

**MATH 306: ELEMENTS OF ABSTRACT ALGEBRA
SPRING 2016 - RICE UNIVERSITY**

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Course Information. Lectures: MWF 11:00-11:50 AM in HBH 423
Website: Search for MATH 306 001 Sp16 on OWL-Space.

Required Textbook. *Contemporary Abstract Algebra* (Eighth Edition) by Joseph A. Gallian.

Course Description and Learning Outcomes. This class will give an introduction and overview of abstract algebra, including groups, rings and fields. Examples will be emphasized throughout the semester. Group theory topics will include subgroups, cyclic groups, permutations, cosets and Lagrange's theorem, direct products, normal subgroups, factor groups, group homomorphisms and the fundamental theorem of finite Abelian groups. Ring theory topics will include subrings, integral domains, ideals, polynomial rings, factoring and divisibility. Field theory topics will include extension fields, algebraic extensions, fields of fractions, and finite fields. If time permits, at the end of the semester we will touch on some applications in cryptography, symmetry and coding, or further topics like the Sylow theorems, group presentations or basic Galois theory.

This course serves as an alternative to the more standard, in-depth algebra sequence offered at Rice, namely MATH 356 and MATH 463. In particular, you may not receive credit for both this course and MATH 356. The class is suitable for math minors and students who are interested in taking a single overview-style algebra course; the other course sequence may be more suitable for math majors and those intending to pursue algebra further and in greater detail.

Prerequisites. MATH 102 (calculus) is the required prerequisite. Recommended prerequisites include honors calculus and a linear algebra class. The material covered in Chapter 0 of the textbook along with basic concepts from linear algebra will be assumed.

Grades. Your grade will be determined by the following:

Weekly homework at 31% total

Three midterms at 23% each

The instructor reserves the right to offer extra-credit assignments.

Expectations. Although attendance is not a component of the class grade, I still expect you to attend every lecture and arrive on time. You are responsible for all material covered and announcements made in class. Not all announcements are guaranteed to be posted to OWL-Space. You are also expected to read any emails that I send to the class.

In the limited lecture time that we have together, there is only so much detail that can be covered. Additionally, it can be difficult to comprehend a math lecture while simultaneously taking good notes. Thus, I expect you to be proactive about the course material, and to fill in any gaps in your knowledge by studying the textbook and having discussions with your classmates. If you start to feel overwhelmed, I expect you to utilize my office hours, the TA's office hours, and your classmates as resources. You are **strongly encouraged** to make study appointments with your fellow classmates for working on homework, preparing for exams, and staying on top of the material.

Homework. Homework will be assigned via OWL-Space and due on Fridays in class, at the beginning of class, unless otherwise stated. In general, late homework will not be accepted. You are encouraged to work together on homework, but the work that you submit must be your own. You are also encouraged to visit instructor and TA office hours if you need assistance with homework assignments. Looking up solutions to homework problems in any written form or searching online for solutions is **strictly forbidden**, as this completely defeats the purpose of struggling with proofs on one's own.

The majority of assignments will be proof-based exercises. Your solutions should include well-organized explanations, written in grammatically-correct English sentences and/or standard mathematical notation. You will be graded not only on the mathematical content of your solutions, but also on the clarity and completeness of your exposition. Additionally, the following guidelines should be followed:

- Begin your homework assignment as soon as your schedule permits.
- Solutions must be written neatly and legibly (or typed) and must appear in the order in which the corresponding problems are listed on the assignment. The use of LaTeX is encouraged but not required.
- Your name must be written at the top of every page in your homework.
- Submissions with several pages must be stapled together.
- If your paper is torn from a spiral notebook, all the little shreds should be removed from the edges.

Exams. Midterm exams will be one hour long and held in class. The **tentative** midterm exam schedule is as follows, and is subject to change.

Midterm I: Wednesday, February 10th, in class.

Midterm II: Friday, March 18th, in class.

Midterm III: Wednesday, April 20th, in class.

Calculators, computing devices, notes and books are prohibited on exams. Any exceptional materials to be permitted during exams will be specified and made explicit by the instructor.

Note that there will not be a cumulative final exam for the course. Rather, you'll be tested via equally-weighted midterm exams three times throughout the semester.

Students with university recognized exam conflicts (e.g. competitions, sporting events, etc) must notify me as soon as possible to reschedule midterms. Make-up exams will only be permitted in extenuating circumstances (e.g. illness, family problems) and rescheduled exams will be only be conducted after the regularly scheduled exams.

Academic Integrity. Students are expected to abide by the Rice Honor Code on all assignments and exams.

Visit <http://honor.rice.edu> for more information.

Students with disabilities. Any student with a documented disability needing academic adjustments or accommodations is requested to speak with me during the first week of class. All discussions will remain confidential. Students with disabilities need to also contact Disability Support Services in the Ley Student Center.

Visit <http://students.rice.edu/students/Disability.asp> for more information.

Disclaimer. The instructor reserves the right to update the expectations outlined in this syllabus. Any modifications will be announced in class before changes are made to the syllabus.