Math 304 **Introductory Combinatorics** **Fall 2006**

Time:	T, Th 12:40–2:00
Classroom:	Carver 124
Instructor:	Dr. Alexander Burstein
Office:	Carver 456
Office Hours:	MTTh 11-12 (subject to change), or by appointment, or by email.
Virtual O/H:	I usually check my email several times a day, so you can usually expect an answer fairly soon, sometimes even if it's late night or weekend.
Email:	`burstein@math.iastate.edu`
WWW:	`http://www.math.iastate.edu/burstein/2006/math304/math304.html`
Phone:	(29)4-7294 (that's 294-7-294)
Textbook:	*Introductory Combinatorics*, 4th edition, by Richard A. Brualdi

Course Content

The topics to be covered include: pigeon-hole principle and applications; permutations and combinations; properties of binomial coefficients (combination numbers); the inclusion-exclusion principle; recurrence relations and generating functions; difference sequences, Catalan numbers, Stirling numbers, partition numbers, and other counting sequences; Polya's counting principle; and others if time permits.

Course Grade

- Homework – 50%
- Midterm Exam (take-home) – 20%
- Final Exam (take-home) – 30%

The midterm **exam** will be announced 1-2 weeks in advance. It will be given sometime in October. Both midterm and final exams will be cumulative, but with emphasis on new material.

The textbook and the class are designed to reinforce, not replace, each other. On the one hand, I cannot write the whole book on the board; on the other hand, people who attend more classes tend to do better on exams.

The **homework** is the heart of this course. Every week or so I will hand out an assignment due a week or so 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.

Please address any special needs or special accommodations with me at the beginning of the semester or as soon as you become aware of your needs. Those seeking accommodations based on disabilities should obtain a Student Academic Accommodation Request (SAAR) form from the Disability Resources (DR) office (515-294-6624). DR is located on the main floor of the Student Services Building, Room 1076.