

MATH 280-01 Modern Algebra Spring 2014

Instructor: Dr. Lauren Williams

Class Meeting: Hirt M209, MWF 9:15 - 10:20 AM

Office: Old Main 401

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Office Hours: Monday 12 - 2, Tuesday 9:30 - 1, Wednesday 12 - 1, Friday 12 - 1

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Textbook

Contemporary Abstract Algebra, 8th Edition, by Joseph A. Gallian. We will be covering parts 0-15 in the textbook, along with a few selected topic from later parts of the text.

Course Description

The underlying theme consists of looking at the structure of mathematical systems primarily as related to certain operations. Topics included are logic and sets, relations, equivalence relations and partitions, number theory (the integers), groups, subgroups, isomorphisms, homomorphisms, rings, and fields.

Course Objectives

- Introduce some of the basic definitions and methods of modern algebra.
- Develop abstract and critical reasoning by studying and writing mathematical proofs.
- Make connections between modern algebra and other branches of mathematics.
- Learn some of the history of the subject.

Homework

There will be several homework assignments that must be turned in. You will have a week to complete each assignment, and late work will not be accepted. You are allowed to work together; however, everyone must submit their own work. Feel free to ask questions about the homework during class or office hours. The lowest homework score will be dropped when your final grade is calculated.

In addition to these assignments, you are encouraged to work on the problems in the textbook. This work will not be collected, but is extremely important to your success in the class.

In Class Examinations

There will be three in class examinations in addition to the final exam:

- Wednesday, February 26
- Wednesday, April 2
- Wednesday, April 30

More information about each exam will be given in class, but the following applies to all:

- Calculators, cell phones, computers, and other devices are not permitted.
- You may not use your notes, textbook, or other materials during the exams.
- A review sheet, including practice problems, will be given to you approximately one week before each exam.
- The lowest exam grade, including any missed exams, will be replaced by the final exam grade if the final exam grade is higher.

Final Exam

The final exam will be cumulative. As with the other in class exams, you are not permitted to use any devices or materials aside from a scientific calculator.

The final exam will be on **Wednesday, May 14th, 8:30 - 10:30 AM.**

Final Grades

Grades will be calculated out of 600 points as follows:

- 300 points - In Class Exams (3 at 100 points each)
- 100 points - Homework (lowest grade will be dropped)
- 200 points - Final Exam

Grading scale:

F	D	D+	C	C+	B	B+	A
0-59	60-64	65-69	70-77	78-83	84-89	90-93	94-100

Other Course Information

- You are neither expected nor required to purchase any materials for the course aside from the required textbook. Graphing calculators and mathematical software could be used to check your work, but should not be relied on to do the work for you.
- I will attempt to return emails as thoroughly and promptly as possible. Please allow up to 24 hours for a response. However, it is better to ask complicated questions during class or in office hours. If you have a question about the homework, it is quite likely someone else has the same question, so you're doing the class a favor by asking!
- There are other linear algebra textbooks available in the library and in my office. Due to book prices, you may not want to invest in a second book, but it can be helpful to have alternate sources or see topics explained in other ways.
- I do not keep detailed lecture notes. It is highly recommended that you establish contacts among your classmates to get notes in case you miss class.
- Attendance is not required, but coming to class regularly will generally improve your grade. Please contact me if you are absent for an extended period.

Learning Differences

In keeping with college policy, any student with a disability who needs academic accommodations must call Learning Differences Program secretary at 824-3017, to arrange a confidential appointment with the director of the Learning Differences Program during the first week of classes.

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Date	§	Topic	Problems	Due
Jan 29	1.0	Preliminaries	3, 4, 12, 16	
Jan 31	1.0	Preliminaries	27, 35, 38	
Feb 3	1.0	Preliminaries	59, 61, 64	
Feb 5	2.1	Intro to Groups	1, 6, 13	
Feb 7	2.2	Properties of Groups	3, 5, 7, 13	HW 1
Feb 10	2.2	Properties of Groups	33, 34, 46, 48	
Feb 12	2.3	Finite Groups & Subgroups	1, 10, 24	
Feb 14	2.3	Finite Groups & Subgroups	32, 34, 43, 44, 49	HW 2
Feb 17	2.4	Cyclic Groups	4, 10, 17, 20	
Feb 19	2.5	Permutation Groups	1, 6, 13, 25	
Feb 21	2.5	Permutation Groups	44, 49, 53, 64	HW 3
Feb 24		Review		
Feb 26		Exam I		
Feb 28	2.6	Isomorphisms	1, 6, 11	
Mar 3	2.6	Isomorphisms	15, 22, 28, 36, 51	
Mar 5	2.7	Cosets & Lagrange's Theorem	1, 5, 8	
Mar 7	2.7	Cosets & Lagrange's Theorem	15, 21, 33, 44, 45	HW 4
Mar 10-14		<i>Spring Break</i>		
Mar 17	2.8	External Direct Products	1, 4, 8, 9	
Mar 19	2.9	Normal Subgroups & Factor Groups	2, 4, 6	
Mar 21	2.9	Normal Subgroups & Factor Groups	18, 29, 36, 39	HW 5
Mar 24	2.10	Group Homomorphisms	5, 8, 20	
Mar 26	2.10	Group Homomorphisms	26, 41, 46, 59	
Mar 28	2.11	Fund Thm of Finite Abelian Groups	2, 7, 15, 17	HW 6
Mar 31		Review		
Apr 2		Exam II		
Apr 4	3.12	Intro to Rings	2, 4, 8	
Apr 7	3.12	Intro to Rings	13, 18, 29, 33, 45	
Apr 9	3.13	Integral Domains	2, 5, 8, 22, 35	
Apr 11	3.14	Ideals & Factor Rings	1, 5, 6, 10	HW 7
Apr 14	3.14	Ideals & Factor Rings	11, 15, 24, 27	
Apr 16	3.15	Ring Homomorphisms	5, 8, 16, 29	
Apr 18		<i>No Class</i>		
Apr 21		<i>No Class</i>		
Apr 23	3.16	Polynomial Rings	1, 6, 10, 13	
Apr 25	3.17	Factorization of Polynomials	4, 11, 12	HW 8
Apr 28		Review		
Apr 30		Exam III		
May 2		Later Topics		
May 5		Later Topics		
May 7		Later Topics		
May 8		Review		HW 9
May 14		Final Exam		