

**MATHEMATICS 563 A1**  
**Introduction to Differential Geometry**  
**Fall Semester 2005**

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**Lectures:** MWF 11-12 in MCS B23

**Text:** *Differential Geometry*, by Andrew Pressley, Springer-Verlag, 2002, 3rd Printing; ISBN 182331526

**My Office Hours:** MW 2-3, F 10-11

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**Content:** Geometry, of course, is the study of “shapes” such as lines and surfaces as well as their higher dimensional analogs. Differential geometry is an application of the ideas from calculus to characterize geometric objects. An example of a question which differential geometry addresses is, for example, “What is the proper notion of the curvature of a surface?” This subject is an active area of research and has various applications in science and engineering, e.g. computer graphics, Einstein’s theory of gravitation (general relativity), quantum physics, and so forth. From time to time, we shall be using the computer algebra package Mathematica to help visualize these geometric objects as well as to help perform algebraic manipulations. Mathematica is available on the ACS UNIX machines in the computer room in the basement of the Math/Computer Science Building.

**Prerequisites:** The material in the course is nontrivial so please make sure that you satisfy the prerequisites. The prerequisites to this course are multivariate calculus and some linear algebra. A knowledge of analysis or topology is useful but is not necessary. We will introduce these ideas as necessary. Some knowledge of Mathematica will also be useful although we will introduce this as needed in class.

**Homework:** Generally, homework will be assigned on a weekly basis and will be due the following week. Late homework will not be accepted. Students may discuss homework with each other (and are encouraged to do so) but all written work must be prepared independently.

**Exams:** There will be a midterm exam and a final exam.