Time: Tu, Th 10:30AM - 11:45AM (D+ block)
Bromfield-Pearson Room 003
Instructor: Dr. Robert Kroholler
Office: SEC 010
Office Hours: Th 12-2
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Text: *Abstract Algebra* by David Dummit and Richard Foote.
Content: Algebra is the study of patterns and structures. For this reason it is the underpinning of many areas of mathematics. This course concentrates on four basic algebraic structures: groups, rings, modules, and fields. Since one of the purposes of the course is to prepare the students for the algebra core exam, we will follow closely its syllabus, reproduced below.

1. Generalities:
    Quotients and isomorphism theorems for groups, rings, and modules.
2. Groups:
    The action of a group on a set; applications to conjugacy classes and the class equation.
    The Sylow theorems; simple groups.
    Simplicity of the alternating group for $n \geq 5$.
3. Rings and Modules:
    Polynomial rings, Euclidean domains, principal ideal domains.
    Unique factorization; the Gauss lemma and Eisensteins criteria for irreducibility.
    Free modules; the tensor product.
    Structure of finitely generated modules over a PID and applications.
4. Fields:
    Algebraic, transcendental, separable, and Galois extensions, splitting fields.
    Finite fields, algebraic closures.
    The fundamental theorem of Galois theory for a field of arbitrary characteristic.

Many of these topics are covered in Math 145 and 146, but we will study them in greater depth. It is unlikely that we can cover all of these topics in the first semester. Students wishing to take the algebra core exam in January will need to do some additional study on their own.
This course is suitable for undergraduates who have done very well in Math 145 and/or 146, especially those wishing to attend graduate school.
Learning Objectives: This course addresses Learning Objectives 1, 2, 3 for Masters
`http://math.tufts.edu/?pid=22&c=39` and Ph.D. programs
`http://math.tufts.edu/?pid=25&c=21inMathematics`.
Homework: There will be weekly homework assigned throughout the course of the semester. You may work on it in groups but should submit your own copy in your own words and writing.
Exams: There will be a midterm and a final exam. The midterm date will be agreed upon in class.
The final will be on the 15th December at 3:30 or a take home exam to be decided in due course.
Grades: Your course grade will be calculated using the following formula:

$$30\% \text{ HW} + 30\% \text{ Midterm} + 40\% \text{ Final.}$$

Student Accessibility Services If you are requesting an accommodation due to a documented disability, you must register with the Student Accessibility Services Office at the beginning of the semester. To do so, call the Student Accessibility Services office at 617-627- 4539 to arrange an appointment with Kirsten Behling, Program Director of Student Accessibility Services.