MATH 6452 Syllabus

Differential Topology, Section A, 3 credit hours

Fall 2026

Instructor Information

Instructor: Dr. John Etnyre

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General Course Information

Description

This is an introductory course in differential topology. This course aims to introduce the basic tools to study the topology and geometry of manifolds (and some other spaces too). (Smooth) Manifolds are "locally Euclidean" spaces on which we can "do calculus" and "do geometry". These spaces are at the center of a great deal of much of the most exciting current research in mathematics and are essential to many applications of mathematics in science and engineering. Throughout the semester, we will discuss the theory of manifolds and a way to generalize differential, integral, and vector calculus.

Course Learning Outcomes

By enrolling in this course, a student will

- Understand the main ideas in differential topology, such as manifolds, tangent and cotangent bundles, vector bundles, differential forms, and vector fields.
- Be able to work with the ideas above to come up with original arguments in differential topology.
- Be able to express complicated mathematical ideas clearly.

Required Course Materials

There is no required text for the class, but there are two recommended texts that might be a helpful supplement to the course lectures are:

- *Introduction to Smooth Manifolds* by Lee.
- *Differential Topology* by Guillemin and Pollack

Grading Policy

The course grade will be based on the following.

Homework: 45%
One Midterm: 25% each
Final Exam: 30%

The cut-offs for grades may be reduced from what is indicated below, but they will not increase.

If your Average is	Your Grade will be
in [90,100]	A
in [80,90)	B
in [70,80)	C
in [60,70)	D
less than 60	F

Description of Graded Components

There will be six assignments, and the homework grade will be an average of the grades on those assignments. The homework assignments will be posted in Canvas and will be turned in on Canvas on the day indicated on the assignment. I encourage you to work on these assignments with other students in the class and to use whatever other resources you might have (like me and others in the department), but **each problem must be written up in your own words by you**. Late homework is not accepted and will receive a score of 0 for that assignment.

At some point, everyone needs to learn TeX or LaTeX, so I encourage you to write up your homework using one of these packages, but this is not a requirement. If you would like help getting started with TeX or LaTeX, you are welcome to talk to me about it.

The midterm exam will be in class, and I will announce it on this Canvas page and in class at least one week before the exam. The tentative date for the exam is October 14. If you need to miss the midterm exam, you must talk to me about this in advance, if possible. If you miss the midterm exam for an excused reason, you will be given the option to take a makeup exam or skip the exam and have the homework and final exam count more towards your final grade.

The final exam will take place during the scheduled final exam time for the course.

Course Policies

Attendance and Participation

Attendance for lectures is not required, but it is highly encouraged. Attendance for the exams is required.

Academic Integrity

Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act according to the highest ethical standards. Review Georgia Tech's Honor Code and the student Code of Conduct.

Any student suspected of cheating or plagiarism on a quiz, exam, or assignment will be reported to the Office of Student Integrity, who will investigate the incident and identify the appropriate penalty for violations.

Accommodations for Students with Disabilities

If you are a student with learning needs that require special accommodation, contact the Office of Disability Services (404-894-2563) as soon as possible to make an appointment to discuss your special needs and to obtain an accommodations letter. Please also e-mail me as soon as possible in order to set up a time to discuss your learning needs.

Student-Faculty Expectations Agreement

At Georgia Tech, we believe that it is important to strive for an atmosphere of mutual respect, acknowledgement, and responsibility between faculty members and the student body. The Student-Faculty Expectations articulate some basic expectations that you can have of me and that I have of you. In the end, simple respect for knowledge,

hard work, and cordial interactions will help build the environment we seek. Therefore, I encourage you to remain committed to the ideals of Georgia Tech while in this class.