

COURSE SYLLABUS FOR MATH 221: COMMUTATIVE ALGEBRA

COURSE DESCRIPTION This is a graduate level course in commutative algebra.

MEETING TIME The course meets on MWF at 11, in Science Center 411.

OFFICE HOURS Thursday at 2PM or by appointment, in Science Center 435.

TEXT “Commutative Algebra,” by David Eisenbud. We will cover a selection of materials from the first thirteen chapters.

COURSE WEBSITE <http://www.math.harvard.edu/~lurie/221.html>

PREREQUISITES Math 123 or equivalent.

TOPICS TO BE COVERED (SUBJECT TO CHANGE) • Modules and tensor products

- Prime ideals, spectra, and localization
- Flat modules and flat algebras
- Valuation theory and integral extensions
- Discrete valuation rings and Dedekind rings.
- Noetherian rings. The Hilbert basis theorem and primary decomposition.
- Noether normalization and Hilbert’s Nullstellensatz.
- Completions of Noetherian rings.
- Henselian rings and Hensel’s lemma.
- Dimension theory of Noetherian local rings.

GRADING Grades will be based on homework ($\frac{3}{4}$) and a take-home final exam due at the end of reading period ($\frac{1}{4}$). Homework will be assigned on the first class day of every week (usually a Monday) and due on the first class day of the following week.