

Professor: Claudia Miller

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Office Hours:

Monday 3:45-5 pm
Wednesday 3:45-5 pm
Friday 1-2 pm
and by appointment

Web Page: <http://clamille.mysite.syr.edu/830.html>

Text: There is no required text. Some references will be provided.

Topics: The course is a continuation of homological algebra MAT 732. The plan is to discuss some fundamental (co)homology theories appearing in the algebraic realm (and in the algebro-geometric, complex analytic, topological realms). For most of these, some basic theory needs to be discussed first. Some possible topics are (in no particular order):

- Koszul complexes and Koszul homology, the Cech complex
- differential graded algebras and resolutions
- simplicial methods and possibly Andre-Quillen homology
- Kahler differentials, relation to singularities, and possibly de Rham cohomology
- Hochschild homology and the bar resolution
- sheaves (topological or algebro-geometric), bundles, and sheaf cohomology
- stable/Tate homology

Clearly this is far too much material, so only a proper subset can be covered.

Prerequisites: The class will modulate between the simple beginnings of and the more complex aspects of the topics. I expect students with completely mixed backgrounds. In particular, if you have not had algebraic geometry or topology, you are still welcome in the class. Each topic will have an extended basic portion, understandable to all who have had MAT 732, and then ramp up to an advanced part that is aimed at the more senior students. Hopefully, this class will give you an introduction to various fundamental theories that appear again and again in many connected fields.

Work: Approximately every 2 to 3 weeks, when I have covered a reasonable set of material, we will have a “problem session class”. You should come to class having read the notes from those weeks, and we will spend the class in two ways: (1) reviewing the main definitions and results (you will put them on the board) and (2) working on some examples or problems that I provide to help the material make more sense and sink in better! Your grade will be based on your active participation in this activity.

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.

Religious Observances Policy: SU religious observances policy recognizes the diversity of faiths represented among the campus community and protects the rights of students, faculty, and staff to observe religious holidays according to their tradition. Under the policy, students are provided an opportunity to make up any examination, study, or work requirements that may be missed due to are religious observance provided they notify their instructors before the end of the second week of classes. An online notification process is available through MySlice (Student Services — Enrollment — My Religious Observances) from the first day of class until the end of the second week of class.

Academic Integrity: The Syracuse University Academic Integrity Policy holds students accountable for the integrity of the work they submit. Students should be familiar with the Policy and know that it is their responsibility to learn about instructor and general academic expectations with regard to proper citation of sources in written work. The University policy also governs the integrity of work submitted in exams and assignments as well as the veracity of signatures on attendance sheets and other verifications of participation in class activities. Serious sanctions can result from academic dishonesty of any sort. For more information and the complete policy, see <http://academicintegrity.syr.edu>.