

# CS:50:198:171 Mathematical Foundations of Computer Science Spring 2010

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## Course Specifics:

Instructor: Rajiv Gandhi  
Office: 311 Business and Science Building  
E-mail: [rajivg@camden.rutgers.edu](mailto:rajivg@camden.rutgers.edu)  
Class Time: MW 11:15-12:35pm  
Classroom: BSB 335  
Office Hours: Thu, Fri 12:15-1:15pm  
Class web-page: <http://crab.rutgers.edu/~rajivg/cs171>

If you have any questions or comments please do not hesitate to see me during my office hours or send me e-mail. If you cannot see me during my office hours please send me email and we can arrange to meet at some other time.

## Text Book:

The required text for this course is the following.

*Mathematics: A Discrete Introduction*, 2<sup>nd</sup> edition, Edward Scheinerman, Brooks/Cole.

Eric Lehman and Tom Leighton have excellent lecture notes on *Mathematics for Computer Science*. We will follow these notes for some topics.

## Course Objectives:

This course is an introduction to *discrete mathematics*, an area of mathematics that deals with finite, but often large set of objects. This subject forms the basis of most areas of computer science. At a high level, the aim of this course is to teach you how to understand, create, and critique mathematical arguments. This helps you to think clearly and communicate precisely without committing to fallacies. Specifically, we will study the following (not necessarily in the same order).

- fundamental mathematical objects such as sets, functions, relations.
- proofs – what constitutes a *correct* mathematical proof and different ways of writing one.
- combinatorial analysis – how to count outcomes of combinatorial processes.
- discrete probability to analyze random processes.
- discrete structures such as graphs and trees.

Many fundamental contributions in different areas of computer science such as operating systems, cryptography, programming languages, databases, networking are based on discrete mathematics. In short, discrete mathematics is good for you!!

## Performance Evaluation:

Your final grade in the course will be decided by your performance in homeworks and exams. Their weightage is as follows.

1. Homeworks – 50%.
2. Exams – 50%.

The best way to learn the material in this course is by solving lots of problems on your own. There will be an assignment every lecture except during the weeks when the exams are scheduled. The assignments are due in the following class period. Late homeworks will not be accepted. Solutions to homeworks will be distributed at the end of the class period on the due date.

## Advice:

**Come to every class!** Missing even one class can have a substantial effect on your ability to understand the material. Be prepared to think and concentrate, in the class and outside. I will try to make the class very interactive. Participate in the class discussions. Ask questions when you don't understand something. Keep up with the class readings. Start homeworks early and come and see me to discuss ideas, solutions or to simply to check if what you understand is correct.

## Collaboration Policy:

We encourage discussion between students regarding the course material. However, no discussion of any sort is allowed with anyone on the homeworks for the class. If you find solution to some problems in a book or on the internet you may use their idea for the solution provided you acknowledge the source (name and page in the book or the website, if the idea is found on the internet). Even though you are allowed to use ideas from another source you must write the solution in your own words. Any violation of this spirit will be dealt with harshly. If you are unsure whether or not certain kinds of collaboration is possible please ask the instructor.