Math 915: Homological Algebra

Syllabus and Policies

Instructor: Tom Marley

Dates, times and location: MWF 11:30 -12:20 in AvH 111

Prerequisites: The official prerequisites for this course are Math 817 and 818. Essentially, you should have a basic knowledge of rings and modules. If you know some commutative algebra, that will be helpful but not required.

Topics: Here is a (not necessarily complete) list of topics which will be covered in this course:

- Basic category theory (e.g., <<R-mod>>)
- Complexes, homology, mapping cones, and the snake lemma
- Hom and tensor products
- Projective, injective, and flat modules
- Resolutions and comparison theorems, homotopy
- Derived functors (e.g., Ext, Tor, local cohomology)
- Spectral sequences
- Applications to commutative algebra

Text: There is no required textbook for the course. We will use Eloísa Grifo's course notes (posted on the course webpage) as our standard reference. Additional references are Weibel's *Homological Algebra* and Rotman's *An Introduction to Homological Algebra*.

Assessment: There will be regular homework sets on which you are allowed to collaborate (but you should write up your own solutions in your words). There will also be two take-home exams (a midterm and a final) on which no collaboration is allowed.