

SYLLABUS

Mathematics 343 will meet on Mondays, Wednesdays, and Fridays,
from 11:00 a.m. to 11:50 a.m., in King 121.

TAUGHT BY: Elizabeth Wilmer

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IM HOURS: Monday, Thursday, 10:00–11:00 p.m

OFFICE HOURS: Monday, 2:00–3:00 p.m.

Tuesday, 3:00–4:30 p.m.

Thursday, 3:30–5:00 p.m.

GOALS OF THE COURSE: An introduction to the tools and methods of modern combinatorics. We will study both advanced techniques for exact and approximate counting and several types of discrete structures.

TEXT: *Combinatorics: Topics, Techniques, and Algorithms* (P. J. Cameron, Cambridge University Press, 1994), available at the Oberlin Bookstore. We will cover most of Chapters 2 through 8, 10, and 13.

EVALUATION: Each of the two take-home exams will be worth 100 points. The final project will be worth 100 points. The homework will be worth 100 points.

EXAMS: There will be two take-home exams during the semester:

the first between Wednesday, March 14 and Friday, March 16,

the second between Wednesday, April 25 and Friday, April 27.

These exams will be written to take two hours; however, you will be allowed to work on each exam for 24 hours after unsealing it. Exact rules and procedures for the take-homes will be provided later. As class will meet as usual during the take-home exams, you should allot extra time for Math 343 during those weeks.

FINAL PROJECT: Each of you will independently study a topic in combinatorics, or in another area of mathematics that uses combinatorial methods. During the last two weeks of the course, you will give the class a half-hour presentation on your topic and prepare a handout that includes a problem or two based on the material of the presentation (the last problem set for the course will incorporate those problems). You will also write a five-to-seven page expository paper that presents your topic in your own words. This final project paper will be due on Thursday, May 17, at 9:00 p.m. (which is the end of the official final exam slot for Math 343).

Later in the semester, there will be a great deal of additional guidance on expectations for each element of the final project. I will point out possible topics when we approach them in class and also distribute lists of suggestions. You should expect to have chosen a topic and scheduled your talk by mid-April.

HOMEWORK: Implicit in each lecture and each problem set is a reading assignment. You should read each section of the book (and any handouts supplementing the book) that we discuss. These will give you another perspective on the material and are available at all times of day or night. When you read, read actively. Have pencil and paper ready to work through any omitted details.

There will be one problem set per week, generally due at the beginning of class on Wednesday. I will hand out problem sheets in advance. Which problems are due on a particular Wednesday will be determined by how far we have gotten in class by the end of lecture the previous Friday.

Late assignments will not be accepted (medical emergencies excepted). I will, however, drop your two lowest homework scores from consideration in your final grade.

The majority of the problems assigned to turn in will be challenging. Some computations will be tricky; you will generally have to write proofs and to think beyond examples done in class or in the book.

While our focus will be on discrete mathematics, we will sometimes require continuous methods—in particular, inequalities and power series.

Soon after each assignment is due, a solution set will be posted to the course web site (<http://www.oberlin.edu/math/faculty/wilmer/343>).

IF YOU HAVE QUESTIONS: We will build ideas on top of each other; missing material early on may cause trouble later. If you don't understand something, ask! Stop by at office hours (or make an appointment for a time that's better for you)! Send e-mail! Call!

WORKING TOGETHER: Talking about mathematics is one of the best ways to improve your understanding of the subject, both because other points of view can be illuminating and because conversation requires you to articulate your own ideas.

I encourage you to discuss problem sets with other students. Unless otherwise specified, however, *you must write up the problems on your own*. Some quick examples:

OKAY: "I wonder if we can use the definition of conditional probability to turn this into a sum. Pat, do you think that will work, or is something different going on?"

NOT OKAY: "Pat, I hate it when you write so small! Is that a 2 or an a in front of the y ? I'm never going to get this copied by the time class starts!"

OKAY: "I'm not sure I understand what's going on. Maybe we should try to find another example like this, except where X and Y are not independent."

NOT OKAY: "Huh. You have this variable m in your write-up. Maybe I can call it k instead, to make it look different."

You will be expected to work *entirely on your own* during the take-home exams, using only such written resources as are specified at the time of the exam.