CSE 2500: Introduction to Discrete Systems, Section 002

Spring 2023

February 23, 2023

1 Description

This course is an introduction to discrete mathematics and its application in computer science. We will begin by looking at formal statements and proof techniques, and then move on to number theory, recurrence relations, set theory, functions and relations, and counting and probability principles.

2 Course Objectives

By the end of this course, you will be able to:

- Determine whether an argument is logically sound and write clear, thorough, and precise mathematical proofs.
- Analyze discrete mathematical functions, sets, graphs, and recurrence relations.
- Apply principles of set theory and the element method of proof to formally demonstrate equality of sets and subset relationships.
- Apply counting principles to determine the order of magnitude of a computing problem or other related domain.
- Apply elementary probability concepts.

3 Possible Updates to this Document

Excluding materials for purchase, syllabus information may be subject to change. The most up-to-date syllabus is located within the course in HuskyCT.

4 Emails

- Joe Johnson - Instructor - joseph.2.johnson@uconn.edu
- Qingqi Lin - TA - qingqi.lin@uconn.edu

5 Office Hours

Resource	Day & Time	Virtual Office Hours Link
Joe Johnson - Instructor	Wed 10:30-12	Joe Johnson Virtual Office
Qingqi Lin - TA	Tuesday 10 - 11:30 am	Qingqi's Virtual Office

Table 1: Office Hours

6 Class Format

The format of the course will be a fully asynchronous online course. Each Monday, a video lecture will be posted to HuskyCT as a sequence of short videos, each 5-15 minutes in length . A sequence of 6-8 assignments will also be posted to HuskyCT on Monday mornings, spread over the course of the semester.

7 Software and Textbook Resources

7.1 Textbook (Required)

We will use the book *Discrete Mathematics with Applications (5th Edition)* by Susanna Epp. Purchasing this book is required. Assignments will be deployed using the WebAssign software of this text, more details on this software are provided below. In order to complete those assignments you will need to have this textbook.

7.1.1 WebAssign

WebAssign is companion software to the textbook through which problem sets will be assigned throughout the course.

- Video instructions for student registration: https://startstrong.cengage.com/webassign-blackboard-ia-no/
- Written instructions (pdf): WebAssign-Student-Quick-Guide-Spring-2023.pdf - located in same folder as this syllabus.
- Purchase options:
  - The bookstore is selling the WebAssign single-term access code for $135.89.
  - If you purchase access through your Cengage/WebAssign account after registering into your WebAssign course (see instructions above) then the cost is $105 for the same access.

8 Communication

The homework assignments, solutions, readings, announcements, discussion will be posted on HuskyCT. Please ensure you receive emails from HuskyCT so you get announcements. In addition, I encourage students to post and answer questions about class material and problem sets. I will also answer questions but I encourage students to try and jointly answer questions. **Do not ask or answer homework problems.**

Personal questions should be sent directly to my email or handled in person during office hours. I will not answer emails from Friday 6pm to Monday 9am.

9 Grading, assignments and exams

9.1 Assignments

There will be 7-9 problem-set assignments over the course of the semester, deployed through the WebAssign software, as described above.

9.2 Exams

There will be two midterm exams and one final exam, as posted in the syllabus. The exams will be conducted online, asynchronously, within the WebAssign enviornment (just like the homework) consisting of multiple choice questions with a format similar to the questions on the homework assignments. Since they will be asynchronous, they will not be delivered in class or at a specific time, but instead, you will be given a couple days during which to complete each of them.

9.3 Grading

The class will be graded as follows:

- 30% homework assignments.
- 20% midterm exam 1.
- 20% midterm exam 2.
- 30% final exam.

Grades will be assigned according to the scale in Table 2. As necessary, the class may be curved upward but not downward.

9.4 Late Assignments Policy

Late work is not accepted, especially given the tight timeframe for this course relative to the large number of topics that are to be covered.

Number Grade	Assigned Grade	Grade Points
93+	A	4.0
90-92	A-	3.7
87-89	B+	3.3
83-86	B	3.0
80-82	B-	2.7
77-79	C+	2.3
73-76	C	2.0
70-72	C-	1.7
67-69	D+	1.3
63-66	D	1.0
60-62	D-	0.7
0-59	F	0.0

Table 2: Grading Scale

10 Tentative Class Schedule

Table 3 contains a tentative plan for the topics week by week. As this course is intended to serve as a kitchen sink into which we toss a whole array of topics, this list is tentative and subject to change.

11 Collaboration

All homework assignments must be completed individually. It is okay for you to discuss a problem with a classmate as long you abide by the following condition:

- Each student you collaborate with should be named on the homework assignment.
- You must first consider each problem on your own and generate ideas on how to solve the problem.
- You may discuss problems and ideas jointly. The goal of collaboration is to understand the high level ideas of the problem. Do not go further than this.
- You must write solutions completely on your own.
- Do not use other resources (outside of your textbooks and collaborators) to attempt to find the problem or the solution. This includes using the internet to search for parts of the problem.

Week	Date	Topics	Chapter	Exam	Assignment
1	01/17	Introduction, Thinking Mathematically	1		1: 01/17-01/22
2	01/23	Propositional Calculus - Part 1	2		2: 01/23-02/05
3	01/30	Propositional Calculus - Part 2	2		
4	02/06	First Order Logic (FOL) and Quantified Statements - Part 1	3		3: 02/06-02/19
5	02/13	First Order Logic (FOL) and Quantified Statements - Part 2	3		
6	02/20	Direct Proof and Counterexample - Part 1 - Introduction	4.1		4: 02/20-03/12
7	02/27	Direct Proof and Counterexample - Part 2 - Rational Numbers, Divisibility, Cases and Quotient Remainder Theorem	4.2-4.5	**Exam 1:** 02/27-03/01	
8	03/06	Direct Proof and Counterexample - Part 3 - Floor and Ceiling, Indirect Proof - Contradiction and Contraposition, Two Famous Theorems	4.6-4.8		
	03/13	**Spring Break - No Classes**			
9	03/20	Sequences, Mathematical Induction	5.1-5.3		5: 03/20-04/02
10	03/27	Strong Mathematical Induction, Recurrence Relations, Using Iteration	5.4, 5.6, 5.7		
11	04/03	Second Order Recurrence Relations	5.8	**Exam 2:** 04/03-04/05	6: 04/03-04/09
12	04/10	Set Theory - Definitions, Element Method of Proof, Set Properties	6		7: 04/10-04/23
13	04/17	Counting and Probability - Intro to Probability, Multiplication Rule, Pigeonhole Principle	9.1, 9.2, 9.4		
14	04/24	Review Week - No New Material			
15	05/01	**Final Exam Week**		**Final Exam:** 05/01-05/03	

Table 3: Tentative class schedule

12 Software and Technical Requirements

The software/technical requirements for this course include:

- Dedicated access to high-speed internet with a minimum speed of 1.5 Mbps (4 Mbps or higher is recommended).
- HuskyCT
- Cengage - WebAssign

NOTE: This course has NOT been designed for use with mobile devices.

13 General Policies

13.1 Academic Honesty

This course expects all students to act in accordance with the Guidelines for Academic Integrity at the University of Connecticut. If you have questions about academic integrity or intellectual property, you should consult with your instructor. Additionally, consult UConn's guidelines for academic integrity.

The collaboration policy described above is designed to allow students the resources to succeed while ensuring they learn and master the material. If you are unsure if something is acceptable according to the collaboration policy, talk to me!

Violations of this policy will be considered violations of the academic integrity policy and will be reported to the Academic Integrity Hearing Board. Consequences may include (but are not limited to) failure of the class. Example violations include: not reporting collaborators, jointly writing solutions, copying or plagiarizing solutions from other sources, and cheating on the exam.

13.2 Student Conduct Code

Students are expected to conduct themselves in accordance with UConn's Student Conduct Code.

13.3 Copyright

My lectures, notes, handouts, and displays are protected by state common law and federal copyright law. They are my own original expression. Students may take notes. In addition, students will be consulted before using their solutions either with or without their name.

13.4 Students with Disabilities

The University of Connecticut is committed to protecting the rights of individuals with disabilities and assuring that the learning environment is accessible. If you anticipate or experience physical or academic barriers based on disability or pregnancy, please let me know immediately so that we can discuss options. Students who require accommodations should contact the Center for Students with Disabilities, Wilbur Cross Building Room 204, (860) 486-2020, or http://csd.uconn.edu/.

13.5 Final Exam Policy

In accordance with UConn policy, students are required to be available for their final exam and/or complete any assessment during the time stated. If you have a conflict with this time you must obtain official permission to schedule a make-up exam with the Office of Student Support and Advocacy (OSSA). If permission is granted, OSSA will notify the instructor. Please note that vacations, previously purchased tickets or reservations, graduations, social events, misreading the assessment schedule, and oversleeping are not viable reasons for rescheduling a final.