

## Topics in Algebra: Math 600D:201

In this course, we plan to cover some parts of Commutative Algebra that are used in Algebraic Number Theory and Algebraic Geometry. Some of these topics will include Integral closure, Dedekind domains and Discrete valuation rings. We will then cover some ground from Homological Algebra, primarily leading to the concept of homological dimension of Noetherian rings. This will be used to state the Auslander-Buchsbaum theorem on regular local rings and provide an overview of key steps in the proof.

The aim is to make the course as self-contained as possible. Students are definitely expected to be familiar with the material covered in Algebra I (Course no. 501). Some exposure to Homological Algebra will be helpful, though not strictly necessary. Grades will be based on class participation, engagement, exercises and lectures. The participants are expected to give one or two lectures along the course.

There is no prescribed text book. The following books will be helpful for the students:

- *Introduction to Commutative Algebra*, M. Atiyah and I.G. Macdonald, Addison-Wesley Publishing Company.
- *Commutative Algebra*, H. Matsumura.