

Math 430 A Geometric Introduction to Topology

Text: *Topology Now!* by Robert Messer and Phil Straffin

Committee: Drs. J. Parish, C. Traub, A. Weyhaupt (Spring 2009)

Catalog Description:

An introduction to topological spaces and equivalence through the study of knots, links, surfaces, 3-manifolds, and other selected topics.

Prerequisite: Math 350.

Sections to be covered:

Deformations

- 1.1 Equivalence
- 1.2 Bijections
- 1.3 Continuous Functions
- 1.4 Topological Equivalence
- 1.5 Topological Invariants
- 1.6 Isotopy

Knots and Links

- 2.1 Knots, Links, and Equivalences
- 2.2 Knot Diagrams
- 2.3 Reidemeister Moves
- 2.4 Colorings
- 2.5 The Alexander Polynomial (definition and examples only)
- 2.6 Skein Relations
- 2.7 The Jones Polynomial

Surfaces

- 3.1 Definitions and Examples of Surfaces
- 3.2 Cut-and-Paste Techniques
- 3.3 The Euler Characteristic and Orientability
- 3.4 Classification of Surfaces
- 3.5 Surfaces Bounded by Knots

Three-Dimensional Manifolds

- 4.1 Examples of Three-Dimensional Manifolds
- 4.2 The Euler Characteristic
- 4.3 Gluing Polyhedral Solids

Metric and Topological Spaces

- 7.1 Metric Spaces
- 7.2 Topological Spaces
- 7.3 Connectedness
- 7.4 Compactness
- 7.5 Quotient Spaces

At the instructor's discretion, additional material from Chapter 5 (Fixed Points) or Chapter 6 (The Fundamental Group) may be included.