

Mathematics 5540H Honors Differential Geometry Spring (even numbered years) 5 credits

## **Catalog Description:**

Geometry of curves and surfaces in 3-dimensional space, curvature, geodesics, Gauss-Bonnet Theorem, Riemannian metrics.

## **Prerequisite:**

C or better in 5520H, or in both 2182H and 2568; or credit for 520H, or in both 263.01H and 568; or permission of department.

## Text:

Text vary, for example:

- Differential Geometry of Curves and Surfaces, DoCarmo
- Elements of Differential Geometry, R. Milman and G. Rarker

## **Topics List:**

- 1. Geometry of curves; Frenet-Serret equations.
- 2. Curvature of surfaces, First Fundamental Form, Gauss's Theorema Egregium.
- 3. Geodesics, exponential map.
- 4. Isometries, conformal mappings; mapmaking.
- 5. Gauss-Bonnet Theorem.
- 6. Riemannian metrics, non-Euclidean geometry.