SYLLABUS

Mathematics 329 will meet on Mondays, Wednesdays, and Fridays,
from 11:00 a.m. to 11:50 a.m., in King 325.

TAUGHT BY: Elizabeth Wilmer
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OFFICE HOURS: Tuesday, 9:30-11:30 a.m.,
Wednesday, 2:00–3:00 p.m.
Thursday, 2:00–4:00 p.m.

GOALS OF THE COURSE: The abstract notions of "ring" and "field" generalize number systems with two operations, addition and multiplication (such as the integers and the rationals). We will prove basic structure theorems for both rings and fields and examine many examples: some familiar, some not. We will also resolve the three great problems of antiquity (can an angle be trisected, a cube duplicated, or a circle squared, using only straightedge and compass?) and prove that there is no general procedure for solving polynomial equations of degree higher than four in terms of radicals.

TEXT: *Topics in Algebra, 2nd Edition,* (I.N. Herstein, John Wiley 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 100 points. The homework will be worth 100 points.

EXAMS: There will be one take-home exam during the semester. You will be allowed unlimited time between

11:50 a.m., Monday, October 14 and **11:00 a.m., Friday, October 18.**

There will also be a take-home final, distributed at the last class meeting on December 11. You will be allowed unlimited time between then and

11:00 a.m. Monday, December 17 (the end of the assigned exam slot for this course).

Both exams will be open textbook, open notes, but you will not be allowed to use any on-line or computational resources (no websites, no calculators, etc.).

IN-CLASS PRESENTATION: You will prepare and present 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 will be required to choose a topic and schedule your talk by **Friday, November 8** (two weeks 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 supplementary handouts) 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 (except for the exam 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 posted to Blackboard soon after each assignment is due.

IF YOU HAVE QUESTIONS: Warning! 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 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 may consult outside books, journals, and websites when you are working on ordinary problem sets, but *you should cite in your writeup* any sources you use other than our textbook and handouts.

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