The Graduate Center of CUNY

Ph.D. Program in Mathematics

Course Syllabus

Course Title: Mapping Class Groups

Course #: MATH 87200

Time and Location: Wed. 3:00PM - 5:00PM

Instructor Name: Jason Behrstock

Contact Information: Jason.behrstock@lehman.cuny.edu

Pre-Requisites: TBA

Office Hours: TBA

Description:

Geometric group theory studies finitely generated groups by treating them as geometric objects. This course will focus on mapping class groups with two goals in mind: one is to explain some of the beautiful geometry intrinsic to these groups, and two, we use these groups as a vehicle to introduce and discuss group theoretic and geometric properties which are instructive to think about even for those whose primary interest lie in other families of groups or spaces.

We'll cover a number of topics — both classical and recent — including, in various degrees of detail:

Neilson-Thurston classification
Complex of Curves
Abelian subgroups (and their sibling, quasi-flats)
Quasi-isometric rigidity
Relations to Artin groups.
Automorphisms of free groups.

Prerequisites

No background on mapping class groups will be assumed, but students should be familiar with basic algebraic topology.

References

There will be no official text for the class, but below is a list of some relevant books and articles. Each of these touches on some aspect of what we will discuss, but contains far more than we could cover in a semester. . . nonetheless, I encourage people to look through them and see what you may find. Most of these are available online, I will try to also have them available, on hold, in the library.

Travaux de Thurston sur les Surfaces, edited by Albert Fathi, François Laudenbach, and Valentin Poenaru. Originally in French, an English translation of the original book is now available as well.

Automorphisms of Surfaces After Nielsen and Thurston, by Andrew Casson and Steve Bleiler.

A Primer on Mapping Class Groups, by Benson Farb and Dan Margalit.

Dimension and rank for mapping class groups, by Jason Behrstock and Yair Minsky