Math 4250 Syllabus
Spring 2026

1. Course Information

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Our classroom: Boyd 304
11:35-12:55 TR
http://www.jasoncantarella.com/

Book: **Theodore Shifrin, Differential Geometry: A first course in curves and surfaces**.

2. Course Schedule

This course is an in-person lecture course with in-class exams and graded homework. The official schedule for the course is provided on the the course webpage. Homework due dates are provided in Gradescope (see below) and aren't listed on the webpage. You are expected to read the notes and the book sections before coming to class. You aren't expected to completely understand everything after a first reading, but it will prepare you to get much more out of the lecture and class activities.

3. Prerequisites

Students are expected to have a grade of B or higher in

(1) multivariable calculus; MATH 2270 or MATH 2500 course (or MATH 3500/3510),
(2) linear algebra equivalent to the MATH 3000 or MATH 3300 course (or MATH 3500/3510),
(3) a proof-based course (such as MATH 4000) or the introduction to proof course (MATH 3200),

In addition, students are expected to have a basic understanding of ordinary differential equations, equivalent to a grade of C or higher in the MATH 2700 course. Computer skills in Mathematica or similar symbolic computation environment (Sage, Maple, Jupyter) will also be helpful.

4. Course Goals

Students will develop an understanding of the geometry of curves and surfaces, including curvature and torsion for space curves and Gauss and mean curvature for surfaces. The course will include discussion of the geometry of three dimensional space, and end with the Gauss-Bonnet theorem. At the end of the course, 4250 students will have a basic grasp of the geometry of curves and surfaces and 6250 students should be prepared for a graduate course in Riemannian geometry.

5. Disclaimer

The syllabus is a general course plan and represents the best available information at the time of writing. Many of the course materials were developed during the pandemic, so we'll probably have to make adjustments as we go.

6. Principal Course Assignments

This course is taught in an in-person active learning model. Course material will be presented in the form of reading assignments, short videos, and homework assignments posted on the course webpage: http://www.jasoncantarella.com/wordpress/courses/math-4250/. Homework will be turned in (online only) through Gradescope http://www.gradescope.com/ and returned through Gradescope as well. There is a "late homework" deadline in Gradescope; homework cannot be accepted after this deadline. Please turn in whatever you have before the late deadline.

There will be two in-class midterm exams and a final exam. Exams and exam grades will be returned via Gradescope. **Note that ELC will not be used for this course.**

7. Grading and Policies

The grading structure for the course is 10% for the homework assignments (total), 30% for each midterm, and 30% for the final exam. The class follows a "standards-based" grading model; you are graded on your mastery of the course material, not the amount of effort you put in. Grades are awarded according to: 90-100 (A), 80-89 (B), 65-69 (C), below 65 (F). Grades of "D" will not be awarded.

8. Attendance Policy

In-person attendance is strongly recommended, as the active learning component of the class simply doesn't work unless you're actually there talking with the other students.

9. Individual Consultation and Office Hours

Office hours are available from 3:30-6:30pm on Wednesdays; office hours are usually attended in groups and are open to all students. Office hours are drop in time; you don't have to stay for the whole time. Short individual appointments to discuss grades or other issues requiring a private discussion are generally available. Short individual discussions of homework problems or course topics is available immediately before or after class, but generally not provided at other times.

10. Academic Honesty

As a University of Georgia student, you have agreed to abide by the University's academic honesty policy, "A Culture of Honesty," and the Student Honor Code. All academic work must meet the standards described in A Culture of Honesty found at: `www.uga.edu/honesty`. Lack of knowledge of the academic honesty policy is not a reasonable explanation for a violation. Questions related to course assignments and the academic honesty policy should be directed to the instructor.

The most important thing is to clearly distinguish between **your own original work** and **collaborative, searched, or AI work**. Both are allowed, and neither is an academic honesty violation. But you have different responsibilities in each case. For your own work:

- **Develop your thought process using sentences.** The most important purpose of writing is to figure out what you think. Unless you can express your argument in the form of a sentence, you may only have a vague or intuitive idea about what you're doing. This can make it very hard to understand what's wrong when you make a mistake.
- **Compute carefully and neatly.** Paper and pencil are tools for mathematical reasoning. Use them properly! Organize your calculations and start each section of algebra with a sentence explaining why this is the correct computation to do. Write neatly (it helps you avoid copying errors). Only use the equals sign to connect expressions that are, in fact, equal. If one thing implies another, use a phrase to indicate this.
- **Cite sources for facts.** If your argument depends on something you've learned before, or a theorem from the class, make a note of it. ("page 4 of notes on ... ", "Wikipedia page on ..."). That way, if you're wrong about it (for instance, you missed a hypothesis) there's something to check. Better yet, double check it yourself!

For collaborative, searched or AI work:

- **Acknowledge the source up front.** Example: "After some online searching, I found a helpful discussion on StackExchange (include the url), which suggested that I try the approach below." or "I talked about the problem with Fionna, and got this idea.", or "ChatGPT proposed the following solution".
- **Check the work.** Your responsibility when you find something written online is to make sure that it holds up. Don't just believe things because a chatbot told you to or someone wrote it on StackExchange. Are the calculations right? Do the sources they cite actually say what they claim? You must explicitly discuss these issues in your writeup of the solution.
- **Realize that you're still responsible for doing similar work.** You will have to demonstrate your knowledge on the exams. Looking up answers can help you get unstuck, but try to immediately do a similar problem yourself. You can always ask your chatbot to generate a similar problem for you to solve.
- **Failure to clearly identify this kind of work results in a grade penalty.** If you don't clearly identify work that was collaborative, searched, or AI, you haven't met the responsibilities above and this will result in a grade penalty on the problem.

11. MAKE-UP EXAMINATIONS

Make-up examinations are generally not given. In cases where students miss an exam for a valid reason (usually legal or medical), the exam is generally waived and the student's course grade is determined by the remaining exam and homework.

12. UGA WELL-BEING RESOURCES

UGA Well-being Resources UGA Well-being Resources promote student success by cultivating a culture that supports a more active, healthy, and engaged student community. Anyone needing assistance is encouraged to contact Student Care & Outreach (SCO) in the Division of Student Affairs at 706-542-8479 or visit sco.uga.edu. Student Care & Outreach helps students navigate difficult circumstances by connecting them with the most appropriate resources or services. They also administer the Embark@UGA program which supports students experiencing, or who have experienced, homelessness, foster care, or housing insecurity. UGA provides both clinical and non-clinical options to support student well-being and mental health, any time, any place. Whether on campus, or studying from home or abroad, UGA Well-being Resources are here to help.

- Well-being Resources: well-being.uga.edu
- Student Care and Outreach: sco.uga.edu
- University Health Center: healthcenter.uga.edu
- Counseling and Psychiatric Services: caps.uga.edu or CAPS 24/7 crisis support at 706-542-2273
- Health Promotion/ Fontaine Center: healthpromotion.uga.edu
- Disability Resource Center and Testing Services: drc.uga.edu Additional information, including free digital well-being resources, can be accessed through the UGA app or by visiting https://well-being.uga.edu.