

Math 201a Spring 2017: Homological Algebra
MWF 2-2:50, 7218 AP&M
Professor D. Rogalski

1. COURSE WEBSITE

<http://www.math.ucsd.edu/~drogalsk/201.html>

2. COURSE TOPICS

This course will be an introduction to homological algebra. This material is important for students studying many subjects, of course topology, but also algebra, algebraic geometry, and number theory. Many students end up learning just the bits they need from this subject on their own, but I think a more detailed introduction to the subject could be useful for many. The prerequisite is Math 200a-c, though Math 200a-b will suffice with permission of the instructor. In particular, I will assume some familiarity with tensor products.

The topics covered will include at least the following: abelian categories, derived functors, tor and ext, homological dimensions. I also hope to say something about spectral sequences. Please let me know if there is a particular topic you are interested in.

3. TEXTBOOKS

I will not follow any one text, but most of the material can be found in both of the following two books:

Weibel, An introduction to homological algebra;
Rotman, An introduction to homological algebra (2nd edition).

There are lots of other decent books which cover the basics. Rotman's book is available on our library website free as an e-book. Rotman is also the more elementary book of the two but is less well-written (beware of typos). Weibel is now the standard reference for the subject, but it can be a bit dense. I will try to give references to the books when appropriate.

4. COURSE MECHANICS

I will post homework sets on the course website approximately every two weeks. It is important to work through as many of the problems as you can. Rather than have homework handed in, we will reserve part of every other Friday for the participants to present to the class their solutions to some homework problems they found interesting. Everyone should plan to do this a few times a quarter. Fairly regular attendance is also expected. There will be no midterms or final exams. I will also post brief lecture summaries on the website.

5. OFFICE HOURS

I will not have formal office hours specifically for this course, as I have found office hour attendance for a topics course is low enough that it does not warrant my setting aside a particular time each week. If I am in my office, feel free to stop in if you have a question. Or see me after class or send me an e-mail message to set up an appointment.