Fall 2014

MATH 485/585–DIFFERENTIAL GEOMETRY

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My office hours are tentatively 1-3pm Mondays, Tuesdays and Thursdays. If these times aren't convenient, you are welcome to arrange to see me at some other time.

Textbook *Elementary Differential Geometry* (revised 2nd edition), by Barrett O'Neill

Course Description Differential geometry is the study of curved objects---both in the sense that an object may be curving within a higher-dimensional space, and in the sense that a geometry may be curved (i.e., lines and angles may not behave as they do in Euclidean geometry). This course will begin with the study of curves and surfaces within three-dimensional Euclidean space, introduce invariant notions of curvature, and proceed with the fundamental results of surface theory. The last few weeks of the course will concentrate on how these ideas generalize to higher dimensions, including the Riemann curvature tensor, the behavior of geodesics in Riemannian manifolds, and some fundamental theorems relating curvature to the topology of the underlying manifold.

You are expected to be familiar with the material from the pre-requisites for this course, especially Math 221 (Vector Calculus) and Math 203 (Linear Algebra). Some experience with Math 323 (Differential Equations) may also be helpful.

Course Work You are expected to read the sections of the textbook covered in class. You are encouraged to ask questions about the readings in class. You will be given regular homework assignments from the textbook. Homework problems will be due one week after they are assigned.

In lieu of a final exam, you will complete a final project. Some suggestions for project topics will be provided, but you can also propose your own topic. In either case, please get my approval for your selected topic.

Resources Homework solutions, other handouts, and a periodically updated course schedule will be posted on OAKS.

Important Dates The last date to withdraw from the class with a grade of W is Oct 23. There will a take-home **midterm** exam, due on Oct. 21. **Final projects** will be due on the evening of Dec. 9.

Make-ups Only in the case of verifiable illness or family emergency will late homework be accepted or make-up exams be given. Accommodations will be made for students who miss tests due to participation in College-sponsored activities.

Grade Formula Your grade will be based on your course work, in roughly the following proportions: 33% homework, 33% midterm, and 33% for the final project.

Students enrolled in Math 585 (instead of 485) will be required to complete more challenging problems on the takehome midterm, and to complete more extensive final projects.

Academic Honesty Discussing assignments and comparing results with your classmates is expected and encouraged, but copying solutions from another student is not acceptable. When you hand in an assignment with your name on it, it must represent your own thoughts and be your own work.