

Math 211 - Algebraic Topology
Fall 2018
Lectures: TuTh, 9:50 - 11:25 AM, McHenry 1279

Dan Cristofaro-Gardiner

Instructor Information:

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Office Hours:
Tu 8:45-9:45, 11:30-12:30, Th 8:45-9:45, McHenry 4174

Course Description:

This is a one quarter, graduate-level course on Algebraic Topology. This is a beautiful topic, and I hope you will enjoy it. The main goals of the course will be to cover the basics of homotopy theory and characteristic classes. If time permits, I hope to talk a little bit about some generalized cohomology theories, including K-theory and cobordism, and to try to give a unifying perspective on all of this through the language of spectra.

Prerequisites:

This is meant to be the final course in the Math 208 - 211 sequence. In principle, you need not have taken all of the previous courses in this sequence. However, it is essential that you have a good working knowledge of concepts like the fundamental group, homology/cohomology, the definition of a topological space, and the definition of a manifold. If you are at all worried that you do not have the prerequisites for the class, I urge you to contact me as soon as possible and we can set up a time to meet and discuss.

Textbook:

There are two textbooks for this class. They are both available for free online.

For the material about homotopy theory, we will be using Chapter 4 of Hatcher's *Algebraic Topology*, available at: <https://pi.math.cornell.edu/~hatcher/AT/AT.pdf>. For the material on characteristic classes, we will be using *Characteristic Classes* by Milnor and Stasheff, available at: <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.448.869&rep=rep1&type=pdf>.

Email and Website:

There is a website for this course, at <https://dancg.sites.ucsc.edu/teaching/math-211-algebraic-topology/>. I will periodically post short lecture summaries there. I might also post clarifying notes from time to time; for example, if many students ask me a similar question, I will post a response.

You are encouraged to email me with any questions that you might have. I will try to respond to all emails with 48 hours.

Grading:

You will have to write a short paper for this class. (I can help you find a topic.) Then, you will have to write a referee report for a classmate's paper, and revise your paper according to the suggestions of your referee. I will be grading your final paper and your referee report.

Advice for you:

To get the most out of this course, I highly suggest that you do some of the exercises in both of the textbooks. I will provide suggestions of good problems to do throughout the course.

Structure of the course:

Roughly speaking, the first part of the course will be about homotopy theory, and the second part will be about characteristic classes; any additional topics will be woven in as appropriate, if we have time.

A note on flexibility:

As this is a small graduate course, we have some flexibility to tailor the lectures to student needs. If there is something you would like to hear about, please let me know!