

Math 137: Algebraic Geometry

Spring 2021

Syllabus

Prerequisites

This is an undergraduate course on Algebraic Geometry.

Basic algebra (fields, rings, modules, polynomial rings) such as from course 123 is a prerequisite.

Tentative list of topics

Affine and projective varieties, Hilbert's Nullstellensatz, Gröbner bases, curves, intersection numbers, Bézout's theorem, divisors and linear systems, Riemann–Roch theorem

Tablets

To discuss mathematics in sections, office hours, and among yourselves, please get a graphics tablet.

References

We will follow *Algebraic Curves* by WILLIAM FULTON to some extent:

<http://www.math.lsa.umich.edu/~wfulton/CurveBook.pdf>

I also highly recommend Brooke Ullery's lecture notes:

<http://people.math.harvard.edu/~bullery/math137/>

Other good references are:

- Chapter I of *Algebraic Geometry* by ROBIN HARTSHORNE
- *Algebraic Geometry* by JOE HARRIS

- *An Invitation to Algebraic Geometry* by KAREN E. SMITH, LAURI KARANPÄÄ, PEKKA KEKÄLÄINEN, and WILLIAM TRAVES
- *Undergraduate Algebraic Geometry* by MILES REID

I plan to put the lecture notes online after each class.

Grading

There will be weekly homework.

Furthermore, there will be a take-home exam at the end of the term.

The final grade will be 70% based on homework and 30% on the final exam.

The two lowest homework scores will be dropped.

You are encouraged to collaborate on homework, but must write the solutions up independently. Remember to always acknowledge collaborators and other sources on homework assignments. Collaboration on the final exam is forbidden. No external sources are allowed on the final exam, except the lecture notes (either those on the course website or those made by the student), problem sets, and solutions to problem sets.