

Syllabus

CSCI 322, Principles of Concurrent Programming, Winter, 2016

- **Instructor:** Geoffrey Matthews, x3797, `geoffrey dot matthews at wwu dot edu`, CF 469
- **Office hours:** MTWF 9:00
- **Texts and Readings:**
 - *The Little Book of Semaphores*, Allen B. Downey, <http://www.greenteapress.com/semaphores/>
 - *Foundations of Multithreaded, Parallel, and Distributed Programming*, Gregory Andrews, Addison-Wesley, 2000.
 - Other readings as assigned.
- **Webpage:** `wwu.instructure.com` homework assignments, grades
- **Repository:** <https://github.com/geofmatthews/csci322> handouts, lectures, code
- **Lectures:** AW403, MTWF 11:00, AW203
- **Content:** This course will cover key concepts, both abstract and concrete, in concurrent programming. Topics covered include:
 - Shared variable and message passing paradigms
 - Mutual exclusion and synchronization techniques
 - Semaphores
 - Condition variables
 - Monitors
 - Rendezvous
 - Concurrent programming facilities in high-level languages
 - Paradigms for process interaction: bag of tasks, heartbeat, pipeline, *etc.*
- **Course goals:** On completion of this course, students will demonstrate:
 1. Thorough understanding of problems and techniques in concurrent programming.
 2. Thorough understanding of algorithms, techniques and programming language support for mutual exclusion, synchronization and communication between processes and threads.
 3. Thorough understanding of the purpose, implementation and use of semaphores, monitors, and rendezvous in concurrent programming.
 4. The effective use of programming language facilities and libraries in the design and implementation of multi-threaded and multi-process applications.
- **Software:** Programming in Scheme, Python, and C, using various libraries such as Pthreads, MPI, and OpenMP. We will also examine case studies of concurrency solutions in other languages, such as Ada and Java.
- **Exams:** One midterm and one final. You may bring two pages of notes to use during the exams.
- **Quizzes:** Except for the first and last weeks of class and the week of the midterm, we will have weekly quizzes on Fridays. The lowest two quiz scores will be dropped.
- **Reading:** All students are expected to do the online reading assigned throughout the quarter in order to be prepared for the weekly quizzes and the exams.
- **Homework:** Homework assignments will be passed out regularly through the quarter, involving a mix of theory (math) and programming. Homework will be due at the start of class on the due date. Late work is accepted at a penalty of 25% per each fraction of 24 hours late. There may be an assignment due during dead week.
- **Attendance:** I will periodically take attendance in class. Perfect attendance is worth 5 points of extra credit. There are no other extra credit opportunities in this class.

- **Grading:**

$$0 \leq F < 60 \leq D < 70 \leq C < 80 \leq B < 90 \leq A$$

Homework	Quizzes	Midterm	Final
40%	20%	15%	25%

- **Academic dishonesty:** Academic dishonesty policy and procedure is discussed in the University Catalog, Appendix D. All students should read this section of the catalog. Academic dishonesty consists of misrepresentation by deception or other fraudulent means. In computer science courses this frequently takes the form of copying another's program, either a fellow student's program, or copying one from the web. Due diligence should be exercised in the labs at all times, since both copying and letting someone else copy your program are equally culpable. Do not walk away from your computer in the lab without logging out or locking the screen. Do not share files, even if it is just to "show them something." Describe it in words, or talk to them in person, never share code.
- **Collaboration:** Collaboration with your fellow students is a good way to learn. Feel free to share ideas, solve problems, and discuss your programs with other students. However, collaboration is *not* copying. All code should be original. Remember the **Simpson's Rule:** after discussing homework with another student, each of you must destroy all written notes, pictures, files, *etc.* that you shared. After that, you must watch a rerun of *the Simpson's*, or do something else unrelated, for half an hour. Then you can take the knowledge you gained from another student and put it to work, since it is now not copying, but learning. You have made it your own.
- **Approximate Schedule:** The following schedule may be adjusted radically depending on interests and problems as they occur.

Weeks	Book	Exams
1	Downey 1-3	
2	Downey 4	
3	Andrews 1-2	
4	Andrews 3	
5	Andrews 4	
6	Andrews 5	Midterm Friday February 12
7	Andrews 7	
8	Andrews 8	
9	Andrews 9	
10	Review	
11		Final Tuesday March 15 8:00am