Math 625, Fall 2002
Differentiable Manifolds

Instructor : Richard Hind, 216 Hayes/Healy, 631-6227 (office)

Time to meet: MWF 10:40 - 11:35

Course Description: We will start with calculus for functions of several variables, roughly following textbook 1. This is the foundation to begin studying differentiable manifolds, forms and vector bundles. See also textbook 2.

The second part of the course will be a brief introduction to Morse theory. Textbook 3 is good but assumes alot more background than will this course.

Finally, we will look at Riemannian manifolds. Textbook 3 has a concise introduction, textbook 4 is an alternative for this and earlier material. Textbook 5 is more advanced.

The lectures will aim to be completely self-contained, so the textbooks are not required although it is certainly recommended that you look at them.

Prerequisites: None.

Exam : One Midterm and one final exam (both of them take-home exams).

Home work : Yes, every week or so.

Textbooks:

1. Spivak, Michael: Calculus on manifolds, New York, W. A. Benjamin, 1965.

2. Warner, Frank W.: Foundations of differentiable manifolds and Lie groups, Corrected reprint of the 1971 edition. Graduate Texts in Mathematics, 94. Springer-Verlag, New York-Berlin, 1983.

3. Milnor, John: Morse theory, Based on lecture notes by M. Spivak and R. Wells. Annals of Mathematics Studies, No. 51. Princeton University Press, Princeton, N.J. 1963.

4. Boothby, William M.: An introduction to differentiable manifolds and Riemannian geometry, Orlando, Fla., Academic Press, 1986.

5. Gallot, Sylvestre; Hulin, Dominique; Lafontaine, Jacques: Riemannian geometry, Second edition. Universitext. Springer-Verlag, Berlin, 1990.