

**Instructor:** Sam Payne, DL 414, sam.payne@yale.edu

**Office Hours:** By appointment.

**Textbook:** Introduction to commutative algebra, by Atiyah and Macdonald.

**Prerequisites:** Introduction to abstract algebra (Math 350), or equivalent.

**Course Overview:** This course covers the basic theory of commutative algebra, including rings, ideals, modules, localization, integral dependence, noetherian and artinian conditions, completions, and dimension theory. Lectures will emphasize examples and geometric intuition. All of this material is essential for anyone wishing to continue toward advanced studies in algebraic geometry or algebraic number theory, and profoundly useful in many other fields of mathematics. Additional and equally essential topics are covered in the assigned homework problems.

The target audience for this course includes advanced undergraduates as well as beginning graduate students. In conjunction with Math 381/501 in the spring, this course provides preparation for the graduate qualifying exam in algebra.

**Homework:** Homework problems will be assigned each week from the textbook. Although these assignments will not be collected, material covered in the homework is part of the curriculum and will be included on the midterm and final exams. Multiple complete solution sets are available online, just a google search away.

**Grading:** Grades for the course will be based on the first midterm exam: 30%, second midterm exam 30%, and final exam 40%.