Syllabus and course information

Differential Geometry II, Spring 2018
MTG 6257—Section 249G

MWF 8th period, LIT 201

Link to class home page

Instructor: Dr. David Groisser

Office Hours: Tentatively Tuesday 6th period (12:50-1:40), Wednesday 9th period (4:05-4:55), and Friday 9th period (4:05-4:55). I will need to reschedule several January (and possibly February) office hours in order to attend talks by applicants for faculty positions in the math department. I will announce the rescheduled hours by email. My office is Little Hall 308. 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 other than the rescheduled hours mentioned above. Students who can't make scheduled office hours may see me by appointment on most weekdays (but never on a Thursday).

Textbook: None.

Prerequisite: MTG 6256.

Syllabus (course content): Integration on oriented manifolds; Stokes's Theorem; de Rham cohomology; Riemannian metrics; introduction to Riemannian geometry (including geodesics and Riemannian curvature); vector bundles and tensor bundles; connections and curvature in greater generality. Depending on students' interests and how much time remains, we may cover additional topics, for which some possibilities are:

- Surfaces in $\mathbb{R}^3$ and the Gauss-Bonnet theorem
- Principal bundles; connections on principal bundles and associated vector bundles
- Further study in Riemannian geometry (conjugate points on geodesics, Hopf-Rinow Theorem, curvature-comparison theorems, Morse index, ...)
- Lie groups and Lie algebras
- Elliptic PDE on manifolds and Hodge Theory
- Curvature and characteristic classes
- Symplectic geometry and the geometry of classical mechanics
- Complex and Kaehler manifolds
- Selected topics in differential topology (transversality, Poincare-Hopf Theorem, degree theory, embedding theorems, ...)

Course-grade components: There will be no exams. Your final grade will be determined entirely by homework, assuming your attendance is good. If your attendance is poor, a grade penalty may be imposed.

Homework: I expect to assign and collect from five to eight problem-sets over the course of the semester. The problem-sets will include some problems that are mandatory and some that are optional. I will grade some subset of the mandatory problems. How large that subset is will depend on how many students handed in the assignment, how successful they were solving the problems, and how well-written their solutions are.

Doing well on the mandatory problems will be sufficient for you to get an A in the class. I do not think that you will find the mandatory homework excessive. However, to get the most out of the course, you should do as many of the optional problems as you can. The more time you put in, the more you will learn. My intent is to give students who want to learn a great deal the opportunity to do so, without requiring you to do a lot more work than you would have to do in other 6000-level courses in this department.

More about homework: Even when homework is well-written, reading and grading it is very time-consuming and physically difficult for your instructor. Please do not make this process more burdensome than it intrinsically needs to be. So:

- The homework you hand in must be neat, and must either be typed (in which case TeX or LaTeX is preferred) or written in pen (not pencil). Please do not turn in homework that is messy or that has anything that's been erased and written over (or written over without erasing), making it harder to read. Anything that is difficult for
Goals of course:

1. For emergencies, call the University Police Department (392-1111) or 911.
2. Contact information for the Counseling and Wellness Center:
3. Many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling Center. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 911.

4. Contact information for the Counseling and Wellness Center: http://www.counseling.ufl.edu/cwc/Default.aspx, 392-1575. For emergencies, call the University Police Department (392-1111) or 911.

5. Goals of course: For the student to master the course-content.