

Instructor: Dr. Chris Black
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Required Text: *A First Course in Abstract Algebra*, 7th edition, John B. Fraleigh,
Addison-Wesley, 2003

GOALS FOR COURSE:

MATH 361 students will:

- ... improve their ability to think abstractly and critically;
 - ... be able to communicate in precise written mathematical language, using correct logic and notation;
 - ... be able to identify groups with certain properties, and provide concrete examples;
 - ... have a firm grasp on the basic concepts of group theory, and the facility to apply them to particular groups;
 - ... actively participate in the classroom dialogue, both as an individual and as a member of a small group, and be an active partner during in-class exercises.
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COURSE PHILOSOPHY:

In this course, we will be introduced to the branch of advanced algebra known as *group theory*. It will seem at first that this material has nothing at all to do with the high school algebra that you know and love. Abstract algebra is a dynamic, active field – many of my mathematical colleagues are engaged in research in the areas of group theory, ring theory, and matroid theory. In this course, we will only be exposed to group theory; the proverbial tip of the iceberg. Concepts and methodologies from algebra are used in diverse fields such as computer science, physics, and chemistry, as well as mathematics.

There are two types of problems in this course: computational problems (which may still be fairly abstract), and proofs. We will continue to develop proof-writing ability. In this course, however, proofs can be tricky since there is rarely a picture you can draw to get yourself started. We will see that many of the methods and topics studied in Math 260 are used extensively in this course.

PROBABLE COURSE TOPICS:

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| ▷ Binary Structures | ▷ Permutation Groups |
| ▷ Isomorphisms | ▷ Cosets |
| ▷ Groups and Subgroups: general groups, cyclic groups, generating sets | ▷ Direct Products |
| | ▷ Symmetry Groups |

GRADING:

Homework:	200 - 250 points, as needed
Take-Home Exams:	100 points each
Final Exam:	100 points
Directed Readings:	26 - 30 points
Attendance/Citizenship:	15 points

PARTICIPATION:

We will spend a portion of each class session working in small groups, and I will often ask students to present their work at the board. Your participation will be graded based on your interactions with your peers, and how often you volunteer to present your solutions.

HOMEWORK:

There are two types of homework problems in this course: computational problems and proofs. Proofs will be graded out of 10 points according to the *Proof Writing Guidelines*. Computational problems will have varying point values. The majority of collected problems will be proofs, and often the problems I have chosen to collect present an important part of the theory of the course. If necessary, graded problems may be re-written and re-graded. You may work in groups to discuss the homework problems, however the final version should be written individually. **It is considered plagiarism to find solutions to proofs assigned as homework in other texts or on the internet.** You are invited to come see me for hints on homework problems if you get stuck. As I will lecture only briefly, you will find that reading the textbook will be critical to your success in this course.

DIRECTED READINGS:

It is crucial that you read your textbook. This material is fairly dense, and it takes more than one exposure to be able to work with the onslaught of definitions and theorems. In order to get your brain used to the new terms, it is helpful to have read over the section *before* attending the lecture. On a daily basis, I will hand out a directed reading assignment. Read the section and answer the questions on the reading assignment. I do not expect you to puzzle over the proofs of the theorems, or attempt the homework; just read over the material and think about the definitions & examples.

ATTENDANCE/CITIZENSHIP:

Discussion, interaction, and group problem solving will all be important aspects of this course, which necessitate your attendance. Citizenship addresses your behavior and comportsment with class members and the instructor. We each need to be respectful of other students, other cultures, and differing ideas within our learning community.

HONOR AND RESPECT:

Each of us should consider our placement at this institution to be a privilege. We need to have respect for one another, and for ourselves. In light of these facts, cheating in any form will not be tolerated. You are encouraged to work together on homework problems, however anything you turn in with your name on it should have been written by you alone (or with members of your assigned group). In a course where much of your grade is determined by your proof writing and take-home exams, plagiarism is a concern. The word “plagiarize” is defined by Merriam-Webster as “to steal and pass off (the ideas or words of another) as one’s own: use (another’s production) without crediting the source.” This is a very serious offense.