

Fall 2019

**MA563–Introduction to Differential Geometry
Syllabus**

Instructor: Steve Rosenberg

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Office: MCS 242

Office Hours: M 10-12, W 1-2 or by appointment

Text: Kühnel, *Differential Geometry: Curves - Surfaces - Manifolds*, 3rd edition

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 Chapters 1– 4.