

MATH 5331 – Algebra I

Fall 2021

Instructor: Dr. Kassie Archer

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Office hours: TBD, or by appointment.

Scheduled lectures:

Section 001

MWF, 9:05–10:00 A.M.

Location: RBN 4039

Course Webpage: All course information and documents will be available on Canvas.

Textbooks: *Abstract Algebra* (3rd edition) by Dummit and Foote. (ISBN: 978-0471433347)

Prerequisites: MATH 3336 or its equivalent (i.e., an introductory undergraduate-level course in abstract algebra).

Course Description

Basic structure, substructure, morphisms, and quotient structures in the categories of groups, rings, and modules.

Student Learning Outcomes

Upon completion of this course, students should be able to do the following:

- State all relevant theorems.
- Create examples and counterexamples demonstrating theorems and their limitations.
- Write clear and logically correct proofs.

Assignments and Grading

Homework

Homework will probably be assigned each week. Collaboration is allowed, but each student must write up their own solution individually.

Exams

There will be two exams during the semester, as well as a comprehensive final exam.

Grading

Your grade will be computed as follows. The rubric for assigning final letter grades will be *no more harsh* than the given scale.

Assignment	Total %
Homework	25
Exam 1	25
Exam 2	25
Final exam	25
Total	100

Numerical	Letter
90 – 100	A
80 – 89	B
70 – 79	C
60 – 69	D
Below 60	F

Course Policies

Canvas

All homework assignments, announcements, and important documents will be posted there.

Attendance and Make-ups

Attendance is very important for doing well in the course. However, if you are sick and/or are experiencing any COVID-19 symptoms, please stay home. Send me an email if this happens and we will figure out make-ups, note sharing, etc.

For absences not related to COVID-19 (such as official UT Tyler activities), let me know beforehand that you will be missing class so we can plan around it.

Cell Phones, Calculators, and Electronic Devices

When class is about to begin, place any electronic devices (such as cell phones) in silent mode and put them out of sight. You may use a laptop or tablet to take notes if you wish. If you are using such devices for other purposes, I will ask you to put them away.

Collaboration, Plagiarism, and Academic Dishonesty

I encourage you to talk to your classmates when studying and working on homework assignments. When learning abstract mathematics, it is extremely helpful to discuss ideas with others, and it can be easier to discern what one does and does not understand when trying to explain things to others. Therefore, collaboration is an indispensable learning tool. However, any work you submit must represent your own effort. Keep the following guidelines in mind when working on homework:

- The solutions that you turn in to me should be written up by you in your own words. It is fine (and encouraged) to discuss ideas with others, but I want each person to think individually about how to put those ideas down on paper.
- If you have worked with others on a particular problem, say so when you write up your solution. If you got a particular idea from someone else, give them the appropriate credit.

In summary, I encourage you to work on homework together, but I do not want you to write up complete proofs as a group—this should be done individually.

Changes to Syllabus

I reserve the right to make changes to the syllabus during the semester. I will announce any changes to course policies in class and post an updated version of the syllabus to Canvas.

Important Dates

August 23: Classes begin.

September 3: Census date. Last day to change schedule or file for grade replacement.

September 6: Labor Day holiday. No class.

November 1: Last day to withdraw.

November 22–26: Thanksgiving break. No classes.

December 6: Study day.

December 7–10: Final exams.

University Policies

Information on University policies concerning the following topics:

- UT Tyler Honor Code
- Students Rights and Responsibilities
- Campus Carry
- UT Tyler Tobacco-Free Policy
- Grade Replacement/Forgiveness and Census Date
- State-Mandated Course Drop Policy
- Student Accessibility and Resources
- Student Absence due to Religious Observance
- Student Absence for University-Sponsored Events and Activities
- Social Security and FERPA Statement
- Emergency Exits and Evacuation
- Student Standards of Academic Conduct
- UT Tyler Resources for Students

can be found at

<http://www.uttyler.edu/academicaffairs/files/syllabuspolicy.pdf>

Tentative Weekly Schedule

This schedule is very likely to change as we move through the semester. Topics marked with an asterisk (*) are optional and will be covered as time permits.

Week	Dates	Topics covered
1	8/23–8/27	Introduction to groups. Basic examples. Homomorphisms and subgroups.
2	8/30–9/3	More on subgroups and cyclic groups.
3	9/6–9/10	Quotient groups, normal subgroups, and the Isomorphism Theorems. (No class on 9/6 for Labor Day.)
4	9/13–9/17	The symmetric group. Introduction to group actions.
5	9/20–9/24	More on group actions. The Sylow Theorems.
6	9/27–10/1	Direct and semidirect products of groups.
7	10/4–10/8	Classification theory – composition series, the Jordan-Hölder Theorem, nilpotent and solvable groups.
8	10/11–10/15	Introduction to rings and basic examples. Ring homomorphisms.
9	10/18–10/22	Ideals and quotient rings. The Isomorphism Theorems for rings.
10	10/25–10/29	Euclidean domains, principal ideal domains (PIDs), and unique factorization domains (UFDs).
11	11/1–11/5	Noetherian and Artinian rings.
12	11/8–11/12	Fundamentals of polynomial rings.
13	11/15–11/19	Polynomial rings over fields.
14	11/22–11/26	Thanksgiving break – no class.
15	11/29–12/3	Introduction to category theory.