

## SYLLABUS

Mathematics 329 will meet on Mondays, Wednesdays, and Fridays,  
from 1:30 p.m. to 2:20 p.m., in King 121.

**TAUGHT BY:** Elizabeth Wilmer

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**OFFICE HOURS:** Tuesday, 3:30–4:30 p.m.

Wednesday, 2:30–3:30 p.m.

Thursday, 2:00–4:00 p.m.

Or by appointment.

**COURSE WEBPAGE:** <http://www.oberlin.edu/math/faculty/wilmer/329>

**GOALS OF THE COURSE:** The abstract notions of “ring” and “field” generalize familiar mathematical systems such as the integers, the rational numbers, and polynomials. Considering these abstractions will allow us both to build entirely new systems and to analyze familiar systems more deeply. During the course, we will resolve the three great problems of antiquity (can an angle be trisected? a cube duplicated? a circle squared? —all using only straightedge and compass) and prove that there is no general procedure for solving polynomial equations of degree higher than 4 in terms of radicals.

**TEXT:** *Topics in Algebra, 2<sup>nd</sup> Edition*, (I.N. Herstein, JohnWiley and Sons, 1975), available at the Oberlin Bookstore. We will cover Chapters 3 and 5 and parts of Chapter 7.

**EVALUATION:** Each of the two take-home exams will be worth 100 points. The in-class presentation will be worth 50 points. The homework will be worth 150 points.

**EXAMS:** There will be one take-home exam during the semester,

between **Tuesday, October 14** and **Friday, October 17**.

There will also be a take-home final exam, which must be completed

between **Tuesday, December 16** and 11:00 a.m. on **Thursday, December 18**.

These exams will be written to take two hours; however, you will be allowed to work on each exam 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.

**IN-CLASS PRESENTATION:** Working in teams of two, you will prepare and give to the class a half-hour presentation on a topic related to the course. Later in the semester, there will be additional guidance on how to prepare your presentation. 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 partner and a topic and scheduled your talk by shortly after fall break.

**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 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.

A solution set will be put out in King 203 (the Mathematics Library) soon after each problem set has been collected. You can read them there or make your own copies (at 10¢ per page) in the Mathematics Department office next door.

**IF YOU HAVE QUESTIONS:** This course will have a particularly “vertical” structure. We will build new ideas on top of old ones and use material from group theory and linear algebra in (perhaps) surprising ways. 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 splitting field here. 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 the Galois group is abelian.”

**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.