

Math 50780
SUMR: Elliptic Curves
Spring 2018

Instructor: Prof. Andrew Putman

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Webpage: <http://www.nd.edu/~andyp/teaching/2018FallMath50780/>

Class Hours: TTh 09:30-10:45

Classroom: DeBartolo Hall 202

Office Hours: A doodle poll will be sent out to schedule them.

Topics: Elliptic curves are remarkable mathematical objects that show up in a wide variety of contexts (number theory, algebraic geometry, topology, complex analysis, mathematical physics, etc.). Most famously, they played a fundamental role in Andrew Wiles's proof of Fermat's Last Theorem. This course will be an introduction to elliptic curves with a focus on their number-theoretic properties, though the precise topics I cover will depend on the interests of the audience.

An unfortunate feature of a lot of undergraduate mathematics courses is that they make it seem like mathematics is a set of random disconnected topics. A nice feature of elliptic curves is that they are a concrete context in which a lot of the mathematics you have learned (analytic, geometric, algebraic, etc.) can be combined to solve problems. My aspiration is that you will leave this class with a strong sense that mathematics is truly a unified subject.

Text: Our main text will be *Rational Points on Elliptic Curves* by Silverman and Tate. Tate is one of the giants of 20th century mathematics, and he wrote this book in an attempt to make the subject of elliptic curves accessible to undergraduates.

Homework: Every Thursday evening I will post a large number of problems to the course webpage. Each of you will be randomly assigned 2-3 problems to solve and write up. Those will be due the following Thursday by 5pm. Once they are turned in, I will randomly assign each problem set to be read by another student. That student is expected to email both you and me written feedback on your homework by the next Thursday at 5pm. You will then have a week to revise your solutions in light of that feedback, and should email me revised solutions by the following Thursday at 5pm. Your solutions will then be posted to the course webpage.

You are required to type up your solutions. If you are unfamiliar with how to do this (e.g. using LaTeX), then contact me and I will give you resources.

You are strongly encouraged to work together as a group solving the problems. Math is much more fun and rewarding if it is a social activity!

Grading: Your grade will be 30% attendance and participation, 35% completion of your assigned homework, and 35% completion of your feedback on your classmate's problems.