Topics in Algebra I
Math 80210
Fall 2014

TIME AND PLACE (LECTURES): MWF 11:30 AM-12:20 PM, Hayes Healy Center 125

INSTRUCTOR: **Claudia Polini**

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OFFICE HOURS: M 1:00 PM-1:50 PM in Hurley 272 or drop in any time

OFFICE: Hurley 272

Information

This course will cover topics in commutative algebra centered around local cohomology. I will be assuming knowledge of a first course in commutative algebra, as in the book of Atiyah-MacDonald. Topics to be covered include the study of injective modules over Noetherian rings, Matlis duality (over a complete local ring, the category of modules with ACC is anti-equivalent to the category of modules with DCC), the notion of depth, Cohen-Macaulay and Gorenstein rings, canonical modules and local duality, The Hartshorne-Lichtenbaum vanishing theorem, and the application of D-modules to study local cohomology of regular rings. We will also discuss several open questions in local cohomology. Hartshorne will give two guest lectures in November. There is no book required for the course.

Students will be required to present material in class. There will probably be several sets of homework. The homework sets will be discussed in class. Students will be asked to present the solution of the homework to the class.