

Math 541 : The Torelli Group Spring 2014

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Class Hours : TTh 1:00–2:15

Classroom : HBH 427

Office Hours : by appointment (or just drop by if I'm around)

1 Course Description

The mapping class group of a surface plays important roles in low-dimensional topology and algebraic geometry. By definition, this is the group of homotopy classes of orientation-preserving homeomorphisms of the surface. It has an enormous literature and can be studied with a wide range of tools. This course will focus on the Torelli subgroup of the mapping class group, which is the kernel of the action of the mapping class group on the first homology group of the surface. Though this might appear to be a rather specialized topic, this group has a surprisingly rich structure. While we will touch on many things, we will emphasize connections to 3-manifold topology.

I will not assume any prior familiarity with the mapping class group. The prerequisites for this course are Math 444 (geometric topology) and Math 356 (group theory). It will also be helpful to be familiar with homology and cohomology theory as covered in Math 445, though we will not need a huge amount of this (mostly just the first homology group, though we will occasionally need more).

My plan is to write a book on the subject while teaching this course, so I will be posting draft chapters throughout the semester.