p-ADIC GALOIS REPRESENTATIONS COURSE

$_{\rm JB}$

Contents

1.	An overview of what we are going to do	3
Part	1. Basic notions and first examples	3
2.	Galois groups	3
3.	Reminder on representation theory	7
4.	Artin representations	9
5.	The cyclotomic character	11
Part	2. Galois representations coming from geometry	15
6.	Galois representations associated to elliptic curves	16
7.	Irreducibility of the Tate module of an elliptic curve	19
8.	Representations coming from geometry I	21
9.	Representations coming from geometry II	26
10.	Algebraic Hecke characters	28
11.	$\ell\text{-adic}$ realizations of algebraic Hecke characters	32
12.	ℓ -adic characters come from geometry	38
Part	3. Local Galois representations I	43
13.	The ℓ -adic monodromy theorem	43
14.	The p -adic complex numbers	47
15.	Admissible representations I	52
16.	Formalism of semi-linear representations and a theorem of Serre	55
17.	Sen theory I – the cohomological descent	60
18.	Sen theory II – The functor $D_{\text{Sen}}(-)$ on \mathbf{C}_{K} -semilinear	
	representations	65
19.	Applications of Sen theory	69
Part	4. Local Galois representations II (period rings)	72
20.	Fontaine's formalism	72
21.	Hodge–Tate representations	75
22.	p-adic rings (Nov 21)	79
23.	de Rham period ring (Nov 28)	84
24.		89
25.	Final lecture	93