

# MA2273 Syllabus

**Instructor:** William J. Martin

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**Office hours:** 1:00–1:50 RF

or by appointment

MA 2273, D Term 2008

Combinatorics

**Text:** Waterloo MATH239 Notes

**Meetings:** 4:00–4:50 MTRF

## OVERVIEW

The goal of this course is to introduce the student to the ideas and methods of enumerative combinatorics, as well as applications and connections to combinatorics more broadly and to other parts of mathematics. Our main tool will be the generating function, which is an algebraic object that allows for efficient enumeration of finite objects. The course will begin with a brisk review of discrete mathematics: Cartesian products, the Pigeonhole Principle, Inclusion-Exclusion techniques, and the Binomial Theorem.

The core of the course comprises an introduction to ordinary generating functions. These will be applied to counting problems involving such things as subsets with restrictions, compositions, binary strings, and more. We will also touch on recurrence relations in combinatorial enumeration and some analysis of algorithms.

As time permits, we will explore some combinatorial structures such as designs, matroids and geometries. This module will likely occupy the last week of D Term.

## TEXT

Our main text will be an excerpt of three chapters from some course notes borrowed from the University of Waterloo, with their kind permission. In addition, we will read a handout covering some basic preparatory material.

## GRADING SCHEME

Homework (best 5 assignments out of 7): 25 %

Tests (Mar. 28, Apr. 14, Apr. 29): 75 %

## GRADES

**A:** 100 % – 88 %;    **B:** 87.99 % – 74 %;    **C:** 73.99 % – 60 %

## HOMEWORK

There will be a total of seven homework assignments, roughly one per week. The best five of these grades will account for 25% of your overall grade in the course.

## STUDENTS WITH DISABILITIES

If you need course adaptations or accommodations because of a disability, or if you have medical information to share with me, please make an appointment with me as soon as possible. My office location and hours are listed at the top of this syllabus. If they have not already done so, students with disabilities who believe that they may need accommodations in this class are encouraged to contact the Disability Services Office (DSO) as soon as possible to ensure that such accommodations are implemented in a timely fashion. The DSO is located in Daniels Hall; the phone number is (508) 831-5235.

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## **ACADEMIC INTEGRITY**

Please read the STUDENT GUIDE TO ACADEMIC INTEGRITY AT WPI and all its pages. For example, the page WHAT CONSTITUTES ACADEMIC DISHONESTY? – found here:

<http://www.wpi.edu/Pubs/Policies/Honesty/Students/constitutes.html>

– gives some examples of academic dishonesty; i.e. acts that interfere with the process of evaluation by misrepresenting the relation between the work being evaluated (or the resulting evaluation) and the student's actual state of knowledge.

Each student is responsible for familiarizing him- or herself with academic integrity issues and policies at WPI. All suspected cases of dishonesty will be fully investigated.