3510 Design and analysis of algorithms

Note: the syllabus and course schedule are subject to change. Any changes to the syllabus and/or course schedule after the semester begins will be relayed to the students in class or on canvas.

Instructor: Gerandy Brito (office: Klaus 2111).

Textbook

The required textbook is *Algorithms* by S. Dasgupta, C. Papadimitriou, and U. Vazirani. The textbook *Algorithm Design* by J. Kleinberg and E. Tardos is an excellent reference that you might consider looking at as well.

Format and technical requirements.

The class will be delivered fully online. **Lectures** are mandatory and asynchronous. They will be recorded and available to the class the entire semester. We will implement quizzes to account for participation and you are responsible to do those, no matter how you choose to watch the lectures. Do not expect the staff to repeat information presented during lectures because you can't attend.

- All information for the class will be shared on **Teams** and **Canvas**. Some information may not be duplicated, you are responsible to check both sources.

- **Teams** is where lectures will be held, and the suggested channel for communication with your team of staff (more on this below). To join the class on Teams, use this code: 8dszq1u (make sure to install Teams first!).

- **Exams** will be conducted on **Canvas**, proctored via **HonorLock**, which is the official proctoring tool recommended by GT. You will need to install an extension in your browser. We will release a practice exam to help you get familiar with the format.

- **Homework** will be submitted on **Gradescope**. We will release a template to type your homework.

Summarizing: keep your Canvas, Gradescope, and Teams accessible. And do not forget to add the HonorLock extension! You need to have access to stable and reasonably strong internet.

Topics to be covered

A) Divide and conquer.

B) Dynamic programming.

C) Graphs algorithms (search on graphs, DFS, BFS, Dikjstra's algorithm, strongly connected components in directed graphs.)

D) NP completeness.

We will typically discuss problems in class that are classical examples of the topic we are covering. Students are expected to do problems using similar strategies in homeworks and exams.

Grade breakdown

The evaluations will consist of participation quizzes, nearly weekly homeworks, 3 exams and one final (optional) exam. First, your grade will be weighted as follows:

- 5% Class participation.

- 20% Homeworks.

- 25% Each of three exams.

After *all these grades* are in and all overall percentage scores for students have been computed using the weights described above, grades are assigned. The standard cutoffs are as follows:

A: [90%, 100%]   B: [80%, 90%)   C: [70%, 80%)   D: [60%, 70%)   F: [0%, 60%)

So, to guarantee an A, get 90% or better overall. (90 means 90, not 89.9)
To guarantee at least a B grade, get 80% or better overall, etc.

After this computation you will have the opportunity to decide if you want to keep this grade or you want to do the final exam. In case you choose to do the final, your score in the final will substitute your lowest exam, if higher (so you can only improve by taking the final).
The cutoffs *might* be adjusted, but only in the downward direction (to make letter grades higher). In the event of a curve, only your final overall percentage grade for the course will be curved. Individual assignments will not be curved as we go along.

Participation quizzes

In (almost) every lecture, we will release a quiz related to the class content you must answer as a participation point. You will have 24 hours to answer each quiz, starting right after the corresponding lecture. The question(s) should be relatively simple so you can answer it after attending lecture. No extensions of any kind will be offered. The lowest 3 quizzes will be dropped.

Homeworks

There will be (almost) weekly homeworks. You will have a week to complete each. Each homework will have three parts: **suggested problems** from the textbook we recommend to do to master the skills presented in lectures; **practice problems** will consist of one or two problems for which we will give you the solutions. You should use these solutions as models to write your own. Finally, **homework problems** will be those you have to submit to receive a grade. There will be one or two problems on each homework (one problem can have multiple parts).
Homeworks will be the best source of practice for the exams. Late submissions will be allowed only if the students has a valid excuse from the office of Student Services. Once grades are released, you will have a week to ask for a regrade, if you consider that your homework was unfairly graded. Please, be considered to your TAs and only do such request if you detect a mistake in your grading.

Collaboration policy

Collaboration is allowed. You must write your own solutions though. On every homework, you should list the names of those students you collaborated with. Mind that copy a solution from your peer or from the internet is plagiarism and is penalized by the GT Code of Conduct. If cheating is detected, you will receive a zero on the assignment and a report will be filed with the Office of Student Integrity.

Exams

Each exams will consist of two-three problems. Exams will be held during regular lecture time. The final exam will be cumulative and will be at a date, time and location TBA.
Exams will be conducted online, on Canvas and proctored via HonorLock. Plan to have access to a quiet, private space to take the exams. Exams will be held during regular class times. By registering to take this class, you are responsible for taking the exam during this time. There will be no make up exam unless you have an official excuse from Student Services. If that is the case, make sure to contact me at least 48 hours in advance. There are obvious exception to this rule (like an accident the day of the exam...which hopefully won't happen). Final decision is at the sole discretion of the instructors. The regrade policy for exam is the same as for homework.

Students with Disabilities and/or in need of Special Accommodations

Georgia Tech complies with the regulations of the Americans with Disabilities Act of 1990 and offers accommodations to students with disabilities. If you are in need of classroom or testing accommodations, please make an appointment with the Office of Disability Services to discuss the appropriate procedures. More information is available on their website. Please also make an appointment with me to discuss your accommodation, if necessary.