

Syllabus for M 432: Abstract Algebra II (Spring 2021)

Instructor Information

Instructor: Nikolaus Vonessen
Email: nikolaus.vonessen@mso.umt.edu
Phone: (406) 243-6222 (for leaving voicemail messages; email is strongly preferred)
Office hours: (Find me on the [Math Department's People page.](#))

Course Catalog Description

4 Credits. Offered spring. Prereq., M 431. Continues the investigation of groups, rings, and fields begun in M 431. Further topics include vector spaces and field extensions. Level: Undergraduate-Graduate

Learning Outcomes

Upon completion of this course, a student will be able to:

1. Demonstrate understanding of the covered topics from the theories of groups, rings and fields.
2. Explain the important definitions and be able to use them correctly;
3. Demonstrate improved proficiency in constructing proofs (in addition to correctness and clarity, focusing on concise, well-written proofs);
4. Demonstrate improved use of English in written assignments.

Required Textbook

Abstract Algebra, An Introduction, 2nd edition, by Thomas W. Hungerford, Brooks/Cole, 1997, ISBN-10: 0-03-010559-5, ISBN-13: 978-0030105593.

We will cover most of the material from the following sections (in this order): 7.1–7.5 (mostly review), 7.6–7.10, 8.1–8.2 (and a bit of 8.3), 5.1–5.3, 6.1–6.3, 9.4, 10.1–10.5 (and a bit of 10.6).

Some additional information:

- This is a 4-credit class, officially meeting MTWF. But we'll skip the Tuesday meetings; they are replaced by study-buddy team meetings (at least 1-2 hours per week, teams of 2-3 students assigned by me, at least initially).
- Fridays will consist of **student presentations**, always by a team of two students, about material in the textbook (assigned the previous Friday). If there are only two students enrolled; you'll be always on; if there are more, we'll rotate this around. So this class is a bit similar to an independent study course. In an independent study course, only the students present material. In this course, I'll present twice a week, and you the third time.

Course Grade

- 20% proof writing homework (one proof specifically graded for writing most weeks, resubmission is possible)
- 60% other homework (most of the problems also involve proving facts). About 2-4 problems graded each week.
- 20% presentations (each graded on the scale 0-4)

Grading Scale

Cutoff Percentage:	93%	90%	87%	83%	80%	75%	70%	65%	62%	58%	55%
Grade:	A	A-	B+	B	B-	C+	C	C-	D+	D	D-

Homework

Working on problems seems to be the most important part of learning mathematics – so please take the homework seriously. **Homework has to be uploaded on Moodle by 11 pm on the due date.** The only accepted file type is PDF. Note that the homework assignments will only be partially graded, and that I will drop the lowest homework score.

- **Extensions:** If you cannot submit a homework set on time for a good reason, contact me before it is due, and I will usually be able to give you an extension. (If I should receive too many extension requests, I might have to change my policy and only grant extensions in cases of documented illness or other exceptional circumstances beyond your control.)
- **To the extent it is reasonably possible, please use LaTeX to write up the solutions of homework problems.** This is a strong request, but not quite a requirement. PDF files created with LaTeX are a great way to communicate mathematics in writing, and make grading much easier. But feel free to submit handwritten solutions in cases where LaTeX coding becomes cumbersome (e.g., solutions involving quite a few matrix sums or products). If you have never used LaTeX, look on Moodle (under Course Information) for some simple instructions on how to get started. If you submit handwritten work, please use an appropriate free app (e.g., Genius Scan) to convert your images into an easily readable PDF file.
- **If possible, please upload just one PDF file per homework set.** I prefer PDF files (they are easy to annotate while grading), and I prefer just one file over several files (that makes it easier for me to keep track of your work while grading).

Problems will be graded based on two considerations:

- Logical correctness.
- Ease of readability. (This is of utmost importance in our class. I think of this class as one where you refine your proof reasoning and writing skills.) Technically correct but hard to read/understand/follow proofs will not receive full points. Caution: this is subjective.

Collaboration on Homework Problems

I encourage collaboration (i.e., **working together** to solve problems, not simply copying the work of others). Come up with the ideas behind the solutions as a group, then write up your own solution. Avoid reading other solutions before writing up your own. I require, however, the following:

1. You always have to write up the solutions in your own words (again, no copying!).
2. You must indicate with whom you worked to solve the problem.
3. It is not permitted to use the Web (Internet) to aid in solving homework problems.

On the other hand, it is also very important to learn to solve problems on one's own. On each homework set, there will be several **"do-on-your-own" problems** marked by a **star (*)**. As the name implies, you have to solve these problems completely on your own – you can consult books but no other materials, and nobody else (with one exception: you can ask me for hints, **both in class or during my office hours**).

Graduate Increment

Graduate students taking this course for graduate credit are expected to perform at a higher level than undergraduates. (1) For graduate students, the above grade scale applies also to the "other homework". For undergraduate students, I consider obtaining a score of 90% or greater on the "other homework" quite good. To reflect this, I will at the end of the semester multiply the "other homework" scores of undergraduate students by 1.1, resulting in a 10% increase (capped at 100%). (2) For graduate students, I also have higher expectations regarding the presentations.

Attendance

Attendance is not mandatory but strongly recommended. Only the occasional exceptional student can learn advanced mathematics while skipping many lectures.

You are expected to study quite a bit outside of class:

Reviewing the material, doing the homework, and preparing for the next class and for your presentations. If you want to do well in this class, plan to spend **at least eight hours per week** on this.

Recording of Class Meetings

Because our class is a remote class, class meetings via Zoom will be recorded. I will let you know if this policy changes.

Classroom and Course-related Behavior

University policy requires that all of us in the classroom treat each other with respect, and refrain from behavior that will disrupt the educational process. Please refrain from using any electronics during class that are not directly related to what we are doing. If you would prefer to be called by a **different name, or gender pronoun**, than listed on the course roster, please let me know.

Disability Modifications

The University of Montana assures equal access to instruction through collaboration between students with disabilities, instructors, and [Disability Services for Students](#). If you have a disability that adversely affects your academic performance, and you have not already registered with Disability Services, please contact Disability Services in Lommasson Center 154 (or call 406-243-2243). I will work with you and Disability Services to provide an appropriate modification.

Statement on Digital Access

Digital devices (like laptops and cell phones) are becoming increasingly important to success in college. In this course, you may need digital devices to access readings, complete and submit written assignments, complete online quizzes, verify your attendance, take in-class polls, and more. I recognize that some students are unable to afford the cost of purchasing digital devices and that other students rely on older, more problem-prone devices that frequently break down or become unusable. I also recognize that those technology problems can be a significant source of stress for students. Given those challenges, I encourage students to contact me if they experience a technology-related problem that interferes with their work in this course. This will enable me to assist students in accessing support.

Academic Honesty

All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University.

Student Conduct Code

All students need to be familiar with the [Student Conduct Code](#). You can find it in the "A to Z" index on the UM home page. In particular, discrimination and harassment are not tolerated at the University of Montana. If you feel that you have been subjected to discriminatory or harassing behavior, please contact the [Office of Equal Opportunity and Title IX](#) at 243-5710 or read [UM's Policy on Discrimination, Harassment, Sexual Misconduct, Stalking, and Retaliation](#) for help in addressing the situation. You can also report the discrimination or harassment to me or to another faculty member or advisor you trust.