

## MTH 427/527- Introduction to Topology I - Fall 2016

**Instructor:** Xingru Zhang

Office: Math 111 Phone: 645-8764 Email: xinzhang@buffalo.edu

**Lectures:** TR 9:30 am – 10:50 am in Math 250

**Office Hours:** by appointment.

**Textbook:** We will be using the lecture notes by Bernard Badzioch available on his web site:

<http://www.nsm.buffalo.edu/~badzioch/MTH427/Syllabus.html>

If you would like to use a published text as a reference, a popular and good textbook is Topology by J.R. Munkres.

**Prerequisite:** MTH 311 (Introduction to Higher Mathematics). It's better if you have taken some 400 level course in analysis or multi-variable calculus.

**Course Description and Material to Be Covered:** The subject of this course is general topology (also called point-set topology). General topology deals with the set-theoretical aspects of topology and in essence it extends the familiar notions of open subsets and continuity from the setting of Euclidean spaces to much more general spaces. Although general topology is a research area in its own right, it nowadays mostly serves as an initial preparation for learning other branches of topology and geometry, including algebraic topology and differential topology. This course is part I of a two-semester introduction to topology at the senior or first-year graduate level (Part II will cover certain aspects of algebraic topology and will be given in the spring semester of 2017 in course MTH 428/528). Topics to be addressed in the current course include metric spaces, abstract topological spaces, continuous functions and homeomorphisms, subspace, product, quotient topologies, separations axioms, connectedness and path connectedness, compactness.

**Homework,, Exams and Grading Scheme:** Homework will be assigned along lectures, and collected every two weeks. You are strongly encouraged to typeset your homework solutions using LaTeX.

There will be two midterm exams and a final cumulative exam. The two midterm exams are tentatively scheduled on Oct.4 and Nov. 8, and the final exam will be given on 12/15/2016, Thursday, 8:00 am - 11:00 am.

You final grade will be calculated by: based on the total of 100 points, the homework, the two midterm exams and the final exam will count 30%, 20%, 20%, and 30% respectively. Cutoffs for the final course letter grades are as follows:

90-100 points–*A*, 86-89 points–*A*<sub>–</sub>, 82-85 points–*B*<sub>+</sub>, 78-81 points–*B*, 74-77 points–*B*<sub>–</sub>, 70-73 points–*C*<sub>+</sub>, 66-69 points–*C*, 62-65 points–*C*<sub>–</sub>, 58-61 points–*D*<sub>+</sub>, 54-57 points–*D*, 0-53 points–*F*.

I reserve the right to modify these cutoffs if circumstances warrant.

**A note to a new graduate student:** this course is one of 6 core courses offered to first year graduate student in pure math and its final exam also serves as an evaluation exam for which a student needs to obtain at least 75 points out of total 100 points in order to pass.

**Student Learning Outcomes:** At the end of this course a student will acquire basic knowledge about general topological spaces with metric spaces and manifolds as special and important examples and closely related notions such as open subsets, closed subsets, basis and subbasis for a topology, subspaces, the closure, interior and boundary of a subspace, product spaces, quotient spaces, compactness and compactification, connectedness and path connectedness, continuous maps between topological spaces and homeomorphisms, separation axioms, metrization.

**Assessment:** Homework, Midterm Exams and Final Exam.

The list below indicates to what extent this course reflects each of the learning objectives of the undergraduate mathematics program. A description of learning objectives is available online at [http://www.math.buffalo.edu/undergraduate/undergrad\\_programs.shtml](http://www.math.buffalo.edu/undergraduate/undergrad_programs.shtml).

- **Computational Skills:** moderately
- **Analytical Skills:** moderately
- **Practical Problem Solving:** moderately
- **Research Skills:** moderately
- **Communication Skills:** moderately