Introduction to abstract algebra
MT3310      MWF 11:00-11:50, GASSON HALL 205.

Instructor: Dubi Kelmer
Email: dubi.kelmer@bc.edu
Office: Maloney Hall 526
Office Phone: (617) 552-1011

Office Hours: MW 10-11:00, Th 1-2 these times are reserved for you and you can (and should) just come without making an appointment. You are also welcome at other times, just make sure to make an appointment via email to make sure I am available.

Course website: All information for the course can be found in the course website at https://www2.bc.edu/dubi-kelmer/MT331Spring16/MT3310.html


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 Rubik'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 MT2210 (Linear Algebra), MT2216 (Introduction to Abstract Mathematics). Students are expected to be familiar with proof by contradiction, proof by induction, and with the concept of one-to-one and onto maps.

Exams There will be two in class exams (Sep 25 and Nov 06) and a final exam (Dec 12). Exams must be taken as scheduled, except for documented illness or family emergency. If you are a student with a documented disability seeking reasonable accommodations in this course, please contact Kathy Duggan, (617) 552-8093, dugganka@bc.edu, at the Connors Family Learning Center regarding learning disabilities and ADHD, or Paulette Durrett, (617) 552-3470, paulette.durrett@bc.edu, in the Disability Services Office regarding all other types of disabilities, including temporary disabilities. Advance notice and appropriate documentation are required for accommodations.

Homework There will be weekly homework assigned weekly on the course website. You are welcome to talk
to others about the homework but you must write up your answers by yourself. You may not copy someone else’s written solution or directly from what they wrote on the board. 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 may be subject to an F in this course and additional university sanctions. Please take note.

Not all problems can be done in two minutes. 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 over the course of the week, not just the evening before it is due, to do well in this class. Late homework will not be accepted! (unless it is the result of an officially excused absence).

Extra Help: Besides attending my office hours, 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.

The grading system is as follows:

- 30 percent: Average of weekly homework (lowest score will be dropped).
- 20 percent: each in-class exam.
- 30 percent: Final exam.