

Math 100B Winter 2010: Abstract Algebra II  
MWF 10-10:50am, Warren Lecture Hall 2111  
Professor D. Rogalski

1. CONTACT INFORMATION

**Prof. Rogalski's Office:** 5131 AP&M

**E-mail:** drogalsk@math.ucsd.edu

**Class web site:** [www.math.ucsd.edu/~drogalsk/100b.html](http://www.math.ucsd.edu/~drogalsk/100b.html). Check here for announcements, homework assignments, schedule of lectures, and other information.

**Office hours:** TBA, will be posted on website

**Section Leader:** Amy Irwin (6331 AP&M)

**E-mail:** airwin@math.ucsd.edu

**Meeting Times:** Tu 12-12:50pm, 1-1:50pm AP&M 5402

**Office hours:** TBA, will be posted on website

2. BASIC COURSE INFORMATION

• **Course description and placement information**

This is a second class in the theory of abstract algebra. The 3 quarter sequence Math 100a-c, together with Math 140a-c (real analysis), is intended to provide a rigorous preparation for graduate study in mathematics. A plan to do graduate work in mathematics is certainly not a prerequisite to take this course, but it is important that you have a strong interest in theoretical, pure mathematics. You should be prepared to spend more time and energy on this course than you would spend on most other undergraduate math courses offered at UCSD (with the exception of Math 140.)

Math 103a-b also gives an introduction to abstract algebra, but it covers significantly less material than Math 100a-b, moves more slowly, and typically has less challenging homework problems and exams. Note that for most variations of the math major which require a course in algebra, Math 103 suffices. Math 103 is also more than sufficient preparation for a mathematically-oriented career in business or industry.

• **Prerequisites**

The prerequisite is Math 100a, or an equivalent course in the theory of groups elsewhere. Please see me if you are planning to take this course and have not taken Math 100a.

• **Textbook**

The textbook is *Abstract Algebra* by Beachy and Blair, 3rd Edition. I think both reading the textbook and attending lecture are important. With material at this level, it is very helpful for you to see difficult concepts (at least) twice, once in class and once in your reading. Sometimes I may

also omit from the lectures some less important details or proofs and leave it to you to learn them from your reading. I will let you know what sections of the book you should read by when.

One copy of the textbook will be placed on reserve in the Science and Engineering Library, but I strongly recommend that everyone buy a copy of the textbook.

- **Homework**

Homework will be assigned weekly. It will be handed out as well as posted on the class website on Fridays. It will also be due in class on Fridays. Late homework will not be accepted, but the lowest homework score will be dropped. Thus if a short illness or other commitment causes you to miss one homework, it is not a problem since that will just be your dropped score.

Many of the homework problems will be very challenging; this course is designed to stretch you. You should expect to spend a lot of time thinking about some of these exercises before the solution is clear to you (start the homework early!), and the write-ups you submit should be *clear, neat, and well-organized*.

Here is my suggested strategy for producing good homework write-ups (I still do something like this myself when I write papers.) Once you think you have figured out how to do a problem, first write out a draft solution. Often in the process of doing this, you will realize there may be minor gaps in your idea you have to fix. In the draft solution, you can cross things out, start again, insert paragraphs, etc. Once you are satisfied, you can create a neat, organized write-up of your final solution.

Remember that the idea of writing a proof is to convince someone else that what you claim is true really is; understanding why it is true yourself is only part of the process.

- **Exams**

There will be 1 in-class midterm on Monday February 8 and a final exam on Friday March 19 from 8am-11am. Bluebooks will not be needed; adequate room will be provided on the exam paper for your answers. No books, notes, calculators or other aids are allowed during exams. The final exam will be cumulative.

- **Collaboration and Academic Honesty**

You are welcome to discuss the homework problems with other students at the stage when you are still formulating ideas. This may be especially useful if, for example, you are confused about definitions or what the problem is asking. The write-up you hand in should be your work alone in your own words, however, and should be written while you are by yourself. While it is also OK to seek hints from classmates that have figured out problems where you have a mental block, you will learn the most if you think about these problems hard on your own first and don't give up too quickly.

The following will not be tolerated in this class: copying from or talking with a classmate during an exam; using books, notes, calculators, phones or any other aids during an exam; or copying or paraphrasing the writeup of a homework problem in whole or in part from a classmate or from any other source such as the internet. I will not hesitate to bring charges of academic dishonesty as appropriate in such cases.

• **Office Hours**

Both I and your TA will have several office hours a week where we will be available for your questions. These will be announced later and posted on the website. If on an occasional basis you need to see one of us and can not make a scheduled office hour, please e-mail one of us to set up an appointment.

• **Grading**

Your final average will be calculated as follows: Homework 25%, Midterm 25%, Final Exam 50%. Then your grade will be at least as good as the grade given by the following standard scale:

97	93	90	87	83	80	77	73	70	60
A+	A	A-	B+	B	B-	C+	C	C-	D

The final grading scale may be more lenient (“curved”) depending on the class average.

3. TENTATIVE SYLLABUS

The main topic of this quarter is the theory of rings, which is in Chapters 4, 5, and 9 of the text. This will not take all quarter, and we plan to cover some linear algebra in the last few weeks of the course: this material is not in Beachy and Blair. I may give out some handouts instead when we get to this part of the course.

The following is a only a possible outline of what we will cover when, and the schedule will surely change. Section references are to Beachy and Blair. A more current schedule will be announced in class and posted on the calendar on the class website.

1/4/10 5.1

1/6 5.1

1/8 4.1

1/11 5.2

1/13 5.2

1/15 4.2

1/18 Martin Luther King Day—**NO CLASS**

1/20 5.3

1/22 5.3

1/25 4.3

1/27 4.4

1/29 4.4

2/1 5.4

2/3 9.1

2/5 9.1

**2/8 Midterm Exam**

2/10 9.2

2/12 9.2

2/15 President's Day—**NO CLASS**

2/17 9.3

2/19 9.3

2/22 linear algebra

2/24 linear algebra

2/26 linear algebra

3/1 linear algebra

3/3 linear algebra

3/5 linear algebra

3/8 linear algebra

3/10 linear algebra

3/12 linear algebra

3/19 (Fri) Final exam, 8am–11am.