Syllabus - Math 394 Fall 2009

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Office Hours: Monday 10-12, Thursday 1:30-2:30

Time: Monday, Wednesday & Friday 9:00-9:50
Room: 310 Fitzelle Hall
Text: Bert Mendelson, Introduction to Topology
3^{rd} edition, Dover

Catalog Description: Basic topics in topology, including metric spaces; continuity and limits; topological spaces; subspaces; neighborhoods; closure, interior and boundary; product spaces; quotient spaces; connectedness; local connectedness; path connectedness; compactness and the Bolzano-Weierstrass property. More advanced topics will be covered as time permits: homotopy, the fundamental group, and simply connected spaces; the fundamental theorem of algebra.

Goals: Obtain mastery of the basic concepts of topology. Develop an understanding of its role in mathematics and relation to other files, in particular through expository writing. Further develop logical and abstract reasoning and problem solving skills through through completion of homework assignments and exams.

Attributes: LA

SUNY Learning Outcome: Students will show competence in the following quantitative reasoning skills: arithmetic, algebra, geometry, data analysis, and quantitative reasoning.

Grading Policy: Your grade will be determined by the following:

- Two midterm exams, each worth 20% of your grade. Tentative dates for these are:
  - Exam 1: Friday, 9 October
  - Exam 2: Friday, 13 November
- Homework, worth a total of 25% of your grade.

- Expository paper on a special topic, worth 15% of your grade. This will be due at the end of the semester. Subjects must be chosen and approved by the instructor by Friday, 6 November.
- The final exam, cumulative and worth 20% of your grade.

Your final grade will be determined from the numerical grade x above according to the following scheme:

A	$92 \leq x \leq 100$	B^-	$82 \leq x < 80$	D^+	$67 \leq x < 70$
A^-	$90 \leq x < 92$	C^+	$77 \leq x < 80$	D	$62 \leq x < 67$
B^+	$87 \leq x < 90$	C	$72 \leq x < 77$	D^-	$60 \leq x < 62$
B	$87 \leq x < 82$	C^-	$70 \leq x < 72$	E	$0 \leq x < 60$

Course Outline: There are five chapters. The main themes of each chapter are as follows:

Chapter 1 Theory of Sets: A review of the main ideas of set theory, including operations on collections of sets, functions, and relations.

Chapter 2 Metric Spaces: A metric space is a special, well-behaved kind of topological space in which the topology arises from a "distance function", or metric. For example, the Euclidean spaces $\mathbb{R}^n$, with the usual notion of distance, are metric spaces.

Chapter 3 Topological Spaces: The theoretical core of the course. We will introduce the main concepts surrounding the notion of a topological space, including separation properties, homeomorphisms and various ways that one obtains new spaces from old ones.

Chapter 4 Connectedness: One of the main basic applications of topology are the various notions of what it means for a space to be (dis)connected. Investigation of these leads to more advanced subjects, such as homotopy theory and algebraic topology.

Chapter 5 Compactness: The other primary application of basic topology. We will revisit the notion of a quotient topology (Chapter 3) in the context of the "cut-and-paste" technique for surfaces.

Attendance: Please come to class regularly and on time. Any material missed due to an unexcused absence is the responsibility of the student.

Students missing 25% or more of class, any time from the second week of class up until the last day to withdraw from an individual course may be removed from the course by the instructor.