MATH 3721 - Abstract Algebra 1

Fall 2026 Syllabus, Section 01, CRN 40509,

Credit hours: 4

Instructor

Thomas Madsen

Email: tlmadsen@ysu.edu

Public Instructor Information

Instructor Title: Associate Professor
Instructor Professional Qualifications: Ph.D., Mathematics, University of Oklahoma, 2014
Instructor Office Location: Cafaro Hall 635
Instructor Office Phone: 330-941-4398

Course Description

3721. Abstract Algebra 1. Introduction to abstract algebra investigating fundamental concepts in group and ring theory. Topics include groups, subgroups, cyclic groups, permutation groups, cosets, direct products, homomorphisms, factor groups, rings, integral domains and polynomial rings. Prereq.: "C" or better in MATH 3720 and either MATH 3715 or CSCI 3710. 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.