

Math 4370 (3 credits)  
TuTh 10:30–11:50  
QUIN 202

**COMBINATORICS**  
**Syllabus**

Spring 2016

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)

**545-1788**/home (9am–9pm only, please)

internet: [adual@utep.edu](mailto:adual@utep.edu)

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

Office hours: **Mon, 9:00–10:00; Tue, Wed, Thu, 1:00–2:00**. Please feel free to come by my office any time during scheduled office hours. You are welcome to visit 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/4370/161/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 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 and Analytic Combinatorics, 2nd ed., Miklós Bóna, Chs. 1, 2, 3, 5.** We may skip some sections, as announced in class. The textbook is required at all class meetings.

**Required Reading:** Read each section that we cover in class, both before and after class. Skim the section before class, even if you don't understand it fully, to have some idea of what we'll be doing in class. Read it more carefully after class to clarify and fill in details you missed in class.

**Warning:** Sometimes, we will not "cover" all the material from a section in class, but instead focus on a particular aspect of the section. In such cases, I will point out in class (and on the course's website) which other parts of the section I expect you to read on your own.

## GRADES:

**Participation (5%)** A significant portion of class time will be devoted to discussions and problem-solving. Your active engagement with the material is required at all times, whether you are presenting, participating in the audience, or working on a problem with a group.

**Homework (35%)** Written homework will be assigned weekly, announced in class, and posted on the course website. These solutions should be written clearly and completely. Assignments will be due at the *beginning* of class, and will not be accepted after then, 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. Your lowest homework score will be dropped.

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

Thu. 18 Feb.
Thu. 14 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. Makeup exams can be given only in extraordinary and unavoidable circumstances, and with advance notice.

**Final (30%)** The final exam will be comprehensive over all material we discuss in class. The final will be on

Thu. 12 May, 10:00 a.m.–12:45 p.m.
------------------------------------

## 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 for 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. My goal is for class meetings and activities to complement, rather than echo, the textbook, and thus for every class to be worth attending.

**Drop date:** The deadline for student-initiated drops with a W is Friday, April 1. 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, for emergencies, 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 Center for Accommodations and Support Services (CASS) at 747-5148, [cass@utep.edu](mailto:cass@utep.edu), or Union East room 106. You are responsible for presenting to me any CASS 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.