

MTHSC 412, Abstract Algebra
Fall Semester 2010
T Th 12:30-1:45 Martin M-204

General information

Instructor: Dr. Matthew Macauley
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Phone: (864) 656-1838
Office: Martin O-325
Office hours: (subject to change!) MWF 9:00-10:00, and by appointment
Text: There are two required textbooks:
Abstract Algebra, Theory and Applications, a free open-source
textbook by Tom Judson
Visual Group Theory, by Nathan Carter.
Web: I will post course material on my website and/or Blackboard.

Objectives

Group theory is the study of symmetry, and is one of the most beautiful areas in all of mathematics. It arises in puzzles, visual arts, music, nature, the physical and life sciences, computer science, cryptography, and of course, all throughout mathematics. This course will cover the basic concepts of group theory, with a special effort will be made to emphasize the intuition behind the concepts and motivate the subject matter.

Many pictures and diagrams will be provided. In class, we will play with the Rubik's cube. We will draw with colored pencils, use scissors to cut shapes from colored paper, and use free mathematical software such as *Sage* and *Group Explorer*. We will analyze art friezes, chemical molecules, and contra dances. At the end of the semester, you will truly understand groups, subgroups, cosets, product and quotients, homomorphisms, group actions, conjugacy classes, centralizers, normalizers, semidirect products, theorems by Lagrange, Cayley, Cauchy, and Sylow, and what Évariste Galois stayed up until dawn writing the night before his untimely death in a duel at age 20, that remains one of the most celebrated achievements in all of mathematics.

In the end, you will leave with a new appreciation of the beauty, and difficulty, of an area of mathematics you never dreamt existed.

Grading

Final grades will be determined by the following rubrik:

Homework	20%
Quizzes & in-class work	15%
Participation	5%
Midterm 1	20%
Midterm 2	20%
Final exam	40%

I will drop either your lowest midterm, or half the weight of your final exam.

- There will be no make-up exams.

Letter grades will then be assigned by:

$$A \geq 90\% > B \geq 80\% > C \geq 70\% > D \geq 60\% > F$$

I reserve the right to adjust the grading scale in your favor. For example, a final grade of 90% will be an A regardless, but I may lower the A line to e.g., 88% if I deem appropriate.

Homework assignments will accumulate from lecture to lecture and will be due twice a week I will post the problems on my website (so it's convenient if you have an older edition of the textbook, or choose to use another one). Late homework will *not* be accepted. If you cannot attend a class period for which homework is due, please make arrangements to have the homework delivered to me before the start of the class in which the homework is due. Also, if you miss a class, assume that some homework relevant to the missed class was assigned, and ask around or check online.

Midterm dates

Midterm 1: Thursday, September 16th (in class)
 Midterm 2: Tuesday, November 9th (in class)
 Final: TBA.

Attendance

Attendance is mandatory. Please bring your copy of *Visual Group Theory* to class, as I will refer to it throughout lecture. Students may leave after 15 minutes if the professor or a guest lecturer does not arrive in that time.

Laptops, cell phones, PDAs

All use of cell phones, and typing on laptops is prohibited during lecture. Calculators, cell phones, laptops, and PDAs will not allowed during exams.

Academic integrity

As members of the Clemson University community, we have inherited Thomas Green Clemson's vision of this institution as a high seminary of learning. Fundamental to this vision is a mutual commitment to truthfulness, honor and responsibility, As members of the Clemson University community, we have inherited Thomas Green Clemson's vision of this institution as a high seminary of learning. Fundamental to this vision is a mutual commitment to truthfulness, honor and responsibility, without which we cannot earn the trust and respect of others. Furthermore, we recognize that academic dishonesty detracts from the value of a Clemson degree. Therefore, we shall not tolerate lying, cheating, or stealing in any form."