

## MATH 613E: TOPICS IN NUMBER THEORY ELLIPTIC CURVES AND ARITHMETIC

### Instructor:

Sujatha Ramdorai

Office: Math Annex 1201

Timings: Monday 10-11; Wednesday 10-12; MATH 202

email: sujatha@math.ubc.ca

URL: [www.math.ubc.ca/~sujatha](http://www.math.ubc.ca/~sujatha)

Office Hours: Wednesdays 12 - 1, by appointment

### Course Outline:

Elliptic curves are important objects and their study straddles different areas such as topology, algebraic topology and arithmetic. However some of the deepest problems related to elliptic curves occur in Number Theory. In this course, we shall explain one such, namely the Birch and Swinnerton-Dyer Conjecture, which was formulated in the early 1960's. The strong version of this conjecture predicts an exact formula that involves different, mysterious objects occurring in the study of elliptic curves and we will explain the terms occurring in this formula. The process of acquainting oneself with these terms will lead us to a deeper study of the theory of elliptic curves itself. We shall also present what is known about this conjecture.

There will be no final exam for this course. I will try to make the course as self-contained as possible, pointing to further readings as the course progresses. Students will be assigned topics during the course on which they are expected to give a seminar style lecture.

**Reference:** The main reference will be the classic book *Arithmetic of Elliptic curves* by J.H. Silverman.