

CSCE 36103, Operating Systems (3 credits), Required CE & CS

Catalog Description: An introduction to operating systems including topics in system structures, process management, storage management, files, distributed systems, and case studies.

Prerequisites: CSCE 20104 Programming Foundations II and CSCE 22104 Computer Organization, each with a grade of C or better.

Corequisites: None

Textbook / required material: Lubomir Bic (2022). *Operating Systems*. Zyante Inc. <http://zyBooks.com>, ISBN: 979-8-203-37738-8

To buy the online book:

1. Login to the class on Blackboard and click any zyBooks assignment link. (Do not go to the zyBooks website and create a new account!)
2. Subscribe

Goals: The goal of the class is to understand operating systems structure and operations.

Student Learning Outcomes. By the end of the course, students will be able to:

- Know the definition of a process, a process control block, and a context switch.
- Define process operations in UNIX such as parent, child, PID, ps, fork(), and exec.
- Describe shared-memory and message-passing interprocess communication.
- Calculate speedup gain using Amdahl's Law.
- Schedule a set of processes with different CPU scheduling algorithms.
- Produce pseudo code using semaphores or a mutex lock to solve a given problem.
- Analyze a solution to a classic synchronization problem.
- Describe the necessary conditions for deadlock.
- Describe the benefits of virtual memory.
- Analyze and design a demand paging system.
- Identify and describe components of a modern file system.

Topics Covered: (2.5 hours = 1 week and total hours must equal 37.5 hours)

- Introduction (2.5 hours)
- Processes, threads, and resources (5 hours)
- Scheduling (5 hours)
- Concurrency (12.5 hours)
- Deadlock (2.5 hours)
- Memory management (5 hours)
- Virtual memory (5 hours)

Grading

Course grades will be determined by these weights:

Reading assignments (zyBooks and other):	10%
Homework (zyBooks and other):	25%
Quizzes:	15%
Exam 1:	25%
Final Exam:	25%

The final class grade will be assigned according to the 10-point scale shown below. The grades may or may not be curved.

A	90 – 100%
B	80 – 89.9%
C	70 – 79.9%
D	60 – 69.9%
F	< 60%

Students in CSCE 361H3 Honors Operating Systems

For Honors students, additional work such as a programming assignment, homework, quiz questions, and/or exam questions will be assigned.

Class / laboratory schedule: Meets either 3 times a week for 50 minutes or 2 times a week for 1 hour 15 minutes for 15 weeks

Relationship of course to Computer Engineering Student Outcomes:

- CE1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
- CE2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
- CE6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.

Relationship of course to Computer Science Student Outcomes:

- CS1. An ability to analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.
- CS2. An ability to design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.
- CS6. An ability to apply computer science theory and software development fundamentals to produce computing-based solutions.

Relationship of course to Computer Science Topics:

- T2. Principles and practices for secure computing
- T8. Networking and communication
- T9. Operating systems and parallel and distributed computing
- T10. The study of computing-based systems at varying levels of abstraction.
- T11. A major project that requires integration and application of knowledge and skills acquired in earlier course work.

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