

FSU COP 5611 Advanced Operating Systems (Spring 2024)

Course Syllabus (version 1/1/2024)

Lecture: TTh 1:20pm – 2:35pm HWC 2401

Contact Information

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Zoom office hours: <https://fsu.zoom.us/j/93488419112>, MTh 4-5, after class, and by appointments

Class website: http://www.cs.fsu.edu/~awang/courses/cop5611_s2024

Objectives

At the end of the course, the student will demonstrate familiarity with current and classic operating systems literature in writing and in oral discussions, research and critique a specific topic in modern operating systems design, develop a research project, and write a research paper in an area of operating systems that is appropriate to the graduate student level.

Prerequisites

- COP 4610 or an equivalent level of maturity in understanding the principles of operating systems design and implementation
- CDA 3100 or an equivalent level of maturity in understanding the principles of computer hardware design and implementation
- Working knowledge of the UNIX programming environment
- Proficiency in C

Delivery Mode

Traditional

Course Material

- Lecture notes (posted on the class website)
- Papers (posted on the class website)
- No required textbook
- Recommended textbooks
 - Andrew Tanenbaum and Maarten van Steen, *Distributed Systems Principles and Paradigms*
 - Mukesh Singhal and Niranjana Shivaratri, *Advanced Concepts in Operating Systems*
 - Tanenbaum, *Modern Operating Systems* (background)
 - Arpaci-Dusseau, Arpaci-Dusseau, *Operating Systems: Three Easy Pieces* (background)
 - Silberschatz, Galvin, Gagne, *Operating System Concepts* (background)
 - Gary Nutt, *Operating Systems: A Modern Perspective* (background)
 - Gary Nutt, *Kernel Projects for Linux* (background)
 - Kernighan, Ritchie, *The C Programming Language* (background)
 - Maxwell, *Linux Core Kernel Commentary* (background)
 - Corbet, Rubini, and Kroah-Hartman, *Linux Device Drivers*, 3rd edition (background)

Class Grading

Paper summaries and critiques	5%
Project	40%
Peer evaluation of projects	5%
Exam 1	10%
Exam 2	10%
Final	30%

Every week of the first ten weeks, you will turn in a one-page critique in class and through Turnitin.com (via Canvas) on papers from specified venues. You will develop a project of your interest and caliber, in teams of two or three. For each week, each team is required to turn in a one-page project report to demonstrate steady progress. By the fifth week you

will submit a two-page proposal of your term project and give a short presentation in class. During the last two weeks of the course you will turn in a 15-page final paper and present your final project. Each team member needs to identify which pages (minimum of five) he or she wrote. Also, you will submit critiques on two class projects that are not yours.

We will hold in-class, closed-book examinations, unless specified otherwise. Examinations will likely be in the form of essays or short answers that involve applying the knowledge and concepts learned in class.

Computer Accounts

You will need a computer science account. If you do not have one, use the following link to obtain one (<https://system.cs.fsu.edu/new/newuser/cs-account-setup/>). You will also need an account at cas.fsu.edu for receiving class emails and using the discussion board. If you want, you can forward your garnet email to other accounts.

Your Responsibilities

- Understand the lecture slides and assigned papers
- Uphold academic honesty in completing your assignments and exams
- Attend office hours for extra help
- Turn in your projects on time
- Check the class web page regularly

Course Calendar (Tentative)

Lecture	Week	Date	Lecture	Due Dates
1	1	1/9	Class canceled due to inclement weather	
2		1/11	Course overview, Advanced file systems issues	
3	2	1/16	FFS, LFS, and RAID	Hw1
4		1/18	File system extensibility, non-disk file systems	
5	3	1/23	F2FS, Nova, Aerie, Strata	Hw2
6		1/25	Memory management and caching for file systems; possible course projects	
7	4	1/30	Threads, events, and scheduling, interprocess communications, large address space	Hw3
8		2/1	Networks	
9	5	2/6	Exam 1	Hw4
10		2/8	Project proposal presentations	
11	6	2/13	Operating systems organization	Hw5
12		2/15	Operating systems organization part II	
13	7	2/20	Distributed operating systems part I	Hw6
14		2/22	Distributed operating systems part II	
15	8	2/27	Distributed operating systems part III	Hw7
16		2/29	IPC in distributed systems	
17	9	3/5	Distributed file systems	Hw8
18		3/7	Exam 2	
	10	3/12	Spring break	
		3/14	Spring break	
19	11	3/19	Distributed file systems part II	Hw9
20		3/21	The Google File System, OceanStore	
21	12	3/26	Facebook Photo Storage, SPOCA	Hw10
22		3/28	RAMCloud, CORFU	
23	13	4/2	Owl and MemLiner	
24		4/4	Operating systems security	
25	14	4/9	Operating systems security part II	
26		4/11	Automated worm fingerprinting	
27	15	4/16	Bitcoin, Cashtags	
28		4/18	Operating systems reliability, failure oblivious computing	

29	16	4/23	Project presentations	
30		4/25	Project presentations	
		4/26		Peer evaluations and project report due

Course Policies

University attendance policy: Excused absences include documented illness, deaths in the family and other documented crises, call to active military duty or jury duty, religious holy days, and official University activities. These absences will be accommodated in a way that does not arbitrarily penalize students who have a valid excuse. Consideration will also be given to students whose dependent children experience serious illness.

Academic honor policy: The Florida State University Academic Honor Policy outlines the University's expectations for the integrity of students' academic work, the procedures for resolving alleged violations of those expectations, and the rights and responsibilities of students and faculty members throughout the process. Students are responsible for reading the Academic Honor Policy and for living up to their pledge to "...be honest and truthful and...[to] strive for personal and institutional integrity at Florida State University." (Florida State University Academic Honor Policy, found at <http://fda.fsu.edu/Academics/Academic-Honor-Policy>)

ADA: Students with disabilities needing academic accommodation should: (1) register with and provide documentation to the Student Disability Resource Center; and (2) bring a letter to the instructor indicating the need for accommodation and what type. Please note that instructors are not allowed to provide classroom accommodation to a student until appropriate verification from the Student Disability Resource Center has been provided. This syllabus and other class materials are available in alternative format upon request. For more information about services available to FSU students with disabilities, contact the: Student Disability Resource Center 874 Traditions Way 108 Student Services Building Florida State University Tallahassee, FL 32306-4167 (850) 644-9566 (voice) (850) 644-8504 (TDD) sdrc@admin.fsu.edu <http://www.disabilitycenter.fsu.edu>.

Syllabus change policy: Except for changes that substantially affect implementation of the evaluation (grading) statement, this syllabus is a guide for the course and is subject to change with advance notice.