Course Announcement

Math 201C - Spring 2011; Cristian D. Popescu.

"Selmer Groups"

I will discuss Selmer groups associated to Galois representations, with an eye on two particular examples: ***the ideal-class group*** of a number field and ***the Selmer group of an elliptic curve*** defined over a number field.

The course will be aimed at exploring the analogies between two major conjectures in number theory: 1) **The Brumer-Stark conjecture** (which links special values of Artin L-functions and ideal-class groups); 2) **The Mazur-Tate conjecture** (which links special values of L-functions associated to elliptic curves defined over $\mathbb{Q}$ and the Selmer groups associated to these curves.)

The Brumer-Stark conjecture is now a theorem under certain hypotheses, due to my recent joint work with Greither. The Mazur-Tate conjecture is wide open. I hope that by the end of this course we will be able to transfer some ideas used in the proof of the first conjecture and say something new and meaningful about the second conjecture.

Background requirements: I will define everything as we move along. However, some prior exposure to algebraic number theory and Galois cohomology would be helpful.

Cristian D. Popescu