

**OUTLINE OF MATH 426,
INTRODUCTION TO TOPOLOGY
FIRST WINTER TERM, 2016–2017**

1. CONTACT INFORMATION

The instructor for this course is me, Ben Williams. I may be reached at tbjw@math.ubc.ca.

The course website is <http://www.math.ubc.ca/~tbjw/426/index.html>.

OFFICE HOURS:

For up-to-date information about office hours, consult the course website. Office hours may also be held by appointment.

2. MEETING TIMES

The course meets Mondays, Wednesdays and Fridays at 12pm in MATH 202. A traditional lecture format will be followed.

3. PREREQUISITES

The formal prerequisites for this course are MATH 321, a second course in real analysis, and Math 322, a first course in group theory. At a minimum, you should be comfortable with arguments regarding continuity of functions from $\mathbb{R}^n \rightarrow \mathbb{R}^m$ and about convergence of sequences. Some homework assignments will also assume knowledge of other kinds of mathematics—please let me know if some assignment requires some knowledge you do not have.

4. PURPOSE

This course feeds into Math 427/527, which is a first course in algebraic topology. You should learn the basic ideas of point-set topology, and the very beginnings of algebraic topology, namely, the theory of the fundamental group and covering spaces. I will emphasize the aspects of the theory that do not overlap with functional analysis.

5. TEXTBOOK

There is no required textbook for this course. Munkres' *Topology* is recommended (a paperback version may be purchased for under \$40, as is Hatcher's *Algebraic Topology* (free online) and for some light reading *Counterexamples in Topology* by Steen and Seebach (about \$15). Both lecture notes and supplementary materials will be made available.

6. HOMEWORK

Homework will be assigned throughout the course, at a rate of one assignment every two weeks. The first assignment will be due on Monday 16 September, in class.

7. EXAMS

There will be an in-class midterm, provisionally on Wednesday 16 October. There will be a final exam.

8. OVERALL COURSE GRADE

The overall course grade will be assigned based on homework (25%) and exams (25% for the midterm, 50% for the final).

9. LIST OF TOPICS

The following is a list of topics that will be covered.

- Topological spaces and continuous functions between them
- Induced topologies
- Separation axioms
- Sequences in metric spaces, completeness
- Connectivity properties
- Compactness properties
- Urysohn's Lemma and the Tietze Extension Theorem
- Topologies on mapping spaces
- Basic homotopy theory
- The fundamental group
- Van Kampen's Theorem
- Covering spaces

10. POLICY STATEMENT

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