G6675: Cohomology of arithmetic groups and automorphic forms

Instructor: Eric Urban
Meeting time: TR 9:10-10:25 in Math. 507

Fall 2008

Frist Lecture: Tuesday, September 16 in Math 507.

Topic: The main purpose of this course is to describe the cohomology of arithmetic groups in terms of automorphic forms. The fact that cohomology of arithmetic groups can be expressed in terms of automorphic forms is fundamental in number theory since it enables us to give a rational and arithmetic structure to the space of automorphic forms and therefore to study congruences between them. We will start by giving a review of some cohomology theories and present the main results due to the work of many mathematicians starting by those of Eichler-Shimura, Borel-Wallach, Harder, Schwermer etc ... and culminating with those of Franke. Our main reference is going to be the book by Borel and Wallach [BW] and the paper by Franke [F]. When necessary we will give some reviews on some basic notions on cohomology or on automorphic forms according to the audience needs.

Bibliography:

[BW] Borel, A.; Wallach, N. *Continuous cohomology, discrete subgroups, and representations of reductive groups*, Second edition. Mathematical Surveys and Monographs, 67. American Mathematical Society, Providence, RI, 2000. xviii+260 pp.

[F] Franke, J. *Harmonic analysis in weighted L_2-spaces*, Ann. Sci. cole Norm. Sup. (4) 31 (1998), no. 2, 181–279.

[LS] Li, J.-S.; Schwermer, J. *On the Eisenstein cohomology of arithmetic groups*, Duke Math. J. 123 (2004), no. 1, 141–169.