Our emails:

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Office hours and Problem sessions

Shoshana: Monday 6:30-7:30pm and Tuesday 8-10am on Zoom

Myrto: Friday 11:00-12:00am in SC342 (or by appointment) new

Jefferson: Tuesday 4:00-5:00pm on Zoom, Friday 2:00-4:00pm in Winthrop, Sunday Problem Session 10:00am–11:00am in Winthrop

Shrey: Wednesday 4:00-6:00pm in Eliot Dining Hall, Sunday Problem Session 5:00-6:00pm on Zoom

Daily suggested reading (homework and worksheets with some solutions are in the files

Introduction, Wednesday Jan 26:   Hammack Â§7.1, 9.1, 9.2, Definitions 4.1 - 4.5 in Â§4.2

Induction, Friday Jan 28: Hammack Chapter 10, Homework posted in files (due next Friday)

Types of proof, Wednesday Feb 2: Hammack Chapters 4 - 6, 9

Sets, Friday Feb 4rth: Hammack Chapters 1, 8

Functions, Wednesday Feb 9th, Hammack Chapter 12

Equivalence relations, Friday Feb 11th, Hammack Chapter 11

Groups, Wednesday Feb 16th, Judson Â§3.1, 3.2 or Fraleigh Â§1.1, 1.2

Subgroups, Friday Feb 18th, Chapters 2 - 3 or Judson Â§3.3 or Fraleigh   Â§1.3

Group Homomorphisms and Isomorphisms, Wednesday Feb 23rd, Judson Â§9.1 and 11.1 or Pinter Chapters 9 and 14

Order, Cyclic Groups, Friday Feb 25th, Pinter Chapters 10 and 11, or Judson Â§4.1

Lagrange's Theorem and cosets, Wednesday March 2nd, Judson Â§6.1, 6.2 or Pinter Chapters 12 and 13

Quotient groups, Friday March 4th, Judson Â§10.1 or Pinter Chapter 15

The first isomorphism theorem, Wednesday March 23rd, Judson (Links to an external site.) Â§11.2 or Pinter (Links to an external site.) Chapter 16 (note that his statement of Theorem 2 requires the homomorphism to be onto, which is another word for surjective)

Cardinality, Friday March 25th, Hammack (Links to an external site.) Â§14.1 - 14.2 or AbbottLinks to an external site. Â§1.5

Introduction to Real Analysis, Wednesday March 30th, Abbott. Â§1.2 Also Abbott Â§2.2 - 2.3.

More sequences, Wednesday April 6th, Abbott Â§2.2 - 2.3

The Bolzano Weierstrass theorem, Friday April 8th, Abbott Â§2.5. A reference for sequences in R^m is Ross

Welcome to Math 101!

The goal of this course is to introduce you to abstract mathematical thought through the study of a few different areas of mathematics. Broadly, our goals this semester will be to

- develop you mathematical thinking

- develop your skill at rigorously communicating your mathematical thoughts (definitions and proofs).

You will become familiar with standard types of proof and be able to read, write and critically analyze such proofs.

Weâ€™ll begin the semester with foundational material â€” including set theory, functions, and basic proof techniques â€” that is important in all areas of higher mathematics.

Weâ€™ll then take a deeper look at two very different areas of mathematics, group theory and the foundations of analysis and topology.

Math 101 is designed based on the idea that you will learn better by actively doing math. There is research backing up this fact [â€œActive learning increases student performance in science, engineering, and mathematicsâ€.](#)

Our class meetings will be a mix of interactive lessons and small group problem solving. Your participation in class is crucial; to appreciate the mathematical process, you must be an active participant in it! You will be asked to suggest ideas, share your mathematical arguments, and give constructive criticism of your classmatesâ€™ arguments. Always keep in mind; one of our main goals is to learn how to communicate mathematics.

Problem sessions:

Our course assistants will hold weekly problem sessions, in which you will have the chance to ask questions on the course material and to work on additional practice problems. You arenâ€™t required to attend, but I encourage you to; practicing and discussing the material is the best way to develop your ability to think and communicate like a mathematician. We will work together to schedule problem sessions in a way that is convenient to everyone.

Homework:

As we all know, the best way to learn mathematics is by doing mathematics, so homework is the most important component of this course.

You will have weekly problem sets, generally due on Fridays. Mathematical communication is a key goal of Math 101, so you are expected to write clearly and coherently, using complete sentences. Unlike math classes youâ€™ve taken before, you will almost certainly need to first figure out how to solve a problem and then, as a separate step, figure out how to communicate your proof clearly. A good rule of thumb for deciding the level of detail in your written work is that another student who has taken Math 101 should be able to easily understand your solution. In order to solve problems creatively, you need time to puzzle over them, [so be sure to start the problem sets early](#)!

We understand that occasionally things may come up that prevent you from giving full attention to homework; for example, you might catch a bug and need to sleep it off, or have several exams or papers due on the same day. Therefore, we will give you 3 â€œlate daysâ€ for the semester; each late day allows you to extend a due date by 24 hours. You do not need to let us know that youâ€™re using a late day; simply submit the assignment as usual.

<u>Collaboration & Academic Integrity:</u>

We encourage you to collaborate with your classmates on homework assignments and to discuss your arguments and approaches. However, you must write up your work independently and in your own words, and you should only submit work that you feel comfortable explaining clearly to another student and to the course staff. In addition, you should cite any outside source (including fellow students) to which you refer. Under no circumstances should you turn in a solution that you have copied from a classmate, a textbook, the internet, or any other source. Finally, you may not share course materials and documents with anyone not enrolled in the course, with the exception of a peer tutor. In general, I discourage you from trying to get help on the internet or from students who have taken 101 or more advanced courses. The point of the problem sets is for you to build your own mathematical muscles; asking for help from outside experts is like asking someone else to lift weights for youâ€" it doesnâ€™t build your skills at all!

Textbooks

You are not required to purchase any textbooks; we will primarily be using 3 textbooks which are freely available online:

â€¢ Richard Hammack, Book of Proof

This text is freely available at http://www.people.vcu.edu/~rhammack/BookOfProof/, and hard copies are available from Barnes & Noble and Amazon.

â€¢ Tom Judson, Abstract Algebra: Theory and Applications This text is freely available at http://abstract.ups.edu/, and hard copies are available from Barnes & Noble and Amazon.

â€¢ Stephen Abbott, Understanding Analysis This text is available to Harvard students at https://link-springer-com.ezp-prod1.hul.harvard.edu/book/10.1007/978-1-4939-2712-8

Exams and grading policy:

There will be a midterm exam and a final exam.

Before the midterm and before the final you will be asked to create and submit a `personal study guide' - I will give you a set of questions to answer. This will be your opportunity to reflect upon your own strength and weakness and plan your preparation for the exam.

There will be no extension to the deadline for the study guides.

Deadline for study guide 1: March 11th

Midterm March 11th

Deadline for study guide 2: May 5th (by midnight)

Final exam: May 6th

Your grade will be calculated as follows:

30% Homework + 10% Study guide 1 + 15% Midterm + 10% Study guide 2+ 25 % Final + 10% In class participation

Course Accessibility

If you need accommodation or assistance for a documented disability, please get in touch with the [Accessible Education Office](#) as soon as possible so that they can arrange accommodations for you in all of your courses.