



Instructor: Lauren Williams, PhD
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Office Hours: Monday 2 - 3 pm
Tuesday 9 - 10:30 am and 1 - 2:30 pm
Wednesday 2 - 3 pm
Friday 1 - 2 pm
and by appointment

Course Description

This is the second semester of a year long sequence on the study of algebraic structures. Course topics include rings, fields, an introduction to Galois theory, symmetry, the Sylow theorems, and finite simple groups.

The topics for this semester come from four major components:

1. **Divisibility.** A return to rings and polynomials, along with a broader understanding of just what it means to divide, reduce, and factor.
2. **Galois Theory.** We'll motivate the very existence of modern algebra! This will be an introduction to field extensions, how they arise in the solution of a historical problem, and how the work of Galois continues to influence mathematics.
3. **Additional topics in group theory.** A few more concepts related to groups, including the sylow theorems, group actions, and a introduction to representation theory.
4. **Symmetry.** The many definitions of symmetry (and what they have in common), the symmetry of shapes and patterns, polynomials, and just about any object. This section will revisit the symmetric groups, cyclic and dihedral groups, and introduce the infinite wallpaper and frieze groups. We'll also introduce related topics like duality.

Course Objectives

On successful completion of the course, students should be able to:

- provide the definitions of algebraic objects, and know some examples of each.
- develop abstract and critical reasoning by studying and writing mathematical proofs.
- understand the connection between modern algebra and other branches of mathematics.
- relate the material learned in this course to prerequisite courses.
- recognize algebraic structures and objects in everyday situations.
- learn about the historical development of modern algebra.

Course Updates

An updated course schedule, assignments, and grades can be found on Blackboard.

Grades

Assignments will be given throughout the semester. Your final grade will be determined by the weighted average of these assignment grades, with the lowest assignment grade dropped from this average.

Important Spring 2022 Dates

January	19	First Class Meeting
	21	Last Day to Add/Drop
March	7-13	Spring Break
	29	Advising Day (No Class)
April	8	Last Day to Declare Pass/Fail
	14-18	Easter Break
	19	Last Day to Withdraw

ADA and Learning Differences

Mercyhurst University is committed to making reasonable accommodations for qualified students, and employees with disabilities as required by law. Please refer to the HUB

<https://lakersmercyhurst.sharepoint.com/sites/StudentsHub>

and select the Services tab, then ADA Accommodations from the dropdown for instructions to request an accommodation. You may also contact Susan Reddinger, ADA Coordinator, ADA@mercyhurst.edu, 814-824-2362, Egan Hall 200. For students with questions about Academic Support, please refer to the HUB

<https://lakersmercyhurst.sharepoint.com/sites/StudentsHub>

and select the Academic Resources tab, then Academic Support for more information.

Title IX Information

Mercyhurst is committed to providing an environment free from sex discrimination, including sexual harassment and sexual violence. Please refer to the HUB:

<https://lakersmercyhurst.sharepoint.com/sites/StudentsHub>

and select the Resources tab, then Title IX – Sexual Respect from the dropdown for more information. If you would like to file a sexual misconduct complaint, please contact Ann Miller, Title IX Coordinator and Compliance Officer, titleix@mercyhurst.edu, 814-824-2363. Please be aware that in compliance with Title IX, educators must report incidents of sexual assault/harassment, stalking, and domestic/dating violence. If you disclose any of these situations in class, in papers, or to me personally, I am required to report it to the Title IX Coordinator (or any of the Deputy Title IX Coordinators).

Course Evaluations

Near the end of the semester, you will be asked to complete an online course evaluation. The evaluation will be completed in class during the last two weeks of the semester using any laptop, tablet, or mobile device. The response tool allows you to note aspects of the course that helped you learn, as well as aspects that might be modified to help future students learn more effectively. You will receive an email letting you know when the evaluation window for our class is open. Please note that these course evaluations are anonymous and instructors do not see the results until after the grades for the course are submitted.