

TOPICS IN HYPERBOLIC GEOMETRY

SUBHOJOY GUPTA

OVERVIEW AND PLAN

This course shall be an introduction to hyperbolic geometry in dimensions 2 and 3, focusing on the structure, geometry and moduli spaces of hyperbolic surfaces.

The first half of the course shall deal with the hyperbolic metrics on surfaces (~ 4 weeks), and understand the degenerations of such structures in Teichmüller space and the Thurston compactification in terms of geodesic laminations (~ 3 weeks). Following that we shall discuss the classification of mapping class group elements and Kerckhoff's solution of the Nielsen realization problem using earthquakes (~ 4 weeks). The remaining time we shall discuss hyperbolic 3-manifolds, and other topics depending on interest.

REFERENCES

Books

Three-dimensional geometry and topology. Vol. 1. William Thurston, Princeton University Press, 1997.

Automorphisms of surfaces after Nielsen and Thurston. Andrew Casson and Steven Bleiler, 1988.

Outer Circles. Albert Marden, Cambridge University Press, 2007.

Selected papers

William Thurston, *Earthquakes in 2-dimensional hyperbolic geometry*, London. Math. Soc. Lec. Notes, Cambridge, 1986.

Steven Kerckhoff, *The Nielsen realization problem*, Annals of Mathematics, no. 2., 1983.