

Math 4370
TuTh 10:20–11:50
EDUC 110

COMBINATORICS
Syllabus

Spring 2012

Instructor: Dr. Art Duval

office: **Bell Hall 303**

phone: **747-6846**/office (24hrs./day; if I'm not in, please leave a message)

747-6502/fax (include a cover sheet with my name, please)

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<http://www.math.utep.edu/Faculty/duval/home.html>

Office hours: **Mon, 2:00–3:00; Wed, 10:00–11:00; Tue, Thu, 1:00–2:00**. Please feel free to come by my office any time during scheduled office hours. You are welcome to come at other times, but in that case you might want to make an appointment, just to make sure that I will be there then. You can make an appointment simply by talking to me before or after class, by calling me at my office or at home, or by sending e-mail. You may also ask any questions directly via phone or e-mail. If I'm not in when you call, please leave a message on the voice-mail or answering machine with your name, number, and a good time for me to call you back. I will try to respond to your phone or e-mail message as soon as possible.

Website: <http://www.math.utep.edu/Faculty/duval/class/4370/121/home.html>

Here you will find this syllabus with relevant links, including homework and reading assignments for the whole semester, as they are announced. Other resources may become available.

Prerequisites: There is no official prerequisite, but there will be some proofs, so some experience with proofs will be helpful, though not required.

COURSE OBJECTIVES: Upon successful completion of this course, you will be able to discover and prove basic theorems in enumerative combinatorics. You will be better able to independently read advanced mathematics. You will be moderately proficient applying the techniques of bijections and generating functions in a variety of settings. Some specific topics include: multiplication, addition, and division principles; permutations and combinations; partitions and compositions; inclusion-exclusion; and counting trees and graphs.

You may have seen some of the early topics in a previous course, such as Discrete Math. Here, we will go much further, and look at more elaborate or sophisticated structures (as described above). We will also apply more rigor than in Discrete Math, as you will need to prove some things, and not just compute them. If you have not seen proofs before, this may be a big difference from previous math courses.

On the other hand, there is more problem-solving here than in some other proof-based math courses. In some cases the proof will be easy, once you know what you are trying to prove.

Textbook: Introduction to Enumerative Combinatorics, Miklós Bóna, Chs. 1, 2, 3, 5. We may skip some sections, as announced in class. Each section will take us about one week in class (Chapter 1 will go a little faster).

You will spend a substantial amount of time outside of class reading the textbook. The course will be structured to encourage and support you in this endeavor. In-class activities will center around our making use of what you have read outside of class.

GRADES:

Homework and Participation: For each section of material we encounter, there will be three kinds of homework, as follows (more details are on a separate handout):

Advance preparation (15%) You will read the section carefully, write responses to reading questions, create some of your own questions, and reflect. The written part of this assignment will be due *before* we discuss the material in class.

Warmup exercises (10%) On the *day of* our class discussion over the material, we will discuss easier warmup exercises. You will prepare your answers, in writing, before class, and the class will share answers in small groups or whole class discussions.

I expect everyone to attend and participate actively in class, in particular to speak up during class discussion with questions and ideas, and to work well with others. Your active participation in class will constitute a substantial part of this part of your grade for the course.

Main exercises (20%) *After* our class discussion over the material, you will turn in clearly-written solutions to harder homework problems. These will generally be due weekly. *Graduate students* taking this class will be assigned additional main exercises, in accordance with university policy.

Written assignments (for all three kinds of homework) will not be accepted after they are due, except in extenuating circumstances that you explain to me as soon as possible. Incomplete homeworks will be accepted, though, so please turn in whatever work you have completed when homework is due. You are encouraged to work together on your homework, but you must write up your solutions by yourself.

Exams (15% each) There will be two in-class, closed-book exams on the following days:

Thu. 23 Feb.
Thu. 12 Apr.

Each exam will cover material from the beginning of the semester, though the second exam will focus more on material since the first exam.

Final (25%) The final exam will be comprehensive over all material we discuss in class. The final will be on

Thu. 10 May, 10:00 a.m.–12:45 p.m.

Makeup exams can be given only in extraordinary and unavoidable circumstances, and with advance notice.

POLICIES:

Academic dishonesty: It is UTEP's policy, and mine, for all suspected cases or acts of alleged scholastic dishonesty to be referred to the Dean of Students for investigation and appropriate disposition. See Section 1.3.1 of the Handbook of Operating Procedures.

Attendance: Due to the course structure, attendance is mandatory. There is no particular penalty for missing a particular class, but you cannot get a good participation grade if you miss too many classes. I will usually "excuse" an absence if you tell me about it in advance, or, in cases of emergencies, as soon as possible afterwards.

Drop date: The deadline for student-initiated drops with a W is Friday, March 30. After this date, you can only drop with the Dean's approval, which is granted only under extenuating circumstances.

I hope everyone will complete the course successfully, but if you are having doubts about your progress, I will be happy to discuss your standing in the course to help you decide whether or not to drop. You are only allowed three enrollments in this course, and students enrolled after Fall 2007 are only allowed six withdrawals in their entire academic career, so please exercise the drop option judiciously.

Courtesy: We all have to show courtesy to each other, and the class as a whole, during class time. Please arrive to class on time (or let me know when you have to be late, and why); do not engage in side conversations when one person (me, or another student) is talking to the whole class; turn off your cell phone (or at least set it to not ring out loud), and do not engage in phone, email, or text conversations during class.

Disabilities: If you have, or suspect you have, a disability and need an accommodation, you should contact the Disabled Student Services Office (DSSO) at 747-5148, dss@utep.edu, or Union East room 302. You are responsible for presenting to me any DSS accommodation letters and instructions.

Exceptional circumstances: If you anticipate the possibility of missing large portions of class time, due to exceptional circumstances such as military service and/or training, or childbirth, please let me know as soon as possible.