

Math 304

Introductory Combinatorics

Fall 2003

Time: T, Th 12:40–2:00
Classroom: Carver 132
Instructor: Dr. Alexander Burstein
Office: Carver 456
Office Hours: T, Th 11:00–12:30, or by appointment
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Textbook: *Applied Combinatorics* by Fred S. Roberts

Course Content

- Introduction (Chapter 1)
- Basic counting rules (Chapter 2)
- Generating functions and their applications (Chapter 4)
- Recurrence relations (Chapter 5)
- The principle of inclusion and exclusion (Chapter 6)
- Polya theory of counting (Chapter 7)
- The pigeonhole principle (Chapter 8)

Course Grade

- Homework – 20%
- Two Midterm Exams – 25% each
- Final Exam – 30%

Midterm **exams** will be announced 1-2 weeks in advance. The first midterm will be in late September; the second midterm, in late October or early November. All exams will be cumulative, but with emphasis on new material.

The **homework** is the heart of this course. Every other week I will hand out an assignment due 2 weeks from that date. The homework will usually

consist of several easier “A” problems designed to test your understanding of the material being covered, and several harder “B” problems designed to test your talent, your stamina, your courage, your fortitude. A few problems may seem too hard at first glance. But this is the common lot of creative and original work in all areas – we always attempt things that are too hard for us. I understand this and allowance will be made at grading time. So forget grades (well, not completely!); throw yourselves at these problems; surprise yourselves at how much you can accomplish.

I ask that you work together in small **groups** of your own choosing to solve these problems. There are two reasons:

1. The problems are simply too hard to do alone. You must learn to cooperate – not compete – with one another. A piece of an idea may germinate in one head, the rest of the solution in another – this is normal, it is the way the world works.
2. It is essential to develop critical faculties and to be able to explain things to each other – *clearly*. It is all too easy to think you have settled something only to find you have been deluding yourself. Here is where you can help one another to think more clearly.

If you work in a group (as I strongly urge), please hand in but *one* paper for the entire group. Everyone in the group will receive the same grade for that assignment. That brings us to the *two fundamental rules which experience shows govern groups*:

1. The best size for a group is four or five.
2. You are in the “correct” group if you are neither always giving nor always taking. Change groups if you are in the wrong one. Remember: *Give-and-take is what you want.*

One more remark on homework: No one will be able to do the problems if he or she begins on them 24 or 48 hours before they are due. You will need the entire time until the due date to think about them. Within a day of receiving them, absorb them and let them cook in your head for the entire two weeks. **NO LATE HOMEWORK CAN BE ACCEPTED.**