

MATH 455/540: ALGEBRAIC TOPOLOGY (SPRING 2015)

Instructor. Dr. Allison H. Moore (allison.h.moore@rice.edu)
Office: HBH 456, Office hours: Monday 3-4, Thursday 3-4.

Course Information. Class meets: MWF 2:00pm - 2:50pm in HB 427
All homework and reading assignments can be found on Owlspace
Teaching Assistant: Katherine Vance (kp9@rice.edu)

Textbook. *Elements of Algebraic Topology* by James Munkres, Perseus Books Publishing, Cambridge, Massachusetts, 1984. ISBN: 0-201-62728 (required)

Course Description. This course focuses on the homology and cohomology of topological spaces. (Co)homology is a way of associating a sequence of abelian groups to a topological space that are invariant under homeomorphism (and more generally homotopy equivalence). The homology groups of a space are in general easier to compute than the homotopy groups and hence they can be more useful in distinguishing some spaces. Some of the topics we will cover are simplicial and singular (co)homology, relative (co)homology, the Mayer-Vietoris sequence and excision, the Eilenberg-Steenrod axioms, CW-complexes, the universal coefficient theorem, basic homological algebra, and Poincare duality. If time permits, we will cover other topics, like the Kunneth formula, Alexander-Lefschetz duality, De Rham cohomology, Cech cohomology or spectral sequences.

Homework and Exams. Homework will be assigned on Wednesdays via OWL-Space and due the following Wednesday in class. Homework must be legible, and will be graded for both validity and exposition. It is recommended that students collaborate with each other on homework, however, other algebraic topology texts and the internet must not be consulted while working homework problems. The work you submit must be your own, and you must show all of your work for full credit. Students enrolled in Math 540 will be required to work more homework problems than students enrolled in Math 445.

There will be one midterm and one final. The exams will be take-home format, with explicit instructions to be distributed at the time of the exam.

The *tentative* date of the midterm and final will be as follows: Midterm tentatively due on February 27th; final to be handed out on the last day of class (April 24th) and due sometime thereafter.

Grades. Grades will be based on the following.

- 40% Homework (with 35% for validity and 5% for exposition)
- 25% Midterm
- 35% Final

The curves and cut-offs used for Math 445 and Math 550 may differ.

Academic Integrity. Students are expected to abide by the Rice Honor Code at all times.

OWL-Space. Announcements, suggested readings and assignments will usually be posted to OWL-Space. Add yourself to OWL-Space with a NetID and check regularly.

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.