managed. Master algorithms involved in memory allocation and page replacement.	Demonstrates ability to fully explain how main memory and virtual memory are managed. Masters all the algorithms involved in memory allocation and page replacement.	Demonstrates sufficient ability to explain how main memory and virtual memory are managed. Masters most algorithms involved in memory allocation and page replacement.	Demonstrates preliminary understanding of how main memory and virtual memory are managed. Knows some algorithms involved in memory allocation and page replacement.	Not understand how main memory and virtual memory are managed. Knows few algorithms involved in memory allocation and page replacement.
Know about the concepts and implementations of file systems. Comprehend the technologies like disk operations and RAID in mass-storage systems.	Demonstrates strong understanding of the concepts and implementations of file systems. Deeply comprehends the technologies in mass-storage systems.	Demonstrates sufficient understanding of the concepts and implementations of file systems. Comprehends most of the technologies in mass-storage systems.	Demonstrates preliminary understanding of the concepts and implementations of file systems. Comprehends part of the technologies in mass-storage systems.	Has very limited understanding of the influence of the usage of the concepts and implementations of file systems. Knows little about the technologies in mass-storage systems.