CS/APMA 202, Spring 2005

Tu/Th 3:30-4:45
Olsson Hall room 120

Instructor: Aaron Bloomfield. Office: Olsson Hall, room 228D (asb@cs.virginia.edu).

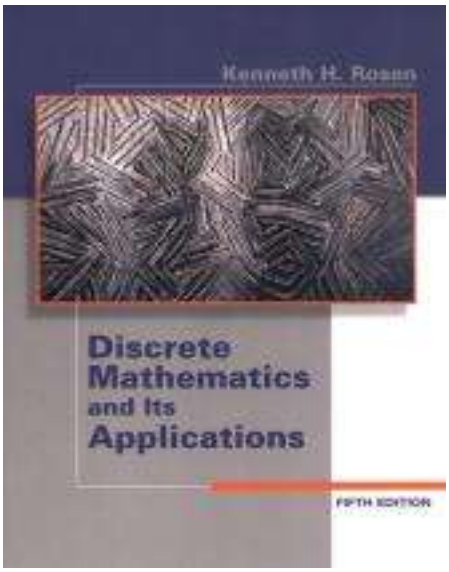
Course web page: http://www.cs.virginia.edu/~asb/cs202/

Introduction: This class will probably be different than any other math class you have taken. You are invited (encouraged, even) to work together on the homeworks. The homeworks count for very little of the grade, but are one of the primary means for learning the material. There will be two finals at the end of the semester, a written final and an oral final.

Course objectives:

1. Logic: Introduce a formal system (propositional and predicate logic) which mathematical reasoning is based on. (sections 1.1-1.4)
2. Proofs: Develop an understanding of how to read and construct valid mathematical arguments (proofs) and understand mathematical statements (theorems), including inductive proofs. Also, introduce and work with various problem solving strategies and techniques. (sections 1.5, 3.1, 3.3, 3.4)
3. Counting: Introduce the basics of integer theory, combinatorics, and counting principles, including a brief introduction to discrete probability. (sections 2.4, 4.1-4.4, 5.1)
4. Structures: Introduce and work with important discrete data structures such as sets, relations, sequences, and discrete functions. (sections 1.6-1.8, 2.7, 3.2, 7.1, 7.3-7.6)
5. Applications: Gain an understanding of some application areas of the material covered in the course. (sections 2.6, 3.6, 10.3)

Office hours: Tu/Th 1-2:30, or by appointment. TA office hours will be posted on the website.



Pre-requisites: C- or higher in CS 101 or APMA 111

Textbook: Kenneth Rosen, Discrete Math and Its Applications, 5th edition. McGraw Hill, 2003. ISBN 0072930330. This book is required for the course. We will be covering sections 1.1-1.8, 2.4, 2.6, 2.7, 3.1-3.4, 3.6, 4.1-4.4, 5.1, 7.1, 7.3-7.6, and 10.3 (although this may change slightly as the course progresses). A tentative schedule is available on the website (under the Syllabus section). Also see the book's website at http://www.mhhe.com/rosen.

Optional textbook: Kenneth Rosen, Student's Solutions Guide for use with Discrete Mathematics and Its Applications, 5th edition. McGraw Hill, 2002. ISBN 0072474777. This book has full solutions to all the odd-numbered problems in the textbook. It will also be available on reserve in the Engineering library.

Make sure to get the 5th edition of both texts!

Philosophy: I believe this course should be hard but fair. The test questions will be difficult, but the curve will ensure that the average grade is in the B range. If for any reason you feel the course is not being fair (too much work, too much expected of the students, to harsh grading, a bad grading curve, etc.), let me know and I will do my

best to correct it. I believe in being available for the students so they can learn the material. My preference is for students to come to office hours, but if you cannot make those, I will make sure to find the time (with sufficient notice, of course) to meet outside my office hours.

Grades: Grades will be calculated by the following formula:

- 20%: Midterm 1
- 20%: Midterm 2
- 25%: Final written exam
- 15%: Final oral exam
- 20%: Homeworks

The grades will follow a standard curve: once the final numerical grade has been computed according to the above formula, the average grade will be somewhere in the B range. Doing significantly better than the average will receive an A. Doing significantly worse than the average will receive an F. I reserve the right to modify this formula slightly by adding quizzes (more on this later).

Homeworks: There will be approximately 25 homeworks throughout the semester. As there are 28 lectures, that means one homework will be due at almost every class (no homework the first day or the two test days). Each homework will generally consist of four or so problems from one section of the course textbook, and will usually cover or augment material gone over in lecture. They will generally be assigned during the lecture in which the material is covered (although they may appear on the website prior to that), and will be due one week later. Thus, there may be multiple homeworks assigned at any one time, although only one will be due on any given class date. You are invited to work together on the homeworks, although each student must submit their own copy. However, copying the homeworks will keep you from learning the material for the exams, and the exams are worth a total of 80% of your grade. Of the homework questions given, some (but not necessarily all!) will be graded for the grade for that homework. As you are allowed to work with each other on the homeworks, they will not be pledged. Homeworks are due at the BEGINNING of class. This means that by 3:35, if your homework is not in, it is late. If you cannot make class, you can turn it in to me before hand, or to the CS secretaries (Ginny Hilton in Olsson 205 or Brenda Perkins in Olsson 204). Any homework handed in after class starts (or slipped under my office door during class) will receive 25 off (out of 100). Any homework turned in the following day will receive 50 points off; no homeworks will be accepted more than one day late. The solutions to the homeworks will be posted to the website after the due date.

Exams: There will be a total of four exams. All exams will be pledged. The two midterms will be during class on 24 February and 7 April. There will be two finals, a written exam (Saturday, 7 May from 9:00 a.m. to 12:00 noon) and an individual oral exam to be scheduled during finals week. The oral exam will consist of the student explaining the solution to 5 (or so) problems in a 20 minute period. The exams will focus on the most recent material taught, but will include all the material covered so far in class. The Engineering School Dean has very explicit rules about missing or rescheduling exams. This class will abide by those rules. If you are going to miss an exam, make every effort to notify me before the exam. Note that the first exam will be returned before the SEAS drop date.

Problem sets: There will be three different types of problems given out during the course. Although most will come from the textbook, there may be some non-textbook problems as well. The first set is the problems given for each homework assignment. The second set of problems will be those presented in class. The last set will be additional questions not gone over during the homeworks or class. These three sets constitute the problem database, from which similar (but not necessarily identical!) problems will be drawn to create the exams. If you understand the problems in the database for a given topic (which is different than just knowing the answer!), then you have a good grasp of the material. The problem database will be filled out as the semester progresses (the problems for that topic will be in the problem database when we start discussing that topic), and is listed on the website.

Miscellaneous: There are a number of ways to learn the course material. Last semester, the students found (in no particular order) the homeworks, slides on the website, lecture, and office hours to be the most helpful to learn the material. Other means included the textbook, solution manual, fellow students, and review sessions. Find what works best for you and use it.