CS1800 -- Discrete Structures
Fall 2025
Khoury College of Computer Sciences
https://course.ccs.neu.edu/cs1800

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Website	https://course.ccs.neu.edu/cs1800
Piazza	https://piazza.com/northeastern/fall2025/cs1800
Gradescope	https://www.gradescope.com/courses/1068541
Lecture Schedule	Section 1: TF 8:00-9:40am (ISEC 102) Section 2: TF 9:50-11:30am (ISEC 102)
Homework Schedule	Released on Tuesday Due on Gradescope the following Tuesday 9pm ET Solutions must be hand-written (not typeset)
Lecture Instructors (CS1800)	Prof. Laney Strange (she/her) - Sections 1 & 2
Recitation Instructors (CS1802)	Prof. Amor-Tijani (she/her) Prof. van der Poel (he/him) Prof. Higger (he/him) Prof. Sundaram (he/him) Prof. Hamlin (she/they)

Syllabus Contents

About this Course

The purpose of this course is to understand and use (abstract) discrete structures that are backbones of computer science. We begin with mathematical notation, logic, and sets. We will then study proof techniques, combinatorics (counting), probability, proof by induction, graph theory, and asymptotic notation. By the end of this course, you will have become familiar with a number of discrete structures that are used throughout computer science.

Recommended Textbook

- Discrete Structures by Harriet Fell and Javed A. Aslam. You can find the PDF free online. We'll cite relevant readings each week, and we recommend reading them before or after lecture.

Discrete Structures Topics

The major topics within the course will be covered in roughly the following order.

Topics
Propositional Logic, Logical Equivalence, Predicate Logic
Representation of Numbers, Gates and Circuits
Sets, Set Operations, Set Equality
Counting; Product Rule + Sum Rule, Combinations + Permutations, Overcounting, Pigeonhole Principle
Probabilities, Joint and Disjoint Probabilities, Conditional Probabilities, Random Variables, and Expected Value
Mathematical Induction: Proof Structure, Simple Induction, Strong Induction
Summations and Sequences
Graph Theory: Definitions, Structure, Graph Algorithms, Graph Proofs
Asymptotic time complexity

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.

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.

Lecture Questions

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 Laney questions directly via the https://forms.gle/5Gz988jzgyAfMdoi9. 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, recitations, office hours, Piazza, etc.

Attendance Policy

CS1800 is an in-person class, and attendance is expected for both lectures and recitations. However, we don't take attendance and we don't want or expect anyone to come to class when they're sick. We'll post the lecture notes from each day, along with short videos that you can use to catch up on missed material.

These videos were pre-recorded. **We do not record lectures in CS1800**. If you need to miss class/recitation...

- Watch the videos and read the notes posted from the given lecture. Write down notes as you read/watch; it'll help.
- Complete the practice problems from your recitation, on your own or with a friend or in office hours.
- 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.

The 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.

You must be present in-person for scheduled quizzes. Dates are posted in this syllabus, on the course website, and on Canvas. Make sure you familiarize yourself with the schedule so that you don't miss the exams.

Evaluation

Grades for CS1800 and CS1802 are merged. You will receive the same grade for both.

Factor	**Number**	**Weight**
Homework	7	45%
Quiz 1	1	15%
Quiz 2	1	15%
Quiz 3	1	15%
Quiz 4	1	10%
(Final Exam - optional)	1	(can replace your scores on individual quiz questions)

The Final Exam is optional and will have questions similar to the quizzes; if you improve your score for a given question on the exam, then we will use the higher score when calculating your CS1800 grade. (More details in the Exam section below.)

Letter Grades

Your final grade for CS1800/1802 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. All homeworks are equally weighted, regardless of the number of points allocated -- we compute the percentage score on each homework assignment, and the average of that becomes your homework grade..

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 professors.

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

Instructor Office Hours

Laney's office hours start on September 3rd, 2025, and are set up to be one-on-one. Make an appointment using the calendly link below, or just drop in if you prefer (although appointments take priority!). My office hours are in-person on Mondays, and on Zoom on Wednesdays.

Day & Time	**Location**	**Notes**
Mondays, 1-2:30pm	Meserve 051	Make an appointment through this link (or just drop in!). Enter through the "Holmes/Meserve" door on Leon St., and go down one level to the basement.
Wednesdays, 9:30-11am	Zoom	Make an appointment through this link (or

		just drop in!).

TA Office Hours

TA office hours will be held in person and online. TA office hours begin on Monday, September 8th. A google calendar will be posted on our course website, and any schedule changes will be announced on Piazza.

For online office hours, we will be using the queuing system in the Khoury Office Hours app. Have a question ready and add yourself to the queue. When a TA is available, they'll call you on Microsoft Teams.

For in-person office hours, please go to the room listed and write your name at the bottom of the list on the whiteboard. A TA will call your name when it's your turn, so please keep an ear out!

Academic Integrity

Details of our academic integrity policies for Homework & Quizzes/Exams are below. If you have a question about what is considered a violation of this policy, please ak! The university's academic integrity policy discusses actions regarded as violations and consequences for students: https://osccr.sites.northeastern.edu/

Homework Policy

We encourage you to work with classmates on homework problems; list all collaborators on the first page of your submission. You may also consult outside sources, including generative AI; list all outside sources you referenced and how you used them on the first page of your submission.

However, **you must hand-write all your solutions yourself, in your own words**. Do not submit anything you can't explain. Typed submissions will not be accepted. Copying solutions from another person or an outside source is a violation of our academic integrity policy.

Any violation of our academic integrity policy will result in a 0 on the assignment, and will also be referred to OSCCR for formal evaluation.

Here are some concrete guidelines.

- Never look at someone else's written homework solutions -- not a classmate's, and not chatGPT's.
- Do not consult any person outside of our CS1800 semester.
- If you produce a solution with another person on a whiteboard, don't simply copy it down afterwards. You must, on your own, write your own solution by hand.
- If someone explains an answer to you, including an AI someone, do not write down their exact

words; instead, on your own write up your solution afterwards.
- If you collaborate with any other person or tool, write their name on the first page of your homework submission.

Quiz & Exam Policy

Quizzes and the final exam will be administered in-person, on paper. You may bring one 8.5x11-inch cheat sheet, with anything written/typed on it, one side only. No other materials or devices are permitted. Phones must be silenced and put away.

During a quiz/exam, you may not look at a classmate's paper and you may not look for solutions from any source besides your cheat sheet.

Please do not discuss the exam/quiz with anyone (including on Piazza) until after it has been graded and returned.

Homeworks

Homework will be assigned regularly in the course. In general, the homework will be released on Tuesday and will be due the following Tuesday at 9pm eastern.

Your solutions must be neatly hand-written. Typed submissions will not be accepted. Begin each problem on a new page. When submitting your solution, you'll tag your pages with the specific homework problem they refer to. Failure to tag your pages upon submission will result in lost points on your homework.

Homeworks will be scored and returned to you, on Gradescope, 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

You can submit any/all homeworks up to 48 hours late with no penalty. However, **once the late deadline has passed, no submissions will be accepted**. This policy exists so you take extra time when you're especially busy, not feeling well, tending to your family, etc.; we won't make any exceptions to this policy.

Second-Chance Homework

You will have an opportunity at the end of the semester to submit one homework (HWs 1-6 only) for a new grade. This is a chance to have another go at a homework if there was one where you didn't do as well as you could have, were extra-busy or dealing with family/life stuff, or missed the deadline. On the second-chance homework, you'll get a new score that will replace your original. For this reason, homework solutions will not be released (other than HW7).

Quizzes & Final Exam

We will have four quizzes during the semester. They will be administered on paper during our regular lecture. The final exam is optional and is an opportunity to improve your quiz scores; every quiz question will have a similar question on the same topic on the final exam and you keep whichever is better.

Final exam schedules are released by the University a few weeks into the semester, and we will announce our final exam date as soon as we have it. You must be present in-person for scheduled quizzes, and for the final exam if you choose to take it. **Please note the quiz/exam dates on your calendar.**

Quizzes

Each quiz comprises one or two questions, but you will have the entire lecture period to complete it. Take your time, review your solutions, and make sure you feel confident about what you are submitting. You may bring one 8.5x11-inch cheat sheet, with anything written/typed on it, one side only. No other materials or devices are permitted. Phones must be silenced and put away.

If you have a relevant DAS accommodation, arrange to take the quizzes in the DAS office. Make sure you set this time up at least a week ahead of the scheduled quizzes to guarantee the time and space you need.

We expect everyone to be present for scheduled quizzes. In the case of an unforeseeable, unavoidable emergency that causes you to miss an quiz, reach out to Laney before the quiz date. I can't guarantee we'll be able to reschedule, but the earlier you reach out the better. If you reach out **after** the quiz date, we won't be able to reschedule.

Quiz Schedule

Quiz No.	**Date**	**Number of Questions**	**Topic(s)**
1	Friday, October 3rd	2	• Propositional Logic (including circuits), Predicate Logic • Number Representation
2	Friday, October 24th	2	• Sets & Set Operations

			• Counting (Combinatorics)
3	Friday, November 14th	2	• Probability • Graph Theory
4	Friday, December 5th	1	• Mathematical Induction

Final Exam

The final exam is optional and is an opportunity to improve your quiz averages. There will be 7 total questions on the final, each corresponding to one quiz question and on the same topic.

For each question, we will keep the score from the quiz or from the final, whichever is higher. You can complete as many questions during the final as you would like; if you are happy with your quiz score on a give topic/question, skip the corresponding one on the final.

If you are happy with **all** of your quiz scores, then there is no need to take the final exam.

The final exam schedule is usually released by the University within the first few weeks of the semester, and we will notify you as soon as we know it. You must be present in-person for the scheduled final exam if you choose to it; final exams cannot be rescheduled.

If you have a relevant DAS accommodation, arrange to take the final exam in the DAS office. Make sure you set this time up at least a week ahead of the scheduled time to guarantee the time and space you need.

Recitations (CS1802)

You must be registered for a lecture section (CS1800) as well as a recitation (CS1802). Recitations are in-person and attendance is expected.

CS1802 Recitations are dedicated time set aside to work on practice problems that specifically prepare you for the current homework or upcoming quiz. Homeworks are released on Tuesdays and your recitation will meet either Wednesday or Thursday; the recitation is your opportunity to solidify your understanding of lecture material, ask questions, and get support for the current homework or upcoming quiz.

Practice Problems, and their solutions, will be released each week for recitation. These practice problems are labelled according to which Homework or Quiz topic they will help you prepare for. You do not need to complete every practice question; we encourage you to do at least one per topic, and to prioritize the topics you would like to practice.

You do not need to submit practice problems; we will release solutions so you can check your work.

Your recitation is led by a Khoury College professor, assisted by a knowledgeable and wonderful Teaching Assistant. Professors and TAs are fantastic resources, and you have the opportunity in recitation to work with them in a smaller group -- I strongly recommend you take advantage of the time to review your solutions to these practice problems, ask for help on the homework, or review material from lecture.

Communication

Reaching out to Laney

Ask me questions, send me emails, and come talk to me! I'm always happy to answer questions about lecture material, course material, review what you need for a quiz, anything on your mind.

You can reach me a few ways:

- *Email*: laneys@northeastern.edu (generally you can expect quick responses from me during regular business hours, but I'm pretty offline evenings/weekends)
- *My office hours*: In-person mondays, and on Zoom Wednesdays, whatever is more comfortable for you. If my office hours don't work for you, send me an email and we'll set up another time.
- *During class*: I always try to end 5 minutes early so we can chat about anything that wasn't clear, answer last-minute questions, etc.
- *Lecture Question Form*: https://forms.gle/5Gz988jzgyAfMdoi9
- *On campus:* I'm around and on-campus a lot, feel free to stop by Meserve even if it's not my office hours; if I'm not busy I'm happy to chat :)

Piazza

Piazza is here for you to ask clarifying questions on homework assignments, which the course staff is here to answer. It is also used for discussions among students about the approach you might take to solving problems in the class.

Sign up for the course piazza page: https://piazza.com/northeastern/fall2025/cs1800

Because this is a theory course, and solutions sometimes rely on one particular, specific insight, we have a few rules governing our Piazza page:

- You may not post solutions to problems.
- You may not post a single, simple insight that enabled you to solve a problem (e.g., "Use Cantor's diagonalization"), but you may post general approaches (e.g., "I thought this homework problem related to the class discussion on infinite binary sequences").
- You must be respectful of and courteous towards your fellow students and the teaching staff.

Violations of these rules will result in our closing the Piazza page.

In general, it's better to post on Piazza than to send an email to one instructor. You're much more likely to get a quick response, and then everyone else can benefit from your question -- trust us, other people are wondering too!

Accessibility

If you require support during the course due to a disability please ensure that you are already registered with the University's Disability Access Services, and contact Laney to coordinate any support needed during the course.

Title IX makes it clear that violence and harassment based on sex and gender are Civil Rights offenses subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories such as race, national origin, etc. If you or someone you know has been harassed or assaulted, you can find the appropriate resources here: Northeastern OUEC.

Course Feedback

Your thoughts and concerns about this course are important. We invite you to give feedback throughout the term. You can reach out to any instructor or TA directly over email, or fill out our feedback form: https://forms.gle/VC5R7KCoaLnDQShW8

You will also be asked to fill out a formal course evaluation at the middle and end of the term.