MATH 342: TOPOLOGY

SPRING 2016

Place:	Library 204
Time:	MWF, 1:10–2:00P.M.
Instructor:	Kyle Ormsby (ormsbyk@reed.edu)
Office Hours:	Library 313, Mon. 11A.M.–12P.M., Wed. 2–3P.M., and by appt.
Textbook:	*Topology* by James Munkres (2nd ed.)
Website:	people.reed.edu/~ormsbyk/342/

Summary. This course will explore the subject of topology, the part of mathematics which abstracts and codifies the concepts of locality and continuity. Topics include product, subspace, quotient, and metric topologies; connectedness and compactness; and the fundamental group. We will develop the language of category theory in parallel with these concepts, allowing us to motivate definitions and draw parallels between topology and other fields of mathematics.

Texts. The course will use James Munkres's *Topology* (2nd ed.) as its primary text. Copies are available in the campus bookstore, and will additionally be on reserve in the library. This text will be supplemented by notes written by the instructor.

Participation. All of our meetings will place an emphasis on active engagement with topology. Students are expected to do assigned readings in advance of class (see the section on quizzes below), and to participate in discussions and demonstrations.

Homework. Homework is due at the start of class each Friday. Excellent solutions take many forms, but they all have the following characteristics:

- » they are written as explanations for other students in the course; in particular, they fully explain all of their reasoning and do not assume that the reader will fill in details;
- » they include a paraphrasing of the problem;
- » when graphical reasoning is called for, they include large, carefully drawn and labelled diagrams;
- » they are neatly written or typeset;[1] and
- » they use complete sentences, even when formulas or symbols are involved.

Each homework problem can earn up to **eight points**, **five** of them awarded for mathematical insight into the problem and **three** for written communication. Late assignments *will not be accepted* in any form, but your lowest homework scores will be dropped.

Quizzes and reading. We will take a five-minute entrance quiz at the start of class on (most) Mondays. *Successful completion of the quizzes will require you to have completed the reading assignment in advance of class.* The problems will be very easy if you have done the reading, and will serve as a starting point for class discussions. Your lowest quiz score will be dropped.

Date: 25.I.16.

[1] Interested students are encouraged to prepare solutions in the LaTeX document preparation system. A guide to LaTeX resources is available on the course website.

Presentations. Each student will give a 20-minute presentation on a topic in topology at the end of the course. In addition to the presentation, students will create careful, typeset notes which will be distributed to their peers (and the instructor). Topics will be selected in consultation with the instructor, and students will give a practice talk to the instructor before presenting to the class. A short topic proposal must be submitted by Monday, March 28 and presentation times will be assigned during the final two weeks of class.

Tests. We will have one in-class midterm, one take-home midterm, and a take-home final. All exams are open book, open notes, open instructor. You may *not* collaborate with your classmates or other individuals on the exam problems. The final presentation of your solutions must be your own and must be properly cited.

- » Friday, February 19: in-class exam.
- » Friday, April 1: take-home exam due (distributed on March 28).
- » Friday, May 6: take-home final due (distributed on April 29).

Technology. The use of electronic devices (cell phones, computers, tablets, calculators, *&c*) is strictly prohibited in the classroom without prior authorization from the instructor. That said, legitimate uses of technology (*e.g.*, note-taking) will be accommodated — just talk to me first.

Grades. Your exams, homework, quizzes, presentation (including handout), and class participation will be taken into account in the determination of your final grade.

Remember: *Math is hard, but we're going to get through this together.*