

UNI CS 3430 (Spring 2014)

Operating Systems

Course Syllabus (Version 1.0)

Lecture: MWF 2:00pm-2:50pm ITTC 328

Contact Information

Instructor

Sarah Diesburg (diesburg@cs.uni.edu)

Office: 311 ITTC

Office hours: MWF 10:00-10:50am, 1:00-1:50pm, and by appointments

Course time and location: MWF 2:00-2:50pm in ITTC 328

Class website: http://www.cs.uni.edu/~diesburg/courses/cs3430_sp14/index.htm and [UNI eLearning](#)

Objectives

- Define, explain, and apply introductory operating systems concepts: process management, inter-process communication, memory management, I/O systems, file systems, and the like
- Use the UNIX operating system interface to implement a user-level shell in the C language
- Design and implement a correct concurrent program requiring synchronization
- Gain experience in implementing and debugging operating system components, including the kernel module, system call, synchronization primitives, and the file system

Prerequisites

- CS 1410 Computer Organization
- CS 1520 Data Structures
- CS 1800 Discrete Structures
- Junior standing or above
- Working knowledge of the UNIX programming environment
- Proficiency in C or other high-level programming language

Course Material

- Lecture notes (posted on the class Web site)
- UNI eLearning website for all other materials
- Required textbooks:
 - Silberschatz, Galvin, and Gagne, *Operating System Concepts*, 9th Edition (ISBN 978-1118063330)

Class Grading

The following coursework components contribute to your final grade, and to the degree shown:

Projects	40%
Attendance	5%
Homework Assignments	10%
Exam 1	10%
Exam 2	10%

Assignments consist of short-answer questions, essays, or problems. The purpose of these assignments is to prepare you for exams. For each assignment, you can earn one bonus percent (of the assignment grade) by giving constructive comments on lectures or discussions. (Instead of comments, you can also submit your funny story of the week.)

There will be three to four increasingly challenging projects due during this course. You are expected to work in teams of two people. For both homework and projects, if you receive help from others, or if you find helpful information from various sources, please include appropriate acknowledgements.

On exams, 80% of the questions asked will be based on lecture materials, assignments, and projects; 20% of the questions will test your ability to apply various principles learned in the class.

The final exam will be comprehensive.

To receive a passing grade for the overall course, you must earn a passing grade on the final exam and a passing grade on the projects.

The grading scale is as follows:

100 – 92	A	69.9 – 68	D+
91.9 – 90	A-	67.9 – 62	D
89.9 – 88	B+	61.9 – 60	D-
87.9 – 82	B	59.9 – 0	F
81.9 – 80	B-		
79.9 – 78	C+		
77.9 – 72	C		
71.9 – 70	C-		

Late Submission Policy

Late project solutions will incur a 10-point deduction each day the project is late. Project solutions received after two days from the original due date will receive 0 points. For example, a project solution submitted anytime on the Tuesday after the original due date of Friday will receive 0 points.

Computer Accounts

You will need CatID credentials to access the eLearning website.

Make sure you are checking your UNI emails. Important class announcements will be sent frequently from the eLearning interface to your UNI email account.

You will also be receiving specialized login accounts to a class-specific programming server. More details to be announced in class.

Your Responsibilities

- Understand the lecture slides and reading assignments
- Attend office hours for extra help, as needed
- Uphold academic honesty in completing your assignments, projects, and exams
- Turn in your projects on time
- Check the class webpage and your UNI email account regularly

Course Calendar (Tentative)

Date	Readings and pre-class assignments	Session Links and Announcements
1/13	Chapter 1	Session One -Introduction and History
1/15	Section 18.1	Recitation One - C and Command Line Parsing
1/17		Session Two - Concurrency
1/20	No Class - Martin Luther King, Jr. Day	
1/22		Recitation Two - Exec
1/24	Chapter 2	Session Three - From Raw Hardware to Processes
1/27	Chapter 6	Session Four - CPU Scheduling
1/29		Recitation Three - Shell built-ins and variables
1/31	Sections 5.1-5.2	Session Five - Cooperating Threads and Synchronization
2/3	Sections 5.3-5.4	Session Six - Implementing Mutual Exclusion
2/5		Recitation Four - Input/Output Redirection and Pipes
2/7	Sections 5.5-5.9	Session Seven - Semaphores and Bounded Buffer
2/10		Session Eight - More on Semaphores
2/12		Recitation Five - Compiling Kernels
2/14		Session Nine - Exam 1 Review
2/17		Exam 1
2/19	Section 18.3	Recitation Six - Introduction to Kernel Modules
2/21		Session Ten - Monitors, Condition Variables, Readers-Writers
2/24	Chapter 7	Session Eleven - Deadlocks
2/26		Recitation Seven - System Calls, Kthreads Debugging
2/28	Sections 8.1-8.6	Session Twelve - Concurrency Conclusion, Memory Protection
3/3		Session Thirteen - Address Translation
3/5	No Class - Video Lecture (Gone to SIGCSE)	Recitation Eight - Locking, Kernel Linked Lists, Elevator Optimizations
3/7	No Class - Video Lecture (Gone to SIGCSE)	Session Fourteen - Caching and TLBs
3/10	Sections 9.1-9.6	Session Fifteen - Virtual Memory
3/12		Recitation Nine - Further Help
3/14	Sections 10.1-10.4, 13.1-13.3.2	Session Sixteen - Device Management and Disk Management
3/24		Recitation Ten - File Systems, FAT32, Endianness
3/26	No Class - Project 2 Demos	Demo Day
3/28		Session Seventeen - Exam 2 Review

3/31		Exam 2
4/2		Recitation Eleven - Boot Sectors, Files and Directories, File I/O
4/4	Chapter 11	Session Eighteen - File Systems
4/7		Session Nineteen - Naming and Directories
4/9		Recitation Twelve - FAT32 Directory Entries, Read-Only Operations, Write Operations
4/11		Session Twenty - Transactions and Reliability
4/14	Chapter 15, Sections 14.4-14.7	Session Twenty-One - Protection and Security
4/16		Recitation Thirteen - Orphaned Data, rm, rmdir
4/18	Sections 17.3-17.5	Session Twenty-Two - Network Protocols
4/21		Session Twenty-Three - Distributed Systems and RPC
4/23		Recitation Fourteen - Further Questions
4/25	Section 17.9	Session Twenty-Four - Distributed File Systems
4/28	Chapter 18	Session Twenty-Five - Linux Kernel Internals
4/30		Session Twenty-Six - Ongoing Research (TrueErase)
5/2		Session Twenty-Seven - Final Exam Review
5/5	Final Exam 3:00-4:50pm	

Course Policies

Attendance: The University requires attendance in all classes. I will be taking role randomly throughout the course as part of your attendance grade.

Missed exams: A missed exam will be recorded as a grade of zero. I will follow the university rules regarding all missed exams.

Scholastic Conduct: You are responsible for being familiar with UNI's Academic Ethics Policies (<http://www.uni.edu/pres/policies/301.shtml>). Remember, discussing assignments is good. Copying code or answers is not.

When using the eLearning discussion board, please do not post more than *one line* of code. Talk about the issue in plain English.

Accessibility: In compliance with the University of Northern Iowa policy and equal access laws, I am available to discuss appropriate academic accommodations that may be required for students with disabilities. Requests for academic accommodations are to be made during the first three weeks of the semester, except for unusual circumstances, so arrangements can be made. Students should register with Student Disability Services, 103 Student Health Center, to verify their eligibility for appropriate accommodations.