MATH 320: Abstract Algebra
Spring 2026 Section 1: TuTh 9:30-10:45am
in-person lecture modality   Meeting room: HH-210

Overview:

This course is a rigorous introduction to ring theory. It is an abstract course, with many definitions, theorems, and proofs, but also with motivating examples.

Prerequisites:

Students are expected to be comfortable with proofs, the language of mathematics. These skills are normally taught in Math 254 and especially Math 245. Students who experienced watered-down versions of these courses will have to work harder to keep up.

Course Materials:

There is a required coursepack, which will be handed out for free. Please don't lose it. A free digital version will also be supplied, but you will need the print copy for exams.

Hungerford's *Abstract Algebra, 3rd ed.*, ISBN: 978-1111569624, may be helpful for additional reading material, as well as Ponomarenko's *Mathematical Maturity via Discrete Mathematics*, ISBN 0-486-83857-9, for background on proof techniques as needed.

Course Structure:

This course has in-person meetings twice weekly, all of which students must attend. These meetings will be split into a first half (approx. 30 mins), followed by a 5 minute break, followed by the remaining time (approx. 40 mins). The first half will consist of student presentations. The second half will consist of students working in groups on the unit exercises, with the instructor offering help and guidance as needed. Following exams, the two halves will be in reverse order.

Grading:

Unit exams, presentations, and the final exam, are all normalized to lie between 50% (blank but present) and 100% (perfect score). Missing grades are still worth 0%. The cutoffs for each letter grade are as below. The deadline for grade appeals is one week from when it's posted to Canvas.

What?	When?	Why?
Student Presentations	various	50
Attendance	throughout	50
Unit 1 Exam	Thu. Feb. 5	100
Unit 2 Exam	Thu. Feb. 26	100
Unit 3 Exam	Thu. Mar. 26	100
Spring Break	Week of Mar. 30-Apr.3	no class
Unit 4 Exam	Thu. Apr. 23	100
Team Unit Exam Score		100
Drop Lowest Unit Exam		-100
Final Exam	Thu. May 7 8-10am	500
Total		1000

A: 920   A-: 900   B+: 880   B: 820   B-: 800   C+: 780
C: 720   C-: 700   D+: 680   D: 620   F: 0

Student Presentations:

The first half of each class will be filled with four student presentations – you will be presenting approximately three times during the semester. All presenters will write their solution on the board simultaneously (before class if possible), and will take turns discussing their solution and answering questions. They will sign up on the signup sheet provided (link in Canvas and in the Discord). Presentations are graded based on correctness as well as discussion accuracy. Your presentation grade is your average score on presentations, scaled up to 50 points.

Teams:

Students will divide themselves into teams of 4-5 people, with whom they will work closely all semester. The end of the day on February 3 is the Team Adjustment Deadline. At this time your team will be locked in for the rest of the semester.

To encourage team collaboration, the average of all the unit exam scores of everyone on your team (including you) will count as another unit exam score for you. The instructor will update this score after each exam to help you estimate your current grade.

Attendance Grade:

Student attendance scores begin at 50/50 and can only decrease. Students may miss one class without penalty. After that, each unexcused absence incurs a 5 point penalty to participation. Coming late, leaving early, or being disengaged (e.g. on your phone) will also lead to penalties.

Exams:

Unit exams are taken with no access to notes, calculators, phones, smartwatches, or other aids, apart from the coursepack which you must bring and use (print version only). Unlimited paper will be provided. Unit exams will consist of ten problems, most of which will be similar to the unit exercises. The lowest unit exam score will be dropped. Each problem will be graded on a scale of 5 to 10. The final exam will be similar to the unit exams in structure, except two hours long, and there will be extra emphasis on Unit 5 (which does not have its own unit exam).

Attendance:

Students are expected to attend every class, paying attention, participating, and taking notes as appropriate. Makeup exams are not given under any circumstances. Students who will miss class due to an official university event or activity (such as athletics), must notify the instructor during the first two weeks of classes. Absences for official university events must be documented with a memorandum from the event's sponsor with that same deadline. Students missing class due to a medical emergency must provide a signed medical excuse justifying the absence. Student Health Services does not provide these.

FERPA:

Student information in this course is confidential as required by law and by SDSU policy[1].

SDS:

If you are a student with a disability and believe you will need accommodations for this class, it is your responsibility to contact Student Disability Services at (619) 594-6473. To avoid any delay

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[1] https://registrar.sdsu.edu/students/additional_resources_students/student_privacy_ferpa

in the receipt of your accommodations, you should contact SASC as soon as possible. Please note that accommodations are not retroactive, and that accommodations based upon disability cannot be provided until you have presented your instructor with an accommodation letter from SASC.

Academic Integrity:

Students are strongly encouraged to study with their team, and to work together on exercises. Teams work best when everybody contributes. Don't sit passively – jump in there and take control of your education. Similarly, don't let others on your team sit passively – if they later bomb their exams, it will hurt both their grade and yours.

Use of AI to help with homework is discouraged but not forbidden – genAI is like a well-spoken but dumb friend, not a math expert. Trusting an AI solution without understanding is just as foolish as trusting a friend's solution without understanding.

Collaboration on exams is forbidden. Use of written, digital, or online resources during exams is forbidden, except for the coursepack. All violations will be reported to the Center for Student Rights and Responsibilities and will also result in grade reductions or worse. Courses failed due to integrity violations are ineligible for course forgiveness. See SDSU's full policy[2] on academic honesty, or ask the instructor, if you have any doubts or questions.

Do not distribute collections of solutions to people outside your team (hints, parts of problems, or even entire single problems from time to time, are all fine).

Additional Help:

The math department[3] maintains a list of paid tutors. Academic advising is available at the Student Success Center[4]. Counseling and Psychological Services[5] helps students with mental health concerns. The SDSU Economic Crisis Response Team[6] helps students with food/housing/financial concerns.

Learning Objectives:

Students will apply definitions relevant to the course (such as divisibility, primality, irreducibility, homomorphism), use those definitions to prove theorems, and apply those theorems to solve concrete problems. Students will articulate ideas and exhibit behaviors that cultivate teamwork, critical thought, and communication skills needed to function in a diverse workforce and global community.

Discord:

Please join the course Discord, you will find it quite helpful: `https://discord.gg/mXwpKApMYb`

Professor:

Vadim Ponomarenko   `vponomarenko@sdsu.edu`
Drop-in office hours: Tuesdays and Thursdays 8:30-9:15am and 11am-12:15pm.
Also at other times by appointment. All office hours held in GMCS 511.
Website: `http://vadim.sdsu.edu/`

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[2]`https://sacd.sdsu.edu/student-rights/academic-dishonesty/cheating-and-plagiarism`
[3]`https://math.sdsu.edu/`
[4]`https://cossuccess.sdsu.edu/academic-advising/`
[5]`https://sacd.sdsu.edu/cps`
[6]`http://sdsu.edu/ecrt`