Course Announcement:

Homological Algebra
Spring Semester 2019-20

Catalog Number: 201.2.2091
Time: Wednesday 12:00 – 14:00
Place: Building 58 room 201
First meeting: 11 March 2020
Teaching Language: English

Description: This is a graduate level course. Undergraduate students can register with my permission.

The prerequisite course is "Commutative Algebra" that I gave in the fall semester (or an equivalent course). We will need the following topics from that course: categories and functors; additive and exact functors; free modules; products and coproducts; tensor products of modules and rings.

The pace of the course, and the amount of material covered, will be determined by the background and capability of the audience. There will be many examples and exercises. I will upload typed notes after every lecture.

Course Grade: pass/fail grade. Passing the course requires attending all lectures and submitting most of the homework.

Homework: To be assigned every week. Checking will be sporadic.

See the first day handout for more administrative information.
Course Topics:

1. Adjoint functors.
3. Projective and Injective modules.
5. Homotopies and homotopy equivalences.
6. The long exact cohomology sequence.
7. Projective, flat and injective resolutions.
8. Left and right derived functors.
9. Applications of derived functors to commutative algebra.
10. Further applications of derived functors and cohomology.

Bibliography:

7. Course notes, to be uploaded every week to the [course web page](#).