

MT004 - Finite Probability Summer, 2009
Section 01: Tuesday - Thursday, 8:30 - 11:30 am,

Instructor:

Ned Rosen rosen@bc.edu Carney 363 (617-552-3771)

Web page: <http://www2.bc.edu/~rosen>

Office Hours

Tuesday, 11:30 – 1:00

Exam Weeks: Wednesday 4 – 5:30

Non-exam Weeks: Thursday 11:30 - 1

By appointment, anytime.

Textbook: Goldstein, Schneider, and Siegel, *Finite Mathematics and its Applications*, Custom Edition for Boston College, together with Radulavich *Student Solutions Manual* (for the text listed above). They come packaged together. **You will also need to purchase an access code for WebAssign for around \$15.**

Course web Site: <http://www2.bc.edu/~rosen/mt004sum09>

The web site is very simple, and you are not required to use it. It contains a copy of this syllabus, a list of the practice problems, a link to WebAssign, and perhaps a few other things as the term progresses.

- Topics:
1. Finite sets and enumeration [Ch.5]
 2. Finite Probability [Ch 6]
 3. Elementary Statistics [Ch.7]

Homework: We will be using WebAssign online system for the graded homework. The assignments are on line, are tied to the specific sections of the text book, and have a due date and time. A separate handout and class demo will show you how to get started in WebAssign. Additional practice problems, whose answers are in the Student Solutions Manual, will be assigned which we will go over at the beginning of the next class. The practice problems are not collected nor graded.

Exams: Two hour exams, dates indicated below. On each exam you may use one page of prepared notes (both sides), a calculator, and pens/ pencils.

Final exam: Thursday August 6. You may use three sheets of notes for the final.

| <u>Tentative schedule:</u> | <u>Week</u> | <u>Tu</u> | <u>Th</u> |
|----------------------------|-------------|--------------|-------------------|
| | 1 | 5.1-3 | 5.4-5 |
| | 2 | 5.5-6, Rvw.. | Exam 1 |
| | 3 | 6.2-4 | 6.5,6 |
| | 4 | 6.6-7, Rvw. | Exam 2 |
| | 5 | 7.2-4 | 7.4-6 |
| | 6 | 7.6-7, Rvw. | Final Exam |

| | | |
|-----------------|-------------------|-----------------------|
| <u>Grading:</u> | Homework | 100 points |
| | Exams | 200 points (2 x 100) |
| | <u>Final Exam</u> | <u>200 points</u> |
| | TOTAL | 500 points. |

Your point total (out of 500) is divided by 5 to give you a course average between 0 and 100. Letter grades will be assigned to these averages. The minimum curve is:

$$50 \leftarrow D\text{'s} \rightarrow 60 \leftarrow C\text{'s} \rightarrow 75 \leftarrow B\text{'s} \rightarrow 88 \leftarrow A\text{'s} \rightarrow 100$$

Extra Help: There is free tutoring available at the Academic Development Center in O'Neill Library. You must make an appointment at 617-552-8055.

Course content.

Probability is the mathematics of uncertainty, and the main topic of this course – *finite probability* – refers to situations in which only a finite number of different outcomes can happen. In order to understand these situations, we first need to be able to count the number of different outcomes, and this topic (called *enumeration*) is the main idea in Chapter 5. Following that, Chapter 6 covers the basics of finite probability, and the final section of the course (Chapter 7) relates the probability we have learned to *statistics*, which is the study of data. Here is a simple, but striking, example of the ideas in this course:

Suppose (to be really generous to the NSA) that by wiretapping the phone conversations of someone, you can tell with 99.9% accuracy whether or not he or she is a terrorist, and let us estimate there are 2500 terrorists lurking out there among the 250 million adult phone users in the US. If a random person is identified from wiretapping as a terrorist, what are the chances that he or she really is a terrorist?

Did you say 99.9%? Most people would, but they'd be wrong. In fact, the correct answer is around 1% -- 99 out of a 100 times a positive terrorist ID will be an innocent person! This example involves Bayesian probability, one of the topics on Chapter 6.

How does this course compare to other BC math courses? In one sense, it is the easiest math core course since the technical math skills needed (e.g. solving equations, simplifying formulas, etc) are really minimal. On the other hand, most of the work involves story problems which must be read and understood before trying to solve—so in another sense, this course can be conceptually challenging since many parts of it can not be reduced to a sequence of automatic “steps.”

University Level Learning

This course may be your first taste of college mathematics. Our goal is more than having you reproduce what was told to you in the classroom; it is for you to acquire a command of the material, so that you can apply what you have learned to new situations.

It is **your** responsibility to learn the material; most of that learning takes place **at home**. Work with other students if you prefer. Or alone. But don't expect to walk out of class with a full understanding of the material, that takes work outside of class.

The instructors' job is to provide a framework, with *some* of the particulars, to guide you in doing your learning at home. It is not to program you with isolated facts nor with step-by-step methods for doing specific types of exam problems. When rote practice occurs, it will be on the homework, not in class.

Read the textbook! It is very readable, but it is not a novel, so it must be read slowly, with pencil, paper, and calculator in hand. Work through examples and try to fill in any omitted steps. Read each section before the lecture covering it; the fast-paced lectures will make much more sense if you have absorbed some of the content upon a first reading. After the class, go back and read it again