

MATH 512-B1
MODERN ALGEBRAIC GEOMETRY
FALL 2021

Time: TuTh 11:00–12:15

Instructor: Sheldon Katz

Course website: <https://faculty.math.illinois.edu/~katz/class/f21/>

Text: Algebraic Geometry, R. Hartshorne, Graduate Texts in Mathematics 52, Springer NY 1977

Supplementary Texts:

(i) The Rising Sea. Foundations of Algebraic Geometry. R. Vakil, online course notes, <http://math.stanford.edu/~vakil/216blog/FOAGnov1817public.pdf>

(ii) Eisenbud-Harris, The Geometry of Schemes, Springer 2000

Reserve Materials:

Hartshorne, in library and electronically, link on course website

Eisenbud-Harris, in library and electronically, link on course website

Prerequisites: Abstract Algebra II (Math 501), or Introduction to Algebraic Geometry (Math 511), or permission of the instructor

In this course, we will develop the language of modern algebraic geometry via schemes and sheaves, while providing geometric understanding. The course will be based on content from the first four chapters of Hartshorne, supplemented by Parts I and IV of Vakil, and Chapter II of Eisenbud-Harris. Since the goal is for students to learn to *use* algebraic geometry, many examples will be worked out during class.

A lot of homework problems will be given, but they will neither be collected nor graded (since this is an advanced graduate course, grades are a non-issue). However, if you want to truly master the material, you are encouraged to try to do all of the problems. That being said, I recognize that your time is limited, so the course is designed to be valuable to you regardless of how much homework you complete.

Weekly readings and homework assignments will be posted on the course website.