Spring 2016

18.721 ALGEBRAIC GEOMETRY

Subject Description

Prerequisites: 18.702 and 18.901.

Formal Course Requirements: Regular problem sets, roughly 8, will be required and graded. In addition, there will be two quizzes during the regular class hour, and no final exam. Weighting in the final grade will be roughly 1/3 for the homework and 1/3 for each quiz.

Feel free to get together with other students to work on the assignments, but the solutions that you hand in must be written entirely by you. Please list your collaborators at the top of your assignment. Consulting texts to do the problems is strongly discouraged. Hand in homework in the slot provided next to the undergraduate math lounge, in building 4. Please hand in by by 4PM on the day it is due, so that it can be picked up.

The schedule for the quizzes is

Wednesday, March 9 and Friday, May 6

Goals of the course: When you have completed this course, you will be well prepared for a graduate course in algebraic geometry, and you should be able to read some papers in the subject. For this, it is essential that you become familiar with cohomology. The effort required is worthwhile.

Algebraic geometry is usually taught assuming familiarity with commutative algebra. We will try to keep commutative algebra to a minimum.

To help make the material accessible, I've made some simplifying restrictions: The most important are:

1. We work exclusively with quasiprojective varieties over the field of complex numbers.
2. Theorems will not be stated or proved in their most general form.
3. Cohomology is introduced only for modules (aka quasicoherent sheaves).

The course begins with plane curves. They provide a good introduction, and present an opportunity to introduce some important concepts. It would be reasonable to spend a whole semester on plane curves, but we won't do that.

Texts: There are notes for the course that I'll revise as the semester progresses. The first chapter is posted, and I'll post subsequent chapters as we go along. Raeez and I are in the process of revising notes from a previous course. I doubt we'll be able to stay ahead, so you may need to attend class to keep up.

I recommend two books in addition to the notes:

Plane Algebraic Curves by Gerd Fischer,

Algebraic Curves by William Fulton.

Fulton is the book closest to the content of the course that is available. It can be downloaded free of charge from the web:

http://www.math.lsa.umich.edu/∼wfulton/CurveBook.pdf

Several other books are listed in the bibliography.

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Office Hours: M 3-4, Th 2-3 See me after class to set up an appointment if you can't make those times.

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