SCHOOL OF STEM SYLLABUS

TERM:

INSTRUCTOR:

COURSE CODE: CSC-227

OFFICE HOURS:

COURSE TITLE: Intro to Operating Systems

OFFICE LOCATION:

DAY(S) AND TIME(S):

EMAIL:

LOCATION:

PHONE:

COURSE PREREQUISITE: CSC-111, CSC-115, CSC-117 OR CSC-118. Can be taken Concurrently

CREDITS: 3

COURSE DESCRIPTION:

This course is structured to explain the functions of an operating system. During the course students will be introduced to what operating systems are, what they do, how they do it, how their performance can be evaluated, and how various operating systems compare with other. The main purpose of this course is to give students a solid background in the components of the operating system, their function and goals, and how to interface and interrelate with them.

STUDENT LEARNING OUTCOMES:

Upon successful completion of this course:

1. Students will learn to summarize, at a top level, the key functions of operating systems.
2. Students will understand the term processes and explain the relationship between processes and process control blocks.
3. Students will understand the distinction between process and threads.
4. Students will learn basic concepts related to concurrency, such as race conditions, operating systems concerns, and mutual exclusion requirements.
5. Students will learn how deadlock occurs in operating systems
6. Students will learn the principal requirements for memory management.
7. Students will understand the virtual memory management mechanism in operating systems.
8. Students will comprehend the differences among long-, medium-, short-term, multiprocessor, multicore, and real-time scheduling.

TEXTBOOK AND SUPPLEMENTAL MATERIALS:
Operating Systems Internal and Design Principles, 9th Edition by William Stallings

ISBN# 0-13-380591-3, 978-0-13-380591-8, 0-13-380609-X, 978-0-13- 380609-0

GRADING POLICY:

Item	**Weight**
Two Exams	25%
Midterm Exam	20%
Final Exam	20%
Labs and Projects	35%

SAMPLE COURSE SCHEDULE:

Week 1	**Chapter 1: Computer System Overview** • Interrupts • The Memory Hierarchy • Cache Memory
Week 2	**Chapter 1 Continues** • Cache Memory • Direct Memory Access • Multiprocessor and Multicore Organization
Week 3	**Chapter 2: Operating System Overview** • Operating System Objectives and Functions • The Evolution of Operating Systems • Major Achievements • Developments Leading to Modern Operating Systems • Fault Tolerance • OS Design Considerations for Multiprocessor and Multicore
Week 4	**Review** **Test 1**
Week 5	**Chapter 3: Process Description and Control** • What is a Process? Process States • Process Description • Process Control • Execution of the Operating System
Week 6	**Chapter 4: Threads** • Processes and Threads • Types of Threads • Multicore and Multithreading

Week 7	**Chapter 4 (Continues)** • Windows Process and Thread Management • Linux Process and Thread Management • Android Process and Thread Management • MAC OS X Grand Central Dispatch
Week 8	**Review** **Midterm Exam**
Week 9	**Chapter 5: Concurrency: Mutual Exclusion and Synchronization** • Mutual Exclusion: Software Approaches • Principles of Concurrency • Mutual Exclusion: Hardware Support • Semaphores • Monitors • Message Passing • Readers/Writers Problem
Week 10	**Chapter 6: Concurrency: Deadlock and Starvation** • Principles of Deadlock • Deadlock Prevention Deadlock Avoidance • Deadlock Detection • An Integrated Deadlock Strategy • Dining Philosophers Problem
Week 11	**Review** **Test 2**
Week 12	**Chapter 7: Memory Management** • Memory Management Requirements • Memory Partitioning • Paging • Segmentation
Week 13	**Chapter 8: Scheduling** • Types of Processor Scheduling • Scheduling Algorithms • Multiprocessor, Multicore, and Real-Time Scheduling • Multiprocessor and Multicore Scheduling • Real-Time Scheduling
Week 14	**Review**
Week 15	**Final Exam**

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