

Spring 2012

MATH 70800: Topology I [17455]
M&W, 2:00pm - 3:30pm, Rm.TBA
Prof. M. Bendersky
4.5 cr.

Course Outline

I will lecture from Rotman's "An Introduction to Algebraic Topology."
Students can use the Hatcher book: <http://www.math.cornell.edu/~hatcher/AT/ATpage.html>
or Prof. Rob Thompson's notes: http://math.hunter.cuny.edu/~rthomps/topology_notes/.

CHAPTER 4

Singular Homology

Holes and Green's Theorem
Free Abelian Groups
The Singular Complex and Homology Functors
Dimension Axiom and Compact Supports
The Homotopy Axiom
The Hurewicz Theorem

CHAPTER 5

Long Exact Sequences

The Category **Comp**
Exact Homology Sequences
Reduced Homology

CHAPTER 6

Excision and Applications

Excision and Mayer–Vietoris
Homology of Spheres and Some Applications
Barycentric Subdivision and the Proof of Excision
More Applications to Euclidean Space

CHAPTER 7

Simplicial Complexes

Definitions
Simplicial Approximation
Abstract Simplicial Complexes
Simplicial Homology
Comparison with Singular Homology
Calculations
Fundamental Groups of Polyhedra
The Seifert–vanKampen Theorem

CHAPTER 8

CW Complexes

Hausdorff Quotient Spaces
Attaching Cells
Homology and Attaching Cells
CW Complexes
Cellular Homology

CHAPTER 9

Natural Transformations

Definitions and Examples
Eilenberg–Steenrod Axioms

Chain Equivalences

..... Acyclic Models
..... Lefschetz Fixed Point Theorem

..... Tensor Products

..... Universal Coefficients

..... Eilenberg–Zilber Theorem and the Künneth Formula

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