MATH/CS 240 (Intro. Discrete Math.) SYLLABUS, Fall 2008
Lecture: TR 11PM – 12:15 PM, Chem B371

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Text is:
Discrete Math. & its Applications
6th ed., by K. Rosen

Office Hours (JSE): Tues, 12:30 -1:30 PM (CRC dining hall)

TA: Harris Nover, nover@math.wisc.edu
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Office Hours (HN): MW: 11:50-1, VV822

Course Content

Mathematics can be loosely divided into two parts. The first is continuous mathematics; as the name suggests, this part of math treats phenomena that can be moved continuously, like functions, curves, and geometric spaces. Most of the math you've learned so far – geometry, trigonometry, calculus – is continuous in nature. The basic object of continuous mathematics is the real number line. Because the physical universe (at least to the naked eye) is continuous, this is the part of mathematics most associated with physics. The second part is discrete mathematics, the subject of our course. Here we throw aside any notion of continuous variation. The basic objects of discrete mathematics are the set of integers and of logical values; there is no way to move continuously from 2 to 3, or from "true" to "false." Because the states of a computer are discrete, this is the part of mathematics most associated with computer science.

Math/CS 240 covers the fundamentals of discrete mathematics. It is a requirement for the BS degree programs in Computer Engineering offered by the ECE Department and in Computer Science offered by the CS Department. It is now a prerequisite for (getting into) advanced computer science courses (CS 367, 520 and 577). The course is a foundational math course for this program and is meant to be taken early in the program; it is also a good foundation for higher mathematics courses. We will aim for breadth, not depth; you will be introduced to many new concepts and topics, and we won't spend a long time on any one of them. We hope that by the end of the course you'll have developed a friendly acquaintance with this important segment of mathematics, and have the expertise necessary to develop a deeper relationship with whatever topics you will need in your future studies.

The prerequisite for the course is Math 221 (Calculus I), and the course will be taught roughly on the level of Math 222 (Calculus II.) These prerequisites are meant to establish a base level of mathematical sophistication; we will not actually use calculus in the course.

Briefly, the topics covered in the course include: logic, set theory, functions and their orders of growth, the integers, algorithms, inductive and recursive definitions and arguments, program correctness, fundamentals of counting and discrete probability, trees and random walks, basic number theory including number-theoretic cryptography, variance and expected value, recurrence relations, . . . This is a long list, but you'll find that there are many connections between the topics.

How to do well in this course You should spend approximately **5–6 hours a week** on the course - studying your book and your lecture notes, thinking about the ideas and concepts and how they relate to each other, talking with some of your classmates about them (study groups are encouraged), and, most important, *doing your homework.* Not even the greatest genius can learn math by listening to it – you have to *do* it, and that's what the homework is for. If you are having trouble with a section of the course, the best remedy is to do even more problems than we assign – Annette and I will be happy to discuss these with you.

Not everything you need to know will be discussed in lecture, and not everything you need to know is in the book. The lecture and the book will reinforce each other. We'll cover a pretty large chunk of the book, which is itself pretty large; lectures and exercises should give you a good idea of what portions we mean to emphasize most, and what will be present on exams. *We will write exams assuming that you have completed the homework, and you should expect to see some variations of homework questions appearing on exams.* This is one more reason to make sure you do a thorough job on the homework.

In addition to the lecture you have once-a-week discussion section with a Teaching Assistant (TA). In this discussion section you can get your questions answered, go over problems, review, etc. Homework will be turned in and exams passed back in these sections.

Exercises Homework will be announced each Thursday and due at the beginning of lecture the following Thursday. Each week, we will choose a subset of problems to be graded; your grade will be a combination of your score on these selected problems, and the overall completeness of your homework. Homework is 25 percent of your grade, so be thorough! Late homework will not be accepted unless your TA has agreed to an extension *before the due date.* You are encouraged to form study groups with your classmates; things not clear to you may become obvious when you try to explain them to others or when you hear other points of view. Sometimes just verbalizing your mathematical thoughts can deepen your understanding. *It is acceptable, indeed desirable, to work on homework collaboratively; however, write-ups must be your own work and may not be identical with those of any of your classmates.*

Exams There will be **two in-class exams** during the semester, each worth 20 percent of your grade, and a final exam, on December 18, at 12:25, worth 35 percent of your grade. Depending on the pace we keep in lecture, we may also have some in-class or on-line quizzes. All quizzes will be announced.

Grades will be distributed as follows: 25 percent homework, 40 percent midterm exams, 35 percent final exam. We will grade on a curve. In the past, the cutoffs have been approximately 93 for an A, 89 for an AB, 80 for a B, 70 for a C, 60 for a D.

Calculator Policy It is acceptable to use calculators while doing your homework. Calculators will not be permitted in exams, and we will not give questions which require (or would be made substantially easier by) the use of calculators.

Attendance It is expected that each student will be present at all of the classes and discussions and will be an attentive class participant.

Office Hours Our office hours are listed on page 1. We encourage you to come, whether to discuss homework problems, topics you are particularly confused about, resources for learning more about topics you're particularly excited about or your general mathematical development. The only thing you should not do is skip class and then ask one of us to redeliver the lecture during office hour.

Note to McBurney Disability Resource Center students: Students of the Center who are recommended for some accommodation (e.g., extended time on exams) should contact the instructor about this no later than October 2, 2008.

Math 240 APPROXIMATE SCHEDULE - Fall 2008

Check the exam schedule now for any unavoidable conflicts.

Week of	**Sections**
September 4	$1.1 - 1.5$
September 11	$1.6 - 1.7, 2.1$
September 18	$2.2 - 2.4$
September 25	$3.1 - 3.3$
October 2	$3.4 - 3.5$
Tuesday, October 7, 2008	**First in-class exam**
October 9	3.6
October 16	3.7
October 23	$4.1 - 4.2$
October 30	$4.2 - 4.4$
November 6	$5.1 - 5.4$
November 13	5.5
Thursday, November 13, 2008	**Second in-class exam**
November 20	$6.1 - 6.2$
November 27	$6.3 - 6.4$
December 4	$7.1 - 7.2$
December 11	$7.3, 7.6$
Tuesday, 18 December, 12:25 - 2:25 pm	**Final Exam**