
MthS 4560/6560: Topology

FALL 2013

Long Hall, Room 123, TTh 12:30–1:45

Instructor	Dr. Matt Macauley (macaule@clemsun.edu) OFFICE: Martin Hall O-325 PHONE: (864) 656-1838 (no voicemail!) OFFICE HOURS: (subject to change!) TTh 11:00–12:00, or by appointment WEBSITE: http://www.math.clemson.edu/~macaule/classes/f13_mthsc412/
Textbook	<i>Introduction to Topology</i> (Third Edition), by Bert Mendelson. Available new for \$8.45 on Amazon.
Prerequisites	MthS 1190/3190 (Intro to proofs), or any higher-level proof-based course (e.g., MthS 4120 or 4530).
Overview	This course is intended to be an introduction to the study of topology, with the focus on point-set topology. Geometry is the study of objects preserved by rigid motions, whereas topology is the study of properties of spaces and objects preserved by continuous deformations. Topology can be thought of “real analysis without the metric,” in that one defines the open and closed sets of a space, and then studies traditional properties of the real numbers such as neighborhoods, continuous functions, compact sets, connected sets, and more. Topology plays a fundamental role in a wide range of areas of pure and applied mathematics and physics, from algebraic geometry, to data analysis, to general relativity to string theory, just to name a few. It is a must for students who plan to pursue mathematics in graduate school and is strongly recommended for physics majors.
Topics	Basic review of the theory of sets. Introduction to metric spaces, and topics such as continuity, open balls, limits, and open and closed sets. Introduction to topological spaces, and topics such as neighborhoods, closure, interior, boundary, functions, continuity, homeomorphism, subspaces, and products. Compactness in topological spaces, the real line, and in metric spaces. Connectedness and path-connectedness of topological spaces, and homotopic paths and the fundamental group.
Learning Outcomes	By taking this class, students will: <ul style="list-style-type: none">• Demonstrate a solid understand of point-set topology and basic homotopy theory at the undergraduate level.• Abstract the notion and key properties of a metric space to a general topological space.• Explain to a friend or family member who knows nothing about mathematics what topology is, why we should study it, and why it might be fun to do so!• Learn to understand, read, and write rigorous mathematical proofs on topology.• Further develop and improve good mathematical writing skills. Important aspects of this are <i>accuracy</i>, <i>clarity</i>, and <i>conciseness</i>.

Policies

- Homework assignments will accumulate from lecture to lecture and will be due roughly once a week. I will post the problems on my website. Late homework will *not* be accepted.
- Attendance is not mandatory, but highly recommended.
- If you get an A or B on the final exam, then you get at least that grade in the course, provided you have (i) attended class *very* regularly, and (ii) maintain a passing grade on the homework.
- All drop/add procedures are your responsibility.
- Absent Professor Policy: If the instructor has not arrived within 15 minutes of the scheduled class time, you may assume that class has been canceled.
- All use of cell phones, laptops, and PDAs is prohibited during lecture. Calculators, cell phones, laptops, and PDAs will not allowed during exams.
- Cell phone policy: http://www.youtube.com/watch?v=FYwpxU_G4Z0
- I will NOT post homework solutions. However, I will gladly help you with any of the problems during office hours or whenever I'm around.
- No whining.

Grading

The final grade will be calculated as follows:

HOMEWORK:	25%
MIDTERM 1:	25%
MIDTERM 2:	25%
FINAL EXAM:	50%

I will drop either your lowest midterm, or half the weight of your final exam.

Homework

Homework assignments will accumulate from lecture to lecture and will be due several times a week. I will post the assignments on my website, as I like to make all materials freely available to everybody (Warning: Websites such as *Course Hero* are a SCAM!). Students may collaborate on their homework problems, but they *must* write up and submit their homeworks separately as well as document their collaborators. Late homeworks will **not** be accepted. You are encouraged to typeset your homework assignments (\LaTeX preferred but not required), and you will get an extra night to complete it if you do (okay to hand-draw pictures, though – there will be many!). You should keep all the graded homeworks in case of missing grades due to missing name or typo errors.

Key Dates

August 22 (Thu)	Class begins; late enrollment fee applies
August 27 (Tue)	Last day to register or add a class
September 3 (Tue)	Last day to drop a class or withdraw from the University without a W grade
October 14–15 (M–Tu)	Fall break
October 29 (Tue)	Last day to drop a class or withdraw from the University without final grades
November 27–29 (W–F)	Thanksgiving break
December 5 (Thu)	Last day of class
December 9 (Mon)	MthS 4560/6560 Final Exam (3:00–5:30pm)

The official statement on Academic Integrity

As members of the Clemson University community, we have inherited Thomas Green Clemson's vision of this institution as a *high seminary of learning*. Fundamental to this vision is a mutual commitment to truthfulness, honor, and responsibility, without which we cannot earn the trust and respect of others. Furthermore, we recognize that academic dishonesty detracts from the value of a Clemson degree. Therefore, we shall not tolerate lying, cheating, or stealing in any form.

When in the opinion of a faculty member, there is evidence that a student has committed an act of academic dishonesty, the faculty member shall make a formal written charge of academic dishonesty including a description of the misconduct, to the Dean of the Graduate School. At the same time, the faculty member may, but is not required to, inform each involved student privately of the nature of the alleged charge.
