Abstract Algebra I - Math 441
Spring 2023
Course Information

Instructor: David S. Barth-Hart, School of Mathematical Sciences

Course Mode: Class lectures will be in person

Class location, days, and times: Lowenthal Hall, room 3105, Mondays and Wednesdays, 10:00 am - 11:50 am.

Remark on COVID and flexibility:

As all of us are only too well aware, COVID circumstances can modify, or even elbow aside, the best laid plans. Remaining attentive and compliant to RIT health and safety directives will be particularly important. While there is no plan at the moment for the Institute to switch to remote learning, even temporarily, it would be foolish to dismiss the possibility entirely. I am glad that our class is in person, and believe there is much of value in that setting.

If a modification of our syllabus is needed, I will let you know about it, and will post a revised syllabus in myCourses.

Necessary prior coursework: successful completion, with a grade of C^- or better, of Math 241 - Linear Algebra, and either Math 200 - Discrete Mathematics and Introduction to Proofs or Math 190 - Discrete Mathematics for Computing. Familiarity with congruence arithmetic, the integers mod n, and counting arguments will be particularly helpful. Still, for the most part we'll cover what we need as we go along. As with the study of any theoretical subject, the main quality needed is a love of proving things.

Office: Gosnell Hall, Room 3234:

I will start the semester with office hours on Tuesdays, from 11:00 am - 1:00 pm, and Thursdays, from 1:00 pm - 3:00 pm. These times, or any changes to them that may be needed, will be posted at our myCourses site. During office hours I will be glad to answer questions, explain material, or go over problems. I can also be reached by email on most weekdays. At some times I welcome drop-in visits as well. Or, if you wish, we can meet by appointment. Secondary sources for help in this and other upper level courses can take a bit of searching to find. One you might try is the Math and Physics Drop-in Tutoring Service, run by the Academic Success Center and held in the Bates Center, on the first floor of the Gosnell building. Please see math support for more information, and this semester's schedule. Don't be surprised if you see people run the other way at the mention of our subject!

e-mail: dshsma@rit.edu

Text: *Contemporary Abstract Algebra*, tenth edition, by Joseph A. Gallian

This is a fine book that is widely used. I will start with a few items from chapters zero and one, but otherwise we can regard the material there as a reference. The bulk of the course will cover topics from chapters one through ten, and parts of chapter twenty-three. But on many class days I will also discuss topics, or an approach to topics, that may or may not be treated in our book.

The study of groups is our chief aim in this first course in Abstract Algebra. Much can be illustrated by simple examples. That is one reason why I like to establish congruence arithmetic as a common foundation for us. It makes a good setting for gaining experience in conceptual reasoning. Gaining confidence with proofs and formal reasoning is easier if the objects themselves are not so abstract.

My view is that a textbook should assist a course, not dictate entirely its content or pacing. A course that merely parrots a textbook lacks vitality. I aim at putting my own stamp on whatever I teach.

Teaching and Learning:

I love Abstract Algebra, and I love to teach it. Just as strong, however, is my desire to foster learning, and encourage in you an affinity for our subject. I will strive to have you gain:

- an ability to see that Abstract Algebra is beautiful and helpful
- skill at formulating and solving problems
- conceptual understanding of the ideas behind the topics we treat
- proficiency at writing arguments and proofs

Important Notes:

- I do not allow formula sheets, books, or electronic devices, such as calculators, cell phones, or smart watches, to be used on in class exams.

  Recall of principal definitions, results, and methods goes hand in hand with learning a subject. My aim is at encouraging and rewarding correct thinking. Using algebra is part of this, messy calculations are not. Though such calculations may arise in applications, we can better handle these if we first have the relevant concepts clearly in mind. I construct my exams so that numbers present no difficulty.

- Please be considerate of your fellow classmates and me by not using electronic devices in class. Also, though much work and late nights may lead you to nod off from time to time, try not to make it a regular part of your class presence!

- The use of copyright protected RIT course material outside the course may be prohibited by law.

Attendance:

Quite often poor attendance and poor performance go hand in hand. I may monitor attendance from time to time, in particular noting long or frequent absences. Take up the challenge of class, don't shrink from it.

Help with our class:

Please be engaged in our class. I welcome questions either directly, during class, in office meetings, or by email. Though we have much to do, I get no joy in speeding along if something is not clear! What is on the mind of one person is often on the minds of others as well. As long as our progress is not ground to a halt by them, questions are a service to everyone.

Suggested Problems, Examples, and Text Exercises:

I will suggest, post, and revise a list of problems from our text that you should solve. Other problems, of my own design, may be posed in class or handouts. It is best if your efforts at solving problems are timely, not too distant from the days when we cover the relevant material. Studying in bursts, while it may work in mastering easy material, is a poor, and often unsuccessful, way of learning advanced material.

I will collect and grade a selection of problems as part of checking your progress. Still, you should not look at problems chiefly as a way of earning points. Working problems is a good way of strengthening your grasp on the material. I am glad to go over problems with you, either in class or in my office. Problems are not ends in themselves. The goal is to understand the material.

When you've done that, you may be able to construct your own problems, or modify given problems. In class and handouts I like to give both routine examples as well as examples that pick at the conceptual understanding of whatever topic we are covering. Some problems that I have constructed will also be part of our problem sets.

Evaluation:

In addition to the problem set part of your grade, there will be two in class exams during the semester, and an in class final exam. I do not normally permit a missed exam to be made up, unless there is an urgent circumstance, and arrangements are made in advance. It is school policy not to give any final exam before its scheduled date and time. So please be careful in making plans for the final exam period. The weights I will use in arriving at course averages are:

35% - Homework average
20% - Exam 1 - Wednesday, February 22
20% - Exam 2 - Wednesday, April 5
25% - Final Exam

Once course averages are computed, letter grades will be assigned according to the following plan:

Grade	Range
A	$90 - 100$
A^-	$89 - 89.*$
B^+	$88 - 88.*$
B	$80 - 87.*$
B^-	$79 - 79.*$
C^+	$78 - 78.*$
C	$70 - 77.*$
C^-	$69 - 69.*$
D	$60 - 68.*$
F	$0 - 59.*$

Note: I do not round off course averages, either up or down.

Academic Integrity:

Members of the RIT community are expected to behave honestly and ethically. This is particularly important when submitting work for evaluation as part of any course or degree requirement. All students should become familiar with the RIT Honor Code and with RIT's Academic Integrity Policy.

RIT Honor Code: https://www.rit.edu/academicaffairs/policiesmanual/p030
RIT Academic Integrity Policy: https://www.rit.edu/academicaffairs/policiesmanual/d080

Academic Accommodation:

The Rehabilitation Act of 1973, reaffirmed by the 1992 Americans with Disabilities Act (ADA), was created to protect the rights of people with disabilities. RIT has developed the statement below to reach out to students with different academic needs:

RIT is committed to providing reasonable accommodations to students with disabilities. If you would like to request accommodations such as special seating or testing modifications due to a disability, please contact the Disability Services Office. It is located in the Student Alumni Union, Room 1150; the website is http://www.rit.edu/dso. After you receive accommodation approval, it is important that you meet with me so that we can work out whatever arrangement is necessary.