Math 312 :: Abstract Algebra :: Fall 2014

This is the syllabus for Math 312. See the links to the right for updated information. Here you'll find information on prerequisites, grading policy, homework, study resources and a tentative course calendar.

Course

- Where: Jamrich 3103
- When: 10:00-10:50 a.m., Mon-Wed-Fri

Office Hours

I am often in my office JXJ 2226, you are free to stop by and see if I am available. My official office hours are

- Monday: 1pm - 2pm
- Wednesday: 1pm - 2pm
- Thursday: 10am - 11am, 1pm - 2pm
- Friday: 1pm - 2pm

Course Description

Math 312 is an introduction to modern abstract algebraic systems and their applications. The course will focus on a rigorous treatment of the basic theory of groups (subgroups, quotient groups, homomorphisms, isomorphisms, group actions) and their applications.

Prerequisites

C or better in Math 211 and Math 163.

Textbook

The textbook we will use for this course Contemporary Abstract Algebra by Joseph Gallian. I will use the Eighth Edition, which is available at the University Bookstore.
Other editions will be very similar, but the exercises will occasionally differ. If you have a different edition, find a friend with the sixth edition to make sure the exercises you work match your friend's.

**Attendance**

Regular attendance is expected. Important dates can be found [here](#).

**Homework**

You will have weekly homework assignments that will be collected and graded. The problems will range in difficulty and you are encouraged to work together. You must, however, write up your own solutions and acknowledge your collaborators, and staple (or neatly package) your work.

**Grading**

- Homework 40%
- Quizzes 20%
- Take-Home Midterm 20%
- Take-Home Final 20%

**Quizzes**

Quizzes will be given roughly every three weeks. Some quizzes will be group/team quizzes.

**Exams**

- Midterm: Oct. 6
- Final - Monday, Dec. 8 :: 10 am - 11:50 am
- Make sure that you will be able to attend the exams at the given dates and times. Exceptions can only be accepted in case of time conflicts with other courses, or serious illness with a physician’s certification.
  
  [Final Exam Schedule](#)

**Technology**

I first learned Abstract Algebra about 15 years ago and I would have loved to have some of the computer generated graphics and computing power available today. Check out the Group Explorer for starters.

On the Take-Home Midterms and Exams, you are NOT allowed to use the internet.
Laptops and Cellphones

In order to promote a focused learning environment, **Do not use your laptop in class unless instructed to do so.** Please put your phone away while in class. I often find that my most creative thoughts arrive while sitting through a boring lecture. I’ll do my best to not be boring, but if I fail give daydreaming a try.

Other Resources

Both free and paid tutoring is available, in the tutoring lab in NSF 3810.

Outcomes & Assessment

Upon successful completion of this course students will be able to:

- Select and correctly apply standard proof writing techniques.
- Describe various properties of groups, such as its subgroups, its order and isomorphisms.
- Apply group theory to analyze symmetry and motion of common objects.

*Evaluation of these learning outcomes will be done through a mix of assignments, class exercises, projects, research papers, group work, written & oral quizzes and tests.*

Course Description

This course will cover most of Parts 1 and 2 text. We will study groups, subgroups and various classes such as cyclic and permutation groups. We will construct homomorphisms and isomorphisms of groups and use these to classify finite abelian groups.

- Preliminaries and Intro to Groups - 3 weeks
- Subgroups - 1 week
- Cyclic Subgroups - 1 week
- Permutation Groups - 1 week
- Isomorphisms - 1 week
- Cosets and Lagrange's Theorem - 2 weeks
- Products, Normal Subgroups and Factor Groups - 2 weeks
- Homomorphisms - 1 week
- The Fundamental Theorem of Finite Abelian Groups - 1 week

University Policies

**Academic Honesty:** Cheating is not only unethical and pathetic, but is a violation of the Northern Michigan University [Student Code and University Policy](#) and grounds for your dismissal from the University.

**Discrimination & Harassment:** Northern Michigan University does not unlawfully discriminate on the basis of race, color, religion, national origin, gender, age, height, weight, marital status, handicap/disability, sexual orientation or veteran status. If you have a civil rights inquiry, contact the [Affirmative Action Office](#) at 906-227-2420.

**Americans with Disabilities Act Statement:** The University seeks to provide equal access to its programs, services and activities for people with disabilities. If you have a need for disability-related accommodations or services, please inform the Coordinator of [Disability Services](#) in the Dean of Students Office at 2001 C. B. Hedgcock Building (227-1700). at 906-227-1700 as soon as possible. Reasonable and effective accommodations and services will be provided to students
if requests are made in a timely manner, with appropriate documentation, in accordance with federal, state, and University guidelines.

**The Registrar:** Withdrawing from any course or any matters relating to registration are the responsibility of the student. For more information regarding this topic, check out the Registrars Website.