

MATH 595 AG2: ALGEBRAIC GEOMETRY II, FALL 2010

Course Meets: 1-1:50 p.m., MWF, 441 Altgeld Hall

Instructor: Thomas Nevins (nevins@illinois.edu)

Prerequisites: Math 502 and Math 511 or some basic familiarity with commutative rings, affine and projective algebraic varieties.

Required Text: R. Hartshorne, *Algebraic Geometry*, Springer-Verlag, 1977.

Other Recommended References:

I. R. Shafarevich, *Basic Algebraic Geometry I*, second edition, Springer-Verlag.

Eisenbud and Harris, *The Geometry of Schemes*, Springer-Verlag.

Algebraic geometry is the geometric study of solution sets of systems of polynomial equations. In recent decades it has become a subject of tremendous breadth as well as depth. It plays a central role in numerous developments in analytic and differential geometry, number theory, representation theory, combinatorics, string theory, and integrable systems, among others.

In Algebraic Geometry I, we developed some basics of algebraic varieties over an algebraically closed field. This course will be devoted to the powerful methods of schemes and sheaf cohomology and their applications. The language of schemes and the application of sheaf cohomology dominate contemporary algebraic geometry. We'll aim both to master the technical underpinnings of these methods and also to develop an understanding of their meaning. We will also apply them to some beautiful classical geometry.