

Math 600: Representation Theory of $GL(2, \mathbb{Q}_p)$

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Text: R. Godement's notes (will be distributed) and Chapter 4 of Bump's book.

Related course: The topics course by Prof. Vatsal (Math 538) will be somewhat coordinated with this course. I expect that this course would be independent, but probably, a co-requisite, to Math 538.

Prerequisites: None really, though some exposure to any of: harmonic analysis, algebraic groups, representation theory, or algebraic number theory would be helpful.

We will start with a very brief introduction to p -adic fields, Haar measure, and character theory for them. Then we will move on to harmonic analysis on the group GL_2 of a p -adic field; more specifically, the main focus of the course will be the representation theory of $GL(2, \mathbb{Q}_p)$, but we will discuss it with a view towards Langlands correspondence for GL_2 .

In particular, we will talk about the principal series representations, discuss the tempered and unitary representations, and the discrete series. Other topics include supercuspidal representations; spherical representations, Hecke algebra, the Satake isomorphism, and intertwining operators.

Then we will define local L -factors, and discuss Jacquet-Langlands correspondence.