

University of Massachusetts at Amherst,
Department of Mathematics and Statistics

MATH 412 INTRODUCTION TO ABSTRACT ALGEBRA II
FALL 2008

SECTION 411.1, CLASS NUMBER 74705

Text : Papantonopoulou, *Algebra, Pure and Applied*.
Instructor : Ivan Mirković
Homepage : Find it from the Mathematics Department home page
Office : 1235I Lederle GR Tower
Phone : 545-6023
Email : mirkovic@math.umass.edu
Office Hours : Tuesday and Friday 12:00-1:00 (check the web page for changes!).

Homework : Weekly. Assigned, collected and returned on consecutive Mondays.
Meet : MW, 2:30-3:45 pm, in LGRT 119.

The grade is formed according to:

- The first midterm exam is worth **25%**,
- The second midterm exam is worth **25%**,
- the final exam is worth **25%**,
- the homework is worth **25%**

Midterm exams will be in class on Wednesdays:

- Exam 1: March 4,
- Exam 2: April 15.

Sample exam handouts These you will receive a week before the exam, and these problems will be discussed at evening **review sessions** before the exam. **Review Sessions** will be in the evening, check the web page for the times.

Course policies. The **final exam** will be cumulative, with an emphasis on the material covered after the second exam

Please note that the **homework deadlines** will be strictly enforced. This means that the assignments will be due in class on the day I've requested them, and the late homework will not be accepted. Help each other out and discuss difficulties, but do **your own** work. If your solution of a problem uses someone else's work, you should acknowledge this explicitly. You are expected to know the (very serious) difference between shared and copied work.

It is expected that you will **attend** virtually all class meetings. Though I will not control this, any absence is likely to cause difficulties in the course. You should also complete the reading and other assignments on time so that you can participate in class discussions

and problem-solving. I will answer *some* questions on homework problems in class, however this may not be very helpful if you have not already tried to solve these problems.

Topics

We will cover material from chapters 6-10 and if we manage also some of chapter 12.

- Ch 6. Rings
- Ch 7. Homomorphisms of rings
- Ch 8. Rings of Polynomials.
- Ch 9. Euclidean Domains and Unique Factorization Domains
- Ch 10. Fields
- Ch 12. Galois Theory

The nature of the course

The algebra sequence is likely to be your first course in mathematics where concepts will seriously outweigh algorithmic procedures and computations. This actually **forces** new modes of work:

- A careful and critical reading of the text.
- Developing precise understanding of the definitions and concepts.
- **Reading Assignments** It will be especially helpful for you to have read (carefully) the discussion in the textbook before that material is discussed in class. A reading assignment will consist of a reading in the textbook. I will not check your reading assignments but I expect you to make a *sincere effort* to understand what the next lecture is about.

HOW TO LEARN abstract MATHEMATICS

The following is what I see as the *basic* approach towards learning mathematics at the conceptual level.

The procedure.

- (1) You start by hearing (or reading) of a new idea, new procedure, new trick.
- (2) To make sense of it you check what it means in sufficiently many examples. You discuss it with teachers and friends.
- (3) After you see enough examples you get to the point where you think that you more or less get it. Now you attempt the last (and critical) step:
- (4) retell this idea or procedure, theorem, proof or whatever it is, to yourself in YOUR OWN words.

More on step (4). Trying to memorize someone else's formulation, is a beginning but it is far from what you really need – you should get to the stage where you can tell it as a story, as if you are teaching someone else. When you can do this, and your story makes sense to you, you are done. You own it now.

However, if at some point you find a piece that does not make sense, then you have to return to one of the earlier steps (1–3) above. Repeat this process as many times as necessary.