

COURSE DESCRIPTION

Department and Course Number	CS 433 (formerly CS 440)	Course Coordinator	Hyatt
Course Title	Operating Systems	Total Credits	3

Current Catalog Description

Introduction to operating systems. This course looks at the internal design and operation of a modern operating system. Topics include interrupt handling, process scheduling, memory management, virtual memory, demand paging, file space allocation, file and directory management, file/user security and file access methods. Several comparisons among current operating systems are used, with attention to Windows and Unix in particular.

Textbook

Operating Systems: Internals and Design Principles, 5th ed., by William Stallings, Prentice Hall, 2005.

References *None*

Course Goals

To give students an understanding of how an operating system performs its normal functions, such as scheduling processes, running multiple programs simultaneously, managing memory to maximize usage and minimize I/O using demand paging and memory management hardware, managing files and access/ security issues.

Prerequisites by Topic

Computer Organization and Assembly Language Programming

Major Topics Covered in the Course

Computer-System Structures, Processes, CPU Scheduling, Memory Management, Virtual Memory, File-System Interface, File-System Implementation, I/O Systems, Mass-Storage Structure.

Laboratory projects (specify number of weeks on each)

Students are given a term project to model the behavior of various types of programs and produce a memory reference string for these programs. They then write simulators for various page replacement strategies and use their data and simulators to study the behavior of the various replacement policies on various types of program behavior. They produce a written report that contains a description of the simulated program behavior, the replacement strategies used, and their observations on the overall result.

Estimate CSAB Category Content

	CORE	ADVANCED		CORE	ADVANCED
Data Structures	_____	_____	Computer Organization and Architecture	10	_____
Algorithms			Concepts of Programming Languages	_____	_____
Software Design	20	_____			

Oral and Written Communications

Every student is required to submit at least 1 written report (not including exams, tests, quizzes, or commented programs) of typically 5-10 pages and to make 0 oral presentations of typically 0 minutes duration. Include only material that is graded for grammar, spelling, style, and so forth, as well as for technical content, completeness, and accuracy.

Social and Ethical Issues

None

Theoretical Content

None

Problem Analysis

As we cover each part of the operating system, students are asked to analyze various alternatives and reason why one is better than the rest given a good description of conditions.

Solution Design

Students spend time learning to discover what kind of program behavior leads to various types of memory accessing problems, and then they experiment with page replacement strategies to try to tune them to handle this unexpected behavior.