

Syllabus

Math 01.526 - Point Set Topology

CATALOG DESCRIPTION:

Math 01.526 Point Set Topology 3 s.h.

An introduction to one of the major branches of modern mathematics covering axiomatic development of topological spaces and metric spaces, and the concepts of convergence, continuity, separation, compactness and connectedness.

OBJECTIVES:

It is the purpose of this course to introduce the student to one of the major branches of modern mathematics. As such, it is of itself worthy of his attention. In addition, several important areas of mathematics, in particular modern analysis, including elementary calculus, depend upon or are clarified by certain topological concepts. To this end the course is designed to emphasize these concepts and to advance his mathematical maturity by exposing the student to other mathematical rigor and abstraction.

CONTENT:

1. Introduction

- 1.1 Set theory
- 1.2 Indexing notation
- 1.3 Function theory

2. Topologies and Topological Spaces

- 2.1 Open and closed sets
- 2.2 Metric spaces
- 2.3 Neighborhoods
- 2.4 Bases for a topology
- 2.5 Closure, interior and boundary
- 2.6 Continuity
- 2.7 Homeomorphism
- 2.8 Separation axioms - T_0 , T_1 , T_2

3. Connectedness

- 3.1 Connectedness of \mathbb{R}
- 3.2 Applications
- 3.3 Separated sets

4. Compactness

- 4.1 Compact spaces
- 4.2 Compact subsets of \mathbb{R}
- 4.3 Heine-Borel Theorem

TEXTS:

Texts, presenting this material for a first course of general topology, such as the following may be appropriate:

*Barnsley, Michael, *FRACTALS EVERYWHERE*, Academic Press, 2nd edition

Roseman, Dennis, *ELEMENTARY TOPOLOGY*, Prentice Hall, Upper Saddle River, NJ 1999.

Buskes, G and Rooij, Aivan, *TOPOLOGICAL SPACES*, Springes, NY, NY, 1997.