

MT310, Section 01 Introduction to Abstract Algebra
Spring Semester 2009 Boston College

Instructor: Prof. Solomon Friedberg

Office: Carney Hall 317. Phone: (617) 552-3002. Email: friedber@bc.edu. Office hours: Monday and Friday 2-3, Wednesday 12-1 (you do not need an appointment at these times). I am also available by appointment (please call or email for an appointment).

Class Hours: MWF 1-1:50 p.m., Fulton Hall 423.

Text: *Abstract Algebra: A First Course* by Dan Saracino, Second Edition. Waveland Press.

Course Web Site: Our course website is www2.bc.edu/~friedber/mt310-09 ...please bookmark this page, as it is the place that homework assignments and other course information will be posted.

Course Description: This course is concerned with abstract algebra. This is one of the most fundamental areas of modern mathematics. The idea is to study mathematical structures with simple rules—so simple that they may be found in many different areas—and yet to see that these simple rules impose a rich structure upon the objects. Much of the course will be concerned with Group Theory. Groups are behind games such as the Rubrik’s cube, and they are also behind the study of symmetries in physics and secure data transmission in computer science. They play a central role in modern mathematics. We will also study objects called Rings. These objects mimic the integers, and yet may be subtly different. Their properties will allow us to discover new facts about the integers themselves. Finally, we will study Fields. These are Rings with extra structure. They are important in understanding the solutions to equations and are also used in coding theory and in cryptography.

This is a foundational upper division course covering one of the subjects which is at the center of modern mathematics. But it is intrinsically sophisticated stuff. You can’t get by just studying right before the test. You need to go over your notes after each lecture. Learn the definitions by heart. Work through the examples (in both text and lecture) until you understand them thoroughly. Then learn the proofs as well as the Theorems. If you put this off, you’ll find that the lectures make use of material you have not yet worked through, and you’ll get behind rapidly. But if you keep up—and don’t hesitate to ask questions in class or in office hours if you’re confused by something—then the course will work well. The material is intrinsically beautiful, and you’ll be introduced to the power of modern abstract mathematics.

Prerequisites: Students are expected to be familiar with proof by contradiction, proof by induction and with one-to-one and onto maps (we will review the material about maps, but it will be a quick review).

Grading and Examinations: There will be two midterm examinations, each counting 22.5% of your grade. Homework will count 22.5% (please see rules below). The final examination will count 32.5%. Improvement on the final, if any, will also be taken into account in determining your grade.

The midterm examinations are tentatively scheduled for Wednesday, February 25, 2009 and Wednesday, April 8, 2009. No early or makeup examinations will be given. Please note that April 8 is a regularly scheduled class, but it is the day before a vacation.

The final examination is *Wednesday, May 6, 2006, at 9 a.m.* Please note: this date and time are fixed by the Registrar and may not be changed. You must go to the final examination at this time—no exceptions.

Homework: Homework assignments will be posted on the class website. Homework will be collected weekly. Usually it will be due on Mondays. You are welcome to talk to others about the homework but *you must write up your answers by yourself*. If you hand in the same homework solutions as someone else, or as found in some other source such as a website, you will be committing plagiarism and will be subject to an “F” in this course and additional university sanctions. Please take note.

Not all problems can be done in one minute. If you are having trouble with a problem look over the text and your notes to see if you can find an idea that helps you get started. If you are still having trouble with a problem, please come to see me in office hours for help. Note that you are welcome, and even encouraged, to come to office hours to discuss the homework *before* it is due. I want to emphasize that you need to work on the homework during the week, not just on Sunday evening, to do well in this class.

Extra Help in the Course: Besides attending my office hours, you should know about the following resources: (a) The Connors Family Learning Center provides peer tutoring for all Boston College students, and support services for students with documented learning disabilities and ADHD. Please call 552-0611 for more information. (b) AHANA students may arrange extra help through the AHANA Student Programs office—please call 552-3358 for more information.

How to Fail This Class:

- (a) Cheat. Please be warned—no quarter given. ‘Nuff said.
- (b) Don’t bother to go to class; after all, you’re really smart. Get a D on the first midterm. Meet with the Professor (preceded by a friendly email to him with Subject “hey prof”) and promise to work harder. Come to a few classes late, decide it’s not important, and stop attending. You’d rather work out. Fail the remaining exam and don’t bother to hand in the homework. Meet with the Professor just before the final to tell him that you “really know it” and are planning on studying non-stop for the next day to be sure. Fail the final. E-mail the Professor to set up a meeting. Explain to the Professor that you had a bad semester due to your roommate, and ask the Professor if there is any extra work you can do over the summer to make up for it so you can get a C.

How to Get a High Grade in This Course:

- (a) Attend all lectures. On time. Focussed on the class.
- (b) Master the material presented in each lecture prior to the next. To accomplish this, study it on your own (going over your notes several times to really learn it), review the text’s discussion of the material, do all assigned homework related to the topic, and make a list of questions to ask the Professor. Then ask.
- (c) Find the way to assimilate the ideas which best works for you. (Some people prefer to study on their own, while others prefer studying in groups. Some find notes from

lecture most useful, others prefer to concentrate their energies on the course text.) Be responsible for your own learning!

- (d) Allow adequate time to review the material prior to each exam. (Sounds easy, but it may require good time management to balance the needs of all your classes and other activities.) It is typically better to study often in smaller doses in place of infrequent long periods. In place of last-minute cramming, get a good night's sleep before each test.