CprE 310 / Theoretical Foundations of CprE

Iowa State University

CprE 310 / Spring 2019

Objectives

This course offers an introduction to theoretical principles that form the foundations of Computer Science and Engineering.

Upon successful completion, you will be able to:

- grasp the basics of modern logic;
- synthesize elementary proofs of statements using several methods, including mathematical induction;
- understand sets, functions, and relations;
- model certain computing problems using tools from graph theory.
- analyze computational processes using combinatorial methods;
- and learn a bit about probability theory along the way.

Content

- **Logical thinking**: intro to logic, propositions, predicates, rules of inference, types of proofs
- **Relational thinking**: reasoning about sets, functions, relations, plus an intro to graph theory.
- **Iterative thinking**: Recursion and mathematical induction.
- **Quantitative thinking**: Permutations and combinations, counting rules, introduction to probability theory.
- **Applied thinking**: Synthesizing practically feasible solutions for computational problems encountered in applications.

Prerequisites

Credit in CprE/ComS 228.

Venue

Lectures: Hoover 1213

Recitations: Coover 1011 (Sections D, E), Coover 1016 (Sections A, B)

Online resources

Lecture notes + homework + grades: Canvas

Discussions: Piazza

https://piazza.com/iastate/spring2019/cpre310

Textbook

The primary text will be our course lecture notes which will be posted on Canvas after each lecture.

The primary resource for additional reference, explanations, and problems is *Essentials of Discrete Mathematics* by Hunter. **A free online copy** is available via the library website.

In the past, we have also used Rosen's *Discrete Mathematics and its Applications*. But I wouldn't recommend buying it.

Contact info

Instructor	Chinmay Hegde	Coover 3128
	chinmay@iastate.edu	Tue 3:00pm, or by appointment
TAs	Souparni Agnihotri	Coover 3201
	souparni@iastate.edu	By appointment
	Daniel Cho	Coover 3209
	chomd90@iastate.edu	By appointment
	Luke Schoeberle	Coover TLA
	lukes@iastate.edu	By appointment
	Devin Üner	Coover TLA
	druner@iastate.edu	By appointment

Schedule

There will be 7 assignments, 7 quizzes, 2 midterm exams, and one final exam.

Recitations

There will be 1 hour of recitation each week on Mondays. The goal of recitation is to help you become good at solving problems. There will be a recitation problem set posted at the conclusion of each week's lectures which the TA's will discuss on Mondays.

The TAs will keep track of your attendance in recitations and Piazza through the semester. Based on both your attendance as well as a qualitative evaluation of your participation in recitation, they will assign a score between 0 and 4. This number will be added to your final percent score. **Please participate actively during recitations** in order to get the maximum score – this can make a difference to your final grade.

This is also a good incentive to get to know your TAs! They are all ex-310'ers and can help you with tips on how to prepare for exams, how 310 fits into the broader CPRE/SE curriculum, etc.

Homework assignments and quizzes

Homework assignments will be posted every two weeks. Likewise, quizzes will be held in class every two weeks (on the Thursday) and will cover the material of the corresponding homework.

The score on late homework submissions will be reduced by 50% **for each day** submitted after the due date, up to a maximum of 3 days. There will be **no makeup quizzes or assignments**; however, your lowest quiz and assignment scores will be dropped from the final grade. This is meant to safeguard you from unanticipated absences (illnesses, interviews, and such). If you have an extended absence, email me at the earliest.

Exams

Midterm exams will be held in mid February (tentatively, Feb 19) and early April (tentatively, April 4). The final exam will be held on May 8 at 12pm, as per the ISU finals calendar.

There will be **no makeup midterms or finals under any circumstance**. So in case you think you will be absent for either midterm or final exam, please email me sufficiently early on so that we can work out a solution.

Grading policy

- 18% - Assignments
- 18% - Quizzes
- 30% - Midterm exams
- 30% - Final exam
- 4% - Recitations

Here are answers to frequently asked questions:

- **Will I get partial credit for my answers?** Yes.
- **How do I resolve a grading error?** The first thing you will need to do is to contact *your* TA during recitation or via email. If they are unable to resolve it, ask them to contact the TA who graded it. If no conclusion is reached, email me.
- **Will the class be curved?** We have followed a policy of curving grades thus far, but in my experience over the last few semesters, the following grading pattern has consistently emerged:
  - Above 90%: A
  - Between 86% and 90%: A-
  - Between 83% and 86%: B+
  - Between 80% and 83%: B
  - Between 77% and 80%: B-
  - Between 74% and 77%: C+
  - Between 70% and 74%: C

  - Between 70% and 60%: C-
  - Between 55% and 60%: D.
  - Below 55%: F.

So unless necessary, we will *not* be curving grades and will be following the above scale.

- **Are final grades negotiable?** No. Final letter grades are, well, final. Any questions/disputes about grading have to be resolved *before* you receive your letter grade, not after.

Collaboration policy

No *in-person* collaboration on homework assignments is permitted. However, you are allowed to ask (and answer) questions about homework on Piazza.

Using Piazza regularly will have several benefits: your question might already be answered there; you can join forces with other students to solve a difficult problem; and the chances of getting a rapid response is high.

Copying homework assignments is **strictly prohibited**. All work that you turn in must be **entirely your own**. If assignments are copied (either from one another, or from an ex-310 student, or using a Google search, or CourseHero, or Chegg, or any other external source), then they will automatically receive a score of **zero** for that assignment and the student will be reported to the Dean of Students Office for academic dishonesty. Please talk to me for any clarifications about this policy.

To recap:

- do your homework diligently and on your own;
- avoid in-person discussions about the homework;
- absolutely avoid Googling for solutions;
- absolutely avoid Chegg or CourseHero;
- absolutely avoid copying an answer from elsewhere;
- if you are finding a particular homework very challenging, ask questions about it (either anonymously or publicly) on Piazza. It is perfectly OK to ask for hints/tips, or even collaboratively solve it with another student there.

Accommodations

ISU 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 the Office of Equal Opportunity.

We will follow ISU's principles of community: respect, purpose, cooperation, richness of diversity, freedom from discrimination, and respectful expression of ideas. While we as instructors are provided with your legal name, we will gladly honor your request to address you in whichever fashion you please. (Please let me know early on in the semester).

If you have a documented disability and anticipate needing accommodations in this course, please talk to me as soon as possible. Please request that a Disability Resources (DS) staff send a Student Aca-

demic Accommodation (SAAR) form verifying your disability and specifying the accommodations you need. DR is located in Room 1076 of Student Services.

There may be times when an academic requirement conflicts with religious observances and practices. If that happens, students may request reasonable accommodation for religious practices. In all such cases, you must put your request in writing. I will strive to provide a reasonable accommodation when possible to do so.