Andrew Vince
Department of Mathematics

College *of* Liberal Arts *and* Sciences

Abstract Algebra

MAS 4301
Spring 2025

Time: MWF period 4
Place: Little 217
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Textbook: Contemporary Abstract Algebra by J. Gallian (10th edition)

Office Hours: MWF period 5 (or by appointment)

Abstract algebra is the study of sets endowed with operations on their elements. This leads to a broad generalization of ordinary addition and multiplication of real numbers. The main algebraic structure covered in this course is called a *group*, but *rings* and *fields* will also be mentioned.

Topics

- Introduction
  - Set notation
  - A little number theory
  - Equivalence relations
  - Symmetry

- Groups
  - Examples
  - Subgroups
  - Permutation groups
  - Cyclic groups
  - Isomorphism
  - Cosets and Lagrange's Theorem
  - Direct product and the Fundamental Theorem of Abellian Groups
  - Normal subgroups and factor groups
  - Homomorphism
  - The class formula
  - Sylow's theorems
  - Finite simple groups

- Rings
  - Examples
  - Basic properties

Homework

(The problems will change according to edition 10 of the textbook.)

Page 23. # 3,16,58,59,60

Page 37. # 2,16 (due until Wed 21 Jan)

Page 54. #4,18,20,26,27,34,50*

Page 68. #1ac,4,15,19,22,23,50* (due Wed 28 Jan)

Page 70. #32

Page 138 #1,3,4,5,7

Page 87 #1,4,5,13,15,26,29,32,64,66,71,72

Page 118 #2,6,28,32,35,40,45,46 (due Fri 6 Feb)

Page 156 #2,3,7,8,16,17,19,26,29

Page 200 #1,9,12,14,17,37,39 (due Fri 20 Feb)

Page 174 #4,6,7,11,26,30,36,74

Page 201 #11,19,24,30 (due Fri 27 Feb)

Page 234 #6,7,8,10,30,31 (due Fri 20 March)

f: Z -> Z_n, f(k) = k (mod n), is a homomorphism
Page 219 #8,9,16,18,21,22,24 (due Mon 30 March)
Four problems from Friday's class. (due Wed 1 April)

Page 250 #4,6,7,9,13,19,22
Page 261 #7,11,13,36,44,49a (due Wed 8 April)

Page 305 #2,3,4,13,14,15,16,17 (due Wed 15 April)

Grades

Four exams, a few questions on each exam. The lowest grade is dropped if all four exams are taken. Each exam has equal weight.

Exam 1. February 3

Exam 2. February 26

Exam 3. March 26

Exam 4. April 21

There will be four homework assignments, each due the class before the corresponding exam. Students will have a chance to present their solutions. The homework itself will count toward the final grade.

The exams will be graded on a sliding scale, the harder the exam, the more lenient the grading. Out of 100, it will never be stricter than 90A, 80B, 70C, 60D.

Exam and homework grades will be posted on the canvas Grades section within a week, but usually sooner.

Campus Resources

The course will be conducted in accordance with the Academic Honesty Policy and policy regarding the use of copyrighted material.

Students with disabilities requesting accommodations should first register with the Disability Resource Center by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

Academic advise and tutoring, as well as health advise (physical and mental) is available to students.

Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found at: Attendance Policies

Information on current UF grading policies for assigning grade points may be found at: Grades

Students are expected to provide feedback on the quality of instruction in this course by completing a course evaluation online via GatorEvals. Students will be notified when the evaluation period opens and can complete evaluations through the email they receive from GatorEvals or in their Canvas course menu under GatorEvals.

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