

# MAT 732, Homological Algebra, Spring 2017

**Professor:** Claudia Miller, Carnegie 300A, 443-1493, clamille@syr.edu

**Web Page:** <http://clamille.mysite.syr.edu/732.html> (not Blackboard)

**Office Hours:** tba

**Text:** Your notes from lecture will be the main source. They can be supplemented by:

- Rotman, *An Introduction to Homological Algebra*, 2nd edition
- Weibel, *An Introduction to Homological Algebra*
- Gelfand and Manin, *Methods of Homological Algebra*

The third is on reserve in the library. The first two are available online – click on hyperlink above or search library site. There are many other classic homological algebra books too.

**Prerequisites:** MAT 631, 632, 731

**Course Topics:** We intend to cover at least the following topics, time permitting:

1. Mini review of homological topics from MAT 731
2. Flatness
3. Chain complexes, homology and homotopy
4. Projective and injective resolutions
5. Derived functors
6. Tor and Ext
7. Bicomplexes (aka double complexes), mapping cones
8. Basic category theory
9. Limits and colimits
10. Derived categories
11. Triangulated categories
12. Spectral sequences

Knowledge of modern homological algebra is essential in many fields.

**Final:** There will be no final exam, but we may use the time to make up the required hours.

**Homework and Grades:** Your grade will be based on the regular homework sets.

They will be due in two stages:

1. On Mondays, serious attempts/drafts will be due. These should be done independently. I will check them right away so that you can have them back.
2. On Wednesdays, final versions will be due. For these you can work together.
3. At any stage, you are welcome to come to me for help!

You must write up the homework problems in your own words and not copy each other or a common source. You may read other sources. *However, you may not look up answers to problems in books or on the internet as this will be considered cheating.* If you cannot do a problem, then don't turn in an answer.

**Students with disabilities:** If you believe that you need accommodations for a disability, please contact the [Office of Disability Services \(ODS\)](#), located in Room 309 of 804 University Avenue, or call (315) 443-4498 for an appointment to discuss your needs and the process for requesting accommodations. ODS is responsible for coordinating disability-related accommodations and will issue students with documented Disabilities Accommodation Authorization Letters, as appropriate. Since accommodations may require early planning and generally are not provided retroactively, please contact ODS as soon as possible.

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