CS 3410: Distributed Systems

Spring 2024 Syllabus

Can be used to fulfill a requirement for students pursuing a degree or emphasis in Computer Science, and open to other students. Covers design and implementation of network applications, including message passing, concurrency, synchronization, scalability, and partial failure.

Prerequisites

CS 2420 and CS 2810, each with a C or better

Fees

Computer lab access fee: $20, used to assist in maintaining computing infrastructure.

Sections

One section:

1. MW 12:00–1:15 PM in Smith 109

   CRN: 20654

   Final exam: Monday, April 29 at 11:00 AM–12:50 PM

Instructor

Instructor: Dr Russ Ross

Email: russ.ross@utahtech.edu

Phone: 435-652-7971 (note: email preferred)

Office: North Burns 226

Office Hours: MTWR 3:00–4:00 PM, Friday by appt

Program learning outcomes

At the successful conclusion of this program, students will be able to:

1. Design, implement, and evaluate computational systems to address needs in a variety of contexts and disciplines.
2. Devise new solutions from foundational principles informed by current practice.
3. Weigh and apply ethical, legal, and social responsibilities in all aspects of practice.
4. Construct effective solutions in teams to accomplish a common goal.
5. Author effective visual, oral, and written communication for a range of audiences.

Course learning outcomes

At the successful conclusion of this course, students will be able to:

1. Design and implement software solutions that span multiple computers across a network. [PLO #1]
2. Analyze the tradeoffs between competing goals in system software projects, including safety, performance, convenience, and ease of future maintenance. [PLO #2, #3]
3. Build and modify complex software projects in teams. [PLO #4]
4. Debate and differentiate the approaches and solutions to distributed systems problems taken by modern internet organizations. [PLO #5]

Resources

Text

There is one recommended text for this class:

- The Go Programming Language
  by Alan Donovan and Brian Kernighan
  ISBN: 9780134190440

Computers

Students are expected to have access to a personal computer running Linux (this includes the Windows Subsystem for Linux) or Mac OS. The instructor will provide basic help setting up the tools and environment for homework, but students are generally responsible for installing and configuring software as well as performing basic troubleshooting and maintenance tasks as needed.

Course web site

This course will be managed through Canvas. Students are responsible for announcements, the schedule, and other resources posted there. In addition, students are responsible for changes and announcements made in class.

Assignments and exams

Reading

The student is responsible for reading the assigned material. A reading schedule is provided with the class schedule on the course website. Readings consist of a series of research papers, online articles, and recordings of technical talks.

Research papers can be difficult reading, so students should plan on several hours over multiple sessions to read each paper.

Students must read the papers AND participate in the class discussions to receive credit for the readings.

Assignments

Assignments will be graded for accuracy of function and style of design. Programs that do not compile will receive no credit. It is important that you start early and get each of your assignments done before its due date. Many problems will take much longer to solve in a single sitting than in many shorter sessions. Give yourself time to think; sleep on difficult problems. Finish early so you can go back and refine your initial approach.

Assignment due dates and submissions are managed in Canvas. Some assignments will be automatically graded using CodeGrinder (which will be explained in class) and others will require the student to record a screencast demonstrating the completed project. This means that you must reserve time to prepare and record a demonstration before the due date.

Final presentation

There will be no exams, but there will be a final presentation. Each student will be assignment a research paper to read and present to the entire class. Details and the schedule will be discussed in class.

Grading

Assignments, reading and discussion of papers, and a presentation each contribute to your point total. In total, the assignments comprise 60% of your grade, reading and discussion 30%, and the presentation counts for 10%. To get credit for the reading you must read each paper and come to class and participate in the discussion for that paper.

Letter grades are assigned based on the percentage of possible points attained, according to the following chart:

Minimum Percentage	Letter Grade
93	A
90	A-
87	B+
83	B
80	B-
77	C+
73	C

73	C
70	C-
67	D+
63	D
60	D-
0	F

Course policies

Attendance

Students are responsible for material covered and announcements made in class. School-related absences may be made up only if prior arrangements are made. The class schedule presented is approximate. The instructor reserves the right to modify the schedule according to class needs. Changes will be announced in class. Exams and quizzes cannot be made up unless arrangements are made *prior* to the scheduled time.

Occasional absences are acceptable as long as the student keeps up with assignment work. Students who miss more than two consecutive weeks of class or who miss more than 20% of scheduled classes during the semester without making prior arrangements will receive a failing grade. Students who miss any scheduled exam (including midterm exams and the final exam/presentation) or fail to complete a final project without making prior arrangements will receive a failing grade.

This course can only be completed by attending classes and completing all assigned work to a satisfactory level. There is no procedure for testing out of the class.

Distractions

Electronics—including laptops—in class have been demonstrated to have a negative impact on student learning (see Shriram Krishnamurthi's writeup for background This class has a NO DISTRACTIONS policy, with a few exceptions:

1. When I ask you to use your laptop (or phone) for a specific activity in class. In this case you are permitted to use it for the duration of the activity, but not during the rest of the class.
2. If you need a laptop to accommodate a disability. If this is the case, please talk to me in advance and please visit the Disability Resource Center to document your need. To help other students in the class, please sit near one of the edges so your laptop does not distract other students more than necessary.

This policy extends to phones, tablets, and other electronic devices. I encourage you to pay full attention to class and take notes on paper.

Time Commitment

Courses should require about 45 hours of work per credit hour of class. This class will require about 135 hours of work on the part of the student to achieve a passing grade, which is approximately 9 hours per week. If you do not have the time to spend on this course, you should probably rethink your schedule.

Late Policy

Reading must be completed before the assigned class so students are prepared and can participate in the discussion. No late work is accepted for readings.

It is critical that students learn Go early in the course. No late work is accepted for the sequence of assignments that introduce the Go programming language.

Each project will have a deadline posted in Canvas. To recive full credit you must submit your work on time. In addition, you may submit up to two weeks late with a penalty of 1% per day. After two weeks no late work will be accepted.

Collaboration

Limited collaboration with other students in the course is permitted. Students may seek help learning concepts and developing programming skills from whatever sources they have available, and are encouraged to do so. Collaboration on assignments, however, must be confined to course instructors, lab assistants, and other students in the course. Students are free to discuss strategies for solving programming assignments with each other, but this must not extend to the level of programming code. Each student must code his/her own solution to each assignment. See the section on cheating.

Cheating

Cheating will not be tolerated, and will result in a failing grade for the students involved as well as possible disciplinary action from the college. Cheating includes, but is not limited to, turning in homework assignments that are not the student's own work. It is okay to seek help from others and from reference materials, but only if you learn the material. As a general rule, if you cannot delete your assignment, start over, and re-create it successfully without further help, then your homework is not considered your own work.

You are encouraged to work in groups while studying for tests, discussing class lectures, discussing algorithms for homework solutions, and helping each other identify errors in your homework solutions. If you are unsure if collaboration is appropriate, contact the instructor. Also, note exactly what you did. If your actions are determined to be inappropriate, the response will be much more favorable if you are honest and complete in your disclosure.

Where collaboration is permitted, each student must still create and type in his/her own solution. Any kind of copying and pasting is *not* okay. If you need help understanding concepts, get it from the instructor or fellow classmates, but never copy another's code or written work, either electronically or visually. The line between collaborating and cheating is generally one of language: talking about solutions in English or other natural languages is usually okay, while discussions that take place in programming languages are usually not okay. It is a good idea to wait at least 30 minutes after any discussion to start your independent write-up. This will help you commit what you have learned to long-term memory as well as help to avoid crossing the line to cheating.

College policies

Spring 2024 Important Dates

- Jan 8: Classes Begin
- Jan 8: Tuition & Fees Due
- Jan 11: Last Day for Waitlist
- Jan 12: Last Day to Add Without Signature
- Jan 15: Martin Luther King Jr. Day
- Jan 18: Drop/Audit Fee Begins ($10 per class)
- Jan 19: Residency Application Deadline
- Jan 20: End of 100% Refund Period
- Jan 22: $50 Late Registration/Payment Fee
- Jan 22: Start of 50% Refund Period
- Jan 29: Pell Grant Census
- Jan 29: Last Day for Refund (No refunds or adjustments after this date)
- Jan 29: Last Day to drop without receiving a W grade
- Feb 2: Associates Graduation Application Deadline Spring
- Feb 2: Masters Graduation Application Deadline Spring
- Feb 5: Last Day to Add/Audit
- Feb 19: President's Day
- Mar 1: Mid-Term Grades Due
- Mar 1: Bachelors Graduation Application Deadline Summer
- Mar 5: Last Day to Withdraw from an Individual Class
- Mar 11–15: Spring Break
- Mar 18: Summer Registration open to Graduate Students
- Mar 18: Summer Registration open to Seniors (90 credits)
- Mar 18: Fall Class Schedule Available Online
- Mar 19: Summer Registration open to Juniors (60 credits)
- Mar 20: Summer Registration open to Sophomores (30 credits)
- Mar 21: Summer Registration open to Continuing Freshmen
- Mar 21: Summer Registration open to New Freshman
- Mar 25: Fall Registration open to Graduate Students
- Mar 25: Fall Registration open to Seniors (90 credits)
- Mar 26: Fall Registration open to Juniors (60 credits)
- Mar 27: Fall Registration open to Sophomores (30 credits)
- Mar 28: Fall Registration open to Continuing Freshmen
- Apr 1: Fall Registration open to New Freshman
- Apr 1: Bachelors Graduation Application Deadline Fall
- Apr 1: Masters Graduation Application Deadline Summer
- Apr 1: Summer Application Deadline for International Students
- Apr 9: Last Day for Complete Withdrawal

- Apr 25: Classwork Ends
- Apr 26: Reading Day/Prepare for Finals
- Apr 29–May 2: Final Exams
- May 1: Associates Graduation Application Deadline Summer
- May 3: Commencement
- May 7: Final Grades Due

Spring 2024 Important Links

- Disability Resource Center: https://drcenter.utahtech.edu
- IT Help Desk: https://utahtech.edu/helpdesk
- Library: https://library.utahtech.edu
- Testing Center: https://testing.utahtech.edu
- Tutoring Center: https://tutoring.utahtech.edu
- Writing Center: https://writingcenter.utahtech.edu

Disability Statement

Utah Tech strives to make learning materials and experiences accessible for all students so If you are a student with a medical, psychological, or learning disability or anticipate physical or academic barriers based on disability, you are welcome to let me know so we can discuss options. Students with documented disabilities are required to contact the Disability Resource Center located in the North Plaza Building, Next to the Testing Center (435-652-7516) to explore eligibility process and reasonable accommodations related to disability.

Title IX Statement

Utah Tech seeks to provide an environment that is free of bias, discrimination, and harassment. If you have been the victim of sexual harassment/misconduct/assault we encourage you to report this to the college's Title IX Director, Hazel Sainsbury, (435) 652-7747, hazel.sainsbury@utahtech.edu. If you report to a faculty member, she or he must notify the Title IX Director about the basic facts of the incident.

Email Disclaimer

You are required to frequently check your university email account. Important class and university information will be sent to your account, including bills, financial aid/scholarship notices, notices of cancelled classes, reminders of important dates and deadlines, and other information critical to your success at Utah Tech and in your courses. To access your account, visit mail.utahtech.edu. Your username is your Digital ID (e.g. D00111111) If you have forgotten your PIN, visit my.utahtech.edu and click the Forgot Pin button.