

# Math 538: Algebraic Number Theory

## Spring Term, 2013

Lior Silberman

v1.0 (January 3, 2013)

Course Website	<a href="http://www.math.ubc.ca/~lior/teaching/1213/538_W13/">http://www.math.ubc.ca/~lior/teaching/1213/538_W13/</a>
Contact me at	MAT 229B — 604-827-3031 – <a href="mailto:lior@math.ubc.ca">lior@math.ubc.ca</a>
My Website	<a href="http://www.math.ubc.ca/~lior/">http://www.math.ubc.ca/~lior/</a>
Class	M 11:00-12:00, F 10:00-12:00, MATH 1100
Office Hours	By appointment and after class.
Textbook	None required; see below for recommendations
(Informal) Prerequisites	Introductory Algebra, Galois Theory

### About the course

This will be a standard graduate number theory course.

Main topics will include:

- Number fields, rings of integers, ideals and unique factorization. Finiteness of the class group.
- Valuations and completions; local fields.
- Ramification theory, the different and discriminant.
- Geometry of numbers: Dirichlet's Unit Theorem. and discriminant bounds.
- Other topics if time permits

The main pre-requisites are basic algebra (rings and fields, rings of polynomials, unique factorization in Euclidean domains), basic number theory (modular arithmetic, factorization into primes) and Galois Theory, but no specific courses are required.

### Textbook

There are many books titled "Algebraic Number Theory"; you can use any for your own reference. I will personally use Lang for my preparation, but if you plan to buy one book make it Neukirch which is more comprehensive and has exercises.

### Evaluation and grading

The final grade will be based on regular problem sets. There will be no final exam.

## References

- [1] Borevich–Shafarevich, *Algebraic Number Theory*
- [2] Lang, *Algebraic Number Theory*
- [3] Neukirsch, *Algebraic Number Theory*