

**MA563–Introduction to Differential Geometry
Syllabus**

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Office Hours: MF 10-11, W 11-12 or by appointment

Text: Pressley, *Elementary Differential Geometry*

Grading Policy: Homework 50%, Take-home Midterm 25%, Take-home Final 25%

This course is an introduction to classical differential geometry of curves and surfaces in \mathbf{R}^3 . The classical approach begins with Gauss' study of two fundamental questions: (i) when can a portion of a curved surface be accurately represented by a flat map, (ii) how does one find paths of shortest length on a curved surface. Both questions are of obvious interest to travelers on the earth's surface. We'll discuss how to set up these questions as ODE/PDE problems. We'll compare the classical and modern approach to these issues: in the classical approach, we try to directly solve the DEs; in the modern approach, we argue more qualitatively.

I intend to cover most of the text. If time permits, we'll introduce concepts from modern (i.e. post-Riemann) differential geometry, which generalizes the classical theory to higher dimensional surfaces/manifolds.