

Abstract Algebra (MATH 461)

Fall Quarter, 2006

Time/Place: MTWF 12:00-12:50 p.m. KRH 345

Instructor: Jonathan Duncan (duncjo@wwc.edu)

Office: Kretchmar Hall 330, phone: 527-2097

Office Hours: 10:00 MTWF, 11:00 W, 1:00 MF, or by appointment

Text: *A First Course In Abstract Algebra, 7th Edition* (ISBN 0201763907),
by John B. Fraleigh, Addison wesley, 2003.

Webpage: <http://math.wwc.edu/courses/461/>

This course introduces selected topics in abstract algebra including groups. We will cover at least sections 0-11 and 13-15, with additional sections and supplements added as time permits. The deadline for withdrawing is **Tuesday, 14 November** and the final will be on **Wednesday, 13 December 2006**.

Topics

1. Preliminaries:

sets, equivalence relations, partial orderings, linear orderings, well orderings, principle of mathematical induction, division algorithm, Euclidean algorithm, fundamental theorem of algebra

2. Groups and Subgroups:

group examples, binary operations, isomorphic binary structures, groups, subgroups, cyclic groups, generating sets, Cayley digraphs.

3. Permutations, Cosets, and Direct Products:

groups of permutations, orbits, cycles, alternating groups, cosets, Lagrange's theorem, direct products, finite abelian groups

4. Homomorphisms and Factor Groups:

homomorphisms, automorphisms, normal subgroups, factor groups, simple groups, group actions, G-sets, applications of G-sets to counting

5. Advanced Group Theory:

isomorphism theorems, series of groups, semi-direct products

Objectives

Upon completion of this course, students will have

1. developed demonstrable understanding of the topics outlined above.
2. successfully engaged in mathematical reasoning and creative problem solving.
3. become proficient in expressing clear and accurate mathematical proofs to problems drawn from the topics outlined above.

The following requirements encourage and measure the successful completion of these objectives.

Homework (O2,O3)

Mathematics is not a spectator sport. Problems will be assigned regularly and will be due by 5:00 p.m. on Wednesday of the following week. Assignments which are more than one class day late will not be accepted. These assignments should be considered the minimal amount of homework required to pass the course, and can be expected to take approximately two hours for every hour spent in class.

Please observe the following guidelines when preparing your homework.

1. Use letter (8.5 × 11) sized paper with clean edges (not torn out of a notebook).
2. Multi-page assignments must be stapled or paper-clipped together.
3. Fold the assignment lengthwise like a book and write your name, the course number, and assignment number on the front cover.
4. Use a pencil, write legibly, and organize your problems and solutions in a logical manner.

Exams (O1,O2)

There will be three exams during the course of the quarter, including the comprehensive final. The first two exam dates are subject to in-class change, and will be announced at least one week in advance. The final exam may only be taken out of schedule after consultation with the Associate Academic Dean.

Each exam includes both a written and oral component. The 20 minute oral exam is worth 20% of the total and must be scheduled outside of class, no more than two class days before or after the date of the written exam. The written component is worth the remaining 80% of the total score.

Exam I	Sections 0-7 and supplements	18 October
Exam II	Sections 8-15 and supplements	14 November
Final	Comprehensive	Wednesday, 13 December 2:00 p.m.

Solution Write-up (O3)

When writing exams and homework solutions, remember that your task is not merely to answer the question, but rather to **convince** the reader that your answer is correct. If you are writing a proof, this means that you should include sufficient justification for each assertion you make. What constitutes sufficient justification is sometimes open to interpretation. If in doubt, check with your instructor! Even in the case of computational problems, you must show your work and provide some justification for your answer. Finally, presentation is an important part of communicating mathematics. You are trying to “sell” your work to the reader, so it should flow naturally and be free from spelling or grammatical errors.

Grades

Your final letter grade will be based on your quarter average as shown below. Your quarter average is made up of four scores: your homework average and three exam scores. Weights for each of these are given below. Appropriate (to your instructor) modifications of the final letter grades may be made in individual cases for progress, unusual circumstances, etc.

Score Weights		Letter Grades (lowest percent)									
Homework	20%		B+	89%	C+	78%	D+	64%			
Exams I-II	2×25%	A	93%	B	82%	C	68%	D	57%	F	0%
Final	30%	A-	91%	B-	80%	C-	66%	D-	55%		

All acts of dishonesty are unacceptable, including cheating, plagiarism, forgery, misrepresentation, falsification, and prohibited collaboration. Violation of academic integrity codes will result in disciplinary action. While collaboration on homework is encouraged, be certain that the work you turn in is your own.

Disabilities

Students with a physical and/or learning disability who require accommodations should contact the instructor or Disability Support Services at 527-2366. This syllabus is available in alternative formats upon request.