p-adic Hodge Theory, MATH 847 Spring 2011

Van Vleck B129 TR 11:00-12:15

Instructor: Bryden Cais

Office: 315 Van Vleck

Email: cais@math.wisc.edu

Office Hours: By appointment

Course Topics: p-adic Galois representations, theory of Hodge-Tate representations and Tate-Sen theory, étale φ-modules (for Galois groups of characteristic p fields) with p-power torsion and $\mathbf{Z}_p$-coefficients, p-adic period rings (their construction and properties) and the formalism of p-adic representations, de Rham, crystalline and semistable representations, filtered (φ, N)-modules. Others (e.g. (φ, Γ)-modules, norm fields, integral p-adic Hodge theory) as time permits.

Text: Throughout the course, we will follow the excellent "Hawaii CMI Summer School" notes of Brinon and Conrad, available here: http://math.stanford.edu/~conrad/papers/notes.pdf

We will supplement these occasionally with other notes and resources that will be linked from the course web-page.

Webpage: A course webpage will be maintained here:

http://www.math.wisc.edu/~cais/847Page/index.html

Assignments and links to other resources will be posted there.

Method of Evaluation: Assignments: 100%.

Homework: There will be regular assignments. We will have an extra, one-hour meeting once per week in which 1–2 students present the solutions to the homework exercises for that week. Each student enrolled in the course for a grade must sign up to present the homework solutions at least once. Everyone should try to do all the homework each week; collaboration is highly encouraged. If you are presenting, you are responsible for understanding all the homework exercises that week, and should accost your fellow students as need be.

References: Please see:

http://www.math.wisc.edu/~cais/847Page/references.html

Below is a tentative schedule for the semester, including homework assignments. The homework numbers refer to the problems on the homework sheet.

Tentative Schedule (Section numbers refer to Brinon-Conrad)

Day	Date	Section	Hmwk	Volunteers
Tuesday	1-18	Intro and 1.1–1.3	1–4	
Thursday	1-20	2.1–2.2		
Tuesday	1-25	2.3	5–8	
Thursday	1-27	2.4		
Tuesday	2-1	3.1	9–12	
Thursday	2-3	3.2		
Tuesday	2-8	3.3	12–16	
Thursday	2-10	4.1		
Tuesday	2-15	4.2	17–20	
Thursday	2-17	4.3–4.4		
Tuesday	2-22	5.1–5.2	21–25	
Thursday	2-24	5.2		
Tuesday	3-1	6.1–6.2	26–30	
Thursday	3-3	6.2–6.3		
Tuesday	3-8	6.3	31–33	
Thursday	3-10	Buffer		
Tuesday	3-15	Spring Break!		
Thursday	3-17	Spring Break!		
Tuesday	3-22	7.1	34–35	
Thursday	3-24	7.2		
Tuesday	3-29	7.3	36–38	
Thursday	3-31	8.1		
Tuesday	4-5	8.1	39–42	
Thursday	4-7	8.2		
Tuesday	4-12	8.3	43–46	
Thursday	4-14	9.1		
Tuesday	4-19	9.1	47–49	
Thursday	4-21	9.2		
Tuesday	4-26	9.2		
Thursday	4-28	No class/ Guest?		
Tuesday	5-3	9.3	50–51	
Thursday	5-5	Buffer		