

Math 537A
Global Differential Geometry
 Fall 2011

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Office Hours: Monday 2-3 (in Math East 145), Tuesday 2-3 (in Math 715), Wednesday 10:30-11:30 (in Math 715)

Textbook: Riemannian Manifolds: An Introduction to Curvature by John M. Lee.

Additional References :

- Elementary Differential Geometry Lecture Notes by Gilbert Weinstein.
- Riemannian Geometry by M. P. Do Carmo.
- A Comprehensive Introduction to Differential Geometry by M. Spivak.
- An Introduction to Differentiable Manifolds and Riemannian Geometry by W. M. Boothby.
- Riemannian Geometry: A Modern Introduction by I. Chavel.
- Lectures on Differential Geometry by R. Schoen and S. T. Yau.
- Comparison Theorems in Riemannian Geometry by J. Cheeger and D. Ebin.
- Riemannian Geometry by Peter Petersen.

Homework: Homework will be assigned on a regular basis. Homework will contain both theoretical and computational problems. Both types of problems are necessary for success in this field.

Presentations: Each student is expected to give a presentation of approximately 1/2 hour in duration. A list of potential topics will be given later in the course, and students working toward orals or dissertations on topics with some geometric content are encouraged to give presentations based on that work. **In order to get all of the presentations in, we will probably have to schedule an extra session (possibly on Dead Day) and may make use of the final exam period.**

Tentative approximate schedule

Weeks	Chapters	Topic
1-2	Weinstein	Curves/surfaces
3	1-2	Introduction, tensors, tensor fields
4	3	Riemannian metrics, examples
5	4	Connections/geodesics
6	5	Riemannian connections/geodesics
7-8	6	1st variation of length, distance
9-10	7	Curvature
11-12	8	Submanifolds, Gauss' Theorem Egr.
13	9	Gauss-Bonnet
14?	10	2nd variation of length, conjugate points
Spring 2012	11	Cartan-Hadamard, Bonnet-Myers, etc.
Spring 2012		Modern topics in Differential Geometry