

COURSE OUTLINE
MATH 532: ALGEBRAIC GEOMETRY I
TERM 2, 2015-16

TIME AND LOCATION

MWF 12-1 in MATX 1118

INSTRUCTOR

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COURSE WEBSITE

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COURSE OUTLINE

Algebraic geometry is – depending on one’s viewpoint – either the study of geometric objects by algebraic means, or the study of systems of polynomial equations by geometric means. This course is intended to be a first introduction to algebraic geometry. The goal is to prepare students to take more advanced courses in the subject. We will study the basic objects of algebraic geometry, algebraic varieties and schemes, as well as the morphisms between these objects. The course will loosely follow the lecture notes [G1], where we hope to cover chapters 1 to 6.

PREREQUISITES

A one year graduate course in algebra is certainly highly desirable. In particular, we will need a good understanding of commutative algebra. Some graduate-level (or advanced undergraduate) knowledge of topology or differential geometry is helpful, but not strictly necessary.

GRADING

There will be sporadic homework assignments and a final project. The final grade will be based half on the homework and half on the project.

REFERENCES

Below are some books which might be useful as a complement to Gathmann's notes. There is also an updated version of the first part of Gathmann's notes [G2].

- [E] David Eisenbud. *Commutative algebra. With a view toward algebraic geometry*. Graduate Texts in Mathematics 150. Springer-Verlag, New York, 1995. xvi+785. ISBN: 0-387-94268-8; 0-387-94269-6. DOI: 10.1007/978-1-4612-5350-1.
- [EH] David Eisenbud and Joe Harris. *The geometry of schemes*. Graduate Texts in Mathematics 197. Springer-Verlag, New York, 2000. x+294. ISBN: 0-387-98638-3; 0-387-98637-5.
- [G1] Andreas Gathmann. *Algebraic Geometry. Notes for a class taught at the University of Kaiserslautern 2002/2003*. URL: <http://www.mathematik.uni-kl.de/~gathmann/class/alggeom-2002/main.pdf>.
- [G2] Andreas Gathmann. *Algebraic Geometry. Class Notes TU Kaiserslautern 2014*. URL: <http://www.mathematik.uni-kl.de/~gathmann/class/alggeom-2014/main.pdf>.
- [H] Robin Hartshorne. *Algebraic geometry*. Graduate Texts in Mathematics 52. New York: Springer-Verlag, 1977. xvi+496. ISBN: 0-387-90244-9.
- [M] David Mumford. *The red book of varieties and schemes*. expanded. Vol. 1358. Lecture Notes in Mathematics. Springer-Verlag, Berlin, 1999. x+306. ISBN: 3-540-63293-X. DOI: 10.1007/b62130.
- [s1] Igor R. Shafarevich. *Basic algebraic geometry 1. Varieties in projective space*. 3rd ed. Springer, Heidelberg, 2013. xviii+310. ISBN: 978-3-642-37955-0; 978-3-642-37956-7.
- [s2] Igor R. Shafarevich. *Basic algebraic geometry 2. Schemes and complex manifolds*. 3rd ed. Springer, Heidelberg, 2013. xiv+262. ISBN: 978-3-642-38009-9; 978-3-642-38010-5.