MA360 – Abstract Algebra I **Fall 2015**
TTh 11:00 a.m.–12:15 p.m. (S-2-64)

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Course Description

Math 360 is an introduction to the basic structures of modern algebra: groups, rings, and fields. Its continuation, Math 361, studies these structures in greater depth, culminating in an introduction to Galois theory.

Prerequisites

Admission to the course is contingent upon successful completion of MA260 or an equivalent linear algebra course.

Text

There is one required text for the course: *A First Course in Abstract Algebra*, Seventh Edition, by John Fraleigh.

Grading

Course grades are based on weekly quizzes (20%), two in-class tests (20% each), and a cumulative final exam (40%).

Reading and class preparation

There is a reading assignment associated with each class period. Although it is not generally possible to discuss every topic in class, students are responsible for the entire content of the reading assignment. *Test and exam questions may cover reading material not discussed explicitly in class.* Consequently it is very important to complete the reading assignments on time and to come to class prepared with questions.

Make-up tests

Tests may be rescheduled only in cases of serious illness, bereavement, or other circumstances of similar gravity. Whenever possible, arrangements for make-up tests must be made *in advance* of the regularly scheduled testing time.

Student conduct

Students are required to adhere to the University Policy on Academic Standards and Cheating, to the University Statement on Plagiarism and the Documentation of Written Work, and to the Code of Student Conduct as delineated in the catalog of Undergraduate Programs, pp. 44–45 and 48–52. The Code is available online at the following web site:

`http://cdn.umb.edu/images/life_on_campus/Code_of_Conduct_5-14-14.pdf`

Web page

This syllabus and other course materials are available on-line at

`http://cartan.math.umb.edu/wiki/index.php/Math_360,_Fall_2015`

Course Calendar

*Homework problems should be done prior to the due date but **are not to be handed in.** One problem from each assignment will appear on the weekly quiz.*

Tuesday, September 8: Introduction.

Thursday, September 10: Sets and relations.

Read before class: Section 0.

Tuesday, September 15: More on sets and relations.

Do before class: Assignment 1.

Thursday, September 17: Binary operations.

Read before class: Section 2.

Tuesday, September 22: Isomorphic binary structures.

Read before class: Section 3.

Do before class: Assignment 2.

Thursday, September 24: Groups.

Read before class: Section 4.

Tuesday, September 29: Subgroups.

Read before class: Section 5.

Do before class: Assignment 3.

Thursday, October 1: Cyclic groups.

Read before class: Section 6.

Tuesday, October 6: Generating sets and Cayley graphs.

Read before class: Section 7.

Do before class: Assignment 4.

Thursday, October 8: Groups of permutations.

Read before class: Section 8.

Tuesday, October 13: Orbits, cycles, and alternating groups.

Read before class: Section 9.

Do before class: Assignment 5.

Thursday, October 15: Cosets and Lagrange's Theorem.

Read before class: Section 10.

Tuesday, October 20: Exam 1 (sections 0, 2, 3, 4, 5, 6, 7, and 8; assignments 1–5).

Do before class: Assignment 6

Thursday, October 22: Direct products and finitely generated abelian groups.

Read before class: Section 11.

Tuesday, October 27: Groups of isometries.

Read before class: Section 12.

Do before class: Assignment 7.

Thursday, October 29: Homomorphisms.

Read before class: Section 13.

Tuesday, November 3: Factor groups.

Read before class: Section 14.

Do before class: Assignment 8.

Thursday, November 5: Factor group computations and simple groups.

Read before class: Section 15.

Tuesday, November 10: Groups acting on sets.

Read before class: Section 16.

Do before class: Assignment 9.

Thursday, November 12: Rings and fields.

Read before class: Section 18.

Tuesday, November 17: Exam 2 (sections 9, 10, 11, 12, 13, 14, and 15; assignments 6–9).

Do before class: Assignment 10.

Thursday, November 19: Integral domains.

Read before class: Section 19.

Tuesday, November 24: Theorems of Fermat and Euler.

Read before class: Section 20.

Do before class: Assignment 11.

Tuesday, December 1: The field of fractions of an integral domain.

Read before class: Section 21.

Do before class: Assignment 12.

Thursday, December 3: Rings of polynomials.

Read before class: Section 22.

Tuesday, December 8: Factorization of polynomials over a field.

Read before class: Section 23.

Do before class: Assignment 13.

Thursday, December 10: Review.

Do before class: Assignment 14.