

Syllabus
MAT 6640: Hyperbolic Geometry
Fall 2023

Lecture: Mon, Wed 11:40am - 12:55pm

October 1, 2023

Instructor:

Benjamin Dozier
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Office: Malott 507
Office hours: Mon 1:10-2:10pm, Wed 4:15-5:15pm.

Prerequisites:

Strong performance in undergraduate analysis (e.g. MATH 4130 or MATH 4180) and topology/geometry (e.g. MATH 4530, MATH 4550, or MATH 4560); or permission of instructor.

Course Description:

From the Course Bulletin: “An introduction to the topology and geometry of hyperbolic manifolds. The class will begin with the geometry of hyperbolic n -space, including the upper half-space, Poincaré disc, Klein, and Lorentzian models. We will cover both synthetic and computational approaches. We will then discuss hyperbolic structures on surfaces and 3-manifolds, and the corresponding groups of isometries (i.e., Fuchsian and Kleinian groups). Additional topics may include: Geodesic and horocycle flows and their properties, counting closed geodesics and simple closed geodesics, Mostow rigidity, infinite area surfaces.”

Textbooks:

- *Introduction to Geometric Topology*, by Bruno Martelli (public domain)
- *Three-Dimensional Geometry and Topology*, by Bill Thurston and Silvio Levy (electronic version available from Cornell Libraries)

Homework: There will be several written homework assignments (likely four), which will be submitted on Canvas.

Presentations (UPDATED): Students enrolled in the course are expected to give a 30 minute presentation (30 min talk + 5 min questions) during one of the lecture slots about some topic related to the course.

Grading:

- Homework: 60%
- Presentation: 40%