Math 697-AG - Introduction to Algebraic Geometry - Fall 2007
TuTh 11:15 AM → 12:30 PM   LGRT 1234

Instructor: Eyal Markman
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Office hours: Tuesday 1:00 → 2:30 pm, Thursday 2:00 → 3:30 pm, and by appointment.

Prerequisites: Graduate level algebra course, such as Math 611 and 612.
References:

1. David Mumford: *Red Book on Varieties and Schemes.* Springer Lecture Notes in Math. Volume 1358. This would probably be the main reference.

2. *Algebraic Geometry*, by R. Hartshorne. A very useful standard textbook. Invaluable also as a reference for every researcher in algebraic geometry! It is rather dense.

3. Shafarevich: *Basic Algebraic Geometry I: Varieties in projective space.* Second Edition.

4. *Algebraic curves*, by W. Fulton 1969.
   An undergraduate level course, with a lot of elementary level background on commutative algebra.

Course Plan: This will be the first semester of a year long introductory course in algebraic geometry. The Spring 2008 semester will be taught by Prof. Tevelev. Topics this semester include:

1. Introduction: Algebraic sets, Zariski Topology, Nullstellensatz, Hilbert basis theorem.

2. Affine varieties, projective varieties, morphisms, birational maps, dimension, nonsingularity.

3. Curves: Valuation rings, completions, integral closure, discrete valuation rings. Extending maps of nonsingular curves to projective varieties.

4. Divisors, line bundles, linear systems, and morphisms to projective space. Picard group. Class group. Degree.

5. Riemann-Roch for projective algebraic curves and applications.

Homework: Will be assigned regularly. Students will hand in the homework and present their solutions to homework problems in several specially scheduled evening problem sessions. Group work is encouraged, but individual papers should be handed in. Expect to work hard this semester, as the above standard syllabus is quite demanding.

Grades: Will be determined by the homework and class participation.