

## MAT 632 — INTRODUCTION TO ABSTRACT ALGEBRA — SPRING 2017

Instructor: Professor Graham Leuschke  
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Lecture: TR 11:00–12:20, Carnegie 115  
Office hours: MW 10:00–11:30; by appt, and any time my door is open  
Text: Dummitt and Foote, *Abstract Algebra*, **3rd ed.**

**Course Description:** This is the second course in a two-semester introductory graduate sequence. The topics covered will come from ring theory (including factorization and module theory) and field theory (including Galois theory).

### Syllabus:

D&F Chapter 7	Intro to Rings	definitions and examples; homomorphisms and quotient rings; ideals; integral domains and rings of fractions; Chinese Remainder Theorem
Chapter 8	Factorization	UFDs, PIDs, and EDs
Chapter 9	Polynomial Rings	definitions and basic properties; Euclidean algorithm; Gauss' Lemma; roots, factors, and irreducibility
Chapter 10	Modules	definitions and examples; homomorphisms and quotient modules; free modules; generators and relations
Chapter 12	Modules over PIDs	the Fundamental Theorem; FTFGAG; canonical forms
Chapter 13	Field Theory	definitions and examples; algebraic and transcendental extensions; straightedge and compass constructions; algebraic closures and separability
Chapter 14	Galois Theory	the Fundamental Theorem of Galois Theory and applications; finite fields; insolubility of the quintic

**Grading:** I will use the following scheme to calculate your grade:

Homework	40%
In-class midterm exam:	30%
Cumulative final exam:	30%

**Homework.** Homework sets will be assigned weekly. *These homework assignments are crucial to your learning experience in the course.* You are encouraged to work together to solve the problems, but each person must hand in their own writeup.

I recommend using  $\text{\LaTeX}$  to prepare your homework writeups. A new service called Overleaf makes this easy, and I am preparing a template file to smooth the path further. Ask me for details.

**Students with Disabilities:** If you believe that you need accommodations for a disability, please contact the Office of Disability Services (ODS), <http://disabilityservices.syr.edu>, located in Room 303 of 804 University Avenue, or call 315-443-4498 for an appointment to discuss your needs and the process for requesting accommodations. ODS is responsible coordinating disability-related accommodations and will issue students with documented Disabilities Accommodation Authorization Letters, as appropriate. Since accommodations may require early planning and generally are not provided retroactively, please contact ODS as soon as possible. You are also welcome to contact me privately to discuss your academic needs although I cannot arrange for disability-related accommodations.

**Academic Integrity:** The Syracuse University Academic Integrity Policy holds students accountable for the integrity of the work they submit. Students should be familiar with the Policy and know that it is their responsibility to learn about instructor and general academic expectations with regard to proper citation of sources in written work. The policy also governs the integrity of work submitted in exams and assignments as well as the veracity of signatures on attendance sheets and other verifications of participation in class activities. Serious sanctions can result from academic dishonesty of any sort. For more information and the complete policy, see <http://academicintegrity.syr.edu>.

**Religious observances policy:** SU religious observances policy recognizes the diversity of faiths represented among the campus community and protects the rights of students, faculty, and staff to observe religious holidays according to their tradition. Under the policy, students are provided an opportunity to make up any examination, study, or work requirements that may be missed due to are religious observance provided they notify their instructors before the end of the second week of classes. For fall and spring semesters, an online notification process is available through MySlice (Student Services -> Enrollment -> My Religious Observances) from the first day of class until the end of the second week of class.