Math 342 (542)
Spring Semester 2008

Instructor Information

Instructor. Dr. Kenneth Price, Associate Professor of Mathematics.

Contact. Phone (920) 424-1057 or send E-mail to pricek@uwosh.edu.

Office Hours. You may stop by my office, Swart 239, if you have questions on Mondays and Wednesdays between 10:20 AM and 12:30 PM or on Tuesdays and Thursdays from 1:50 PM to 2:50 PM. No appointment is needed to see me during office hours. For arranged appointments ask in person, call, or send E-mail.

Explanation of Grading

Your final grade is based on percentage of total points earned according to the following scale.

A	at least 92.0%	C	69.0% to 76.6%
AB	88.2% to 91.9%	CD	65.2% to 68.9%
B	80.5% to 88.1%	D	57.5% to 65.1%
BC	76.7% to 80.4%	F	below 57.5%

Grading Policy. *A statement of the solution with no additional explanation will not be awarded full credit.* Quiz and Exam problems should be answered completely.

Quizzes. The lowest quiz score will be dropped. Quiz problems come directly from the book.

Exams. Three exams will each be worth fifty points for a total of 150 points.

Student Responses Your comments will be collected on a regular basis in a written student response. You must write half of a page (or more) about anything related to your progress in this class. Student responses are due at the beginning of class and will not be accepted late or written on spiral-bound notebook paper. The five student responses are each worth 2 points for a total of 10 points. You may want to answer the questions below.

- What are the most important topics or concepts you have learned?
- How would you rate your understanding: poor, fair, or above average? Why?
- Do you have experiences related to the material? If so, please describe in detail.
- What do you find motivating or interesting?

Projects and Presentations for Graduate Credit Graduate students taking this class are enrolled in Math 542. Graduate students are expected to demonstrate higher-level thinking than their undergraduate classmates. Grading criteria will be adjusted to account for different levels of mastery. Graduate students will also complete projects and presentations to demonstrate analysis and synthesis of ideas as well as use of mathematical language. They should contact the instructor for details.

Makeup Policy. Special consideration for particular students is unfair to the rest of class. Therefore exams and quizzes must be taken at scheduled times. No exceptions will be made unless the following conditions are met.

- The reason for a makeup must be documented, verifiable, and beyond your control.
- Provide a written explanation. Phone messages and Email do not count.
- Make arrangements in advance whenever possible.

Academic Integrity The University of Wisconsin System disciplinary code provides standards of academic integrity for all students. Section 14.01 of these guidelines states[1]:

> Students are responsible for the honest completion and representation of their work, for the appropriate citation of sources, and for respect of others' academic endeavors.

Examples of academic misconduct include submitting others' work as your own, cheating on a quiz or exam, tampering with the work of others, and intentionally assisting another student in any of these activities.

Course Information

In modern algebra the variables are just as likely to stand for actions as numbers. The approach is wide-ranging and allows investigation of the abstract structure of objects auch as figures, equations, physical properties, or even other algebraic objects. Math 342 (542) provides an introduction to a central topic in modern algebra: group theory.

A group is an algebraic system described by a set equipped with one associative operation. Groups contain an identity element and every element has an inverse. Groups arise naturally as symmetric actions of a given object. The group structure to combine symmetric actions is to simply perform one action after another. If the order matters, which it often does, then this operation is not commutative.

The independent study of groups from a purely algebraic point of view has led to many advances. Group theory has applications in diverse areas such as art, biology, geometry, linguistics, music, and physics. The kinds of groups covered in this class include permutation, symmetric, alternating, and dihedral groups. Some of the important theorems covered are Cayley's Theorem, Fermat's Little Theorem, Lagrange's Theorem, and the Fundamental Theorem of Finite Abelian Groups.

Prerequisite. Completion of Math 222 with a grade of C or better.

Textbook. Contemporary Abstract Algebra (6th edition) by Joseph Gallian, Houghton Mifflin Company. Problems will be assigned from this version of the book and chapters zero through eleven will be covered.

Class Format.

> "It is nearly a law of nature in mathematics that a well-motivated example fitting a theorem is half the battle of proving the theorem." [2]

We will use methods of proof in every class. This requires using precise statements of definitions and theorems. The actual statements used in class may differ slightly from the textbook, so students must be able to recognize their logical equivalence. We cover many examples to motivate the need for definitions and to apply theorems.

Students are expected to answer questions in class and help solve problems. Every student should plan to be involved and keep up with class activities. You are encouraged to think critically, ask questions, read ahead, and form study groups.

[1] The system guidelines and local procedures are printed in the UW Oshkosh Student Discipline Code 2001-2002. Questions should be directed to the Dean of Students office.

[2] From the article, The Lost Cousin of the Fundamental Theorem of Algebra by Timo Tossavainen, which appeared in Mathematics Magazine Vol. 80, NO. 4, October 2007.