

MATH 851

FALL 2014

ADVANCED TOPICS IN TOPOLOGY

TR 11:00–12:15

EMS E408

INSTRUCTOR: Fredric Ancel

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OFFICE HOURS: TR 3:30 – 4:45, and by appointment

COURSE OBJECTIVE: The goal of the course is to cover fundamental properties of hyperbolic manifolds with the aim of developing enough background to understand a proof of one of the most significant results of geometric topology: *Mostow's Rigidity Theorem*. This theorem says that for $n \geq 3$, two homotopy equivalent hyperbolic n -manifolds are isometric. The proof which is the objective of the course is not Mostow's original difficult heavily analytic argument. Instead, we follow a geometrically motivated proof discovered by Gromov and first expounded by Thurston.

PRIMARY SOURCES:

Foundations of Hyperbolic Manifolds, 2nd Edition by John. G. Ratcliffe, Springer, 2006.

Lectures on Hyperbolic Geometry by R. Benedetti and C. Petronio, Springer, 1992.

SECONDARY SOURCES:

The Geometry and Topology of Three-Manifolds by William P. Thurston, Electronic version 1.1, March 2002.

"Simplices of maximal volume in hyperbolic space, Gromov's norm, and Gromov's proof of Mostow's rigidity theorem (following Thurston)" by Hans J. Munkholm, in *Lecture Notes in Mathematics 788, Topology Symposium Siegen 1979*, U. Koschorke and W. D. Neumann, editors, Springer, 1980, pages 109-124.

SUPPORTING MATERIAL: Go my website - <https://pantherfile.uwm.edu/ancel/www/> and open the folder MATH 851 FALL 2014. PDF files of scanned handwritten lecture notes can be found in the folder LECTURE NOTES. Electronic versions of some of the sources can be found in the folder SOURCES.

HOMEWORK will be sporadically assigned, collected and graded.

LINK TO UNIVERSITY POLICIES for faculty and students:

<http://www4.uwm.edu/secu/SyllabusLinks.pdf>