**Differential Geometry 230ar**
**Instructor: Ben Weinkove**

**Fall 2004, MWF 1pm, 310 Science Center**

## Syllabus

- Manifolds, vector fields, tensors
- The Levi-Civita connection, differentiating tensors
- Geodesics
- Riemannian curvature tensor
- The heat equation on $\mathbf{R}^n$
- The heat equation on a compact Riemannian manifold
- The Li-Yau Harnack estimates and convergence of the heat equation
- Complex manifolds and Kähler geometry
- Yau's Theorem (the Calabi conjecture)
- Solution of Yau's Theorem by the Kähler-Ricci flow method
- Minimal submanifolds and the mean curvature flow (if time permits)

## Homework and exam

Homework exercises will be set during the class. If you are taking the class for a letter grade you must hand in a minimum of 5 problems (your choice) every two weeks. The first homework is due on Wednesday October 13th.

There will be a take home final.

## Some useful books

- William M. Boothby, *An Introduction to Differentiable Manifolds and Riemannian Geometry*, 1986
- Luther P. Eisenhart, *Riemannian Geometry*, 1926
- James A. Morrow and Kunihiko Kodaira, *Complex manifolds*, 1971