MATH 8200: ALGEBRAIC TOPOLOGY, SPRING 2011

MIKE USHER

Instructor: Mike Usher

Scheduled class meetings: TR 11-12:15 in Boyd 326. Additional meetings (for the problem sessions, and to make up for classes that I'll miss due to travel) to be arranged.

Office Hours: after class, or by appointment.

Prerequisites: Point-set topology (MATH 4200/6200 or equivalent), and some comfort with abstract algebra (at least at the level of MATH 4000/6000). We will make early and frequent use of the notions of group homomorphisms and quotients of groups, so you should be prepared for this.

Required Textbook: *Algebraic Topology* by Allen Hatcher. Cambridge University Press, 2001. ISBN 0521795400. The book can be freely downloaded from http://www.math.cornell.edu/ hatcher/AT/ATpage.html

Other possibly-useful references:

- The later parts of *Topology* by Munkres cover some of the material from the first part of this course. Munkres also has a book, *Elements of Algebraic Topology*, about (more than) the material from the second part of the course.
- *A Basic Course in Algebraic Topology* by Massey (Springer GTM 127) is a good general reference—I will probably follow this book for the classification of surfaces.
- *Homology Theory* by Vick (Springer GTM 145) is a nice source for its titular subject.
- For most parts of the course for which I don't closely follow Hatcher, I will try to write up notes and put them on my webpage. In particular I have already done this for the first couple of weeks.

Homework: The weekly homeworks form a very important part of the course. You are welcome to collaborate on the problems and to seek help from other sources, but solutions should be written up independently and reflect your own understanding of how to solve the problem.

Grading: 80% of the grade will be based on homeworks, and 20% on the final.

Topics:

- Introduction to homotopy theory, including covering spaces, the fundamental group, and van Kampen's theorem
- The classification of surfaces
- Homology theory (simplicial, singular, and cellular) and applications such as the Lefschetz fixed point theorem.

This material basically corresponds to Chapters 0-2 of Hatcher, plus classification of surfaces.

Obligatory language: As a University of Georgia student, you have agreed to abide by the Universitys academic honesty policy, A Culture of Honesty, and the Student Honor Code. All academic work must meet the standards described in A Culture of Honesty found at: www.uga.edu/honesty. Lack of knowledge of the academic honesty policy is not a reasonable explanation for a violation. Questions related to course assignments and the academic honesty policy should be directed to the instructor.

The course syllabus is a general plan for the course; deviations announced to the class by the instructor may be necessary.