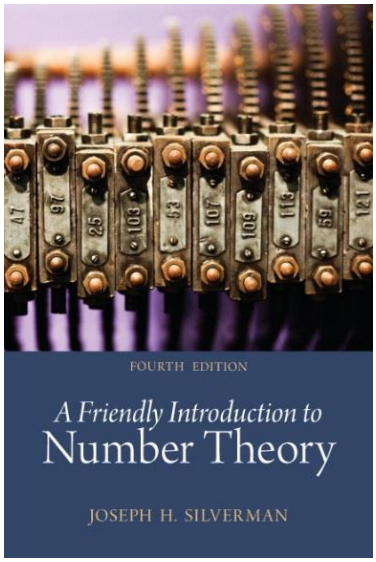
POLICIES/SYLLABUS

Instructor Eric Moorhouse, Ross Hall $6^3 = 216$, moorhous@uwyo.edu , https://ericmoorhouse.org

Office hours MWF 10–10:50am, T 1:30–2:50pm, R 2:10–3:30pm. Subject to change; see https://ericmoorhouse.org/schedule.html for updates and temporary changes. I am also available by appointment, and often by simply dropping by.

Prerequisite Grade of C or better in MATH 3500 (Algebra I)



Class Meeting MWF 8–8:50am in RH 247. 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.

Textbook J.H. Silverman, *A Friendly Introduction to Number Theory*, 4rd ed., Prentice Hall, 2012. You may obtain either a hardcopy or an electronic copy through Pearson MyLab and Mastering (although we will *not* be using the online features other than electronic access to the textbook). The 3rd edition will probably suffice, assuming you are able to find corresponding pages whenever I cite the 4th edition by page number. Our course website (see below) features links to Silverman's website for the textbook, including a list of errata; also online-only Chapters 47-50 (Appendices A & B). The textbook, among the best undergraduate number theory books currently available, nevertheless suffers from its focus on algebraic theory of numbers, with very little representation of the analytic side of the theory. We will compensate by providing some class handouts (which will also appear on the course website) on selected analytic topics.

Frequently Asked Questions Read this syllabus, which answers most questions (beyond course content) students ask me. For further information, see https://ericmoorhouse.org/courses/FAQ.html

Grading Scheme

50%	Homework
20%	Midterm Test
30%	Final Exam

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

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 twice per month, and will be submitted to me through WyoCourses by 5:00pm on the specified due date (usually after 3–4 classes); see below. 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, *do not copy anyone else's work directly*, whether or not they are in the class. Copying will adversely affect your grade; and most importantly, of course, you won't be adequately preparing yourself for the tests in this way. *Copying on an assignment will result in a grade of zero for that assignment*. (If you wish to contest this, you may contest the grade within one week after the homework grade is posted.) For further information, consult the FAQ (see below).

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 a single pdf, never as multiple individual pages. *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.

Tests: There will be one 50-minute test during class time, and one final exam, both of which are 'closed book'; however, you will be permitted to use a handheld calculator and one 'cheat sheet' (one 8.5 by 11 inch sheet with information written on one side in your own handwriting). Sharing of calculators or other aids during the test or the exam, is not permitted. The midterm test will cover a specified unit of material only, but the final exam will be comprehensive. The final exam is scheduled for 8:00–10:00am on Wednesday, May 14, 2025, in our usual lecture room.

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.

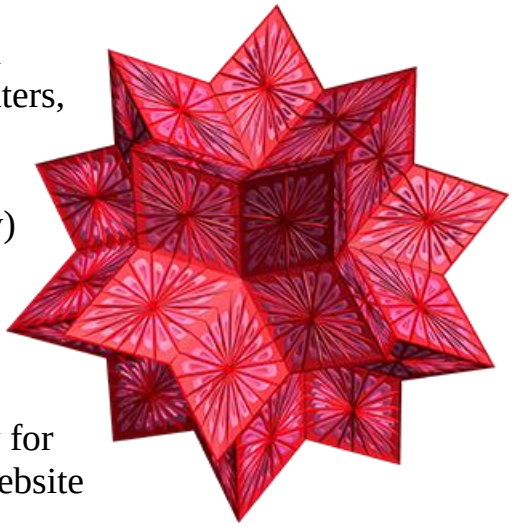
MATH 4550 Home Page: Please bookmark the site https://ericmoorhouse.org/courses/4550/ and visit it often for course-related information. This site will direct you to

- pdf slides and audio/video recordings of lectures;
- relevant handouts, including this document;
- current announcements including homework reminders, test dates, etc.;
- my personal home page, schedule, etc.; and
- links related to the course content.

Do not confuse the official course website with WyoCourses. The WyoCourse site will be reserved for materials deemed private or sensitive (including Zoom links, graded homework and tests, and any documents we don't want to be publicly available). The course website, however, will provide much more capacity for posting homework assignments, videos and documents, while also demanding much less time for me to regularly update than WyoCourses which is designed with security (not utility) in mind. Also, WyoCourses cannot tell you how you are doing overall in the

class (in particular, it does not have letter grades). As indicated previously, you should come and visit with me regarding such questions.

Wolfram Mathematica



As a UW student, you have access to the Wolfram Mathematica software, either from campus computers, or from anywhere while logged in remotely from a personal computer using your UW credentials. It is recommended (although not strictly necessary) that you install Mathematica on a personal computer for use throughout this course as we will frequently demonstrate number-theoretic computations in class using Mathematica, and the software will often be useful in homework, if only for checking your work. See the link on the course website for details on installing Mathematica.

SageMath provides a free open source alternative to Mathematica, but this alternative requires a level of technical expertise that I am not going to assume every student has; so if you use SageMath, you will be pretty much on your own. Please let me know if you intend to use SageMath. I know that many students will have experience with Matlab, but this simply *will not suffice* for most of the computations we require. In previous years we have used Maple, but UW no longer maintains a Maple license. Your hand-held calculator will suffice for some, but not all, computations we encounter throughout the semester. Most modern applications of number theory (in particular, applications to public key cryptography) require computations involving integers of hundreds of digits; and for practical reasons, many textbooks are limited in scope to computations involving integers with at most 8 digits. We feel that this limitation does not allow students to reasonably appreciate the subject. Our department's Learning Goals and Objectives (www.uwyo.edu/mathstats/current), Objective 3, prescribes that "[Students shall] use appropriate computational tools, such as dynamic mathematics software, [or] programming languages … in mathematical work."

Appropriate Conduct/Academic Dishonesty: For issues of classroom deportment, etc., we refer to Classroom Climate and Conduct. This document is also linked on both the course website and the WyoCourse page. See also UW Regulation 2-114 (Academic Dishonesty).