SYLLABUS – MATH 7830

CHARACTERISTIC $P > 0$ COMMUTATIVE ALGEBRA

Description: We will learn about characteristic $p > 0$ commutative algebra. Particularly we will focus on measuring singularities. Topics will include Kunz's theorem, Frobenius splittings, Hilbert-Kunz multiplicity and F-signature, test ideals and applications. We will also explore some of these things in Macaulay2.

- **Time:** Monday, Wednesday, Friday 9:40 – 10:30am
- **Location:** LCB 323
- **Instructor:** Karl Schwede
- **Contact information:**
  - email: schwede@math.utah.edu
  - office: JWB 323
  - website: `http://www.math.utah.edu/~schwede/math7830`
- **Office hours:** TBD
- **Textbooks:**

  I will be providing notes. Some supplementary commutative algebra can be found for example in:
  - *Introduction to Commutative Algebra* by Atiyah and MacDonald.
  - *Commutative Ring Theory* by Matsumura.

  Some supplementary homological algebra can be found in
  - *An introduction the homological algebra* by Weibel.

Grade: Your grade will be determined by the following formula.

75% Homework and computer assignments (due about once every two weeks – not every problem will be graded).

25% Oral final or presentation.

Students are allowed, and even encouraged to work together when solving homework problems (although each student is responsible for their own write-up). LaTeX use is encouraged.

Prerequisites: Students should know the material described on the 6310-6320 qual syllabus. Some basic algebraic geometry and slightly more advanced commutative and homological algebra will sometimes be helpful but not required.

Academic Integrity: All University of Utah policies regarding ethics and honorable behavior apply to this course.

Disabilities: The Americans with Disabilities Act requires that reasonable accommodations be provided to qualified individuals. To discuss any such accommodations, please contact me as well as the Center for Disability Services, (801) 581-5020, at the beginning of the semester.