Northeastern University
Khoury College of
Computer Sciences

CS 5002 Discrete and Data Structures (Fall 2020)   Professor Higger

General Information
This course introduces the mathematical structures and methods that form the foundation of computer science. It studies structures such as sets, tuples, sequences, lists, trees, and graphs. It discusses functions, relations, ordering, and equivalence relations. It examines inductive and recursive definitions of structures and functions. It covers principles of proof such as truth tables, inductive proof, and basic logic and the counting techniques and arguments needed to estimate the size of sets, the growth of functions, and the space-time complexity of algorithms. It also, discusses data structures such as arrays, stacks, queues, lists, and the algorithms that manipulate them.

Professor
Matt Higger   office: 319A Meserve   email: mhigger@ccs.neu.edu

Office Hours
Please see Canvas course page for office hours. Note that office hours may change slightly through the semester to accommodate student availability.

Meeting Time and Location
Weds   6:00 – 9:15 PM   Shillman 305 (or virtual)

Course Websites
Canvas serves as the central site which contains all course information (including links to the web services described below):

https://northeastern.instructure.com/

Piazza is a message board which allows for students to ask homework questions.
Gradescope will be used to manage submission of assignments and record grading.

Textbook
Discrete Structures by Harriet Fell and Javed Aslam
ISBN-13: 978-1634876469, ISBN-10: 1634876466

Either version (1 or 2) is fine for studying. Version 2, I believe, fixes some minor typos. Search online for the latest version and errata.

Grading
Making mistakes is part of learning! If this is your first math course in a little while, expect to take a bit to get into the swing of things. The grading policy is my attempt at encouraging excellence in addition to forgiving the mistakes which will occur along the way. With this motivation in mind:

All students will receive either a +2% bonus on their final course grade or have their lowest HW score dropped from the HW average. The choice will be made to maximize each student's grade. (In other words, it always makes sense to do your best on each HW but if you struggle with one HW in particular it won't sink your grade).
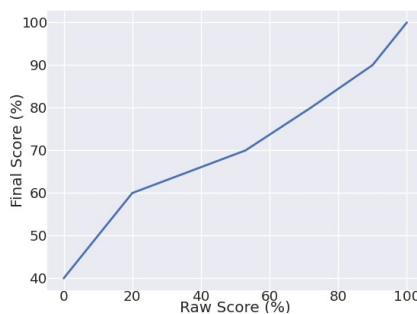
Homework   50%
Midterm   25%
Final   25%

Exams
Both the midterm and final will be curved. This means two things:
- The exams are rigorous surveys of the material: study well and prepare to think hard!
- I will add points to everyone's raw exam score so that work worthy of an "A" receives a score in the 90's and so on.

An example exam curve is shown below. A student who earned 80% of the raw points on the test receives an effective grade of about 85%. The curve will never lower a student's grade so that no final score will be lower than a raw score.

Homework
Written homework assignments will be posted to Canvas roughly weekly (there may be some odd due dates to accommodate exams and vacation). Typically, they'll be available Thursday morning and due Wednesday before class (precise due dates will be on the HW itself).

Late HW will incur a penalty of 15% of the total possible points per day it is late up to two days. After 48 hours beyond the due date no HW will be accepted. (Extending beyond this 48 hour mark makes for tight TA grading deadlines and may muddle the student's ability to work on the next HW). Additionally, each student has 3 late day "passes" which are automatically used to neutralize the first late day penalties possible.

Example:
HW 1 is 2 days late   2 late day passes used
HW 2 is 2 days late   1 late pass day used, 15% penalty applied to this HW
HW 3 is 1 day late   15% penalty applied to this HW
HW 4 is 2 days late   30% penalty applied to this HW

Challenges

Part of challenging yourself is allowing for the tough moments which come with your growth, we all doubt ourselves sometimes! Email me directly (Prof Higger) if you're concerned about your progress so we can put academic supports in place to keep you in peak learning form. Sometimes a quick chat is all it takes to put yourself back in an effective mindset. Please don't hesitate to reach out.

Academic Integrity

Cutting corners to get a grade is a vote of no confidence in yourself. The best course of action is a proactive solution, see "Challenges" above.

Written HW assignments are an assessment of your skills. I encourage you to work in groups but you must include the names of all group members on each submission. **Additionally, under no circumstances should you share written answers (including electronically) to another student. This will be considered plagiarism.** You are welcome to discuss the problem but at the end of the discussion each student should be able to reproduce the thinking demonstrated on their written submission independently. Attempts to violate the spirit of the rules listed here with loopholes will generally be received unkindly and treated as integrity violations.

Course Outline & Exam Dates

Sep 9	Number Representation
Sep 16	Logic
Sep 23	Sets & Functions
Sep 30	Counting (Combinations & Permutations)
Oct 7	Probability
Oct 14	Midterm Exam Week
Oct 21	Sequences & Series
Oct 28	Graphs & Trees
Nov 4	Proofs (Direct, Contradiction, Induction)
Nov 11	Veteran's Day
Nov 18	Algorithms & Function Growth
Nov 25	Thanksgiving
Dec 2	Recurrence Relations & Review
Dec 9	Final Exam Week