
CSc 245

Introduction to

Discrete Structures

Instructor: Rebecca Faust

Syllabus

[https://rjfaust.github.io/teaching/summer2021/
csc245/Syllabus.html](https://rjfaust.github.io/teaching/summer2021/csc245/Syllabus.html)

Course Description

An introduction to mathematical concepts for Computer Science. Topics include first-order logic and logical arguments, proof techniques with an emphasis on mathematical induction, sets, relations and functions, properties of integers, counting methods, probability, and recurrences.

Course Prerequisites or Co-requisites

MATH 111, MATH 112, grade of B or better in CSC 127B or CSC 227.

Course Objectives

- **Goal:** Students will learn the mathematical concepts and practices most useful for Computer Science.
- **Course Objectives:**
 1. Learn and apply principles of logic to construct sound arguments.
 2. Learn several proof forms and construct complete proofs using those forms.
 3. Learn a variety of fundamental mathematical principles and apply them to solve problems relevant to the study of computer science.

Expected Learning Outcomes

1. Reconstruct concept definitions and explain how more advanced concepts are defined in terms of more basic concepts.
2. Given a set of hypotheses, determine whether or not a given conclusion logically follows from them.
3. Given a non-trivial provable conjecture, construct a complete and logically sound proof that convincingly argues the truth of the conjecture.

Expected Learning Outcomes

4. Demonstrate ability to convert between logic and set expressions.
5. Solve specific types of recurrence relations and prove that the solutions define the same sequences as the original relations.
6. Given a counting problem, produce the correct quantity of potential outcomes by identifying and applying the appropriate counting concepts.

Instructor & TA's

Instructor:

Rebecca Faust

rjfaust+sum21csc245@email.arizona.edu

Office Hours:

Ash Reed

rachelreed@email.arizona.edu

Office Hours:

Vatsav Sethupathi

vatsav14@email.arizona.edu

Office Hours:

TA's:

Richard Spence

rcspence@email.arizona.edu

Office Hours:

Mary Eskandari

maryameskandari@arizona.edu

Office hours:

Contact Us

Ways to Contact Us:

- Office Hours
- Piazza
 - Most questions/comments should go here
- Email
 - For private, confidential and sensitive matters

Websites

- **Class:** <https://rjfaust.github.io/teaching/summer2021/csc245>
- **D2L:** <https://d2l.arizona.edu/d2l/home/1033934>
- **Piazza:** piazza.com/home/summer2021/csc245/home
- **GradeScope:** <https://www.gradescope.com/courses/266002>

Course Format

- **Asynchronously online** - All videos are pre-recorded, released at the start of the week.
 - Posted on D2L, uses Playposit to add questions throughout the lectures
 - Students may not modify or re-use content for any purpose other than personal educational reasons.
 - Due by the following Sunday
- **Required Text:** [Discrete Mathematics and its Applications \(Rosen\)](#), U.S. 8th ed., McGraw-Hill, 2019. *Do not buy an international edition or an earlier edition!*
 - Syllabus has other optional supplemental texts

Equipment Requirements

- Reliable internet signal for watching lectures, uploading assignments, taking online exams, etc.
- A computer capable of running a browser that supports D2L, Playposit and Gradescope.
- A webcam and microphone to participate in office hours and so we can observe you during exams, should we deem it necessary.

University Dates and Deadlines

6/7/2021	FIRST DAY OF 10 WEEK SESSION CLASS <ul style="list-style-type: none"> • UAccess still available for registration • First day to file for the Grade Replacement Opportunity (GRO) • First day to add classes for audit and instructor signature is required
6/11/2021	Last day to use UAccess for adding classes, changing classes, or changing sections
6/12/2021	Instructor approval required on a Change of Schedule form to ADD or CHANGE classes
6/15/2021	<ul style="list-style-type: none"> • Last day to drop without a grade of W (withdraw) • Classes dropped on or before this date will remain on your UAccess academic record with a status of dropped, but will not appear on your transcript • Last day to change from credit to audit, or vice versa, with only an instructor's signature
6/15/2021	Last day for a refund
6/16/2021	<ul style="list-style-type: none"> • A penalty grade of W will be awarded for each withdrawal and the class(es) will appear on your transcript • A change from credit to audit requires instructor approval on a Change of Schedule form
6/23/2021	Last day for department staff to add or drop in UAccess
6/23/2021	Last day to change from pass/fail to regular grading or vice versa with only instructor approval on a Change of Schedule form
6/24/2021	Instructor's and dean's signatures are required on a Change of Schedule form to change from pass/fail to regular grades or vice versa
7/4/2021	4th of July, no classes
7/10/2021	Last day to make registration changes without the dean's signature
7/11/2021	Instructor's and dean's signatures are required on all Change of Schedule forms to ADD or CHANGE classes
7/18/2021	Last day to file for Grade Replacement Opportunity (GRO)
7/18/2021	<ul style="list-style-type: none"> • Last day for students to withdraw from a class online through UAccess • Last day for students to change to/from audit with only instructor approval • Last day for instructors to administratively drop students
7/19/2021	<ul style="list-style-type: none"> • Instructor and dean's signatures required on a Late Change Petition in order to withdraw from class and students must have an extraordinary reason for approval • Instructor's and dean's permission required on a Change of Schedule form to change to/from audit
7/30/2021	Last day for students to submit a Late Change Petition to their college
8/11/2021	<ul style="list-style-type: none"> • Last Day of Class • No registration changes can be made after the last day of class • Final exam • Final grades are available in UAccess as soon as the instructor posts them • Per Faculty Senate Policy, grades should be submitted within two business days after the final exam

Weekly Schedule

Typical Week:

- (Hopefully) Release lecture videos at the end of the weekend
 - Lectures posted on D2L with Playposit
 - Students must watch videos by the following Sunday
- Tuesday Quiz (due by 11:59pm)
- Friday: Release new homework in the morning, previous homework due by 11:59 pm

Note about Lectures

- If this were in person, we would have:
 - 45 contact hours (each contact hour is 50 minutes)
 - This would be about three 75 minute lectures per week.
- Since we are asynchronously online, the pre-recorded video of what would normally be a 75 minute lecture will be quite a bit shorter, possibly around 50 minutes.
- I will rely on your feedback to tell me what you need more of from my lectures

Lecture Topics

Topic	Week	Material Covered
1. Math Review	1	Handout
2. Logic	1	1.1, 1.3
3. Quantification	2	1.4, 1.5
4. Arguments	2	1.6
5. Proofs	3	1.7, 1.8
6. Sets	4	2.1, 2.2
7. Matrices	4	2.6
8. Relations	5	9.1, 9.3, 9.5, 9.6
9. Functions	6	2.3
10. Integers	6	2.3
11. Sequences & Strings	7	2.4
12. Mathematical Induction	7	5.1, 4.2
13. Counting	8	6.1-6.6
14. Recursive Algorithms	9	3.1, 5.3, 5.4
15. Recurrence Relations	9	8.1, 8.2
16. Finite Probability	10	7.1, 7.2

Grade Scale & Breakdown

- A \geq 90%
- 80% \leq B < 90
- 70% \leq C < 80
- 60% \leq D < 70
- E < 60%
- Homework - 48%
- Exams - 35%
 - Midterm - 15%
 - Final - 20%
- Participation - 17%
 - Quizzes - 12%
 - Lectures - 5%

Grade Breakdown

Homework - 48%

- **Frequency:** 1 assignment per week
- **Content:** Content from week they are assigned
- **Submission:** Due Friday's, at 11:59 pm, submitted on Gradescope. Feedback & the rubric used will be posted on Gradescope. Note, the TA's and I will not guarantee responses to questions asked after 5 pm on the day it's due.
- **Legibility:** 5% EC for typed homework, Latex is strongly encouraged. If legibility becomes a problem, I will switch from 5% EC to requiring typed homework for 5% of grade. I will provide a Latex template for each homework assignment and quiz.
- **Incorrect or Incomplet HW:** Even if you don't finish, turn in what you have. Most problems are eligible for partial credit, so show your work!
- **Late Assignments:** Unless exceptional circumstances occur, late assignments will not be accepted.

Grade Breakdown

Homework - 48%

- **Discussing your HW score:**
 - If you don't understand why you lost points or want more feedback, feel free to come ask us
 - Talk to TA's first (they will be grading your HW) and come with specific questions/concerns
 - If you are not satisfied after talking with the TA's, feel free to come to me.
- **Disputing your score:**
 - Must be done within a week of the homework being returned
 - Regrade request can be made through Gradescope. Please provide specific reasons why you believe your answer was graded incorrectly

Grade Breakdown

Exams - 35%

- Midterm - 15%
 - Online & timed, on Gradescope or D2L
 - Released July 8th, must be completed by due July 9th 11:59pm.
 - It will be 90 minutes.
- Final - 20%
 - August 10th, before 11:59pm.
 - Online & timed on Gradescope or D2L
 - You will be given 2 hours to complete it.

Grade Breakdown

Exams - 35%

- All exams will be open book, open note.
 - You may **not** use the internet, work with classmates, or use classmates coursework
- **Regrade Requests:** You may request a regrade up to a week after your exam was returned. I will be the one regrading it
 - In the request, specifically and in detail, explain what you think is misgraded
 - I will regrade the **entire exam**, not just the question you dispute. This means that, potentially, you could lose points on the exam if other questions were misgraded in your favor.

Grade Breakdown

Participation - 17%

- Lecture Videos - 5%
 - Released Monday's, due the following Sunday
 - Finishing the videos and answer the questions count towards your grade
- Quizzes - 12%
 - Released Tuesday's 12am, due the same Tuesday 11:59pm
 - Designed to take 10 - 15 minutes.
 - (No EC for typing.)

Calculating Your Grade

- (I believe) Your final grade on D2L will not be accurate until **ALL** grades are entered at the end of the semester.
- To calculate your intermediate grade, use a weighted grade calculator, such as <https://www.rapidtables.com/calc/grade/grade-calculator.html>.
- Note, D2L should tell you your grade for each category
 - e.g. for lectures, it should say something like 4.5/5%

Grade Response Time

- Per department policy, homework will be graded before the next assignment is due
- We will do our best to get quizzes back before the corresponding hw assignment is due on Friday.
- We will do our best to respond to emails and piazza posts within 24 hours of receiving them (48 hours on the weekend). If you submit a question less than 24 hours before an assignment is due, you risk not getting an answer (with the exception of quizzes and exams).

Academic Dishonesty

- **Do's**
 - With Classmates:
 - Share intellectual views
 - Discuss principles and applications of course materials
 - Discuss assignment requirements and high level concepts
 - Ask TA's and myself for help (but do not expect us to just give you the answers!)

Academic Dishonesty

- **Do not's**
 - Discuss or share solutions to assigned work with classmates
 - Search for solutions on the internet, even if you're just looking for a hint!
 - Use the internet or your classmates assignments when taking exams
 - Get answers from or use the work of past students
 - Submit homework or exam questions to online answering services
- **Rule of thumb:** If you wouldn't ask/share it on Piazza, it's probably not ok

Academic Dishonesty

- **Penalty for Academic Dishonesty:**
 - At a **minimum**, you will receive not only receive a 0% on the **entire** assignment (including exams!), will also lose an additional 50% on the assignment.

Question: What will the final grade be?

Assignment	Weight	Earned Grade
Final Exam	20%	x
All other Assignments	80%	100%
Total Grade	100%	$.8*(100) + .2*x$

- A student has earned 100% on all of their assignments so far. This counts towards 80/100 points of their total grade.
- They ran out of time on the final exam so they consulted their friends exam. However, the instructor discovered that they borrowed their friends answer.
- What will their final grade be after penalty for academic dishonesty is imposed (receiving a 0% on the assignment, plus the additional loss of credit equal to 50% of the assignment)

Academic Dishonesty

- **Penalty for Academic Dishonesty:**
 - At a **minimum**, you will receive not only receive a 0% on the **entire** assignment (including exams!), will also lose an additional 50% on the assignment.
 - You are better off turning in nothing than turning in an assignment that violates academic integrity!
 - Last summer, 17% of the class were reported for academic dishonesty on an exam and received -50% on their exams

UA Code of Academic integrity

Students are expected to adhere to the UA Code of Academic Integrity as described in the UA General Catalog. See <http://deanofstudents.arizona.edu/academic-integrity/students/academic-integrity>. Please take the time to read this policy; ignorance of the policies is not an acceptable excuse for their violation

Absence/Participation Policy

- Participation is measured through completion of quizzes and lecture videos by the set deadlines
- The UA's policy concerning Class Attendance, Participation, and Administrative Drops is available at <http://catalog.arizona.edu/policy/class-attendance-participation-and-administrative-drop>
- The UA policy regarding absences for any sincerely held religious belief, observance or practice will be accommodated where reasonable: <http://policy.arizona.edu/human-resources/religious-accommodation-policy>. Absences pre-approved by the UA Dean of Students (or dean's designee) will be honored. See <https://deanofstudents.arizona.edu/absences>

Department and University Policies

- Refer to the online syllabus for full descriptions of these policies
- **Department of CS Code of Conduct** - We strive to be welcoming and inclusive, respect privacy and confidentiality, behave respectfully and courteously, and practice intellectual honesty. Disruptive behaviors (such as physical or emotional harassment, dismissive attitudes, and abuse of department resources) will not be tolerated

Department and University Policies

- **Classroom Behavior Policy** - (Doesn't quite apply right now)
- **Pronoun Preference** - If you prefer to be called a different name than what is on the class roster, please let me know and feel free to correct instructors on your preferred gender pronoun. If you have any questions or concerns, please do not hesitate to contact me
- **Threatening Behavior Policy** - prohibits threats of physical harm to any member of the University community, including to oneself.

Department and University Policies

- **Accessibility and Accommodations** - The Disability Resources Offices provides guidelines regarding accessibility and accommodations: <http://drc.arizona.edu/instructors/syllabus-statement>.
- **UA Nondiscrimination and Anti-harassment Policy** - The University is committed to creating and maintaining an environment free of discrimination; see <http://policy.arizona.edu/human-resources/nondiscrimination-and-anti-harassment-policy>
- **Confidentiality of Student Records** - See <http://www.registrar.arizona.edu/personal-information/family-educational-rights-and-privacy-act-1974-ferpa?topic=ferpa>

Department and University Policies

- Additional Resources for Students (more details in syllabus)
 - Campus Health
 - Counseling and Psych Services
 - The Dean of Students Office's Student Assistance Program
 - Survivor Advocacy Program
 - Campus Pantry
 - Title IX

Pandemic-Related Information

- **Academic advising:** If you have questions about your academic progress this semester, or your chosen degree program, consider contacting your department's academic advisor(s).
- **Life challenges:** If you are experiencing unexpected barriers to your success in your courses, please note the Dean of Students Office is a central support resource for all students and may be helpful.
- **Physical and mental-health challenges:** If you are facing physical or mental health challenges this semester, please note that Campus Health provides quality medical and mental health care.

Subject to Change Policy

- The syllabus is subject to change, without advanced notice, as deemed appropriate by the instructor
- Most likely apply to (but not limited to):
 - Course schedule
 - Exam setup for final exam
 - Legibility requirements of assignments

This week

What you should do this week

- Watch all lectures
 - Background/Review
 - Logic
- Homework 1
 - Due **THIS** Friday (06/12)
 - Math Review