

Course Syllabus

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Com S 311

Introduction to the Design and Analysis of Algorithms

Spring 2021

Credits 3

Departmental Information

Department of Computer Science

226 Atanasoff Hall

Ames, IA 50011-1090

Phone (515) 294-4377

Prerequisites

- COM S 230 or CPR E 310 (undergraduate discrete computational structures course)
- COM S 228 (undergraduate introduction to data structures).
- MATH 166
- ENGL 150

Current Catalog Description

Basic techniques for design and analysis of algorithms. Sorting, searching, graph algorithms, string matching, and NP-completeness. Design techniques such as dynamic programming, divide and conquer, greedy method, and approximation. Asymptotic, worst-case, average-case and amortized analyses. Topics from advanced data structures such as balanced trees and hashing.

Class Time, Place, Attendance

Section A (virtual, ZOOM): Tuesday and Thursday, 2:10 pm - 3:25 pm, Oliver Eulenstein

Section B (virtual, Webex): Tuesday and Thursday, 3:40 pm - 4:55 pm, Xiaoqiu Huang

Section C (virtual, ZOOM): Tuesday and Thursday, 11:00 am - 12:15 pm, Oliver Eulenstein

Section D (virtual, Webex): Tuesday and Thursday, 3:40 pm - 4:55 pm, Donald Stull

This course will use Webex and ZOOM for synchronous online interactions.

Attendance: It is strongly recommended that you attend all the lectures and recitations. If you do not attend, it is your responsibility to find out what was covered and to learn it on your own.

Course Format (online)

Course delivery: live lectures

Couse tools:

- video conferencing service Webex and ZOOM
- PIAZZA's learning management system, to be determined
- Plus/Delta feedback tool

Teaching Staff Information

Instructor Information

Oliver Eulenstein (oeulens@iastate.edu (<mailto:oeulens@iastate.edu>))

Office: 212 Atanasoff, 294-2407

Office Hours (virtual): TBA

Xiaoqiu Huang (xqhuang@iastate.edu (<mailto:xqhuang@iastate.edu>))

Office: 205 Atanasoff, 294-2432

Office Hours (virtual): 2:00-3:00 pm Monday and Wednesday

Donald Stull's (dstull@iastate.edu (<mailto:dstull@iastate.edu>)).

Office Hours (virtual): TBA

TA Information

Will be filled in shortly.

Office hours are provided to answer any questions that you may have regarding lecture material, exams, or homework. Please take advantage of this opportunity. We reserve the right to change office hours.

Course Outcome and Learning Objectives

Course Outcomes

- Ability to understand problem statement based on mathematical/logical specification.
- Ability to design solutions using standard algorithmic strategies (such as graph-modeling, divide and conquer, and dynamic programming).
- Ability to develop correct and efficient implementation of algorithms from their description.
- Knowledge of computational intractability.

ABET Outcome

- Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.
- Apply computer science theory and software development fundamentals to produce computing-based solutions.

Exams

Exams will be posted on Canvas. You will have 36 hours (i.e., a day and a half) to complete the exam and upload your solutions via Canvas. **Your solutions must be typed, and submitted by the scheduled time.**

- Exam 1 is tentatively scheduled for the first week of March.
- Exam 2 will be available from Monday, April 12, 2021 at 8am to Tuesday, April 13 at 8pm.

We reserve the right to reschedule exams.

Exams are typically graded on the same day when they are held.

An exam appeal must be in writing and provide information to include the number of the question under the issue and a brief statement

giving the reason for the appeal. This written statement and the original exam paper must be given to the instructor during the specified appeal period.

Purpose of the Exam

The primary purpose of exams is to test the understanding of the concepts covered in class. Exam solutions must be entirely your own work. The following is a non-exhaustive list of activities that amount to cheating on an exam.

- Copying someone else's solutions.
- Using notes or reference materials (unless instructed otherwise).
- Altering an exam for re-grading.
- Getting an advance copy of the exam.
- Having someone else write the exam.

We reserve the option to interview students to make sure that they will be able to produce solutions on their own.

Assignment Guidelines

Homework will be distributed frequently through Canvas, and it is every student's responsibility to check Canvas regularly for the latest assignments and announcements. Please note the last homework assignment can be requested to turn in during the dead week.

The primary purpose of assignments is to clarify and enhance the understanding of the concepts covered in class.

The Fundamental Rule: You must write up each problem solution by yourself, without assistance.

We expect you to understand the solutions that you submit thoroughly. This means that, if called upon to do so by a member of the course staff, you should be able to explain each one of your problem solutions orally.

Learning can be enhanced by collaboration. Thus, we encourage you to discuss general concepts and questions concerning the homework assignments with your classmates. If you do collaborate with classmates, however, you must identify your collaborators. If you work with no one, you should write "Collaborators: none."

Examples of allowed collaboration are the following:

- Discussing the material presented in class or included in the assigned readings that is needed for solving assigned problems.
- Assisting other students in understanding the statement of the problem (e.g., by translating some English phrases unfamiliar to that student).

The following are examples of activities that are prohibited:

- Sharing solutions or fragments of solutions (e.g., via email, whiteboard, handwritten, or printed copies).
- Posting solutions or fragments of solutions in a location that is accessible to others.
- Using solutions or fragments of solutions provided by other students (including students who had taken the course in the past).
- Using solutions or solution fragments obtained on the Internet or from solution manuals for textbooks.
- Using material from textbooks, reference books, or research articles without properly acknowledging and citing the source.

Assignment Formatting, Submission, and Feedback

- Submissions that are late by not more than 12 hours from the deadline will be accepted with a penalty of 25% on the overall points of the homework. Any later than that, the submission will not be accepted/graded.
- Homework solutions will have to be typed. Do NOT submit a photocopy of handwritten homework except for diagrams that can be hand-drawn and scanned. We reserve the right NOT to grade homework that does not follow the formatting requirements.
- Each student must hand in their own assignment.
- If you discussed the homework or solutions with others, a list of collaborators must be included with each submission. Each of the collaborators has to write the solutions in their own words (copies are not allowed).

Graded homework will be returned via *Canvas*. If you have questions about the grading or if you feel an error has been made in grading your assignment, contact the TA that graded it, either during office hours or by email. *Please do not use the internal Canvas mail system to contact TAs or the instructor.*

There will be a five business day window of appeal for each homework beginning the day the graded homework is available on Canvas. Note, a re-grade may also result in a lower score. If you are not satisfied with the response from the TA, please contact your instructor promptly.

We reserve the right to change the submission policy.

Correct submission of an assignment is your responsibility

Remember that when submitting an assignment via Canvas, you can immediately check whether the submission was successful, and you can always download your submission and verify that it is what you intended. Don't forget that with Canvas, it is NOT sufficient to select the file to be submitted. You also have to remember to click the "Submit" button.

General Requirements:

- When proofs are required, do your best to make them both clear and rigorous.
- Even when proofs are not required, you should justify your answers and explain your work.
- When asked to present a construction, you should show the correctness of the construction.

Grading Policy

Grades are determined based on homework and three exams, as outlined below.

- Homework - 70%
- Midterm exam - 15%
- Final exam - 15%

For any open-book/notes exam, students are sampled to check if they are able to do it on their own. If they fail to demonstrate the same level of understanding, their exam scores may be lowered.

The Canvas Default Grading Scheme determines letter grades.

Letter Grade	Range
A	100% to 93%
A-	< 93% to 90%
B+	< 90% to 87%
B	< 87% to 83%

Letter Grade	Range
B-	< 83% to 80%
C+	< 80% to 77%
C	< 77% to 73%
C-	< 73% to 70%
D+	< 70% to 67%
D	< 67% to 63%
D-	< 63% to 60%
F	< 60% to 0%

We reserve the right to adjust this grading scheme during the semester.

Textbook

Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein, Introduction to Algorithms (3rd edition), MIT Press, 2009.

The course may also cover material that does not appear in the textbook. *The primary resource of course material is the course lectures.*

Canvas

We will be using *Canvas* for this course. Students are expected to log in daily to check for announcements and information.

In particular:

- Announcements about the course, such as assignments, due dates, and changes of exam times or locations, will be made via Canvas.

- Clarifications and answers to common questions about homework will be announced on Canvas.

It is your responsibility to know how to log in, regularly check and read announcements, and submit homework via Canvas.

You can log into Canvas with your ISU NetID and password at <https://canvas.iastate.edu>.

Academic Dishonesty

The class will follow Iowa State University's policy on academic dishonesty. Anyone suspected of academic dishonesty will be reported to the Dean of Students Office. Please see it [here \(http://www.dso.iastate.edu/ja/academic/misconduct.html\)](http://www.dso.iastate.edu/ja/academic/misconduct.html). Unless specifically instructed otherwise, every assignment and lab activity is to be the product of your own intellectual effort and is to be done on your own.

Any violation of this rule will be considered academic dishonesty, otherwise known as cheating. Anyone guilty of academic dishonesty will receive an automatic F in this course. Additionally, we will adhere to university policies regarding academic dishonesty, which means that you may receive any of the penalties described in the Policies and Practices section of the Student Handbook under Academic Dishonesty.

There are two forms of academic dishonesty to be careful about:

- *Plagiarism*: If you present the work of someone else as if it were your own, you are guilty of plagiarism. Plagiarism is unethical at every level of every profession.
- *Tendering information*: In a university environment (such as in this course), if you make your assignment available for someone else to copy, you are guilty of tendering information, which is also considered to be a form of academic dishonesty.

Remember that all the ideas and techniques you need to do an assignment will have been presented as examples in class, recitation, or the class book, and you can discuss all such examples freely. In general, it is acceptable to discuss how to do the homework with other students, but when it is time to sit down and write your solutions, they must be written in your own words, and you must be able to produce the entire result without help from anyone else.

Disability Accommodation

Iowa State University complies with the Americans with Disabilities Act and Sect 504 of the Rehabilitation Act. If you have a disability and anticipate needing accommodations in this course, please contact (instructor name) to set up a meeting within the first two weeks of the semester or as soon as you become aware of your need. Before meeting with (instructor name), you will need to obtain a SAAR form with recommendations for accommodations from the Disability Resources Office, located in Room 1076 on the main floor of the Student Services Building. Their telephone number is 515-294-7220 or email disabilityresources@iastate.edu (<mailto:disabilityresources@iastate.edu>). Retroactive requests for accommodations will not be honored.

Warning

Just as a word to the wise, note that random examples you find on the web are likely to mislead you more than helping you, since those who post them have no idea of the ideas and techniques being covered in our particular class. You will be much better off reviewing examples from class and posting your questions on the Canvas discussions, where the instructor, TAs, and other students going through the same experience can help you.

Dead Week

This class follows the Iowa State University Dead Week policy, as noted in section 10.6.4 of the Faculty Handbook <https://www.provost.iastate.edu/faculty-and-staff-resources/faculty-handbook> (<https://www.provost.iastate.edu/faculty-and-staff-resources/faculty-handbook>). Note that the due date for mandatory graded submissions for the last homework assignment may fall within Dead Week.

Harassment and Discrimination

Iowa State University does not discriminate on the basis of race, color, age, ethnicity, religion, national origin, pregnancy, sexual orientation, gender identity, genetic information, sex, marital status, disability, or status as a U.S. Veteran. Inquiries regarding nondiscrimination policies may be directed to the Office of Equal Opportunity, 3410 Beardshear Hall, 515 Morrill Road, Ames, Iowa

50011, Tel. 515 294-7612, Hotline 515-294-1222, email eooffice@iastate.edu (<mailto:eooffice@iastate.edu>).

COVID-19 health and safety requirements

Students are responsible for abiding by the university's [COVID-19 health and safety](https://www.dso.iastate.edu/guidance-for-supporting-community-expectations-during-covid-19-pandemic) [_ \(https://www.dso.iastate.edu/guidance-for-supporting-community-expectations-during-covid-19-pandemic\)](https://www.dso.iastate.edu/guidance-for-supporting-community-expectations-during-covid-19-pandemic)

[expectations](https://www.dso.iastate.edu/guidance-for-supporting-community-expectations-during-covid-19-pandemic) [_ \(https://www.dso.iastate.edu/guidance-for-supporting-community-expectations-during-covid-19-pandemic\)](https://www.dso.iastate.edu/guidance-for-supporting-community-expectations-during-covid-19-pandemic). All students attending this class in-person are required to follow university [policy](https://web.iastate.edu/sites/default/files/safety/COVID-19/fall/ISU%20COVID%20face%20covering%20policy.pdf) [_ \(https://web.iastate.edu/sites/default/files/safety/COVID-19/fall/ISU%20COVID%20face%20covering%20policy.pdf\)](https://web.iastate.edu/sites/default/files/safety/COVID-19/fall/ISU%20COVID%20face%20covering%20policy.pdf) regarding health, safety, and face coverings:

- wear a cloth face covering in all university classrooms, laboratories, studios, and other in-person instructional settings and learning spaces. Cloth face coverings are additionally required to be worn indoors in all university buildings, and outdoors when other people are or may be present where physical distancing of at least 6 feet from others is not possible. Students with a documented health or medical condition that prevents them from wearing a cloth face covering should consult with [Student Accessibility Services](https://sas.dso.iastate.edu/) [\(https://sas.dso.iastate.edu/\)](https://sas.dso.iastate.edu/) in the Dean of Students Office.
- ensure that the cloth face covering completely covers the nose and mouth and fits snugly against the side of the face.
- practice physical distancing to the extent possible.
- assist in maintaining a clean and sanitary environment.
- not attend class if you are sick or experiencing symptoms of COVID-19.
- not attend class if you have been told to self-isolate or quarantine by a health official.
- follow the instructor's guidance with respect to these requirements. Failure to comply constitutes disruptive classroom conduct. Faculty and teaching assistants have the authority to deny a non-compliant student entry into a classroom, laboratory, studio, conference room, office, or other learning space.

These requirements extend outside of scheduled class time, including coursework in laboratories, studios, and other learning spaces, and to field trips. These requirements may be revised by the university at any time during the semester.

In accordance with university policy, instructors may use a face shield while they are teaching as long as they are able to maintain 8 feet of physical distance between themselves and students during the entire instructional period. Some form of face covering must be worn at all times in learning spaces regardless of the amount of physical distancing.

Faculty may refer matters of non-compliance to the Dean of Students Office for disciplinary action, which can include restrictions on access to, or use of, university facilities; removal from university housing; required transition to remote-only instruction; involuntary disenrollment from one or more in-person courses; and other such measures as necessary to promote the health and safety of campus.

It is important for students to recognize their responsibility in promoting the health and safety of the Iowa State University community, through actions both on- and off-campus. The university's faculty asks that you personally demonstrate a commitment to our [Cyclones Care campaign](https://www.care.iastate.edu/) [\(https://www.care.iastate.edu/\)](https://www.care.iastate.edu/). Iowa State University's faculty support the Cyclones Care campaign and ask you personally to demonstrate a commitment to our campaign. Your dedication and contribution to the campaign will also protect your family, classmates, and friends, as well as their friends and families. Our best opportunity for a successful fall semester with in-person learning and extramural activities requires all of us to collaborate and fully participate in the Cyclones Care campaign.

Religious Accommodations

Iowa State University welcomes diversity of religious beliefs and practices, recognizing the contributions differing experiences and viewpoints can bring to the community. There may be times when an academic requirement conflicts with religious observances and practices. If that happens, students may request a reasonable accommodation for religious practices. In all cases, you must put your request in writing. The instructor will review the situation in an effort to provide reasonable accommodation when possible to do so without fundamentally altering a course. For students, you should first discuss the conflict and your requested accommodation with your professor at the earliest possible time. You or your instructor may also seek assistance from the Dean of Students Office (<http://dso.iastate.edu> [\(http://dso.iastate.edu/\)](http://dso.iastate.edu/)) at 515-294-1020 or the Office of Equal Opportunity (<https://www.eoc.iastate.edu> [\(https://www.eoc.iastate.edu/\)](https://www.eoc.iastate.edu/)) at 515- 294-7612.

Inclusive, Professionalism and Mutual Respect Statements

Promoting student health and wellness, “Iowa State University is committed to proactively facilitating the well-being of all students. We welcome and encourage students to contact the following on-campus services for assistance regarding their physical, intellectual, occupational, spiritual, environmental, financial, social, and emotional needs:

- Student Wellness call (515) 294-1099 or via the website (<http://studentwellness.iastate.edu> [\(http://studentwellness.iastate.edu/\)](http://studentwellness.iastate.edu/));
- Thielen Student Health Center call (515) 294-5801 (24/7 Medical Advice) or via the website (<http://www.cyclonehealth.org> [\(http://www.cyclonehealth.org/\)](http://www.cyclonehealth.org/));
- Student Counseling Services call (515) 294-5056 or via the website (<https://counseling.iastate.edu> [\(https://counseling.iastate.edu/\)](https://counseling.iastate.edu/));
- Recreation Services call (515) 294-4980 or via the website (<http://recservices.iastate.edu> [\(http://recservices.iastate.edu/\)](http://recservices.iastate.edu/)).
Students dealing with heightened feelings of sadness or hopelessness, thoughts of harm or suicide, or increased anxiety may contact the ISU Crisis Text Line (Text ISU to 741-741) or contact the ISU Police Department (515) 294-4428.”

Related to University policies, “Students in this course are responsible for being familiar with the University’s student rules and policies. Visit the ISU Policy Library website (<http://www.policy.iastate.edu> [\(http://www.policy.iastate.edu/\)](http://www.policy.iastate.edu/)).”

Regarding the name, gender identity, or gender expression, “Class rosters are provided to the instructor with the student’s legal name. *I will gladly honor your request to address you by an alternate name or gender pronoun.* Please advise me of this preference early in the semester so that I may make appropriate changes to my records.”

Academic Freedom and Freedom of Speech

Iowa State University supports and upholds the First Amendment protection of freedom of speech and the principle of academic freedom in order to foster a learning environment where open inquiry and the vigorous debate of a diversity of ideas are encouraged. Students will not be penalized for the content or viewpoints of their speech as long as student expression in a class context is germane to the subject matter of the class and conveyed in an appropriate manner.

Contact Information

If you are experiencing, or have experienced, a problem with the issues of academic dishonesty, disability accommodation, dead week, harassment and discrimination, or religious accommodation, email academicissues@iastate.edu (<mailto:academicissues@iastate.edu>)

Course Summary:

Date	Details
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