

MATH 3551 A — Abstract Algebra I

Taylor Dupuy, University of Vermont

Fall 2026

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Office Hours TBA. Announced in class and posted on the course webpage during the first week.

Course Meeting Times MWF 12:00–12:50, Lafayette L107. CRN 92936. 3 credits. Classes run September 9 through December 11, 2026 — 37 meetings.

Final Exam Thursday, December 17, 2026, 10:30 AM–1:15 PM, Lafayette L107. The time and room are assigned by the Registrar; the exam is 2 hours 45 minutes.

Book David S. Dummit and Richard M. Foote, *Abstract Algebra*, 3rd edition, Wiley. ISBN 0-471-43334-9. An errata list is maintained by Professor Foote at http://www.cems.uvm.edu/~foote/errata_3rd_edition.pdf

Content Chapters 1–5 of Dummit and Foote — the basic theory of groups, subgroups, and quotient groups — together with portions of Chapter 6 on solvable and nilpotent groups. Section 5.3 (the table of groups of small order) is skipped: it is a reference table rather than a body of technique, and nothing later in the course or on any exam depends on it. This course is the basis for the sequel, MATH 3552.

Prerequisites Enforced: (MATH 2468 or MATH 2551 or a grade of C– or better in MATH 2055) and (MATH 2522 or MATH 2544).

Grading Three in-class midterms, 20% each, and a cumulative final exam, 40%. There is no graded homework. Letter grades are assigned on the usual scale (A: 90–100, B: 80–89, C: 70–79, D: 60–69, F: below 60), with plus/minus grades at the top and bottom of each band. I reserve the right to curve upward, never downward.

Exam Dates Midterm 1: Monday, October 12 (in class).

Midterm 2: Friday, November 6 (in class).

Midterm 3: Monday, November 30 (in class).

Final: Thursday, December 17, 10:30 AM–1:15 PM.

Homework and practice problems

There is no graded homework in this course. Practice problems will be posted and worked in class, but they are not collected and they do not count toward your grade. The reason is not that work done outside of class does not matter — it is the whole preparation — but that written work done outside of class can no longer be reliably attributed to the student who submitted it, so grading it would be measuring the wrong thing. Everything that counts in this course is therefore written in class, by hand, without notes or devices.

Do the practice problems anyway. They are the only realistic preparation for the kind of writing the exams ask for, and they are where you find out — while it is still cheap to find out — which definitions you do not actually know.

How much time this takes. The usual rule of thumb is about three hours of work outside of class for every hour spent in it. This course meets three hours a week, so plan on roughly nine hours a week of reading, problems and writing — an hour and a half a day, most days of the week. In a first algebra course a good deal of that time goes into definitions and examples rather than into finished proofs, and that is time well spent.

The suggested problems. Lists of recommended problems from Dummit and Foote are kept for each part of the course and posted on the course webpage,

<https://tdupu.github.io/algebra-one/fall-2026/algebra.html>

Problems on the three midterms and on the final are written to be **similar to those problems, but not identical to them**. The expectation is that you can do problems *of that kind*: the skill is meant to transfer, and a memorised solution does not transfer. If you can work a recommended problem on a blank page without looking at anyone's answer, the exam will feel familiar.

Work with other people. Find two or three classmates in the first couple of weeks and set a standing time to work problems together. Explaining an argument out loud to somebody who is not yet convinced is the fastest way to discover whether you really have one, and a study group is much easier to start in September than the week before Midterm 2.

You are also very welcome to ask an AI for help with a practice problem — I recommend it, and there is more about this in the next section. One request about how you use it, and it is the only one I will make: **read the problem and make a genuine attempt at it before you look up an answer or ask a model**. Give it ten or fifteen minutes, put something on the page, get properly stuck. The value is in the attempt. A solution you have read is not a skill you have, and the distance between those two is exactly what the exams measure.

AI tools

I **strongly recommend** that you use AI coding and reasoning tools while you study, and two in particular: **Claude Code** and **Codex**. Learn to drive them well. They are patient, they are available at two in the morning, and being able to work with them is going to matter in whatever you go on to do.

Since I am recommending them, you should know that I use them. **This syllabus, the course webpages and the problem sets for this course were generated with Claude Opus 5 in a Cowork harness.** The decisions, the sequencing and the policies are mine, and I have read and edited every line of what you are holding — but the drafting was done with a model, and it would be strange to recommend a tool to you while quietly concealing that I use it myself.

If you would like help with any of this, please ask me. Installing these tools, prompting them, working out what they are and are not good at — I am glad to help, in office hours or after class, and it is not an off-topic question.

None of this is in tension with the fact that no work outside of class is graded. The two ideas fit together. Nothing you do outside of class counts toward your grade, and the reason is not that these tools are forbidden; it is that because they exist and are good, work produced outside a classroom no longer tells me — or you — very much about what you can do on your own. So I do not grade it, and I have no interest in policing it. What I grade is what you write in the room, by hand, on the three midterms and the final. The rest of the week is yours to learn with by whatever means work for you, and AI is one of the means I recommend.

The one boundary is the exams themselves, and it is not really a rule about AI: exams are closed-book and closed-device and are your own work, as the Academic Integrity section below says. That is a rule about the exams. It is not a rule about how you study.

Exams

All exams are closed book: no notes, no books, no calculators, no phones, no devices of any kind.

Replacement rule. Each midterm score is replaced by the maximum of that midterm score and your score on the final exam. So a bad day on a midterm is repairable: if you learn the material by December, the final speaks for that midterm too.

One consequence is worth stating plainly. A missed midterm is recorded as a zero, and the replacement rule then replaces that zero with your final exam score. This means there are no makeup exams, and you do not need to document anything or ask my permission to miss one. If you are sick, stay home. The rule already covers you.

Two things sit outside this. **Accommodations arranged through Student Accessibility Services** come first: bring me your SAS letter in the first two weeks and we will put in place whatever it calls for — extended time, a separate room, or an alternate sitting — for every exam in the term. The second is a **religious holiday** that falls on an exam date; see the University Policies at the end of this syllabus. Both are described there.

Attendance

I do not take attendance and there is no participation grade. That said, the exams come out of what happens in the room, and nearly everyone who stops coming does badly. If you must miss class for a university-sanctioned event — an intercollegiate athletic competition, for instance — please let me know in advance so we can plan around it.

Week-by-week schedule

This schedule is a plan, not a contract; topics may shift by a meeting or two. The exam dates will not move. Fall Recess (Friday, October 9) and Thanksgiving recess (November 23–27) are already removed below. The term is 37 meetings, beginning Wednesday, September 9.

Wk	Meeting	Topic (Dummit & Foote)	Events
1	Wed Sep 9	Course intro; 1.1 binary operations and the definition of a group	First day of class
	Fri Sep 11	1.1 basic properties; 1.2 dihedral groups	
2	Mon Sep 14	1.3 symmetric groups; cycle decomposition	Add/Drop, Pass/No Pass, Audit deadline

Wk	Meeting	Topic (Dummit & Foote)	Events
	Wed Sep 16	1.4 matrix groups; 1.5 the quaternion group	
	Fri Sep 18	1.6 homomorphisms and isomorphisms	
3	Mon Sep 21	1.6 continued; 1.7 group actions	
	Wed Sep 23	2.1 subgroups and the subgroup criterion	
	Fri Sep 25	2.2 centralizers, normalizers, stabilizers and kernels	
4	Mon Sep 28	2.3 cyclic groups and cyclic subgroups	
	Wed Sep 30	2.4 subgroups generated by a subset; 2.5 the lattice of subgroups	
	Fri Oct 2	3.1 quotient groups and homomorphisms	
5	Mon Oct 5	3.2 cosets and Lagrange's theorem	
	Wed Oct 7	3.2 continued; review for Midterm 1	Review day
	Fri Oct 9	<i>Fall Recess — no class</i>	
6	Mon Oct 12	—	Midterm 1 (1.1–3.2)
	Wed Oct 14	3.3 the isomorphism theorems	
	Fri Oct 16	3.3 continued; 3.4 composition series	
7	Mon Oct 19	3.4 the Jordan–Hölder theorem and the Hölder program	
	Wed Oct 21	3.5 transpositions and the alternating group	
	Fri Oct 23	4.1 group actions and permutation representations	
8	Mon Oct 26	4.2 Cayley's theorem	
	Wed Oct 28	4.3 the class equation	
	Fri Oct 30	4.3 continued; conjugacy classes in S_n	
9	Mon Nov 2	4.4 automorphisms	Last day to withdraw
	Wed Nov 4	Review for Midterm 2	Review day
	Fri Nov 6	—	Midterm 2 (3.3–4.4)
10	Mon Nov 9	4.5 the Sylow theorems: statements and Sylow I	
	Wed Nov 11	4.5 Sylow II and Sylow III	
	Fri Nov 13	4.5 applications: groups of order pq , p^2q , and small order	
11	Mon Nov 16	4.6 the simplicity of A_n ; 5.1 direct products	
	Wed Nov 18	5.2 the fundamental theorem of finitely generated abelian groups	
	Fri Nov 20	Review for Midterm 3	Review day
	Nov 23–27	<i>Thanksgiving recess — no class</i>	
12	Mon Nov 30	—	Midterm 3 (4.5–5.2)
	Wed Dec 2	5.4 recognizing direct products	
	Fri Dec 4	5.5 semidirect products	
13	Mon Dec 7	5.5 continued; classifying groups of small order	
	Wed Dec 9	6.1 solvable and nilpotent groups	
	Fri Dec 11	6.1 continued; review for the final	Last day of class

The review day for Midterm 3 falls on Friday, November 20, which is ten days before the exam rather than the usual two, because Thanksgiving recess (November 23–27) sits between it and Monday, November 30. There is no class between the review day and the exam. Use the recess.

Reading days are December 12, 13 and 16. The final exam period is December 12–18; our final is Thursday, December 17, 10:30 AM–1:15 PM, in Lafayette L107.

Graduate credit

Students taking this course for graduate credit should notify me within the first two weeks of the semester, copying the graduate chair. There is no additional coursework for graduate students; the grading scheme above applies unchanged.

University policies

Academic Integrity All work in this course is governed by UVM's Code of Academic Integrity, <https://www.uvm.edu/policies/student/acadintegrity.pdf>. In practice, in this course, that means exams are your own work, written without notes, devices, or assistance.

Code of Student Rights and Responsibilities Students are responsible for knowing the Code, <https://www.uvm.edu/policies/student/studentcode.pdf>.

Student Accessibility Services UVM is committed to full access for students with documented disabilities. Contact Student Accessibility Services (SAS), A170 Living/Learning Center, 802-656-7753, access@uvm.edu. If you have an accommodation letter, please arrange to meet with me within the first two weeks of the semester so that accommodations can be put in place well before the first midterm on October 12.

Religious Holidays Students have the right to practice the religion of their choice. If you will miss class or an exam for a religious holiday, submit your documented schedule of absences to me in writing by the end of the second full week of classes. You will be permitted to make up the work without penalty. For a midterm that means an alternate sitting arranged in advance, or, if you prefer, the replacement rule under **Exams** above, which carries your final exam score into that midterm's slot. Either way the absence costs you nothing. This is the one circumstance in which a midterm is sat outside its scheduled meeting.

Attendance and Athletic Absence Students representing the University in a sanctioned event should provide me with their schedule of expected absences in advance. See the attendance policy in the Code of Student Rights and Responsibilities above.

Course Evaluation All students are expected to complete an evaluation of the course at its conclusion. Evaluations are anonymous and confidential, and I do not see them until after grades are submitted. I read them carefully and they change how I teach this course.