Math 80220 Syllabus, Spring 2016

Course title: Introduction to Toric Varieties

Instructor: Claudiu Raicu

Course website: sakai.nd.edu

Email: craicu@nd.edu

Office: 112 Hayes–Healy

Office hours: TBD

Problem sessions: TBD

Textbooks: *Toric varieties* by David A. Cox, John B. Little, Henry K. Schenck; *Introduction to Toric Varieties* by William Fulton.

Course Description

This course will be an introduction to the theory of toric varieties, from an algebraic geometry point of view. Due to their concrete, combinatorial nature, toric varieties provide an excellent source of examples in algebraic geometry, as well as a great route to introduce and illustrate more abstract concepts. I will present the basic theory with an emphasis on examples, and in particular I will discuss existing computer algebra software that will allow you to make further explorations on your own.

The main prerequisite for this course will be graduate algebra, although some basic knowledge of algebraic geometry and commutative algebra will be useful. My aim is to introduce the standard material on toric varieties (cones, fans, polytopes; affine, projective, and abstract toric varieties; divisors and cohomology), and if time permits to discuss some further topics.

I will suggest weekly homework exercises, and I strongly encourage you to work on them either individually or in groups. If there is interest, we will organize problem sessions where we present/work through some of the exercises.