Math 548 **Geometric Structures** **Spring 1996**

SUGGESTED READING

The following books are (or soon will be) on 24-hour reserve in the Math Research Library.

1. S.-S. Chern, *Complex manifolds without potential theory*, New York, Springer-Verlag, 1979. Although this is primarily a book about complex manifold theory, its appendix gives an excellent general treatment of characteristic classes of real and complex vector bundles.

2. D. S. Freed and K. K. Uhlenbeck, *Instantons and Four-Manifolds*, MSRI Publications Vol. I, New York, Springer-Verlag, 1984 An excellent early introduction to Donaldson's application of gauge theory (connections in principal fiber bundles) to 4-manifold topology.

3. M. W. Hirsch, *Differential topology*, New York, Springer-Verlag, 1976. Good treatment of the classification of vector bundles, as well as much standard material on transversality, Sard's theorem, and the Whitney approximation and embedding theorems.

4. S. Kobayashi, *Transformation groups in differential geometry*, Berlin, New York, Springer-Verlag, 1972. The main reference for the theory of G-structures.

5. S. Kobayashi and K. Nomizu, *Foundations of Differential Geometry*, New York, Interscience Publishers, 1969. This is a fairly comprehensive reference for differential geometry, with a strong emphasis on the principal bundle approach, and a thorough treatment of connections and characteristic classes. It's hard to read if you don't already have a basic understanding of the material, but it's a good reference.

6. H. B. Lawson and M.-L. Michelsohn, *Spin geometry*, Princeton, Princeton University Press, 1989. A comprehensive introduction to spin algebra, spin bundles, Dirac operators, and their applications in geometry and topology.

7. J. W. Milnor and J. D. Stasheff, *Characteristic classes*, Princeton, Princeton University Press, 1974. This is the standard reference for the topological construction of characteristic classes. It also has an appendix explaining the Chern/Weil construction (using connections).

8. M. Spivak, *A comprehensive introduction to differential geometry*, Berkeley, Publish or Perish, 1979. This is a classic. It's overly verbose, and not as complete as one might like, but many people find it a fun read. The basic theory of vector bundles is laid out in Volume 1, principal bundles and connections are treated in various ways in Volume 2, and characteristic classes are treated in Volume 5.

9. N. Steenrod, *The topology of fibre bundles*, Princeton, Princeton University Press, 1951. This was one of the first books to lay out the general topological theory of fiber bundles. It's pretty old-fashioned, but quite readable, and the concreteness of the presentation has much to recommend it.