

MATH 210A. ALGEBRA

Instructor: Prof. Brian Conrad, conrad@math.stanford.edu

Office: 383CC, Sloan Hall

Office hours: MWF, 9–10am, and by appointment.

Course assistant: Jeremy Miller (jkmiller@math.stanford.edu), 381K, Sloan Hall. He will hold office hours in his office at 10–11am on Wednesdays and 1:30–3:30pm on Thursdays.

Prerequisites: Math 120 and 121 (elementary group theory and abstract linear algebra, notion of ideal in a commutative ring, elementary facts related to quotient modules and quotient of a ring by an ideal, and finite Galois theory – including finite fields).

Textbooks: *Algebra* by Serge Lang.

Homework/exams: Homework is due *every* Friday, and is posted at the course webpage. The first homework is posted already and is due on the first Friday of the course (it only requires material from the first lecture and assumed background in algebra).

There will be no exams; the final grade is determined as follows: 100% homework. You may certainly work with others on the homework (and are encouraged to discuss the material with classmates), but definitely write up solutions on your own.

Late homework is not accepted for any reason whatsoever. However, the lowest homework grade is dropped. (A late homework counts as a zero.) Be careful not to “waste” this option by using it up too early in the quarter!

Course description: This is the first quarter of the year-long sequence in algebra at the graduate student level. We will cover a lot of tensorial and multilinear algebra, both over fields and more general commutative rings, basic properties and techniques in the study of modules and rings (e.g., localization, exact sequences, derived functors), some structure theory in linear algebra (e.g., canonical forms from a module viewpoint, structure of symplectic and Hermitian forms, etc.), and some preliminary ideas in the theory of group representations. All of these notions will be developed more deeply in the subsequent two quarters of the sequence.

This material is absolutely basic for anything in advanced pure mathematics which involves algebraic concepts. This course will move rapidly, so please don't let yourself fall far behind.