Mathematics 423/502. Topics in Algebra

TTh 14:00-15:20, MATX 1102, Winter 2018

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Textbook: Atiyah and Macdonald, Introduction to commutative algebra.

Course description: This is a course in Commutative Algebra, with some homological algebra mixed in. This material is of interest in its own right; it is also important for advanced work in algebraic geometry, algebraic topology and algebraic number theory. Specific topic include:

- Preliminaries on rings and ideals.
- Nilradical and Jacobson radical.
- Local rings and localization.
- Modules: tensor product, extension and restriction of scalars.
- Noetherian and Artinian rings.
- Hilbert basis theorem.
- Gröbner bases.
- Hilberts Nullstellensatz, Noether normalization theorem, and an introduction to affine algebraic geometry.
- Time permitting, we may explore further topics, such as primary decomposition of ideals in Noetherian rings, Krull dimension, valuations, or finite generation of rings of invariants.

Prerequisites: The official prerequisites are Math 412 or Math 423/501. The most important pre-requisite not listed in the calendar is Math 323 or equivalent. In other words, I will expect a high comfort level with linear algebra, and some familiarity with rings and modules.

Homework will be assigned on a bi-weekly bases. Interaction and collaboration on homework is encouraged, but if you collaborate, please acknowledge this in writing.

Evaluation: Course marks will be based on the homework and two midterm exams. The midterms will be given in class Thursday, February 15 and Thursday, March 22.

For further information, see the course web page at
`http://www.math.ubc.ca/~reichst/423-502S18syll.html`