

MAT 632 -- INTRODUCTION TO ALGEBRA II -- Spring 2019

Contact Information

Instructor: Professor Dan Zacharia

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Office Hours: MW 10:00-11:30. Also by appointment, and any time my door is open.

Class Time and Location: MW 12:45–2:05, Carnegie 120.

Course Content

Course Description: MAT 632 is a continuation of MAT 631. We will cover rings (including factorization and module theory) and fields (including Galois theory). *Prereq.:* MAT 631.

Textbook: *Abstract Algebra, 3d ed.* Dummit & Foote. ISBN 978-0-471-43334-7.

Course outline:

1. Introduction to Ring Theory (Chapter 7). Definitions, examples, homomorphisms, ideals and quotient rings. Integral domains and rings of fractions. The Chinese Remainder Theorem.
2. Factorization (Chapters 8 and 9). Euclidean Domains, Principal Ideal Domains, and Unique Factorization Domains. Gauss Lemma. Polynomial rings, irreducibility and roots.
3. Modules (Chapters 10 and 12). Definitions and examples, homomorphisms and quotient modules. Free modules, the fundamental theorem of finitely generated abelian groups, canonical forms.
4. Fields (Chapter 13). Definitions and examples, algebraic and transcendental extensions, algebraic closure and separability. Straightedge and compass constructions.
5. Galois Theory (Chapter 14). The Fundamental Theorem of Galois Theory. Finite fields, insolubility of the quintic.

Course Policies

Grading. The grades will be based on homework (40%), a midterm exam (30%), and a cumulative final exam (30%).

Homework will be assigned in class. Some problems will be assigned to be turned in and graded. You are encouraged to work together to solve the problems, but each person must submit her/his own writeup. Writing mathematics is an important skill to acquire and will be taken into consideration in the grading. Your solutions should be clear, concise, and complete. If something is obvious or trivial, you should say so, but be sure that you are not ignoring the crux of the problem. I recommend using LaTeX for your writeups. You are encouraged to discuss the homework problems with your classmates and to work together, but submitted assignments must be written up individually.

Exams. There will be one midterm exam during the semester probably the week before Spring Break, and a cumulative two-hour final exam on Tuesday, May 7, 2019 from 3:00-5:00 pm. There will be no make-ups: a missed exam counts as zero unless you present a valid excuse from a physician or the Dean's office. If the absence is excused, your final exam grade will be used to replace the missed exam.

Tips for success in this course:

- It is absolutely essential that you understand how to solve all the assigned problems. Once you understand how to solve a problem, write your solution down neatly and in full detail with explanations that make your reasoning clear.
- Don't fall behind. If you are having difficulties keeping up with the material, see me immediately to discuss the problem.
- Ask questions: in class, after class, during office hours, or by email.

University Policies

Students with disabilities. If you believe that you need academic adjustments (accommodations) for a disability, please contact the Office of Disability Services (ODS), visit the ODS website—<http://disabilityservices.syr.edu>, located in Room 309 of 804 University Avenue, or call (315) 443-4498 or TDD: (315) 443-1371 for an appointment to discuss your needs and the process for requesting academic adjustments. ODS is responsible for coordinating disability-related academic adjustments and will issue students with documented Disabilities Accommodation Authorization Letters, as appropriate. Since academic adjustments may require early planning and generally are not provided retroactively, please contact ODS as soon as possible.

Academic Integrity. Syracuse University's Academic Integrity Policy reflects the high value that we, as a university community, place on honesty in academic work. The policy defines our expectations for academic honesty and holds students accountable for the integrity of all work they submit. Students should understand that it is their responsibility to learn about course-specific expectations, as well as about university-wide academic integrity expectations. The policy governs appropriate citation and use of sources, the integrity of work submitted in exams and assignments, and the veracity of signatures on attendance sheets and other verification of participation in class activities. The policy also prohibits students from submitting the same work in more than one class without receiving written authorization in advance from both instructors. Under the policy, students found in violation are subject to grade sanctions determined by the course instructor and non-grade sanctions determined by the School or College where the course is offered as described in the Violation and Sanction Classification Rubric. SU students are required to read an online summary of the University's academic integrity expectations and provide an electronic signature agreeing to abide by them twice a year during pre-term check-in on MySlice.

The Violation and Sanction Classification Rubric establishes recommended guidelines for the determination of grade penalties by faculty and instructors, while also giving them discretion to select the grade penalty they believe most suitable, including course failure, regardless of violation level. Any established violation in this course may result in course failure regardless of violation level.

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 a 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.