Math 581b: Algebraic Number Theory (Syllabus)

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Class: Monday, Wednesday, Friday at 10:30AM in Padelford C401.

Webpage: `http://wiki.wstein.org/edu/2010/581b`

Evaluation:

- 70% homework (assigned each Wednesday, due the following Wednesday)
- 30% final project (about 10 pages)
- No exams

Office Hours: Mondays 2:30–4:30 in Padelford C423 (my office). I will also frequently go to lunch at 1:30 PM nearby with students.

Textbooks:

- We will follow this book closely: `http://wstein.org/books/ant/`
- Milne's Algebraic Number Theory book is also good: `http://www.jmilne.org/math/CourseNotes/ant.html`
- I mainly learned algebraic number theory from Lang's *Algebraic Number Theory*, Borevich and Shafarevich's *Number Theory*, Fröhlich and Taylor's *Algebraic Number Theory*, Marcus's *Number Fields*, Cassels and Frohlich's *Algebraic Number Theory*, Ireland and Rosen's *A Classical Introduction to Modern Number Theory*. You can learn a lot from those books (∀∃ `pdf`'s).

Course Goals:

1. Learn **proofs** of important theorems: unique factorization of ideals in Dedekind domains, structure of factorization of rational primes (decomposition and inertia groups), finiteness of the class group and unit group.
2. Learn about some **objects** of algebraic number theory: number fields, (degree 1) function fields, adeles and ideles, Galois cohomology groups, local fields, class fields and the Artin reciprocity map, elliptic curves.
3. Learn how to **compute** with some of the above objects.