

Math 40760 Differential Geometry, Fall 2009

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Text: Do Carmo, *Differential Geometry of Curves and Surfaces*

Course Web Page: <http://www.nd.edu/~nancy/Math40760/info.html>

Supplementary books (will be on reserve in the math library):

Chern, editor, *Studies in Global Geometry and Analysis*, MAA Studies, Vol. 4, especially Chern's article on "Curves and Surfaces in Euclidean Space"

Laugwitz, *Differential and Riemannian Geometry*

O'Neill, *Elementary Differential Geometry*

Oprea, *Differential Geometry and its Applications* (which includes Maple code)

Syllabus, etc.: The topics covered will include the differential geometry of curves in \mathbf{R}^3 , the local differential geometry of surfaces in \mathbf{R}^3 , and some topics in the global differential geometry of surfaces. We will cover chapters 1-3 and most of chapter 4 in Do Carmo, and a few additional topics.

There will be weekly homework assignments to turn in, problems for discussion in class, a paper or project, a portfolio, and a final exam. The first two assignments are posted on the course web page.

The paper or project is your opportunity to study a topic related to the course that you really want to learn about or to do a computer project related to it. I'll hand out suggestions for projects in early October or you can choose your own topic. The projects will (tentatively) be due on Monday, November 23.

For the portfolio you will select a few problems from the homework, redo them to be completely correct and well written. You will give a clear picture of some of your major accomplishments in the course and why you consider these to be major accomplishments. The final portfolio will (tentatively) be due Monday, December 7, but you will submit preliminary versions of at least part of it earlier. Detailed instructions will be given out later.

The final exam will be take-home, due December 14 at 10:00 a.m. (the time scheduled for the final) unless we agree on a later date and time.

Honor Code: The Honor Code is in effect for all exams, assignments and projects. I encourage you to work together on the assignments and projects, but copying in any form or submitting work done by others as your own is a violation of the Honor Code.

Computers: I will use the computer algebra system Maple, Professor Banchoff's java applets, 3D-XplorMath-J applets and possibly MATLAB for class demonstrations. These will help you use visualize much of the material. I strongly recommend that

you use these tools. You will find them useful for visualizing things and will find Maple and MATLAB useful for doing routine computations. You can also use Mathematica for these purposes. You can download MATLAB and Mathematica from OIT. I will email you information about how you can purchase Maple at a discount (price \$75).

Grading: The homework will count for 40% of your grade, with in class participation counting for 5-10% of that, the portfolio and project will each count for 15%, and the final will count for 30%.