

CS 501: Computer Algorithms II

Fall 2021: Tuesday-Thursday 5:00 pm -- 6:15 pm, Taft Hall (TH) 215

Course page: <http://asudeh.github.io/teaching/cs501fall21/>

Instructor: Abolfazl Asudeh

Office: SEO 1131 (asudeh@uic.edu, <http://asudeh.github.io>)

Office Hours: Thursday, 2:30-4:30 pm

GTA: TBA

Office: TBA

Office Hours: TBA

Class Modality:

- In-person. Classes are streamed live and the Zoom link to join the class online will be shared on the blackboard. The recordings will be available on the blackboard after every class.

Prerequisites:

- CS/MCS 401, CS 251 or MCS 360

Course Description and Goals:

- The design of computer algorithms is a rich and heavily studied area in computer science, whose impact has been great in both the practical and theoretical aspects of the field. At a high level, this course aims exploring advanced computation models, theory and advanced algorithm design and analysis techniques that have broad applicability in solving real-life problems in cross-disciplinary areas such as data mining, big data exploration, data science, and social networking. The course will consist of three parts: (a) the theory of NP-completeness, (b) approximation techniques to cope with intractability, and (c) randomized techniques.

Textbook:

- a) NP-completeness
 - (Chapter 34) [CLRS] Cormen, Leiserson, Rivest, Stein, **Introduction to Algorithms**, MIT Press, 2009.
 - *Barna Saha. Approximation Algorithms for Large Scale Data Analysis. ACM PODS. 2021.*
- b) Approximation Algorithms
 - [Vazirani] Vijay V. Vazirani, [Approximation algorithms](#). Springer Science & Business Media.
 - David Williamson & David Shmoys, [The Design of Approximation Algorithms](#).
- c) Randomized Algorithms
 - [Motwani] Rajeev Motwani, Prabhakar Raghavan: **Randomized Algorithms**, 1995
- d) Geometric Approximation Algorithms
 - Sarel Har-Peled. **Geometric approximation algorithms**. No. 173. American Mathematical Soc., 2011.
 - Herbert Edelsbrunner. **Algorithms in combinatorial geometry**. Vol. 10. Springer Science & Business Media, 2012.

Additional References:

- [KT] Kleinberg and Tardos, Algorithm Design, Addison Wesley, 2006, ISBN 0-321-29535-8.
- [GJ] Michael R. Garey, David S. Johnson: Computers and Intractability: A guide to the theory of NP-completeness, 1979

Evaluation:

- 2 exams worth 1/3rd weight each
- Homework worth 1/3rd weight
- Active Participation in Class (APC): 10% weight Bonus

$$\text{Final Grade} = 1/3 \text{ Exam}_1 + 1/3 \text{ Exam}_2 + 1/3 \text{ HW} + 0.1 \text{ APC}$$

Grades will be posted online on the UIC Blackboard system.

If you have a question or complaint about the way an exam was graded, then, *within one week* of the date the assignment is returned, you should either explain what it is on a separate piece of paper and give it to the TA along with the assignment or, better yet, come into office hours and get it straightened out then. We want everyone happy and satisfied, but we can't do much in the couple of minutes before and after class.

Rule, Academic Integrity

Incompleteness:

The UIC Undergraduate Catalog states that in addition to needing excellent justification for an incomplete, a student must also have been "making satisfactory progress in the course."

Therefore, no matter how good your excuse, I will not grant you an incomplete if you have less than a C average at the time you ask for an incomplete.

Academic Integrity:

You may discuss the homework problems with other students; in fact, I encourage you to do so, but you are expected to write up your solutions by yourself. If you do work on the problem sets with other students, please put the names of your group at the top of your problem set. If you consult any web page while working on an assignment, put the URL for the page on the homework. If your homework is highly similar to another students' homework (e.g., more than 50% as determined by the similarity checking software) then we will consider you to be guilty of cheating.

Cheating will not be tolerated!

Not only is cheating a violation of the campus code of integrity, which might incur a reduced grade, expulsion from the class or university, it is also a slight against the other students in the class who will give you dirty looks. Refer to the UIC Student Disciplinary Policy for guidelines and policy on student integrity and possible repercussions. Cheating is plagiarism, taking credit for somebody else's work and I take it very seriously.

The minimum penalty for any cheating will be a grade of zero for the homework, project, or exam in question, along with a warning. The minimum penalty for cheating after a warning has been given will be an F for the course. In both cases, the maximum penalty is expulsion from the University.

Keeping Documents Private:

You must keep private and not email, post on the web, or share in any way:

- Any solutions to homework problem sets or tests that we give you,
- Any lecture notes not posted on the class website.

Other Resources:

[Information about how to interpret midterm grades](#)

[Statement about disability services](#)

[List of registration and records policies](#)

<http://www.uic.edu/ucat/catalog/CA.shtml#f>

Guidance for Fall 2021

This guidance applies to all undergraduate, graduate and professional students. Please be aware that students in the Health Sciences Colleges or those who work at UI Health may have additional requirements.

Vaccination Requirements, Saliva Testing and Daily Healthcheck

Students who plan to come to campus, or are engaging in academic and clinical activities or field placements off-campus, are required to be vaccinated.

To be on campus, students who have received vaccine exemptions or have received one vaccine dose and are scheduled for their second dose must do daily UIC Healthcheck and saliva test two times per week.

- [Healthcheck App](#)
- [Locations for testing](#)
- Students should plan their saliva testing carefully and get it done at the beginning of their day before they go to classes.
- Students should request a receipt at the testing site in the event they are asked to demonstrate that they have tested that day.

Please do NOT COME TO CAMPUS if you have COVID-19 symptoms. See the Healthcheck app for a list of these symptoms.

Classes

Students are expected to attend **on-campus** and **hybrid courses IN PERSON*** if they

- Have received a COVID-19 vaccination (full vaccination series complete)
- Have received a vaccine exemption and are saliva testing two times per week and completing their daily Healthcheck
- Are partially vaccinated and are saliva testing two times per week and completing their daily Healthcheck.

All students are expected to **WEAR A MASK** that is tight-fitting and covers both the mouth and nose when inside any building at UIC including classrooms, regardless of vaccination status. Students may remove their masks when alone in a private office or personal residence hall room, or if they have a medical condition, disability or other reason that prevents them from safely wearing a face mask.

Students who cannot come to campus should immediately check with their instructors to determine whether:

- There are required in-person course components and/or examinations.
- Their class will be live-streamed and/or video recorded.
- There are other mechanisms to obtain course content.

And, using this information, students will need to decide whether it's feasible for them to take that particular course in the Fall semester or consult with an advisor to determine the best possible route by which to continue their intended program of study.

* If social distancing rules are reinstated at any point during the semester, these guidelines will be modified.

Students on campus who need to log into synchronous online courses.

All synchronous online courses have been assigned a classroom where students who are on campus can go to log into their online course. These courses will still be taught online, but you will be able to use the designated classroom to join the online course. Be ready to use your headphones so you do not disturb others.

Students who cannot come to campus to complete course requirements but have in-person examinations.

These students are subject to testing in the UIC saliva testing program and completion of the UIC Healthcheck. Saliva testing must be completed at UIC not earlier than 48 hours and not more than 72 hours ahead of the exam date, so that the test result is available (and negative) by the date of the examination. For example, if you have an in-person exam at 3:00 p.m. on Thursday, you must complete your saliva testing no later than 3:00 p.m. on Tuesday but no earlier than 3:00 p.m. on Monday. Students must be prepared to present their UIC Daily Pass at the examination site. Note that the Saliva Testing Badge AND the Healthcheck Badge must be “green” to sit for the examination. A process for validation of the UIC Daily Pass prior to in-person exams is under development.

What happens if students do not follow these guidelines?

- Students who are not wearing a mask will be asked to get a mask before returning to class. If the student refuses, then they will be asked by the instructor to immediately leave class and will be reported to the Dean of Students using the [COVID-19 Non-Compliance Report](#).
- If a **student refuses to wear a mask and refuses to leave the classroom** this is considered student misconduct and will be reported to the Dean of Students using the [Student Misconduct Incident Report Form](#).
- Students on campus who are unvaccinated (without vaccine exemption) OR who are in groups required to saliva test and do the daily Healthcheck and are not complying with these requirements will be reported to the Dean of Students via the campus monitoring system.
- In these cases, the Dean of Students will proceed as described in the [Student Disciplinary Policy](#).

Questions?

If you have additional questions about the campus response to COVID-19 and the Fall 2021 semester, please visit the [Frequently Asked Questions webpage](#).