

**MATH 136: Differential Geometry**  
**Monday, Wednesday, Friday 12:00 - 1:00 PM**  
**Science Center 507**

---

**Instructor:** Tristan Collins, Science Center 239

**Office Hours:** 2:00-3:00 PM Wednesday and Thursday.

**Textbooks:**

- (required) Differential Geometry, 2nd Ed.- Wolfgang Kühnel
- (supplementary) Differential Geometry of Curves and Surfaces- Manfredo P. do Carmo

**Course Outline:**

*Curves and Surfaces*

- Parametrized curves and arc-length
- Frame fields
- Exterior differential calculus
- Regular surfaces in 3-space
- Area and orientation
- The Gauss map

*Geodesics and Curvature*

- Geodesics
- Parallel transport
- The exponential map
- Curvature of a surface
- The Gauss-Bonnet Theorem

*Manifolds*

- Differentiable manifolds
- Immersions and embeddings
- Orientation and volume
- Connections and geodesics
- Curvature tensors

**Prerequisites:** I expect you to be familiar with multivariable calculus and linear algebra.

**Homework:** There will be weekly assignments, posted on Monday, which are to be turned in to the Math 136 mailbox by the following Monday by 5:00 pm. Late homework will not be accepted. On the other hand, your lowest homework grade will be dropped when calculating your final grade. Please staple or paper clip your homework, and remember to write your name on it!

**Exams:** There will be two midterm exams, which will be held in approximately week 4 and week 9. There will also be a cumulative final exam of the take-home variety.

**Grading:** The final grade will be computed in the following way: Homework: 40%, Midterms: 15% each, Final: 30%.

**Collaboration:** I encourage students to collaborate on their homework. However, it is absolutely essential that students write up their own solutions. Collaboration on the final exam is prohibited. Plagiarism and cheating are violations of the Harvard College Honor Code.

**Important Dates:**

University Holiday .....	Monday, Sept. 5
University Holiday .....	Monday, Oct. 9
Thanksgiving Recess .....	Nov. 22-26
Last Day of Class .....	Friday, Dec. 1