

Topology 250 A
Fall 2018

Instructor: Jesse Wolfson
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Office: Rowland Hall 410H
Office hours: Monday, Wednesday 1-2 pm

You may also send an email to set up additional meetings.

Class Time and Location: MW 2:00-3:20, RH 440R
Course Webpage: <https://eee.uci.edu/18f/45095>

Overview and goals: Math 250 is a yearlong sequence covering the core methods and phenomena investigated by algebraic topology. This is by no means a comprehensive syllabus in topology, but rather a starting point and a foundation for future inquiry. Our goal is to provide students with this foundation, through an inquiry based learning environment that asks the students to be the primary presenters of material, asks audience members to engage actively with questions, and asks the class to collectively discuss and compute many examples. Throughout, I will try to link topics to highlights of the research tradition and areas of active current research.

Course Resource: Our primary reference this fall will be a series of handwritten lecture notes from a course originally taught by Kevin Costello at Northwestern. This will be supplemented with Part II of Munkres' *Topology* and Chapters 0 and 1 of *Algebraic Topology* by Hatcher (<https://pi.math.cornell.edu/hatcher/AT/AT.pdf>). I will also supplement this with historical surveys and more advanced reading to try to link topics covered in class to highlights of 20th century (and more recent) research.

Grading:

Presentations	50%
Audience participation	50%

Special Dates:

Thanksgiving break	Thursday and Friday, Nov 28 and 29
Last Day of Classes	Friday, Dec 6

Participation/Structure of Class:

This class will follow an "Inquiry Based Learning" (IBL) style rather than a typical lecture format: students, rather than the professor, will take turns presenting material at the board, while students in the audience ask questions and/or flag points that they would like to better understand. The goal and practice of an IBL classroom is for students to make the material (and the classroom) their own. The role of the professor is to sit back, speaking up only to amplify and paraphrase important questions and comments, or when needed to help moderate the discussion.

Absences:

The structure of this class depends fundamentally on participation in the classroom. As such, we need students (and faculty) to be present for each class. I realize that life can be unpredictable, so you may miss one class per quarter, no questions asked. You must notify me at least the night before class you need to use your planned absence.

Outline (timeline and topics subject to adjustment as needed):

- Week 1: Topological spaces and continuous maps
- Weeks 2,3: Building new spaces from old
- Week 4: Group actions and covering spaces
- Week 5: Paths and path lifting
- Week 6: Universal Covers, Homotopy, Computing the Fundamental Group
- Week 7: Homotopies and covers
- Week 8: Universal covers and the Galois correspondence for covering spaces
- Week 9: Van Kampen's Theorem, statement and applications
- Week 10: Proof of Van Kampen's Theorem

The policies outlined above are subject to reasonable change at instructors' discretion. In the event of a change, written or verbal notice will be given.