

Course outline for Math 250, Fall 2006.

INSTRUCTOR

Instructor: Thomas Lam
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Office hours: Monday 3:15-4:30, Thursday 11:00-12:00.

LECTURES

Class hours: Monday Wednesday Friday 2-3pm.
Class location: Science Center 109

EXAMS AND HOMEWORK

Homework: Problem sets, roughly once a week.
Paper: There will be a final paper, due during reading week.
Exam: None.
Grading: Roughly problem sets 70% and paper 30 %.

SYLLABUS

The exact syllabus has not yet been decided, but I expect to spend a bit more than one-third of the time on Galois theory and the rest of the time on representation theory of finite groups and associative algebras.

For Galois theory, we will start with splitting fields of polynomials and go rather quickly to the fundamental theorem of Galois theory. After that we will spend some time with the calculation of Galois groups. I expect to get up to a proving a version of Hilbert's Theorem 90, in modern group cohomology notation.

For representation theory, we might do:

- Representation theory of finite groups, character theory.
- Wedderburn's theorem and central simple algebras.
- Some modular representation theory, especially the case of symmetric groups.

TEXTBOOKS

There are no required textbooks for this course. Here are some references for Galois theory:

- *Galois Theory*, Ian Stewart.
- *Galois Theory*, Joseph Rotman.
- *Algebra*, Serge Lang.
- *Basic algebra*, Nathan Jacobson.

For representation theory:

- *Representation theory: A First Course*, Fulton and Harris.
- *Representation theory of finite groups and associative algebras*, Curtis and Reiner.
- *Linear representations of finite groups*, Serre.
- *The representation theory of the symmetric group*, James and Kerber.