

DIFFERENTIAL GEOMETRY - MATH 647

University of Notre Dame, Mathematics Department

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MWF 9:35-10:25 - Fall '97

This course will consist of a brief introduction to riemannian geometry followed by the study of several geometric topics in which analysis on non-compact manifolds is either the main tool or the actual object of study.

Course Content:

A rough content of the course is as follows:

- (1) manifolds, connections, curvature, geodesics, Jacobi fields and applications.
- (2) An introduction to the theory of minimal surfaces: Plateau's problem, connections with complex analysis and some important recent developments in the global theory.
- (3) Various aspects of analysis on non-compact manifolds. Here the main topic is the spectral theory of the laplacian on complete manifolds, with emphasis on the interplay between convexity and some aspects of quantum mechanical scattering theory.
- (4) Miscellaneous topics.

Prerequisite:

The prerequisites are courses in real and complex analysis and a general appreciation for the beauty of analysis (estimates say so much...).

References:

General references include Do Carmo and M.Berger for general riemannian geometry , Nitsche and Dierskes-Hildebrandt-Kuster-Wohlrab for minimal surface theory and some papers for current research topics.