**FSU COP 4610 Principles of Operating Systems**

**Course Syllabus (Version 1/1/2021)**

Lecture: MWF 10:40-11:30am

### Contact Information

Instructor

 Andy Wang (awang@cs.fsu.edu)

 Office: 269 Love Building Office hours: M 4-5pm, F 4-5pm, and by appointment

Class website: http://www.cs.fsu.edu/~awang/courses/cop4610\_s2021

Teaching Assistants (cop4610t@cs.fsu.edu, subject: cop4610)

 Christopher Draper and Alanna Mottesheard

**Objectives**

* Define, explain, and apply introductory operating systems concepts: process management, interprocess 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**

* COP 4530, or an equivalent level of understanding of data structures
* CDA 3100, or an equivalent level of maturity in understanding the principles of computer hardware design and implementation

**Course Material**

* Lecture notes (posted on the class Web site)
* Required textbooks: Silberschatz, Galvin, and Gagne, *Operating System Concepts*, 10th Edition (ISBN 978-1-119-32091-3)

**Class Grading**

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

Projects 40%

Homework Assignments 10%

Exam 1 10%

Exam 2 10%

Final Exam 30%

Assignments consist of short-answer questions, essays, or problems. The purpose of these assignments is to prepare you for exams.

There will be three to four increasingly challenging projects due during this course. You are expected to work in teams of two to three 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.

**Computer Accounts**

You will need a computer science account. If you don’t have one, use the following link to obtain one: https://system.cs.fsu.edu/newuser/cs-account-setup/.

You will also need a my.fsu.edu account for receiving class emails and using the discussion board. If you want, you can forward your email to other accounts (see http://its.fsu.edu/Email/EmailAccounts/Email-Account-Management-Information).

**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 Web page and your email account regularly

**Course Calendar (Tentative)**

In recitation sessions, the TAs will present materials pertaining to the course projects.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Date | Lecture | Week | Lecture |  |
| 1/6 | 1 | 1 | Course overview, introduction and history |  |
| 1/8 | 2 |  | Recitation |  |
| 1/11 | 3 | 2 | Concurrency: threads, address space, and processes |  |
| 1/13 | 4 |  | Genesis: from raw hardware to processes | HW1 due  |
| 1/15 | 5 |  | Recitation |  |
| 1/18 | 6 | 3 | Martin Luther King Jr. Day |  |
| 1/20 | 7 |  | CPU scheduling | HW1 debrief |
| 1/22 | 8 |  | Recitation |  |
| 1/25 | 9 | 4 | Cooperating threads, synchronization | HW2 due  |
| 1/27 | 10 |  | Implementing mutual exclusion | HW2 debrief |
| 1/29 | 11 |  | Recitation |  |
| 2/1 | 12 | 5 | Semaphores and bounded buffer, more on semaphores | HW3 due  |
| 2/3 | 13 |  | Exam review | HW3 debrief HW4 due |
| 2/5 | 14 |  | Recitation |  |
| 2/8 | 15 | 6 | Exam 1 |  |
| 2/10 | 16 |  | Exam 1 debrief  |  |
| 2/12 | 17 |  | Recitation |  |
| 2/15 | 18 | 7 | Monitors, condition variables, and readers-writers  |  |
| 2/17 | 19 |  | Deadlocks |  |
| 2/19 | 20 |  | Recitation |  |
| 2/22 | 21 | 8 | Memory protection  | HW5 due |
| 2/24 | 22 |  | Address translation  | HW5 debrief |
| 2/26 | 23 |  | Recitation |  |
| 3/1 | 24 | 9 | Caching and TLBs, demand paged virtual memory  |  |
| 3/3 | 25 |  | Device management  | HW6 due  |
| 3/5 | 26 |  | Recitation |  |
| 3/8 | 27 | 10 | Exam review  | HW6 debrief HW7 due HW7 debrief |
| 3/10 | 28 |  | Exam 2 |  |
| 3/12 | 29 |  | Recitation |  |
| 3/15 | 30 | 11 | Exam 2 debrief  |  |
| 3/17 | 31 |  | File systems and disk management, naming and directories |  |
| 3/19 | 32 |  | Recitation |  |
| 3/22 | 33 | 12 | Transactions: reliability from unreliable components  |  |
| 3/24 | 34 |  | Protection and security  |  |
| 3/26 | 35 |  | Recitation |  |
| 3/29 | 36 | 13 | Network protocols, Networks and distributed systems  | HW8 due |
| 3/31 | 37 |  | Remote procedural call, Distributed file systems  | HW8 debrief |
| 4/2 | 38 |  | Recitation |  |
| 4/5 | 39 | 14 | Final review  | HW9 due |
| 4/7 | 40 |  | Composite-file File System  |  |
| 4/9 | 41 |  | Recitation |  |
| 4/12 | 42 | 15 | TrueErase | HW10 due |
| 4/14 | 43 |  | Automated worm fingerprinting |  |
| 4/16 | 44 |  | Recitation |  |

**Course Policies**

**Attendance:** 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)

**Americans with Disability Act:** 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.