

## Math 301: Abstract Algebra I

Spring 2022 – 3 credits

MWF 9:55am – 10:45am

Carver 196

Instructor	Jason McCullough 452 Carver Hall 4-8150 <a href="mailto:jmccullo@iastate.edu">jmccullo@iastate.edu</a> ← best way to contact me
Grader	Connor Depies <a href="mailto:cmdepies@iastate.edu">cmdepies@iastate.edu</a>
Office Hours	M 2-3pm, F 11am-12pm, Th (virtual) 10-11am, or by appt. For virtual office hours, email ahead of time and use webex link: <a href="https://iastate.webex.com/meet/jmccullo">https://iastate.webex.com/meet/jmccullo</a>
Textbook	“Abstract Algebra, An Introduction” by Thomas W. Hungerford, third edition. The text is available from the University Bookstore in both hardcopy and electronic format.

### Content

In this class we will begin the study of abstract rings and later groups. We examine parallels between the integers and polynomials.

Referring to the text, we will cover most of Chapters 1-5 and 7.

Prerequisites: Math 165/165H, Math 201 (C- or better), Math 317/407

### Assessment

There will be weekly homework assignments. While you are encouraged to work with the other students, it is important that you **write up your own solutions independently**. I don't want to see multiple papers that are carbon copies of each other. Duplicate solutions will be penalized. It is very important that you do the homework conscientiously and consistently. There will be a homework assignment due during prep week.

Your lowest 1 homework score will be dropped at the end of the semester.

We will have two in-class midterm exams and a final exam.

### Learning Outcomes

Upon completion of this course, students...

1. Will be familiar with properties of the integers such as prime factorization, divisibility, and congruence
2. will be able to reason abstractly about mathematical structures
3. will recognize and comprehend correct proofs of formal statements and be able to formulate proofs clearly and concisely

### Learning Objectives

1. Students will be able to perform computations involving divisibility of integers.
2. Students will be asked to identify ring-theoretic and group-theoretic properties and identify these properties in familiar rings and groups.
3. Students will provide proofs to simple assertions of ring- and group-theoretic principles.

### Method of Instruction

1. Lectures will emphasize ring- and group-theoretic properties. Weekly homework assignments will ask students to recognize these properties.
2. Weekly homework assignments.
3. Numerous proofs will be presented in class. Students will construct proofs on weekly homework assignments.

### Course Websites

Grades and homework will be available via Canvas. There is a tentative schedule below.

### Grading scheme

Homework	45%
Exam 1 (Feb 28)	15%
Exam 2 (Apr 22)	15%
Final Exam (May 9 – 9:45am)	25%

Letter grades will be assigned based on your overall percentage and will be no stricter than a straight-scale (93+ = A, 90+ = A-, 87+ = B+, etc.). If I deem it necessary, I may lower this scale based on exam scores.

### Tentative Schedule

Week (week of)	Monday	Wednesday	Friday
1 (January 17)	<b>No Class</b>	App. A	App. B
2 (January 24)	1.1	1.2	1.3

3 (January 31)	1.3	2.1	App. D
4 (February 7)	2.2	2.3	2.3
5 (February 14)	3.1	3.1	3.2
6 (February 21)	3.2	3.3	Review
7 (February 28)	<b>Exam 1</b>	4.1	4.2
8 (March 7)	4.3	4.4	4.4
9 (March 14)	<b>Spring</b>	<b>Break</b>	--
10 (March 21)	4.5	4.5	4.6
11 (March 28)	5.1	5.2	5.2
12 (April 4)	5.3	7.1	7.1
13 (April 11)	7.2	7.3	7.4
14 (April 18)	7.5	Review	<b>Exam 2</b>
15 (April 25)	8.1	8.1	Other topics
16 (May 2)	as time	allows	Review
17 (May 9)	<b>Final</b>	<b>Exam</b>	<b>Week</b>

\* if time allows

### Class Decorum and other items

- Please arrive on time.
- Cellphones should be silenced and stowed – not on your desk/lap.
- No food/drink in class (with the possible exception of water bottles).

### COVID-19 items

**Face masks encouraged:** Because of the continuing COVID-19 pandemic, all students are encouraged—but not required—to wear face masks, consistent with current recommendations from the Centers for Disease Control and Prevention. Further information on the proper use of face masks is available at:  
<https://www.cdc.gov/coronavirus/2019-ncov/your-health/effective-masks.html>.

**Vaccinations encouraged:** All students are encouraged to receive a vaccination against COVID-19. Multiple locations are available on campus for free, convenient vaccination. Further information is available at:  
<https://web.iastate.edu/safety/updates/covid19/vaccinations>.

Vaccinations may also be obtained from health care providers and pharmacies.

**Physical distancing encouraged for unvaccinated individuals:** Classrooms and other campus spaces are operating at normal capacities, and physical distancing by faculty, staff, students, and visitors to campus is not required. However, unvaccinated individuals are encouraged to continue to physically distance themselves from others when possible.

## ISU Syllabus Statements

### Free Expression

Iowa State University supports and upholds the First Amendment protection of [freedom of speech](#)[Links to an external site.](#) and the principle of [academic freedom](#) [\(Links to an external site.\)](#) in order to foster a learning environment where open inquiry and the vigorous debate of a diversity of ideas are encouraged. Students will not be penalized for the content or viewpoints of their speech as long as student expression in a class context is germane to the subject matter of the class and conveyed in an appropriate manner.

### Academic Dishonesty

The class will follow Iowa State University's policy on academic dishonesty. Anyone suspected of academic dishonesty will be reported to the [Dean of Students Office](#)[Links to an external site.](#).

### Accessibility Statement

Iowa State University is committed to assuring that all educational activities are free from discrimination and harassment based on disability status. Students requesting accommodations for a documented disability are required to work directly with staff in Student Accessibility Services (SAS) to establish eligibility and learn about related processes before accommodations will be identified. After eligibility is established, SAS staff will create and issue a Notification Letter for each course listing approved reasonable accommodations. This document will be made available to the student and instructor either electronically or in hard-copy every semester. Students and instructors are encouraged to review contents of the Notification Letters as early in the semester as possible to identify a specific, timely plan to deliver/receive the indicated accommodations. Reasonable accommodations are not retroactive in nature and are not intended to be an unfair advantage. Additional information or assistance is available online at [www.sas.dso.iastate.edu](http://www.sas.dso.iastate.edu)[Links to an external site.](#), by contacting SAS staff by email at [accessibility@iastate.edu](mailto:accessibility@iastate.edu), or by calling 515-294-7220. Student Accessibility Services is a unit in the Dean of Students Office located at 1076 Student Services Building.

### Discrimination and Harassment

Iowa State University does not discriminate on the basis of race, color, age, ethnicity, religion, national origin, pregnancy, sexual orientation, gender identity, genetic information, sex, marital status, disability, or status as a U.S. Veteran. Inquiries regarding non-discrimination policies may be directed to Office of Equal Opportunity, 3410 Beardshear Hall, 515 Morrill Road, Ames, Iowa 50011, Tel. 515-294-7612, Hotline 515-294-1222, email [eooffice@iastate.edu](mailto:eooffice@iastate.edu)

## **Prep Week**

This class follows the Iowa State University Prep Week policy as noted in section 10.6.4 of the [Faculty Handbook](#).

## **Religious Accommodation**

Iowa State University welcomes diversity of religious beliefs and practices, recognizing the contributions differing experiences and viewpoints can bring to the community. There may be times when an academic requirement conflicts with religious observances and practices. If that happens, students may request the reasonable accommodation for religious practices. In all cases, you must put your request in writing. The instructor will review the situation in an effort to provide a reasonable accommodation when possible to do so without fundamentally altering a course. For students, you should first discuss the conflict and your requested accommodation with your professor at the earliest possible time. You or your instructor may also seek assistance from the [Dean of Students Office](#)[Links to an external site.](#) at 515-294-1020 or the [Office of Equal Opportunity](#)[Links to an external site.](#) at 515-294-7612.

## **Contact Information for Academic Issues**

If you are experiencing, or have experienced, a problem with any of the above statements, email [academicissues@iastate.edu](mailto:academicissues@iastate.edu)