

MATH 5821 - Topics in Abstract Algebra

Fall 2026 Syllabus, Section 01, CRN 40512,

Credit hours: 4

Instructor

Thomas Madsen

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Public Instructor Information

Instructor Title: Associate Professor

Instructor Professional Qualifications: Ph.D., Mathematics, University of Oklahoma, 2014

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Course Description

5821. Topics in Abstract Algebra. A course in abstract algebra aimed at developing a broad understanding of the subject. Credit will not be given for both MATH 3721 and MATH 5821. Prereq.: Permission of graduate director or department chair required. 4 s.h.

Course Readings

Group	Title	Author	ISBN
Required	Course notes	Thomas Madsen	

As primary text for this course we will use some notes. If you would like to buy a physical textbook, I recommend the 8th edition of Joseph Gallian's Contemporary Abstract Algebra. There is a newer edition, but the 8th edition is fine. You don't need to buy this book, but it might be helpful for some things.

The course readings are subject to change in the event of extenuating circumstances, research developments, current events, and/or to ensure better learning.

Tentative Schedule - This is a rough guide for our plan. We may include more topics as there is interest/opportunity/time

Week of	Proposed Topic	Due/To Prepare for Class
8/24	Review of things from Linear Algebra and Discrete Mathematics. Introduction to group theory.	Study your notes, Homework may be due, prepare for quiz/exam.
8/31	Basic group theory (definition, examples, properties)	Study your notes, Homework may be due, prepare for quiz/exam.
9/7	Basic group theory (definition, examples, properties) Subgroups	Study your notes, Homework may be due, prepare for quiz/exam.
9/14	Subgroups Cyclic Groups	Study your notes, Homework may be due, prepare for quiz/exam.
9/21	Permutation groups	Study your notes, Homework may be due, prepare for quiz/exam. Exam 1
9/28	Permutation groups, dihedral groups	Study your notes, Homework may be due, prepare for quiz/exam.
10/5	Homomorphisms	Study your notes, Homework may be due, prepare for quiz/exam.
10/12	Isomorphisms Group actions	Study your notes, Homework may be due, prepare for quiz/exam.
10/19	Group actions Cosets and Lagrange's Theorem	Study your notes, Homework may be due, prepare for quiz/exam.
10/26	Cosets and Lagrange's Theorem	Study your notes, Homework may be due, prepare for quiz/exam. Exam 2

11/2	Normal subgroups and factor groups	Study your notes, Homework may be due, prepare for quiz/exam.
11/9	The Fundamental Theorem for Finite Abelian Groups	Study your notes, Homework may be due, prepare for quiz/exam.
11/16	Rings and fields	Study your notes, Homework may be due, prepare for quiz/exam.
11/23	Rings and fields	Study your notes, Homework may be due, prepare for quiz/exam. Exam 3
11/30	Catch-up and review	Study your notes, Homework may be due, prepare for quiz/exam.
12/7	Final Exam	Final Exam

The course schedule, policies, procedures, and assignments in this course are subject to change in the event of extenuating circumstances, by mutual agreement, and/or to ensure better learning.