

**MATH 595 MG2: MODERN ALGEBRAIC GEOMETRY II,  
SPRING 2016**

**Course Meets:** 11-12:20 Tu Th

**Instructor:** Thomas Nevins ([nevins@illinois.edu](mailto:nevins@illinois.edu))

**Prerequisites:** Math 500; Math 510 or Math 511 or similar background advisable; Math 512 (Modern Algebraic Geometry) or similar background on schemes advised but not formally required.

**Texts:** *Algebraic Geometry*, R. Hartshorne, Springer-Verlag, 1977; also Ravi Vakil's "Foundations of Algebraic Geometry." Both texts are available electronically (Hartshorne via the UIUC Library).

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.

This course is the second semester of an introduction to the language and tools of modern algebraic geometry. It will **not** presume that students have taken the first semester. However, it will presume enough familiarity with basic ideas of algebraic geometry (as in Math 510 or 511, for example, plus a bit of extra sophistication) to make the second semester useful.

The second semester (i.e., Math 595) will focus on cohomology, especially of vector bundles (and sometimes more general coherent sheaves) on quasiprojective algebraic varieties, and applications to geometry. It will be possible to get much out of the course without knowing much about schemes or coherent sheaves in advance; though students who start the course without knowing anything about those subjects will be expected to do some extra reading early in the semester to master a few basics.

Students will be expected to do some reading outside of class. I would like us to work through many problems together.