MA360 – Abstract Algebra I **Fall 2019**
TTh 11:00 a.m.–12:15 p.m. (S-2-65)

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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. The Code is available online at the following web site:

https://www.umb.edu/editor_uploads/images/life_on_campus/Code_of_Conduct_5-14-14.pdf

Please pay particular attention to Section XII, paragraphs 1 and 5. In this course, you will be permitted to use a short note sheet during exams, provided that you have prepared the sheet yourself. Your exam responses may quote your lecture notes or the course textbook without attribution, but material taken from any other source must be properly attributed to its author. In addition, the use of electronic devices during exams is *expressly prohibited*. Violation of these policies will result in disciplinary action.

Web page

This syllabus and other course materials are available online at

http://cartan.math.umb.edu/wiki/index.php/Math_360,_Fall_2019

Schedule of topics

Week 1: Introduction. Sets and relations. (Textbook section 0.)

Week 2: More on sets and relations.

Week 3: Binary operations. Isomorphic binary structures. (Sections 2 and 3.)

Week 4: Groups and subgroups. (Sections 4 and 5.)

Week 5: Generating sets and cyclic groups. (Sections 6 and 7.)

Week 6: Groups of permutations. Orbits and cycles. (Section 8.)

Week 7: First midterm (Tuesday, October 15; covers assignments 1–5). Sign of a permuatation; the alternating group. (Section 9.)

Week 8: Cosets and Lagrange's theorem. Direct products and the Chinese Remainder Theorem. (Sections 10 and 11.)

Week 9: Groups of isometries. Homomorphisms. (Sections 12 and 13.)

Week 10: Quotient groups. Quotient group computations and simple groups. (Sections 14 and 15.)

Week 11: Group actions. (Section 16.)

Week 12: Second midterm (Tuesday, November 19; covers assignments 6–10). Rings and fields. (Section 18.)

Week 13: Integral domains. Theorems of Fermat and Euler. (Sections 19 and 20.)

Week 14: Euler's Theorem and RSA encryption. Field of fractions of an integral domain. (Section 21.)

Week 15: Rings of polynomials. Factorization of polynomials over a field. (Sections 22 and 23.)