

# Graph Theory

## MATH 314

### Spring 2022

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## Course Information

Times: TR 11:00am–12:15pm  
Location: 196 Carver Hall  
Webpage: <https://mathematicaster.org/teaching/graphs2022/>

## Instructor Information

Instructor: Chris Cox  
Email: [cocox@iastate.edu](mailto:cocox@iastate.edu) or [chris@mathematicaster.org](mailto:chris@mathematicaster.org)  
Webpage: <https://mathematicaster.org/>  
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Grader: Liz Sprangel  
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## Textbook

**A first course in graph theory** by Gary Chartrand and Ping Zhang.  
Other materials will be distributed as necessary.

## Course Topics

Structural and extremal properties of graphs. Topics are selected from: trees, networks, colorings, paths and cycles, connectivity, planarity, directed graphs, matchings, Ramsey theory, forbidden structures, enumeration, applications.

## Homework

There will be 13 homework assignments. To compute your final homework score, your lowest of these scores will be dropped and the remaining 12 scores will be averaged. Assignments will be posted to the course webpage and are due on **Tuesdays** by the end of class (the only exceptions being the first week and the week of the midterm). If you are unable to attend class on the day an assignment is due, you are responsible for emailing your assignment to me: this email must be in my inbox by the end of lecture, and your submission *must* be a .pdf file.

I will post homework solutions to the course webpage Tuesday afternoons. These solutions will be password-protected and I will share with you the credentials on the first day of class. If you forget the credentials, please send me an email.

Homework exercises are an essential part of this and any course. It is difficult to fully understand the material without working through the homework problems in a thoughtful manner, especially since this is an

accelerated summer course. Homework is especially important as this course will build upon itself, so if you lack the understanding of a certain topic, this will make understanding later topics more difficult. Take ample time to think about the problems posed, your strategies and the validity of your logic and explanations.

I encourage you to collaborate and form study groups. Learning collaboratively opens your mind to new ideas that you may not have considered and also forces you to clarify your own ideas. Nonetheless, copying any part of another person's homework is not permitted. To avoid what I could consider to be plagiarism, you must not write your assignment during collaborative sessions, but do so alone once your mind is clear. Not only will this help prevent cheating, it will also help you better understand the material.

## Late-Work

Late submissions, be they in-person or by email, incur a 1% (as in percentage point) penalty per **minute** of being late, e.g. an assignment submitted at 12:27pm which would have received an 80% will instead receive a 68%.

## Exams

There will be two exams in this course: a midterm and a final. The final exam is essentially just a second midterm in that it will not be cumulative. However, this is a bit misleading since the course will build on itself. That is, while the final exam will not explicitly test you on topics covered in the midterm, it will not be possible to pass the final without understanding and using the material covered in the first part of the course.

For each exam, you are permitted (and encouraged) to bring one standard  $8.5 \times 11$  sheet of paper with notes. These notes *must* be handwritten and can take up both the front and back of the paper. You are not permitted to photocopy any other person's notes, but you may, of course, collaborate with others on what to include. Besides this sheet of notes, you are not permitted to use any other materials on the exam beyond your own smarts.

The midterm will take place on **Thursday, March 10** during the normally scheduled class time, and the final will be scheduled by the University Registrar's Office. The time and location of the final exam will be communicated to you once it is scheduled.

## Makeup Exams

The Mathematics Department has very specific guidelines regarding the opportunity to make-up an exam. The categories designated by the [Faculty Handbook](#) (section 10.4.3) and requiring official documentation are:

1. Extracurricular activities as a representative of ISU.
2. Military service.
3. Officially mandated court appearances.

At the discretion of the instructor and with official documentation whenever possible, the other potential situations for a make-up exam are:

4. Medical excuse.
5. Family emergency.
6. Religious observations and practices.

See the [Mathematics Department Make-up Exam Policy](#) for the full policy. Please note that conflicts arising due to employment are not normally grounds to request a makeup exam. More information on the University's final exam policies and procedures may be found [at the Registrar's website](#).

## Participation

On **Feb 3, Feb 17, Mar 8, Apr 7, Apr 21** and **May 5** we will have discussion sessions. On these days, the first half of class will be a normal lecture but the second half will be set aside for a group worksheet (except for Mar 8 and May 5 where the entire class will be a discussion session). You will break into small groups to work through questions related to everything that we have recently covered in class. These worksheets will not be graded, but they will give you the opportunity to discuss the material with your classmates and with me.

**Your participation in these discussion sessions constitutes 6% of your grade: 1% for each session.**

Beyond the discussion sessions, participation is strongly encouraged at any and every other time. Time will not allow me to regularly check attendance in this class; however, it is expected that you will attend class regularly. If you do miss a lecture, you are responsible for learning the materials you missed on your own.

I ask a lot of questions during class and will want to hear your thoughts and ideas. Don't hesitate to go for it! If you have any questions during lecture, please interrupt me and ask. It is very possible that I have made a mistake, or at the very least, very likely that someone else has exactly the same question as you do.

## Grading

Homework .....	64%
Midterm .....	15%
Final .....	15%
Participation .....	6%

Your worst homework score will be dropped.

## Take care of yourself!

I want you to enjoy this course, and I care about your mental state. Do not hesitate to talk to me for any reason. I encourage feedback, which you can provide by speaking to me or through email. If you encounter difficulties of any kind, I will be here to help you find a solution or to direct you to the resources you need; the sooner the better.

Do your best to maintain a healthy lifestyle this semester by eating well, exercising, avoiding drugs and alcohol, getting enough sleep and taking some time to relax. This will help you achieve your goals and cope with stress.

All of us benefit from support during times of struggle. You are not alone. There are many helpful resources available on campus and an important part of the college experience is learning how to ask for help. Asking for support sooner rather than later is often helpful.

## Statement on Free Expression

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.

## **Statement on Accessibility**

Iowa State University is committed to assuring that all educational activities are free from discrimination and harassment based on disability status. Students requesting accommodations for a documented disability are required to work directly with staff in Student Accessibility Services (SAS) to establish eligibility and learn about related processes before accommodations will be identified. After eligibility is established, SAS staff will create and issue a Notification Letter for each course listing approved reasonable accommodations. This document will be made available to the student and instructor either electronically or in hard-copy every semester. Students and instructors are encouraged to review contents of the Notification Letters as early in the semester as possible to identify a specific, timely plan to deliver/receive the indicated accommodations. Reasonable accommodations are not retroactive in nature and are not intended to be an unfair advantage. Additional information or assistance is available online at [www.sas.dso.iastate.edu](http://www.sas.dso.iastate.edu), by contacting SAS staff by email at [accessibility@iastate.edu](mailto:accessibility@iastate.edu), or by calling 515-294-7220. Student Accessibility Services is a unit in the Dean of Students Office located at 1076 Student Services Building.

## **Statement on Discrimination and Harassment**

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 non-discrimination policies may be directed to 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).

## **Statement on Religious Accommodation**

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 the 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 a 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](#) at 515-294-1020 or the [Office of Equal Opportunity](#) at 515-294-7612.

## **Statement on Academic Dishonesty**

Academic misconduct is a violation of the behavior expected of a student in an academic setting as well as a student conduct violation. A student found responsible for academic misconduct is subject to the appropriate academic penalty, determined by the instructor of the course, as well as sanctions under the university [Student Disciplinary Regulations](#). Depending on the act, a student could receive an F grade on the test/assignment, F grade for the course, and could face suspension from the University. See the Student Disciplinary Regulations at <http://www.policy.iastate.edu/policy/SDR> for more details and a full explanation of the policy on Academic and Research Misconduct by students.