

# Math 411 – Introduction to Abstract Algebra – Syllabus

## Section 03 – Fall 2021

**Instructor:** Chris Elliott (pronouns: he/him)

You can reach me by e-mail at [celliot@math.umass.edu](mailto:celliot@math.umass.edu). Please feel free to call me Chris.

**Office Hours:** Wednesday 2:30–4:30 and Friday 10:30–11:30 in LGRT 1124, and by appointment.

## What We'll Cover

In this course we'll learn about the theory of *groups*: a fundamental mathematical tool that we use to study the idea of symmetry. Some of the key topics that we'll cover are:

- Key examples: cyclic groups, symmetric groups, alternating groups, dihedral groups.
- Equivalence relations, cosets and Lagrange's theorem.
- Normal subgroups, quotient groups and the isomorphism theorem.
- Group actions, the orbit-stabilizer theorem and Cayley's theorem.

## Schedule

We will meet three times a week for classes

Monday/Wednesday/Friday – 1:25pm to 2:15pm – LGRT 173.

There will be two 90 minute midterm exams and a final. The exams will be held on the following days

- **Midterm 1:** Wednesday October 13th, 7:00–8:30pm (room TBD)
- **Midterm 2:** Wednesday November 10th, 7:00–8:30pm (room TBD)
- **Final:** Week of December 13th, online (exact day TBD)

The midterms will both be in person, and will be closed book. The final exam will be take-home, you'll have one day to complete it. It will be open book and note, but other resources, including the internet, may not be used. You'll submit the final online through Gradescope (see the Homework section below for details).

## Makeup Exams

If you cannot make one of the exam times, please let be know as long as possible in advance and **at least two weeks beforehand**. I can arrange make-up exams for legitimate conflicts (e.g. for academic commitments, religious observances) but advance notice is necessary.

## Textbook

We'll use the textbook **Abstract Algebra: A First Course** by Dan Saracino (second edition). We'll cover approximately the material in chapters 0–14. To find the book on eCampus, go to <https://umass.ecampus.com/course-list.asp?autocourselist=1&c=|3901189&s=142048>.

We'll be using the second edition of the textbook. If you have a copy of the first edition, please let me know: much of the content in the chapters we'll be covering is the same, but page numbers may be different.

In the last part of the class I'm planning on covering group actions, which Saracino doesn't emphasize. I'm planning on making my own notes for this part of the class, which I'll share on Moodle once we get there.

## Homeworks

There will be nine homework assignments, assigned on Thursdays and due by midnight the following Thursday. The first homework will be due on **Thursday September 17th**, and there will be a new homework due every week from then on, with the exception of weeks containing an exam.

Homeworks will consist of 5-10 problems on the material we learned in the past week. Some problems that are particularly challenging will be marked with a (\*). These problems are **optional**; you can earn 100% on the homework without attempting these, but good solutions will be worth extra credit!

You are encouraged to work on the homework in groups; this is often one of the best ways of learning. However, your final solution **must** be your own work; you should write up your answers on your own, without anyone else's work present (in other words, do not copy!). Please list anyone you worked with on your homework submission, so that the grader knows that there's not a problem with similar answers!

You will submit your homework online through **Gradescope** (<https://www.gradescope.com>). You should sign up for a free account using your UMass email address. Once you've created an account you should join the section using the following course code:

Gradescope course code: **YVZVND**.

## Late Homework Policy

Homework is accepted up to one day late with a 10% lateness penalty. Homework more than one day late will not be accepted. I will, however, be dropping the two lowest homework scores when calculating your final grade.

## How to Succeed in the Class

- I highly encourage you to read the relevant textbook chapter before each class; I'll keep you updated on what we'll be covering each week to help you do this. However, don't be disheartened if you don't understand everything on the first read through, this is normal! The textbook is quite densely written, and you will gain a lot from reading through it in advance, seeing the material in class, then revisiting it afterwards.
- Mathematics is not a solitary activity! Almost all math research (including all of my own current research projects) is done collaboratively. One of the most helpful resources that you have available is the rest of the class. Please meet up, talk about the material together, work on the homework together (though please look at the Homework section above for information on what collaboration is allowed, and what is not). We're able to meet in person now, but you are also very welcome to form groups to learn together online.
- I will be available twice a week for office hours (times listed on the first page). You're welcome to come to office hours to discuss course material, homework, or any other mathematical topics. If you have any questions or concerns, please come by, or send me an e-mail.

## Assessment Structure

- Homeworks: 35% (lowest two scores dropped)
- Midterm 1: 20%
- Midterm 2: 20%
- Final: 25%

The grade boundaries will be as follows. If they're adjusted, it will only be in your favor (i.e. by lowering the numerical score required to achieve a given grade).

A	A-	B+	B	B-	C+	C	C-	D+	D	F
≥ 90	87–90	83–87	79–83	75–79	71–75	67–71	63–67	59–63	55–59	< 55

## COVID

In order to reduce the risk of COVID-19 infection, everyone will be required to follow current university guidance on public health mandates, including the rules on masking. Please do not come to class if you are feeling unwell. Let me know if you have any concerns or questions.

## Academic Honesty

*Since the integrity of the academic enterprise of any institution of higher education requires honesty in scholarship and research, academic honesty is required of all students at the University of Massachusetts Amherst. Academic dishonesty is prohibited in all programs of the University. Academic dishonesty includes but is not limited to: cheating, fabrication, plagiarism, and facilitating dishonesty. Appropriate sanctions may be imposed on any student who has committed an act of academic dishonesty. Instructors should take reasonable steps to address academic misconduct. Any person who has reason to believe that a student has committed academic dishonesty should bring such information to the attention of the appropriate course instructor as soon as possible. Instances of academic dishonesty not related to a specific course should be brought to the attention of the appropriate department Head or Chair. The procedures outlined below are intended to provide an efficient and orderly process by which action may be taken if it appears that academic dishonesty has occurred and by which students may appeal such actions. Since students are expected to be familiar with this policy and the commonly accepted standards of academic integrity, ignorance of such standards is not normally sufficient evidence of lack of intent. For more information about what constitutes academic dishonesty, please see the Dean of Students website: [http://umass.edu/dean\\_students/codeofconduct/acadhonesty/](http://umass.edu/dean_students/codeofconduct/acadhonesty/).*

## Accommodations

*The University of Massachusetts Amherst is committed to making reasonable, effective and appropriate accommodations to meet the needs of students with disabilities and help create a barrier-free campus. If you are in need of accommodation for a documented disability, register with Disability Services to have an accommodation letter sent to your faculty. It is your responsibility to initiate these services and to communicate with faculty ahead of time to manage accommodations in a timely manner. For more information, consult the Disability Services website at <http://www.umass.edu/disability/>.*