Foundations of Computer Science (FOCS), Spring 2021
CSCI 2200, RPI
Tuesdays and Fridays, 10:10am–12pm, Online

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Office Hours: Tue, Fri 12pm–1pm or by appointment, online

This course introduces the math behind computer science: discrete math and the theory of computation.

**Discrete Mathematics:** proofs, sums and recurrences, graphs, counting and probability

**Theory of Computation:** what is computing?, how can it be done? what is computable?, how fast can we do it? (P vs NP)

The textbook for the course is *Discrete Mathematics and Computing* by Magdon-Ismail. I require and all gradeables expect that you read and worked through the indicated portions of the text along with attending the lectures. One does not substitute for the other.

Other resources: *Discrete Mathematics and Its Applications*, by Rosen
*Introduction to the Theory of Computation*, by Sipser

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

**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 computability within those models, and
- ✓ can recall key facts regarding finite automata and Turing machines.

**Grading.** Final Midterm Quizzes (3) Homeworks (13) Bonus in class pop quizzes

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<td>Grade</td>
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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.

**Collaboration and Academic Honesty.** All assignments that are turned in for a grade must represent the student's own work. In particular:

- NO discussion on exams. 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.