Math 546 Section 001, Algebraic Structures I Fall 2023

Instructor: Prof. Adela Vraciu

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The best way to contact me is by email. I will respond to emails received by 5pm M–F within 5 hours, or by 9am the next day if received after 5pm.

Office Hours: MWF 2:10–3:00pm (in person) OR by appointment (via zoom).

Textbook: *Abstract Algebra* by John A. Beachy and William D. Blair. The class covers the first three chapters of the book (Chapters 1 and 2 are mostly review; Chapter 3 is the main part of the class).

Topics:

- Definition, examples and properties of groups
- Definition, examples and properties of subgroups
- Lagrange's theorem and corollaries
- The order of an element in a group
- Special groups: integers, congruence classes, permutations, groups of symmetries, cyclic groups
- Homomorphisms and isomorphisms: definition, examples and properties
- Cayley's theorem
- Cosets, normal subgroups, factor groups; the fundamental homomorphism theorem
- Set theory
- Functions

Learning Outcomes:

- Develop the ablility to verify the group, subgroup, homomorphism and isomorphism requirements; identify when the group axioms hold and when they fail
- Gain familiarity with the main examples of groups and their properties
- Develop the ability to find examples of groups and subgroups satisfying certain properties
- Develop the ability to use the concepts of groups, subgroups, homomorphisms and isomorphisms in an abstract setting
- Develop creative thinking and problem solving abilities

Grades: The following table shows how each component of the course counts toward your final grade:

Three midterm exams	12% each = 36%
Quizzes	20%
Homework	20%
Final Exam	24%

Letter grades are assigned as follows:

90-100: A 85–89.99: B+ 80-84.99: B 75–79.99: C+

68-74.99: C 60–67.99: D+ 50–59.99: D 0–49.99: F

Homework: Homework will be assigned weekly. The assignment will be posted in Blackboard. However, you are expected to turn in homework on paper during class on the due date (do not upload in Blackboard).

Quizzes: There will be a short quiz most weeks. The quizzes will be announced in advance. You will be given a list of problems to study for the quiz. One problem from the list will be selected. It will be assumed that you will have already figured out how to solve the problem ahead of time (not much time will be given for figuring it out during the quiz).

Missed quizzes **cannot** be made up, except under rare circumstances and with a documented excuse (examples include illnes, family emergency, participation in a University-sponsored event, or religious observation).

The two lowest quiz scores will be dropped.

Exams: Midterm 1: Friday, September 29 during class

Midterm 2: Wednesday, November 1 during class

Midterm 3: Wednesday, November 29 during class

Final Exam: Monday, December 11, 12:30–3pm

Expectations: The focus of this class is writing mathematics. You will often be required to write proofs. Some of the problems will be based on concrete examples, but many will be abstract in nature.

Your work will be graded based on how well it is written. You are expected to include appropriate steps with correct justifications and appropriate amount of detail. Points will be taken off for skipped steps or incomplete explanations. Points may be taken off if your writing is poorly organized/illegible.

Attendance: Students are expected to attend every class meeting. Absences are can be excused under certain specific circumstances (see https://academicbulletins.sc.edu/undergraduate/regulations/undergraduate-academic-regulations/). Any other absences are unexcused. You are allowed a total of two unexcused absences. Any unexcused absence in excess of two will be penalized by a 1% deduction from your total score per occurence.

Honor Code: In accordance to the Honor Code, improper collaboration or unauthorized assistance in connection with any academic work constitutes cheating.

Collaboration is allowed for homework, but prohibited for quizzes and exams (including take-home exams, if any).

Any attempt to seek assistance from homework tutoring websites such as Chegg, Course Hero etc. constitutes cheating.

Disabilities: The Student Disability Resource Center (SDRC) empowers students to manage challenges and limitations imposed by disabilities. Students with disabilities are encouraged to contact me to discuss the logistics of any accommodations needed to fulfill course requirements (within the first week of the semester). In order to receive reasonable accommodations from me, you must be registered with the Student Disability Resource Center located in Close-Hipp, Suite 102