ELLIPTIC CURVES–MATH 593, Fall 2012

- **Textbook**: *Elliptic Curves*, Authors: Gurjar et. al., Narosa Publishing House, distributed by the AMS in the US. Since it is possible that the book may not easily available, I will provide an electronic version (somewhat old) at my web page. There are innumerable books on the topic in the library and most of what we cover will be available in these.
- **Instructor**: Mohan Kumar, Room 111 A, Cupples I. Phone: 5-6728; email: kumar at wustl dot edu and URL:
  http://www.math.wustl.edu/~kumar/courses/539-2012/eliiptic.html
- **Class times**: The class meets on MWF 1-2pm in Cupples 218.
- **Office Hours**: Monday 3-4pm and Thursday 1-2pm or by appointment. Since I am also teaching 310, these office hours may be a bit crowded, but you are welcome to drop in at other times.
- I will give some homework and your final grades will depend on these. There will be no examination at the end of the course.
- The subject of Elliptic curves shows, like all good mathematics, the fundamental unity of mathematics. The course will have three parts, analytic, algebraic and number theoretic.

  For the analytic part, we will assume that all of you have had a course in graduate level complex analysis and similarly for the algebraic part, you have had a course in graduate level algebra. In particular, some commutative algebra and Galois theory will be assumed. Some facility with polynomials is expected.

  We will briefly discuss Riemann surfaces and complex tori and their moduli in the analytic part. In the next part, we will discuss (again, briefly) varieties, projective varieties and morphisms. We will prove Bezout's theorem, discuss curves, divisors, elliptic curves and the structure of endomorphisms of elliptic curves. In the last part, we will deal with rational points on curves, Mordell-Weil Theorem and some applications.