MATH 412: Abstract Algebra II
Winter 2013

Instructor: Dr. Leanne Robertson
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Office: Bannan 418, 398-4434
Office hours: M 2-3, W 9-10 & 2:15-3, Th 10:30-12, and by appointment
Course ANGEL page: http://angel.seattleu.edu (homework assignments, homework solutions, and exam solutions are all posted here)

Text: Joseph A. Gallian, Contemporary Abstract Algebra, 7th Edition

Description: This second course in the Abstract Algebra sequence serves as an introduction to rings, fields, and Galois theory. Material in the text will be supplemented with examples from algebraic number theory, including the Gaussian integers and Fermat's Last Theorem. Topics include:

Chapters 12-14: Review of the definitions, main theorems, and examples of rings, subrings, integral domains, fields, characteristic, ideals, and factor rings
Chapter 15: Ring homomorphisms
Chapter 16: Polynomial rings
Chapter 17: Factorization of polynomials
Chapter 18: Divisibility in integral domains (and an excursion into the Gaussian integers)
Chapter 19: Vector spaces
Chapter 20: Extension fields
Chapter 21: Algebraic extensions
Chapter 22: Finite fields
Chapter 32: An introduction to Galois theory
Chapter 33: Cyclotomic extensions
Additional material: How to prove Fermat’s Last Theorem for regular primes

Prerequisite: A grade of C or better in Math 411.

Class Schedule: The class meets MWF from 12:30-1:55 in Bannan 301. Students are expected to attend and participate in all class meetings.

Homework: There will be weekly homework assignments, usually due on Fridays (see Tentative Schedule). Homework will consist of two types of problems, class problems and regular problems. The class problems will be done in groups of 3 students each and will be presented in class. Two groups will often be assigned the same set of problems and will be chosen at random to present various problems assigned to their group. Every group member should be able to answer questions about every class problem assigned to their group. As with all group work, every group member is expected to participate actively, receive support from the group, and make sure responsibilities are shared equitably. Students are responsible for all class problems on exams, not just the problems assigned to their groups.

You may discuss the regular problems with your classmates, but they must be written up individually. More precisely, to solve the problems you may work together and share
information verbally, on scratch paper, or at a blackboard, but you must write up the solutions individually and not share the homework papers that you plan to submit. The problems will be challenging, so do not wait until the night before the assignment is due to begin working on them! The solutions to the homework will be posted on the course Angle page, so late homework cannot be accepted.

Preparatory Assignments and Participation: Students are expected to prepare for, attend, and participate in all class meetings. Students get the most out of class when they have read and are familiar with the material that will be discussed that day. Thus reading and written “preparatory assignments” will often be given. Completed preparatory assignments will be collected at the beginning of class and will be graded for completion, not for accuracy. To prepare for class you should also look over your notes from the previous class and try the assigned homework problems. Once prepared, please come to class on time and with your cell phones turned OFF. Participating in class includes answering and asking questions, completing preparatory assignments, arriving on time, offering ideas and conjectures, listening and working effectively with your group, volunteering to do a problem on the board, and simply being alert and paying attention in class. Participating and talking are not necessarily the same thing.

Tests: There will two in-class one-hour tests and a two-hour cumulative final exam.

Test 1: Monday, February 4
Test 2: Wednesday, March 6
Final Exam: Friday, March 22, 2:00-3:50

Grading: The points for the course will be distributed as follows:

<table>
<thead>
<tr>
<th>Assignments</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
<td>200</td>
</tr>
<tr>
<td>Two midterm tests (100 points each)</td>
<td>200</td>
</tr>
<tr>
<td>Final exam</td>
<td>150</td>
</tr>
<tr>
<td>Preparatory Assignments and Participation</td>
<td>50</td>
</tr>
<tr>
<td>Total points</td>
<td>600</td>
</tr>
</tbody>
</table>

Based on the above point distribution, students are guaranteed the following course grades, including + and -. The percentages may be lowered, but they will not be raised.

90% and above: A
80% and above:  B
65% and above:  C
55% and above:  D

Academic Honesty: SU is committed to the principle that academic honesty and integrity are important values in the educational process. Academic dishonesty in any form is a serious offense against the academic community. Acts of academic dishonesty will be addressed according to the SU Academic Integrity Policy (see https://www.seattleu.edu/registrar/Policies.aspx) If you are not sure whether a particular action is acceptable according to the Academic Integrity Policy, you should check with your instructor before engaging in it.

Enjoyment: I hope you enjoy the class and appreciate the beauty of the theory of rings and fields. 😊