**Algebraic Topology (Math 414b/501b), Winter 2008, Reading Material**

The following is a list of books that you might like to refer to to supplement the lectures. The first one is the course text book.

Hatcher, A, *Algebraic Topology.* This book covers everything needed for both the algebraic topology and homotopy theory courses, and is explained very well with a lot of pictures. It is published by Cambridge University Press and is freely available on the web. I recommend purchasing a hard copy as the price is reasonable. This book also explores many interesting side areas that we won't have time for in our courses.

Greenberg, M., and Harper, J., *Algebraic topology: A first course.* This is an excellent book with a pleasant, flowing style. It assumes slightly more maturity of the reader than Hatcher's book, but the result is that it is more compact. It also covers the homotopy theory needed for our course. Note that older printings of this book are well-known for their typographical errors. The thirteenth printing is a great improvement. This book has often been used for M414b.

Munkres, J., *Elements of algebraic topology.* This is a thorough introduction to homology and cohomology, from the ground up, with careful attention to all details. It doesn't cover the fundamental group or covering spaces.

Massey, W., *A basic course in algebraic topology*, Graduate Texts in Math. 127. This book is a nice introduction to topology which begins with the classification of surfaces. It is a combination of two earlier books, which were GTM volumes 56 and 70. One curious feature of this book is that it develops *cubical* singular homology rather than the traditional *simplicial* singular homology.

Rotman, J., *An introduction to algebraic topology*, GTM 119. A very nice book covering homology and cohomology in a slick way. There is a sheet of errata. (You can photocopy mine, for example.)

Fomenko, A.T., Fuchs, D.B., Gutenmacher, V.L., *Homotopic Topology.* A very interesting book with striking artwork. Covers a lot of the material in this course and Math 546a in an efficient and geometrical way. Unfortunately, it is very pricey and hard to find. The library has one copy and I can lend my copy out.

Spanier, E.H., *Algebraic topology.* This is a classic encyclopedic treatment of homology and cohomology, which goes further than any of the others books on this list. It also covers much of the material from the next course, Homotopy Theory I (Math 546a). It is an excellent reference, but doesn't give much in the way of intuition.

Whitehead, G.W., *Elements of Homotopy Theory.* Another advanced encyclopedic treatment which covers most of the material for this course and Math 546a, but which can be a little awkward and inefficient at times.

Adams, J.F., *Algebraic topology—a student's guide.* Use this gem to find out what to learn once you've finished the introductory sequence of courses, or what it is we're building a base for. It begins with a discussion of the various areas of algebraic topology, and then reprints many of the original papers. Keep in mind that it was written in the early 70's and that lots has happened since then. Excellent.

There are lots more ...