**Mathematics 423/502. Algebra II**
TTh 11:00-12:30, January - April 2026
in MATH, room 104.

**Instructor:** Zinovy Reichstein

**Textbook:** Atiyah and Macdonald, Introduction to commutative algebra.
Available on line through UBC library.

**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. The main topics will be:

- Rings, ideals, nilradicals, the prime spectrum.
- Local rings and localization.
- Modules: tensor product, exact sequences, flatness.
- Noetherian and Artinian rings.
- Hilbert basis theorem.
- Hilbert's Nullstellensatz, Noether normalization theorem.
- Algebraic varieties and an introduction to affine algebraic geometry.
- Gröbner bases.

The textbook by Atiyah and Macdonald is a classic. Each chapter conveys a vast amount of information in just a few pages. I will follow the book quite closely in the first half of the course, then deviate from it with increasing frequency in the second half. In particular, Gröbner bases are not covered in Atiyah-Macdonald. I will be posting lecture notes throughout the term.

**Homework:** I plan to assign a problem set every 2-3 weeks. Interaction and collaboration on homework is encouraged, but the work you turn in should be your own, written in your own words.

**Evaluation:** Course marks will be based on the homework (50%) and the final exam (50%). There will be no midterm exam.

**Further information** will be provided on Canvas.