Hunter College of The City University of New York

MATH 340 Topology 3 hrs, 3 cr

Text: <u>Topology</u> by James R. Munkres, 2nd Edition; Prentice-Hall

Set Theory and Logic

- Fundamental Concepts
- Functions
- Relations
- The Integers and the Real Numbers
- Cartesian Products
- Finite Sets
- Countable and Uncountable Sets
- The Principle of Recursive Definition
- Well-Ordered Sets
- The Maximum Principle

Topological Spaces and Continuous Functions

- Topological Spaces
- Basis for a Topology
- The Order of Topology
- The Product Topology on X x Y
- The Subspace Topology
- Closed Sets and Limit Points
- Continuous Functions
- The Product Topology
- The Metric Topology
- The Quotient Topology

Connectedness and Compactness

- Connected Spaces
- Connected Subspaces and the Real Line
- Components and Local Connectedness
- Compact Spaces
- Compact Subspaces of the Real Line
- Limit Point Compactness
- Local Compactness

Countability and Separation Axioms

- The Countability Axioms
- The Separation Axioms
- Normal Spaces
- The Urysohn Lemma
- The Urysohn Metrization Theorem
- The Tietze Extension
- Imbedding of Manifolds

The Tychonoff Theorem

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- The Stone-Čech Compactification

The Fundamental Group

- Homotopy of Paths
- The Fundamental Group
- Covering Spaces
- The Fundamental Group of the Circle
- Retractions and Fixed Points
- The Fundamental Theorem of Algebra
- The Borsuk-Ulam Theorem
- Deformation Retracts and Homotopy Type
- The Fundamental Group of Sⁿ
- Fundamental Groups of Some Surfaces