Syllabus: MA 435-535-2F
Algebra II: Modern
Spring 2025

Class meets: Tuesday & Thursday 15:30–16:45, HHB 126
Instructor: Dr. Nándor Simányi
Office: UH 4014, phone: 205-934-2154, E-mail: simanyi@uab.edu
Web site: http://people.cas.uab.edu/∼simanyi/teaching/MA-435-535-2025/
Office hours: Monday and Wednesday, 12:00–1:00, or by appointment.

Course Description. Basics of the most important algebraic structures: Groups, rings, fields. Plenty of examples.

Text:. Regularly distributed handouts and I. N. Herstein: Abstract Algebra. John Wiley & Sons. 3rd Ed. (A copy of this book can be found on the website dedicated to this class.)

Homework will be assigned on a weekly basis.

Learning outcomes: By the end of the course students will learn how to use abstract algebraic structures, like groups, rings, fields, etc, in solving complex real-life problems presenting themselves, for instance, in coding design, geometric optimization, discrete geometry, algorithmic design, etc.

Assessment Procedures. Student achievement will be assessed by any or all of several measures: Regularly assigned homework problems, two midterm tests, and a comprehensive final exam. A numerical score is given on each of them.
Students taking the class at the 500 level will have an additional, assigned project to prepare in order to successfully pass the class.

Class Attendance: Class attendance is mandatory. One can get a passing grade only if the number of their unexcused absences is not more than 20% of the number of classes.

Grading Policy. Student achievement on the items assessed will be used to determine the final grade. The percentage of the final numerical grade assigned to each item is as follows: final exam: 40%; two midterm tests: 20% each; homework 20%. At the end I will "reasonably" curve the overall numerical scores.

Final exam. Tuesday, April 29, 4:15 PM 6:45 PM

Draft Syllabus

Groups: Definition and examples
Subgroups, isomorphisms
Transformation groups
Cyclic groups, order of an element
Coset decomposition, Lagrange's theorem
Homomorphisms. Normal subgroups and factor groups
The homomorphism theorems
Cauchy's theorem

Rings: Definitions and examples
Subring, center
Ideals, homomorphisms, quotient rings
Polynomial rings and their structure
Divisibility, irreducible vs. prime elements.
Unique Factorization Domains

Fields: Definition, examples.
Prime fields, characteristics
Field extensions
Elements of Galois Theory, time permitting.