

CS5002 - Discrete Structures
Spring 2024
Northeastern University

Prof. Laney Strange (she/her)

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Course web page	http://course.ccs.neu.edu/cs5002
Piazza	https://piazza.com/northeastern/spring2024/cs5002
Gradescope	https://www.gradescope.com/courses/674159 access code JK2XEZ
Lecture Question Form	https://forms.gle/VYb428oGKx3Wn23Y6
Course Feedback Form	https://forms.gle/ErqdaL1rmyuBiBfJ7
Lecture Schedule	W 6:00-9:20pm SH 135

Contents

[About this Course](#)

[Recommended Textbook](#)

[Evaluation](#)

[Office Hours](#)

[Inclusive Classroom](#)

[Name and Pronoun Usage](#)

[Homework](#)

[Homework Late Policy](#)

[In-Class Assignments \(ICAs\)](#)

[Exams](#)

[Attendance Policy](#)

[Academic Integrity](#)

[Title IX](#)

[Students with Disabilities](#)

About this Course

This course introduces the mathematical structures and methods that form the foundation of computer science. The material is motivated by applications from computer science. We will cover the following:

- **Techniques:** binary and modular arithmetic, set notation, and methods of counting, evaluating sums, and solving recurrences.
- **Supporting Theory:** the basics of probability, proof by induction, growth of functions, and analysis techniques.
- **General problem solving** techniques with many applications to real problems.

Specific topics covered in the course include:

- Propositional logic
- Predicate logic and quantifiers
- Gates and circuits
- Representation of numbers
- Sets
- Combinatorics
- Probability
- Graphs
- Proof by mathematical induction
- Sequences and summations
- Growth of functions

Recommended Textbook

There is no required textbook. However, the material is mostly going to be from the following book:

- [Discrete Structures](#) by Fell and Aslam

You do not need to read the textbooks ahead of lecture; they are most useful as reference materials or for looking up new examples. Keep them handy when working on the homework or reviewing your lecture notes.

Evaluation

Factor	Number	Weight
Homework	7	45%
Exam #1	1	20%
Exam #2	1	20%
In-Class Assignments (3 dropped)	9	15%
	TOTAL	100%

Your final grade for CS5002 will use the following breakpoints to convert from letter to number grades. We use natural rounding to get these whole numbers, e.g., 96.5 becomes a 97 but 96.4 becomes 96.

Letter	Range
A	94-100
A-	90-93
B+	87-89
B	83-86
B-	80-82
C+	77-79
C	73-76
C-	70-72
D	60-69
F	< 60

Office Hours

Office hours are a great place to get clarification on concepts and have conversations with TAs and Laney. All office hours are listed on the course website.

Laney's office hours take place both in-person and online:

- T 3:30-6pm
- F 12-1pm
- In-person location: ME 313
- Online location: <https://northeastern.zoom.us/my/laney>

You can make an appointment for a one-on-one meeting with Laney during her office hours at <https://calendly.com/laneystrange/1-1-office-hours-with-laney>. You can also just drop by, either in-person or online, but appointments take priority.

TA office hours are group-based, and are also offered in-person and online. They are listed on the TA & Office Hours page of the course website.

It'll be important that you come to office hours having already made an attempt on the homework. We will be happy to help guide you on concepts and provide clarification. We cannot provide you with answers to problems, and we cannot confirm whether your solution is correct.

Inclusive Classroom

We believe that diversity and inclusiveness are essential to excellence in academic discourse and innovation. In this class, the perspective of people of all races, ethnicities, gender expressions and gender identities, religions, sexual orientations, disabilities, socioeconomic backgrounds, and nationalities will be respected and viewed as a resource and benefit throughout the semester. Suggestions to further diversify class materials and assignments are encouraged. If any course meetings conflict with your religious events, please do not hesitate to reach out to Laney to make alternative arrangements.

Questions during lecture

- We invite everyone to raise their hands to ask and answer questions during class, and to engage in discussion with classmates. However, we know it's not always the easiest thing to speak up in a big classroom, or to clarify your thoughts in real time.
- Therefore, you can also ask questions about lecture via our lecture-question form: <https://forms.gle/VYb428oGKx3Wn23Y6>. Laney will review these questions during the break and after lecture, and respond during lecture or on Piazza, keeping you anonymous.

To create and preserve a classroom atmosphere that optimizes teaching and learning, all participants share a responsibility in creating a civil and non-disruptive forum for the discussion of ideas. This includes all ways you interact with classmates and course staff -- in lectures, office hours, Piazza, etc.

Name and Pronoun Usage

As this course includes some discussion, it is vitally important for us to create an educational environment of inclusion and mutual respect. This includes the ability for all students to have their chosen gender pronoun(s) and chosen name affirmed. If the class roster does not align with your name and/or pronouns, please inform Laney of the necessary changes.

Homework

All homework assignments will be submitted on Gradescope. You can type up your solutions, or write them by hand and then scan with your phone. If you submit a PDF, submit only a single file. If you submit images, submit one per page!

Draft rubrics will be released with each homework, ensuring transparency around what we'll be looking for when grading. The rubrics may change slightly when we grade the homeworks after submission, but we promise they won't change much. It is your responsibility to read the homework assignment itself and the accompanying rubric to make sure you've covered all required parts of every question.

Homeworks will be scored and returned to you, on Gradescope, usually within one week. After getting your homework back, you have the option to file a regrade request. under one of the following categories:

- **Clarity** -- you're not sure why points were taken off, even though you've read the rubric and your grader's comments.
- **Mistake** -- your grader mistakenly took points off.

When filing a regrade request, specify which category the request belongs in. You'll receive a response, and possibly an updated score, from your grader. After that, if you still have concerns or questions about your grade, email laneys@northeastern.edu.

Homework Late Policy

If you miss a homework deadline, we've set aside two late deadlines where you can submit missing homeworks with no penalty.

There will be a separate "Late Submission" assignment on gradescope for every homework, which becomes available after the original deadline has passed.

- **HW 1-4:** Late submissions by Friday February 23rd at 6pm
- **HW 5-7:** Late submissions by Wednesday April 17th at 6pm

If you submit late, your homework will not be graded until after the late deadline. This policy exists for times you fall behind on a homework, aren't feeling well, or are busy with classes/life. Apart from these two late deadlines, no late submissions will be accepted.

In-Class Assignments (ICAs)

ICAs will be assigned during lecture, and we'll set aside time for you to work on them individually, and then to review the solutions as a class.

ICAs are due at 6pm the day after they are assigned. You'll submit your ICA solution for credit. This will be graded on completion. You need to complete 2 of the problems for full credit.

ICAs may not be submitted late, but three ICAs will be dropped and not count towards your final grade.

Exams

There are two exams this semester, and they will be administered in-person, during our scheduled lecture, and completed on paper.

Exam dates:

- **Exam #1:** Wednesday, February 21st
- **Exam #2:** Wednesday, April 10th

It is your responsibility to familiarize yourself with these dates and ensure you are available for exams and can be on-campus for them. The exams are designed to be completed in less time than we have designated for lecture, so that no one feels rushed. Take your time on the exam problems and ask any questions that come up.

For each exam, you may bring one 8.5x11-inch paper as a cheat sheet, with anything written or typed on it (one side only). You will submit this cheat sheet along with your exam, and you will not be permitted to use any other materials or notes during the exams.

Additionally, we will use the last day of class to offer a short, one-problem exam for anyone who wants to take it. Your score on this problem can be used to replace your score on ONE problem from Exam 1 OR Exam 2. No cheat sheets are permitted for this make-up exam problem.

If you have a DRC accommodation, make sure that you have emailed your letter to laneys@northeastern.edu well before the first exam. If your accommodation is for extra time or a distraction-free environment, you'll need to coordinate directly with the DRC to book a time to take the exam in their office.

Attendance Policy

Lectures and exams are in-person and attendance is expected. We don't want or expect anyone to come to class when they're sick, though, so we'll post supplementary videos each week that you can use to catch up on any missed material.

These supplementary videos were recorded in previous semesters. We do not record lectures in CS5002.

If you need to miss class:

- Watch the videos and read the notes posted from the given week.
- Complete and submit the ICA for that week.
- Stop by Laney's or a TA's office hours to make sure you're caught up and feeling confident on the material.
- There is no need to notify us about missing class.

These supplementary videos, plus the notes from class, are meant to be helpful for days when you need to miss class, but they will definitely NOT be an identical experience! They should suffice when you miss a class or two due to illness or emergency, but we do not recommend using them as a substitute for regular participation in the in-person lecture.

Academic Integrity

Exams are solo endeavours; no books, notes, phones, or other devices are permitted.

On the other hand, homeworks can be collaborative. We expect that you might study with friends and work out solutions to problems together, but you must write up your own solutions, in your own words. Copying solutions from a classmate or online source is a violation of our academic integrity policy and will be referred to OSCCR.

Here are some concrete guidelines.

- Never look at someone else's homework solutions. Otherwise you might turn in overly similar work.
- If you produce a solution together, don't simply copy it down afterwards. You must, on your own, write your own solution in your own words.
- If someone explains an answer to you, do not write down their exact words; instead, on your own write up your solution afterwards.
- If you collaborate with (or get help from) any other student, then write their name on the the first page of your assignment at the top.

Violation of this policy has consequences both within the course and through the university's OSCCR office. For a first violation, you will receive a zero on the assignment. For a second violation, you will receive a failing grading in CS5002. All violations will be reported to OSCCR:

<http://www.northeastern.edu/osccr/academic-integrity>

Title IX

Title IX of the Education Amendments of 1972 protects individuals from sex or gender-based discrimination, including discrimination based on gender-identity, in educational programs and activities that receive federal financial assistance.

Northeastern's Title IX Policy prohibits Prohibited Offenses, which are defined as sexual harassment, sexual assault, relationship or domestic violence, and stalking. The Title IX Policy applies to the entire community, including male, female, transgender students, faculty and staff.

If you or someone you know has been a survivor of a Prohibited Offense, confidential support and guidance can be found through University Health and Counseling Services staff (<http://www.northeastern.edu/uahcs/>) and the Center for Spiritual Dialogue and Service clergy members (<http://www.northeastern.edu/spirituallife/>). By law, those employees are not required to report allegations of sex or gender-based discrimination to the University.

Alleged violations can be reported non-confidentially to the Title IX Coordinator within The Office for Gender Equity and Compliance at: titleix@northeastern.edu and/or through NUPD (Emergency 617.373.3333; Non-Emergency 617.373.2121). Reporting Prohibited Offenses to NUPD does NOT commit the victim/affected party to future legal action.

Faculty members are considered "responsible employees" at Northeastern University, meaning they are required to report all allegations of sex or gender-based discrimination to the Title IX Coordinator.

In case of an emergency, please call campus police.

Please visit <http://www.northeastern.edu/titleix> for a complete list of reporting options and resources both on- and off-campus

Students with Disabilities

Students who have disabilities who wish to receive academic services and/or accommodations should visit the Disability Resource Center at 20 Dodge Hall or call (617) 373-2675. If you have already done so, please provide your letter from the DRC to Laney (laney@northeastern.edu) early in the semester so that we can arrange those accommodations.