CS 6033: Design and Analysis of Algorithms: INFO

Fall 2018

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When and Where:

When: Tuesdays, 6:00 - 8:30 pm

Where: Rogers Hall 215

Instructor:

Greg Aloupis

Office: 10.091 in 2MTC

Gmail: cs6033greg (you might not get a quick reply if you try my general NYU email, which is greg.aloupis @nyu...)

Webex (by appointment)

Office hours will be updated on the main course page.

TAs:

Office hours may vary and will be updated weekly on the main page.

Who to contact, and when:

First make sure the answer to your question isn't already on the course website (e.g., when is the exam, when are office hours, etc)

We have a Piazza page.

Piazza is mainly meant for asking questions that others would benefit from seeing. If you have a question that does not affect other students, or that may reveal answers to homework questions, please use email instead. Do not post questions like "I tried to solve homework X like this but I'm not sure it's correct". In general, do not use Piazza to send me private messages. Email me instead.

Questions about admin, course content, technical problems about submitting homework, accessing grades, etc: contact me (Greg).

Grading concerns: either contact the TA who graded the problem, or submit a regrade request in Gradescope. If it remains unresolved, contact me.

Major illness or other issue? Feel free to contact me, but you are expected to contact Health Services and/or your dean.

Non-required textbook: Introduction to Algorithms, 3rd edition, by Cormen, Leiserson, Rivest and Stein.

This is commonly just referred to as ``CLRS". More info at MIT press.

Note: my Resources page refers to this book so you can find relevant chapters if you wish. The course doesn't explicitly rely on the book though. Also, this book is massive. We will not cover everything in it. See "Topics" below.

Even more non-required textbook: Algorithms, by Dasgupta, Papadimitriou and Vazirani.

This book has been used at NYU in previous semesters for the undergraduate algorithms course. It is smaller and cheaper than CLRS. It does not contain everything that I will teach.

Prerequisites: Basic data structures and discrete math.

See the Resources page and search for the word "prerequisite" to see when you will need to know background material.

You will probably find this course difficult if you're not comfortable with induction, recursion and proofs, or if big-O seems like a challenging concept. It is assumed that you know the basics about arrays, linked lists and trees. Knowledge of basic probability will be helpful for two or three lectures but I will recap what you need to know.

If you have not done well in discrete math or have not passed data structures, you should contact me.

Topics: This is an introduction to the design and analysis of algorithms, which involves discussing a few basic data structures as well. Many topics could fit in such a course, and not all intro courses go over exactly the same material.

We will place all emphasis on theory instead of programming. This course is about figuring out how to solve a problem before you start coding.

To see what is taught in this course, please visit the Resources page.

Exam schedule and weight (tentative)

Exam 1, worth 40%, on October 23 in class.

Exam 2, worth 40%, during final exam period. This exam will cover everything that was not on Exam 1.

Homework is worth 20%. There will be about 10 assignments. Some may be worth more than others.

All exams are closed book. No notes whatsoever.

Late homework:

Unless mentioned otherwise on a homework assignment, the following will apply:

If you are 0-24 hours late there is a 25% penalty. If you are 24-48 hours late there is a 50% penalty. After that you do not get credit.

Missed homework:

If you fail to submit 5 or more percentage units without justification, your final grade will drop by a letter.

If you fail to submit 8 or more percentage units, you will not pass the course.

Furthermore, submitting an answer that shows almost no effort will also count towards this rule. If you submit only part of an assignment, units will be calculated proportionally. The number of percentage units on each homework assignment will be written at the top. Homework submitted within the 48-hour late window does not count as missed.

Excused absence:

If you have a serious reason for not submitting homework or not taking an exam, you should notify your Dean and/or Health Services, and of course you may CC me as well.

There is no penalty if you do not attend lectures.

I cannot arrange a makeup exam if you have a predictable conflict that could be reasonably avoided. Check the final exam schedule before making travel arrangements.

Important note:

Do not assume that the numerical score you receive on homework or exams directly corresponds to a particular letter grade. Your score is just a number that lets me figure out who is doing better or worse than average. Don't panic if you think you scored low. An evaluation of your performance will be given after each exam: you will see a plot of exam scores and a letter grade estimate. You will also receive updates about average homework performance.

The way I have taught the course until now, exam scores are typically low; the median is usually around 60%, often in the 50's, and an 80% is excellent. (I always include two hard questions, each worth 10%. In some sense, consider these to be extra credit, and focus on getting the other 8 questions done first).

Warning:

If you need credit for this course in order to graduate, it is your responsibility to do well. There will be no extra credit options. Rather than notifying me after the final exam that your life will be ruined if you don't get a good grade, discuss your situation with me when the course begins!

How to submit homework

You will find assignments posted in Piazza, in a tab called "Resources". Typically they are posted a week or two before the deadline. Solutions will be posted on the same page.

Submit homework in Gradescope. That's where you will find grades and comments too.

Gradescope will prompt you to submit one or more files (PDF or images).

Keep homework problems on different pages (but if one problem has multiple parts, it's ok to have them on the same page)

There is a straightforward way to let Gradescope know what pages of your file relate to each problem. If you don't do this, we won't grade your work.

Ideally your submission will be typed. If not, it should be produced by writing extremely clearly and scanning with good contrast. There should be no shadows, coffee mugs, pets, body parts, etc, visible in your submission. Also, it helps if your file is not massive. That just slows down Gradescope. 1-2MB should be more than enough.

Don't crop, it doesn't help. In fact it is useful if you can leave space so we can annotate with comments.

Tips for doing well in this course, if you find it challenging:

Come to class! However, don't expect that all you need to do is show up and simply soak in information. Lectures should serve as an introduction to material, which you should further study on your own later. If you find that the in-class pace is too fast, consider reading some basic material beforehand.

Taking extensive notes in class works well for some people, but keep in mind that all class notes displayed are already available to you. Consider bringing a printout of the condensed notes to class. Then you can mark your own observations, clarifications and questions quickly, and spend more time paying attention.

Use the full version of the course notes when studying, not the condensed version. Try to anticipate what is coming next. Try to re-prove things. Derive on your own, rather than verifying what is written. When you simply verify what's there, it is easy to overestimate what you've understood.

Don't cram. The most common reason students don't do well on the exams in this course is that they think they can learn the material for an exam in two days. Spend time on this course regularly. Many students underestimate how much time is required to truly understand some of these topics.

Use all resources available: class notes, the summary PDF document at the top of the Resources page, the videos, the book, the web. Do practice problems from the book, starting with the more basic ones. In many cases you can make your own practice problems (e.g. draw an arbitrary graph and find shortest paths).

As much as possible, don't memorize. Instead, understand. I do realize that some basic memory is required in any case. But if you think you need to memorize how algorithms work, why they are correct, or what their time complexities are, then you're not approaching this course correctly and should talk to me.

Pretend that you will have to teach the material that you're reading, to 100 people.

Try to do the homework on your own. If you are entirely stuck, get only basic hints from your classmates and TAs, but don't rush to do this if you've only spent an hour or two on a problem. If you have no idea how to approach a problem, then you probably need to study the basics a bit more: take the time to review the material from the corresponding lectures, and solve some easier exercises on your own. Then think about what tools you have just learned about, and whether they might help. If none of this works, then get some hints. Homework should take multiple hours.

When stuck solving homework problems, see how you'd handle a made-up example. Think about whether your example is oversimplified, whether you've made unnecessary assumptions, and whether your solution is generalizable (if applicable). Also, sometimes it's a good idea to add extra assumptions, thus making the problem easier to solve, and gradually remove the assumptions.

Read the homework solutions even if you got a good score. Sometimes graders don't notice subtle mistakes on homework submissions. Reading the solutions might help you avoid repeating such mistakes on an exam. Also, even if your ideas worked, the solutions might have a more efficient idea or description that will end up worth knowing about.

Don't hesitate to talk to me and to the TAs.

Everyone involved in this course is to respect the following:

NYU academic integrity policy

NYU non-discrimination policy

Basically, be nice.

Don't cheat:

If you cheat on an exam, you will likely face suspension and most likely an F in the course.

It is not acceptable to copy solutions from any source or to distribute solutions. You may work on homework assignments with your classmates as long as this is mentioned on your submission. However you are expected to write your own version, on your own.

Moses Center Statement of Disability:

If you are student with a disability who is requesting accommodations, please contact New York University?s Moses Center for Students with Disabilities at 212-998-4980 or mosescsd@nyu.edu. You must be registered with CSD to receive accommodations. Information about the Moses Center can be found at nyu.edu/csd. The Moses Center is located at 726 Broadway on the 2nd floor. Please do this at the start of the semester.