

## MA 541 Modern Algebra I

Fall 2025

**Professor:** Jennifer Balakrishnan ([jbala@bu.edu](mailto:jbala@bu.edu))

**Course hours:** TR 9:30 - 10:45 AM (CAS 201)

**Office hours:** M 10:00 AM - 11:00 AM, T 10:45 - 11:45 AM, or by appointment (CDS 409)

**TF:** Liqiang Huang ([lqhuang@bu.edu](mailto:lqhuang@bu.edu))

**Discussion:** F 9:05 - 9:55 AM (CAS 235) or 10:10 - 11:00 AM (CAS B06A)

**Office hours:** F 11:00 AM - 12:00 PM (CDS 345)

**Text:** Judson, *Abstract Algebra: Theory and Applications*, 2022 edition

The textbook is freely available at <http://abstract.ups.edu/>

**Course website:** <http://math.bu.edu/people/jbala/541.html>

**Material:** This course will serve as an introduction to the theory of groups and rings in abstract algebra as well as to computational tools for performing related computations. Throughout, we will illustrate theory with concrete examples from geometry and number theory and use the computer algebra system **SageMath** to do explicit calculations. We will also showcase present-day applications, such as cryptography. The plan is to follow Chapters 3-7 and 9-17 in Judson's book, time permitting.

**Grading:** Homework will be due weekly. There will be midterm quizzes on **October 9** and **November 6** and a final exam. The first midterm counts for 15%, the second midterm for 15%, the final counts for 20%, weekly discussion questions count for 10%, and homework counts for 40%.

**Homework:** Homework will be due one week after it is assigned and is due in person at the start of class. You are welcome to work with others on your homework; please acknowledge your collaborators on the first page of your write-up. You may submit one late homework assignment (up to one week after the original due date). However, please contact me ahead of the deadline to arrange this. I will drop your lowest homework score when calculating final grades.

**Computer packages:** Some problems will involve computer calculations using the open-source software package **SageMath**, which can be either used freely here: <https://sagecell.sagemath.org/> or via a free download from <http://www.sagemath.org>.

**Accommodations:** Students with documented disabilities may be entitled to accommodations in this course that may include, but are not limited to, additional time on exams, staggered homework assignments, and note-taking assistance. If you believe you should receive accommodations, please contact the Office of Disability & Access Services ([access@bu.edu](mailto:access@bu.edu)) to discuss your situation. This office can give you a letter that you can share with me outlining the accommodations you should receive.

**Cheating:** Boston University's policies on cheating are spelled out in the BU Academic Conduct Code, available at <http://www.bu.edu/academics/resources/academic-conduct-code/>. These policies will be followed in this class.