

Math 70900: Differential Geometry 1
Fall 2023

Class meetings: WF 2:00–3:30 p.m. in Grad Center 6421

Instructor:

Prof. Stephen Preston
MATH 4303
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Office hours: WF 3:30-4:00, or by appointment

Text: *Introduction to Differential Geometry*, Stephen Preston, available on the course web site.

Alternate texts (for a slightly different perspective):

- Comprehensive Introduction to Differential Geometry vol. 1 by Michael Spivak (3rd edition)
- Introduction to Smooth Manifolds by John Lee, available to download through GC library

Course outline: This is the first of a two-part course sequence (both called Differential Geometry 1; the second course is Math 71000) intended to prepare students for the Qualifying Exam in Differential Geometry. In this class we will cover the first two sections of the syllabus which can be found at <https://www.gc.cuny.edu/sites/default/files/2021-09/Differential-Geometry-Syllabus.pdf> and a bit of the third section (Riemannian geometry). In particular our main topics will be:

- Manifolds (definitions and examples)
- Tangent bundle and vector fields
- Lie groups and Lie algebras
- Differential p -forms and integration
- Stokes' Theorem and elements of differential cohomology
- Riemannian metrics, connections, geodesics, and curvature

Grading: Grades will be based on a midterm and final exam (25% each), together with weekly homework assignments (50%).

Homework: Homework will be assigned weekly and generally due on Wednesdays except in cases of holidays. You are encouraged to work together on homework, although each student must submit an individual write-up.

Important dates:

- Friday September 15: no class (Rosh Hashanah)
- Wednesday November 22 and Friday November 24: no class (Thanksgiving)
- Friday December 8: last day of this class