Syllabus for Mathematics 738, Section 001, Spring 2017

TIME AND PLACE: 1:10pm – 2:00pm MWF LeConte 303B INSTRUCTOR: Ralph Howard OFFICE: LC 304 PHONE: 777-7471
OFFICE HOURS: TTh 3:00pm – 4:00pm and by appointment
E-MAIL: howard@math.sc.edu
TEXT: *Algebraic Topology* by Allan Hatcher.

The grades will be based on the homework, which will be assigned through out the term, and a take home final exam.

Course content: The goal of the class is to understand the basics of the fundamental of a space and its relation to the covering spaces and deck transformations. This will be used to prove some results in algebra (about subgroups of finitely presented groups) and complex analysis (Picard's Theorem). The other main topic will be homology theory with an emphasize how to compute the homology groups for concrete spaces. Homology will be used to prove basic results such as the Brouwer Fixed Point Theorem, the Borsuk Ulam Theorem, and which spheres have a non-vanishing vector field that are an important part of a graduate education in mathematics.

Learning Outcomes: Upon successful completion of this course, students should be able to:

- Compute the basic invariants of a concrete topological spaces and use them to prove theorems about the spaces.
- Understand the algebra related to homology and be able apply this to related fields such as algebraic geometry, several complex variables, and commutative algebra.