



POLICIES/SYLLABUS

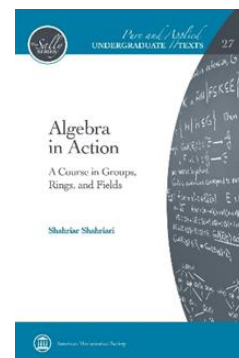
Instructor: Eric Moorhouse, Ross Hall 6³ = 216,
<https://ericmoorhouse.org>, email moorhous@uwyo.edu.



Class Meeting: MWF 9:00–9:50 am in CR 141. I record classes and post pdf slides and audio/video recordings of classes on the course website (see below) for your future reference as an aid to reviewing and studying. However, this is not an invitation to skip class. You are expected to attend class regularly. Students who consistently attend class perform on average a full letter grade better than students who do not.

Prerequisite: Grade of C or better in Math 3500 (Algebra I: Introduction to Rings and Proofs). Successful completion of Math 4510 (Algebra II: Group Theory) is an asset, but not essential. However, *familiarity with linear algebra (at the Math 2250 level) will be expected*; please let me know if this is a problem.

Textbook: S. Shahriari, *Algebra in Action: A Course in Groups, Rings, and Fields*, American Mathematical Society, 2017. You are required to prepare by reading relevant sections of the textbook before coming to class. Occasional printed handouts may be prepared and distributed as the course progresses. These (and any other assigned readings, including notes from class lectures) you will be expected to read and absorb, asking questions if anything is unclear.



Course Delivery: You are expected to attend class live whenever possible. We will try to post video recordings and pdf slides of classes for your use in reviewing material. Although your attendance is not strictly required, *students who attend regularly at these times can expect to have stronger class performance*. Some of the course content will also be featured in printed handouts and instructional videos which you will watch on your own time; and you should watch these videos as well because much of this content will not be repeated during class time.

Grading Scheme:

I will assign grades (A, B, C, D, F, W) *at the end of the semester* according to the scale: A=exceptional, B=very good, C=adequate, D=poor, F=fail, W=withdrawal.

I always encourage students to consult me at any time during the semester with questions, including (but not restricted to) questions about your progress in the course. You may ask questions by email, at your own risk (remember that email is not secure); but questions asked in person typically receive more prompt and complete answers. Raw numerical grades for the test and homework may be checked on WyoCourses, but *WyoCourses does not supply letter grades for the course*. For further information regarding assignment of letter grades, refer to the FAQ (see below) and consult with the instructor.

50%	Written Homework
20%	Midterm Test
30%	Final Exam
100%	Total Grade

Office Hours: MWF 10:00–10:50am; T 1:30–2:50pm; R 2:10–3:30pm in my office RH 216. In addition to my regularly scheduled office hours, please feel free to see me at other times, either by appointment or at other times if I am not busy. Office hours are subject to change with or without notice, so you are advised to check my current schedule and availability posted at <https://ericmoorhouse.org/schedule.html>.

Homework:

Homework is a vital part of this course. Mathematics, more than most subjects, is one which you learn not by listening and absorbing, but by trying out yourself. The learning of mathematics is also more sequential than that of other subjects ... so all the more need to be regular in doing problems yourself! Homework assignments will be assigned approximately once per week, and will be submitted to me through WyoCourses by specified due date (usually after 2–3 classes) by 5:00pm. The following expectations apply to submitted homework:

- Write clearly. Part of the grade reflects organization and clarity of presentation.
- Most solutions require sentence answers. Correct use of vocabulary, spelling, grammar, and punctuation is expected for full credit.
- There is no need to re-write questions.

It is fine for you to discuss the homework with other students. However, please do not copy anyone else's work directly, whether or not they are in the class. Copying may adversely affect your grade; but more importantly, of course, you won't be adequately preparing yourself for the tests in this way. For further information, consult the FAQ (see below).

Tests:

We will have one mid-term test during class time, and one final exam. Both are 'closed book'; however, you will be permitted to use a handheld calculator and one 'cheat sheet' (one 8½×11 inch sheet with information written on one side in your own handwriting). Sharing of calculators or other aids during the test and the exam is not permitted. No other devices are permitted. Cell phones must be switched off (and in particular cannot be used as calculators). The test will cover a specified unit of material only, but the final exam will be comprehensive. The final exam is scheduled for 8:00–10:00 am on Wednesday, December 11, in our usual lecture room (CR 141).

Make-up tests for those who miss tests, will only be granted in cases of verifiable illness or the most extreme circumstances (at my discretion). Please contact me in advance of such a situation if possible. Even in legitimate cases, the make-up test will be harder than the original test.

MATH 4520 Course Website:

Course-related announcements, links, handouts, homework solutions, etc. will be posted at the course website <https://ericmoorhouse.org/courses/4520/> (not to be confused with WyoCourses). The WyoCourse site will be reserved for materials deemed private or sensitive (including Zoom links, course grades, and any documents we don't want to spread beyond our class). The course website however will provide much more capacity for posting homework, instructional videos and documents, while also demanding much less time for me to regularly update than WyoCourses which is designed with security in mind.

Submitting Homework on WyoCourses: Electronic homework submissions on WyoCourses are due on specified days by 5:00pm. Submit your work on time; no work can be accepted after the solutions have been posted. Please submit your work in pdf format (not of excessive file size). You are responsible for making sure your document uploads correctly. Popular options for generating your pdf are

- Write on blank paper and scan it using a mobile device or flatbed scanner, then export save as pdf. *Do not use your camera app*; rather, use a dedicated scanner app which crops your document and avoids glare, shadows, etc., optimizing the images as documents (unlike the camera app which optimizes for faces etc.)
- Avoiding paper, use a tablet and stylus with a good note-taking app (Notability is a popular and highly recommended choice). Write either on a

blank new page, or in our case, annotating the pdf copy of the worksheet from our course website. Export as pdf.

Some assignments may be typed on your laptop (e.g. in MS Word) and then exported as pdf.

Frequently Asked Questions: For more detail on policies of course administration, learning progress, etc. please refer to <https://ericmoorhouse.org/courses/FAQ.html>. Most questions students ask me are already answered in this document.

The Algebra Depth Sequence (Math 3500/4510/4520):

The Algebra Depth Sequence at the University of Wyoming consists of three courses: Math 3500 (*Algebra I: Introduction to Rings and Proofs*), Math 4510 (*Algebra II: Introduction to Groups*), and Math 4520 (*Algebra III: Topics in Abstract Algebra*). These courses cover (roughly) the theory of rings, groups and fields, respectively—three of the four classes of algebraic structures which form the cornerstone of modern algebra. The fourth such class of structures (vector spaces) is the subject matter of Math 2250 (*Elementary Linear Algebra*). The student is assumed to arrive at this point (the third course in the depth sequence) with a ready foundation in formal mathematical thinking and communication, including the reading and writing of proofs, as well as a strong foundation in the theory of rings, and vector spaces. Knowledge of groups (from Math 4510) will be an asset but we accommodate students taking Algebra II and III in either order; so for those who have not had Algebra II, the necessary background on groups will be provided at the time of need.

Course Content:

The course will cover the basic theory of fields, found in Part 3 (Chapters 21-28) of the textbook. Since fields are logically special cases of rings, some topics from the earlier must also be recalled (notably Chapter 17). These sections of the textbook will be supplemented with related course handouts and videos. Highlights include

- The most important examples ($\mathbb{R}, \mathbb{C}, \mathbb{Q}, \mathbb{F}_q, \mathbb{Q}_p, F(x)$, algebraic number fields, the hyperreals, etc.) and the most basic properties of each.
- Basic theory, beginning from the axioms of field theory: field extensions, characteristic; algebraic and transcendental elements; splitting fields; field automorphisms; algebraic closures.
- The impossibility of trisecting an arbitrary angle in the Euclidean plane using straightedge and compass.

- The rudiments of Galois theory, including Abel's Theorem: the impossibility of expressing roots of a general quintic polynomial $f(x) \in \mathbb{Q}[x]$ as algebraic expressions (including radicals) of the coefficients of $f(x)$. (Only general results will be presented, not complete proofs.)

Students with Disabilities: If you have a physical, learning or psychological disability and require accommodations, please let me know as soon as possible. You will need to register with, and provide documentation of your disability, to the University Disability Support Services (UDSS) in SEO, Knight Hall.

Appropriate Conduct: For issues of academic honesty/dishonesty, classroom deportment, etc., we refer to [Students & Teachers Working Together](#) (UW College of Arts & Sciences) and additional documents available through our WyoCourses site.

Academic Honesty: Academic dishonesty will not be tolerated in this class. Cases of academic dishonesty will be treated in accordance with UW Regulation 2-114. The penalties for academic dishonesty can include, at my discretion, an "F" on an exam, an "F" on the class component exercise, and/or an "F" in the entire course. Academic dishonesty means anything that represents someone else's ideas as your own without attribution. It is intellectual theft (stealing) and includes (but is not limited to) unapproved assistance on examinations, plagiarism (use of any amount of another person's writings, blog posts, publications, and other materials without attributing that material to that person with citations), or fabrication of referenced information. Facilitation of another person's academic dishonesty is also considered academic dishonesty and will be treated identically.

Syllabus Changes: This syllabus is subject to change. Updates to this syllabus will appear electronically on the course website, and you will be alerted by email.