CSCI 2200 RPI

Foundations of Computer Science (FOCS) 2025

This is a **math/theory** course in discrete mathematics and the theory of computation.

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)*

The Course Follows the Text Book: *Discrete Mathematics and Computing: A Set of Lectures*, M. M-I. The text book is required.

Other resources: *Discrete Mathematics and Its Applications, 7th edition* by Rosen.
Introduction to the Theory of Computation, 3rd edition by Sipser.
Mathematics for Computer Science, **open** course notes by Lehman, Leighton, Meyer.
Internet, there is abundant material available online for free.

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.

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

Grade.	Final	Midterm	Quizzes (3)	Assignments(10)	Bonus in class pop quizzes
	35%	**25%**	**30%**	**10%**	**2%**

There are no makeup quizzes, homework 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

Collaboration and Academic Dishonesty
– **NO** discussion on exams. Discussion is allowed on homework but work handed in must be your own.
– IT IS YOUR DUTY TO PROTECT YOUR HOMEWORK FROM BEING COPIED.
– Copying (from **anywhere** other than the class text or notes) is **NOT** allowed.
– You should write and understand all solutions yourself.

Treat your work with pride and don't share it. Respect work of others: if you use work from others in your deliverables, you should: (i) indicate how this third party work was used to solve your tasks; and, (ii) acknowledge the original authors of the work.

Plagiarizing someone else's work is a **serious issue**. In cases of academic dishonesty, the minimum penalty will be an automatic grade of F, in addition to other institute mandated protocols.

Help: Help hours, TA-recitations, TA-office hours, Insructor-office hours, Piazza.

Warmup. To get a feel for the joy of doing mathematics, algebraically simplify: $(x-a)(x-b)(x-c)\cdots(x-z)$