Foundations of Computer Science (CSCI 2200)

Course Syllabus

Course description

This is a **theory** course in discrete mathematics and the theory of computation. Every computer scientist should have a solid grasp of these concepts in order to be able to develop fast algorithms, design large systems and be able to reason about program correctness.

Discrete Mathematics
(i) Proofs, especially induction (ii) Sums and Recurrences (iii) Graphs (iv) Counting and Probability

Theory of Computing
(v) What is computing? (vi) How to compute? (vii) What can we compute? (viii) How fast? (P vs. NP)

Learning Outcomes

Upon successful completion of this course, each student:
– can define discrete mathematical objects and mathematical proofs using logic
– can apply mathematical tools such as induction and recursion
– can recall key definitions relating to discrete mathematical objects
– can formulate combinatorial arguments
– can define and compute the probability of an event
– can develop formal models of computation and reason about what is computable within those models
– can recall key facts regarding finite automata and Turing machines.

Textbook

Discrete Mathematics and Computing, M. Magdon-Ismail.

The text book is required. Reading the book is complementary to lecture material – you are also required to work through all exercises in addition to attending the lectures. Homework problems will be assigned from the book as well.

Prerequisites

CSCI 1200 (Data Structures) + MATH 1010 (Calc I). Math 1020 (Calc II) is **strongly recommended**.

Grading

Final	Midterm	Quizzes (3)	Homeworks (10)	Bonus in-class pop-quizzes
30%	30%	30%	10%	2%

There are no makeup quizzes, homeworks, or exams. Special circumstances will be handled case-by-case, if the student presents an institute letter requesting it and if the instructor deems the request reasonable.

Threshold	95%	90%	85%	80%	75%	70%	65%	60%	55%	50%	<50%
Grade	A	A-	B+	B	B-	C+	C	C-	D+	D	F

Piazza

We will use Piazza for questions and discussions. The instructor and all TAs/mentors will regularly monitor Piazza. Please email me or the TAs if you are not signed up in Piazza.

Homework Mechanics

Homework submission: Homework assignments will be submitted through Submitty (submitty.cs.rpi.edu). If you have any issues with the system, let me know as soon as possible.

Grading. Late assignments will not be graded.
- -20 points for a hand written (not typed up) solution
- You **MUST** show your work to get full credit, even for multiple choice questions
- Non-multiple choice questions are graded as follows:
  - Correct solution (you **MUST** show your work): 100%
  - You made significant progress (you **MUST** show your work): 80%
  - You understood the problem and made a reasonable attempt but something went wrong: 50%
  - Not in the right ball park or serious error: 0%

Exam and Quiz Mechanics

- In-class pop-quizzes: Teams of 2 or 3, open book.
- 3 Quizzes: Closed book
- Cumulative Midterm: in class, closed book, 1 double sided 8.5 x 11 cheat-sheet.
- Cumulative Final: Finals week, closed book, 2 double sided 8.5 x 11 cheat-sheets.

If you need testing accommodations (e.g. an extension in your test time), please contact Shianne Hulbert (hulbes). She will also be sending emails to ensure that you are informed about your test time accommodations near to the tests and quizzes.

Missing Exams or Quizzes due to COVID-like Symptoms

Students who have to miss an exam or a quiz due to a valid excuse, e.g., illness, will be allowed to take a make-up exam. If you also miss the make-up midterm exam due to a valid excuse, you will not take a midterm exam and the midterm exam grade will be replaced with the final exam's grade. If you miss a

quiz due to a valid excuse, the quiz's grade will be replaced by the average of all following exams and quizzes, including the final exam. There will be no make-up quizzes.

Collaboration and Academic Honesty

You are expected to work alone on all assignments. In particular:
- **NO** discussion on exams or quizzes. Discussion is allowed on homework but submitted work must be your own.
- **YOU ARE RESPONSIBLE FOR ENSURING THAT YOUR HOMEWORKS ARE NOT COPIED.**
- Copying from **anywhere** other than the class notes or your notes is NOT allowed.
- You must write and understand all solutions yourself.

In cases of academic dishonesty, the minimum penalty is a course grade of F, and other institute-mandated protocols may be invoked.

Announcements

It is the student's responsibility to be aware of and understand all announcements made in the lectures.