

Math 205 (Fall 2013) – The cohomology of global fields

Professor: Cristian D. Popescu

Schedule: MW 4:00-5:20PM, in AP&M 7421.

Brief description: This is a continuation of my Math 205 – Spring 2013 course, in which I discussed local and global fields from a valuation theoretic and topological point of view. This Fall, I will start by discussing the rings of adèles and groups of idèles associated to a global field, followed by idèlic (topological) proofs of various classical theorems in number theory such as Dirichlet’s unit theorem, the finiteness (or compactness) of ideal class groups (or more general Arakelov class groups) etc. In the second part of this course, after a brief introduction to group cohomology, I will discuss the cohomology of various objects naturally arising in both the local and global field contexts (e.g. groups of units, idèle class groups etc.) My main goal will be to discuss the cohomological statements (with or without proof, depending on time availability) of the local and global reciprocity laws, due to Hasse and Artin, respectively.

Background requirements: Math 205 - Spring 2013.

Bibliography: I will not follow a text. However, I strongly recommend “*Algebraic Number Theory*” by Cassels and Fröhlich; “*Algebraic Number Theory*” by Neukirch; “*The Cohomology of Number Fields*” by Neukirch, Schmidt and Wingberg.