Math 343
Introduction to Algebraic Structures
Spring 2012

Professor: Pete Goetz
Office: BSS 358

Office Hours: Monday 4-5 BSS 308; Tuesday 4-5 BSS 308; Wednesday 4-5; Thursday 8-9; Friday 4-5.

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Course Website: http://users.humboldt.edu/pgoetz/343.htm

Time and Place: We meet MWRF from 1:00-1:50 in FR 201.


Pre-requisite: Math 240 and Math 241 or consent of the instructor.

Course Overview: The subject of “abstract algebra” includes a variety of different but interconnected fields of modern mathematics. In this course we begin an introductory study of two of these fields, specifically group theory and ring theory. These branches of algebra are concerned with the structure of groups and rings. You already know some examples. The set of integers, \( \mathbb{Z} \), equipped with the operation of addition is an example of a group. If you consider \( \mathbb{Z} \) with both addition and multiplication, then you get an example of a ring.

There is interplay in this course between the concrete and the abstract. Groups and rings did not appear out of the vacuum; rather they were discovered in the course of solving some very concrete problems. Hence the concrete, realized in specific examples, is necessary for the discovery of the abstract. On the other hand, studying structures in their most general form, i.e. defined axiomatically, enables us to prove theorems applying to all specific examples of such structures. So both theory and examples are important and complement each other.

Course Goals: The following four fundamental goals are what I will keep in mind as I teach the course, design assignments, and assess your work. Your final grade will depend on how well you achieve each of these goals.

1. Obtain a basic understanding of the theory and techniques of abstract algebra.
2. Gain ability in abstract reasoning, problem solving, and formulating conjectures.
3. Obtain a stock of examples of specific groups and rings.
4. Be able to clearly communicate and express mathematical ideas.
Class Period Format: I am going to try something different in this course this semester. Rather than lecturing the entire period, we will spend the first twenty minutes discussing the homework that is due for that class period. The last thirty minutes of class I will spend lecturing. Because of this it is very important that you read the textbook carefully and come to class prepared. I won’t write all the definitions on the board or prove all the theorems. Instead I will talk about the definitions, give examples, sketch proofs of theorems, or give motivation. I’m hoping that this will create a more dynamic and fun classroom experience and that you will learn more abstract algebra in the process. One more time for emphasis: to get the most out of the course, you must read the book regularly and repeatedly.

Homework: Homework will be collected in class on nearly every Monday, Wednesday and Friday. Homework sets require both problem solving and presentation skills. It is of no use to solve a problem if you can’t clearly communicate your solution to someone else. A solution to a problem or the proof of a theorem should be a clear, concise, logical, written argument. I will be grading your homework sets on both presentation and mathematical correctness. Some of the homework problems could be difficult. Be sure to come see me in office hours if you need extra guidance. Homework is due in class on the day listed on the homework assignment document. This document will be actively updated throughout the semester and is available from the course website. I will not accept late homework. If you have to miss class, you need to make arrangements to turn in your assignment early. I will drop your five lowest homework scores.

Exams: We will have three exams during the semester in addition to a cumulative final exam. The dates for these exams are given below. Mark your calendars and plan accordingly as no makeup exams will be given. Each exam will consist of four parts: definitions, theorem statements, true or false, and statements to prove.

Exam 1  Friday, February 17
Exam 2  Monday, March 26
Exam 3  Friday, April 27
Final Exam  May 7, 12:40 – 2:30

Grading Components: Your course grade will be based on the following components:

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<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Homework</td>
<td>25%</td>
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<tr>
<td>Lowest Exam Score</td>
<td>10%</td>
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<tr>
<td>Middle Exam Score</td>
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<td>Highest Exam Score</td>
<td>20%</td>
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<tr>
<td>Final Exam</td>
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**Academic Integrity**: Please see [http://studentaffairs.humboldt.edu/judicial/academic_honesty.php](http://studentaffairs.humboldt.edu/judicial/academic_honesty.php) for HSU’s policy on academic honesty.

**Emergency Evacuation Procedures**: The evacuation plan for the classroom is posted on the orange signs. Also review [http://studentaffairs.humboldt.edu/emergencyops/campus_emergency_preparedness.php](http://studentaffairs.humboldt.edu/emergencyops/campus_emergency_preparedness.php) for information on campus Emergency Procedures. During an emergency, information can be found on campus conditions at: 826-INFO or [www.humboldt.edu/emergency](http://www.humboldt.edu/emergency).