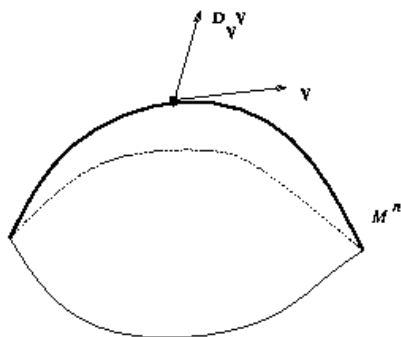


Curves and Surfaces in Three–Dimensional Space: An Introduction to Differential Geometry

MWF 8th period (3:00–3:50), LIT 233



What is this course about? For geometric objects in \mathbf{R}^3 it's "intuitively obvious" what words like *curved*, *straight*, and *flat* mean. But as soon as you try to nail down these notions, you find some obvious questions, such as the ones here (course announcement), that you (probably) don't know how to answer. This course will be an introduction to these questions and their answers. Topics will include the Frenet formulas; covariant derivatives; principal curvatures; Gaussian curvature and mean curvature; geodesics; holonomy around a closed curve; and (time permitting) the Gauss-Bonnet Theorem.

Prerequisites:

1. MAC 2313, MAC 3474, or the equivalent (Calculus 3).
2. MAS 4105 (Linear Algebra). **NOTE:**

MAS 3114 (Computational Linear Algebra) **DOES NOT** meet the linear-algebra prerequisite.

This prerequisite will be waived for graduate students *in the mathematics department*, but will **NOT** be waived for graduate students in other departments. Graduate students in other departments are welcome to *audit* the course (see <http://www.registrar.ufl.edu/currents/specialregistrations.html#2>), but will not be allowed to take the course for credit without specific permission from me.

Prerequisite does not mean *corequisite*. All prerequisites must be completed successfully *before* taking this course.

Text: Barrett O'Neill, *Elementary Differential Geometry*, revised 2nd edition (2006).

Warning: The *revised* 2nd edition, which is the book we'll be using, is not the same as the original 2nd edition (1997).

Instructor: David Groisser

Office: Little 308.

Phone: 294-2307.

Email: groisser (at) ufl (dot) edu. Please include your full name and an *informative* subject line in all email correspondence with me.

Office Hours: *Tentatively* Monday 5th period (11:45-12:35), and Wednesday & Friday 9th period (4:05-4:55). Please come early in the period or let me know to expect you later; otherwise I may not stay in my office for the whole period. See my schedule for updates. Students who can't make scheduled office hours may see me by appointment on most weekdays (but *never on a Thursday*).

Components of your course grade:

Homework

One mid-term exam. The format (in-class, extended sit-down, or take-home) is TBD. My *rough estimate* for the date of the midterm is Wednesday, Feb. 26. *This date is subject to change*, but I will give you at least a week's notice before the exam.

Final exam. The format (two-hour exam at the time set by the registrar — Wednesday, April 30, starting at 3:00 p.m. — or take-home) is TBD.

For the weights of these grade-components, see "**Grading system**" below.

Grading system: The system I will use in this class is as follows:

1. After each homework or exam, I decide a grade-scale for that item according to the philosophy "A = excellent, B = good, C = satisfactory, D = unsatisfactory but passing". In setting these scales, I don't have a predetermined grade curve or predetermined percentages for letter grades.
2. At the end of the semester, I compute a numerical "raw score" for each student according to the following two weighting-schemes:
 - 30% homework, 30% midterm, 40% final exam.
 - 50% homework, 20% midterm, 30% final exam.

3. By applying the weighting-schemes above to the cutoffs for exams and homework, I construct two different sets of raw-score grade-cutoffs. The homework assignments do not all count equally:

30% homework, 30% midterm, 40% final exam.

50% homework, 20% midterm, 30% final exam.

3. By applying the weighting-schemes above to the cutoffs for exams and homework, I construct two different sets of raw-score grade-cutoffs. The homework assignments do not all count equally; longer assignments count more than shorter assignments.
4. Using these data, I obtain two letter grades for each student. The final grade I assign is the higher of the two.

Homework: will assigned almost daily, and selected problems will be collected sporadically for grading. It is critical that you keep up with the homework, which will be posted on the homework page , even if I fall behind on the grading.

Student Honor Code: Students are expected to abide by the the Honor Code:

We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.

On all work submitted for credit by students at the university, the following pledge is either required or implied: ***“On my honor, I have neither given nor received unauthorized aid in doing this assignment.”***

What if you miss an exam? If you miss an exam for a valid reason, I will work out something with you that is as fair as is feasible. In a class like this without cookie-cutter exams, it's impossible for me to write two different exams of exactly the same level of difficulty. It takes me many hours even to try, and hours more to create a grading-scale for an exam taken by just one person. Therefore, unless I'm able to give you the same exam as the rest of the class, and be reasonably certain that there is no information-flow between people taking the exam at different times, I will not give you a make-up exam. Instead, I will just give you a “bye” and simply re-adjust the weights of the other components of your grade.

If you are going to miss an exam due to illness, you should notify me by phone or email before the exam starts (even if it's just a few minutes before).

Attendance policy. Barring valid reasons such as illness, weddings, funerals, family emergencies, and team activities, I expect students to be in class every day and *on time*, paying attention for all 50 minutes of the period. Coming late to class is disruptive to both your instructor and your classmates.

I may take attendance, at least until I learn students' names, but do not plan to factor it into your grade directly. However, students who choose not to regularly attend class (not counting valid reasons such as those mentioned above) should not expect the same consideration in office hours that students with good attendance will receive. Be aware that the University of Florida Attendance Policies paragraph:

The university recognizes the right of the individual professor to make attendance mandatory. After due warning, professors may prohibit further attendance and subsequently assign a failing grade for excessive absences.

Students with a lot of unexcused absences may find themselves dropped from the class with a failing grade.

Students with a contagious illness are asked to exercise good judgment and to be considerate of their classmates and instructor when deciding whether to come to class. Coughing and sneezing in an enclosed space like a classroom or office is a wonderful way to spread germs.

Classroom decorum:

Cell-phone ringers, audible text-message alerts, etc., should be turned off while you are in class. Please also avoid other disruptive or distracting noises, such as the tapping of pencils or feet, or the zipping and unzipping of backpacks several minutes before the end of class.

Do not use your personal computer in class without express prior permission from me. Ditto for your cellphone, except to receive emergency alerts from UF. In particular, **do not read or write text-messages in class.**

Do not read, do the crossword puzzle, etc., while you are in class. If you're too bored to pay attention, do homework.

Tentative, approximate weekly schedule of lectures: [Click here](#) . Students are expected to read the relevant material in the appropriate chapter-section of the textbook no later than the day after we cover that material in class, and preferably earlier.

Teaching-evaluations. Students are expected to provide feedback on the quality of instruction in this course based on 10 criteria. These evaluations are conducted online at <https://evaluations.ufl.edu>. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results>.

Religious Holidays. The following is part of the University of Florida Policy on Religious Holidays : “Students, **upon prior notification of their instructors**, shall be excused from class or other scheduled academic activity to observe a religious holy day of their faith.”

Accommodations for students with disabilities: Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the instructor when requesting accommodation.

Course goals: For the student to master the course-content described above in **“What is this course about?”**