Math 518-1, Commutative Algebra
Instructor: TBA

Commutative algebra is the foundation stone of modern algebraic geometry and this course should be viewed as a preparatory course for the Algebraic Geometry course (Math 536A/B) which is offered in the fall of every even numbered year. The course is designed with this purpose in mind. We will begin with the notion of localization of rings, notions of free, projective, injective modules, flat modules and move on to discuss prime and primary ideals and the primary decomposition theorem. After this we will introduce depth and dimension and prove the dimension theorem and introduce and study properties of local rings in some detail.
The course will lead up to the characterization of regular local rings. This theorem, roughly speaking, lays the groundwork for the algebra-geometric analogue of the notion of smoothness.
If time permits we will study the notion of Cohen-Macaulay and Gorenstein rings and some of their characterizations.