

MAT 632, ALGEBRA II
Spring Semester 2015

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

Instructor: Declan Quinn, 229D Physics Building.

Office Hours: Mon 2:30-3:30pm, Wed 1:50pm-2:45pm, Fri 12:45pm-1:40pm and by appointment. (Any changes will be announced in class and via email.)

Telephone: 443-1484.

Text: *Algebra*, 2nd Edition, by Michael Artin, Pearson

Mathematics Prerequisite: MAT 631.

Approximate List of Topics:

- **Introduction to Ring Theory** Definitions, examples, homomorphisms, ideals and quotient rings. Integral domains and rings of fractions. The Chinese Remainder Theorem.
- **Factorization** Euclidean Domains, Principal Ideal Domains (PID), and Unique Factorization Domains (UFD). Gauss Lemma. Polynomial rings, irreducibility and roots.
- **Modules** Definitions and examples, homomorphisms and quotient modules. Free modules, the fundamental theorem of finitely generated modules over a PID, the fundamental theorem of finitely generated abelian groups, canonical forms.
- **Fields** Definitions and examples, algebraic and transcendental extensions, algebraic closure and separability. Straightedge and compass constructions.
- **Galois Theory** The Fundamental Theorem of Galois Theory. Finite fields, insolubility of the quintic.

Homework: In order to learn this material it is absolutely vital that you work problems. Some of these will be listed for handing in. You are encouraged to work together, but each person must write up an independent solution. The solution to these problems, as well as some others, will be posted on blackboard.

Grading: Your grade will be based 40% on homework, 30% on the midterm (date and format to be decided) and 30% on the final exam.

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.

Disabilities: Students who may need academic accommodations due to a disability are encouraged to discuss their needs with the instructor at the beginning of the semester. In order

to obtain authorized accommodations, students should be registered with the Office of Disability Services (ODS), 804 University Avenue, Room 309, 315-443-4498 and have an updated accommodation letter for the instructor. Accommodations and related support services such as exam administration are not provided retroactively and must be requested in advance. For more information contact the Office of Disability Services.

Office of Disability Services: Office of Disability Services, 804 University Avenue Room 309, Syracuse, New York 13244-2330 (315) 443-4498 TDD: (315) 443-1371 e-mail: odssched@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 a religious observance provided they notify their instructors before the end of the second week of classes. For fall and spring semesters, an online registration is available through MySlice (Student Services -> Enrollment -> My Religious Observances) from the first day of class until the end of the second week of classes.