

# A Survey of Geometric Group Theory

## – List of Topics

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This document provides the list of topics in the seminar "A Survey of Geometric Group Theory" including prerequisites for each topic. When deciding on a topic please take your level of education into account and choose accordingly. The main reference is "Office Hours with a Geometric Group Theorist" edited by Matt Clay and Dan Margalit.

### **1 Quasi-Isometries (Feb 27)**

Based on Chapter 7 of the main reference. No special prerequisites necessary.

### **2 Groups Acting on Trees, Free Groups and Folding (Mar 5)**

Based on Chapters 3 and 4 of the main reference. No special prerequisites necessary, but some experience in basic group theory (free groups, free products,...) and basic topology (fundamental group) can be helpful.

### **3 The Ping-Pong Lemma and Automorphisms of Free Groups (Mar 12)**

Based on Chapters 5 and 6 of the main reference. No special prerequisites necessary, but some experience in basic topology (fundamental group) can be helpful.

### **4 Dehn Functions (Mar 19)**

Based on Chapter 8 of the main reference. This is a more advanced topic. Some background in topology is needed; some background in differential geometry and algebraic topology can be helpful.

### **5 Hyperbolic Groups (Mar 26)**

Based on Chapter 9 of the main reference. Some background in differential geometry and (algebraic) topology is helpful, but not necessary.

## **6 Ends of Groups (and Braid Groups) (Apr 2)**

Based on Chapter(s) 10 (and 18) of the main reference. No special prerequisites necessary. Some basic group theory can be helpful. Try not to overlap too much with the last talk (the later should be more advanced).

## **7 Growth of Groups (Apr 9)**

Based on Chapter 12 of the main reference. This is a more advanced topic. Some interesting combinatorial tools are introduced, but no special prerequisites are necessary.

## **8 Coxeter Groups (Apr 23)**

Based on Chapter 13 of the main reference. This is a more advanced topic. Some background in differential geometry and topology is needed. Algebraic topology is helpful, but not necessary.

## **9 Right-Angled Artin Groups (Apr 30)**

Based on Chapter 14 of the main reference. No special prerequisites necessary. This topic has a connection to the talk before.

## **10 Lamplighter Groups (May 7)**

Based on Chapter 15 of the main reference. This is a more advanced topic. Some background in group theory (presentations of groups, semidirect products, ...) is necessary.

## **11 Mapping Class Groups (May 14)**

Based on Chapter 17 of the main reference. This is a more advanced topic. A decent background in (algebraic) topology is needed.

## **12 Braids and Configuration Spaces (May 28)**

Based on Chapter 18 of the main reference. This is a more advanced topic. A decent background in (algebraic) topology is necessary. Some background in group theory can be helpful. Try not to overlap too much with the talk "Ends of Groups (and Braid Groups)" and talk more about configuration spaces and topology.