

MAST 699A (MAST 832)

Topics in Algebra
Winter 2015

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Class Location: Mondays and Wednesdays, 10:00-11:15, in LB 759-06.

Office Hours: By appointment.

Main Topics:

- 1) Curves over algebraically closed fields (2 weeks).
- 2) Elliptic curves over the complex numbers (1 week).
- 3) Elliptic curves over finite fields (1 week).
- 4) Elliptic curves over local fields. Formal groups (2 weeks).
- 5) Elliptic curves over global fields (especially over number fields) (1 week).
- 6) Mordell's theorem. Formulation and consequences (2 weeks).
- 7) The proof of Mordell's theorem (3 weeks).

Main Text: J. Silverman, *The Arithmetic of Elliptic Curves*, Graduate Texts in Mathematics, 129 Springer-Verlag (N.Y., Berlin, Heidelberg, 2009 ISBN 978-0-387-09494-6).

Outline: The course will focus on understanding the geometry and arithmetic properties of elliptic curves. The main result that will be proved is Mordell's theorem which states that the group of rational points of an elliptic curve, defined over the rationals, is a finitely generated abelian group. Some natural generalizations of this theorem will also be discussed.

Evaluation:

Problem sets (4)	50%
Final exam	50%