

Tier 3 syllabus

[first name] [middle name or initial]* [last name]

July 24, 2019

Committee:

[name] (Major/Chair)

[name] (Major)

[name] (Minor)

1 Major: Number Theory

1.1 Local Fields and Local Class Field Theory

(i) Local Fields [11]

(ii) Wedderburn theory [6]

(iii) The Brauer group of a local field [6]

(iv) Local Class Field Theory [11]

1.2 p -adic groups

(i) The analytic theory [8]

(ii) Uniform pro- p groups [4]

*optional

1.3 Rigid Geometry

- (i) Affinoid algebras and their associated spectra of maximal ideals [1, 5]
- (ii) Formal schemes and Raynaud's functor [1]

1.4 p -adic representation theory

- (i) Smooth representations [3]
- (ii) Locally analytic representations [9, 10]
- (iii) Some principles of p -adic Langlands correspondences [2]
- (iv) Category \mathcal{O} and locally analytic representations [7]

2 Minor: Probability Theory

2.1 Markov Chains

- (i)
- (ii)
- (iii)

2.2 Random Walks

- (i)
- (ii)
- (iii)

References

- [1] Siegfried Bosch. *Lectures on formal and rigid geometry*, volume 2105 of *Lecture Notes in Mathematics*. Springer, Cham, 2014.
- [2] C. Breuil and P. Schneider. First steps towards p -adic Langlands functoriality. *J. Reine Angew. Math.*, 610:149–180, 2007.
- [3] M. Casselman. Introduction to the theory of admissible representations of p -adic reductive groups. Preprint. Available at: <https://www.math.ubc.ca/~cass/research/pdf/p-adic-book.pdf>.
- [4] J. D. Dixon, M. P. F. du Sautoy, A. Mann, and D. Segal. *Analytic pro- p -groups*, volume 157 of *London Mathematical Society Lecture Note Series*. Cambridge University Press, Cambridge, 1991.
- [5] Jean Fresnel and Marius van der Put. *Rigid analytic geometry and its applications*, volume 218 of *Progress in Mathematics*. Birkhäuser Boston, Inc., Boston, MA, 2004.
- [6] Falko Lorenz. *Algebra. Vol. II*. Universitext. Springer, New York, 2008. Fields with structure, algebras and advanced topics, Translated from the German by Silvio Levy, With the collaboration of Levy.
- [7] S. Orlik and M. Strauch. On Jordan-Hölder series of some locally analytic representations. Preprint. Available at: <https://arxiv.org/abs/1001.0323>.
- [8] Peter Schneider. *p -adic Lie groups*, volume 344 of *Grundlehren der Mathematischen Wissenschaften [Fundamental Principles of Mathematical Sciences]*. Springer, Heidelberg, 2011.
- [9] Peter Schneider and Jeremy Teitelbaum. Locally analytic distributions and p -adic representation theory, with applications to GL_2 . *J. Amer. Math. Soc.*, 15(2):443–468, 2002.
- [10] Peter Schneider and Jeremy Teitelbaum. Algebras of p -adic distributions and admissible representations. *Invent. Math.*, 153(1):145–196, 2003.
- [11] Jean-Pierre Serre. *Local fields*, volume 67 of *Graduate Texts in Mathematics*. Springer-Verlag, New York-Berlin, 1979. Translated from the French by Marvin Jay Greenberg.

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