Specialization in Mathematical Logic

- 5 professors in mathematical logic, offering a variety of courses / student seminars.

- For the Specialization Module in Mathematical Logic, one needs to attend two lecture courses (Logic III and Logic IV), with an exam about the content of Logic III.

Regularly, courses in the following areas are offered:

- **Axiomatic Set Theory**: large cardinals, forcing, inner models, infinite combinatorics... ⤳ Prof Ralf Schindler

- **Deskriptive Set Theory**: automorphism groups, Polish groups, topological dynamics... ⤳ Prof Aleksandra Kwiatkowska

- **Model Theory**: stability theory, model theory of groups and (valued) fields... ⤳ Prof Martin Hils, Prof Franziska Jahnke (from 09/2024), Prof Katrin Tent

- **Geometric Group Theory**: Prof Katrin Tent regularly offers lecture courses on geometric group theory, and on its connections to model theory.

Lectures in the Specialization in Logic in the winter term 2024-25

- **Model Theory** (Prof Katrin Tent)

  (as Logic III in the Specialization or as Logic II in the Broadening Module)

  We introduce first-order logic and the fundamental notions of stability, in particular Morley's theorem about the number of models.

- **Descriptive Set Theory** (Prof Aleksandra Kwiatkowska)

  (as Logic III in the Specialization or as Logic II in the Broadening Module)

  Deskriptive Set Theory; Polish spaces and Polish groups; Cantor and Lusin schemes; Kuratowski-Ulam Theorem; Mycielski Theorem; Borel sets and Borel hierarchy; Analytic and coanalytic sets; Infinite games; Uniformization theorems

- **Model Theory of Pseudofinite Fields** (Prof Martin Hils)

  (as Logic IV in the Specialization Module)

  In the course, we will give an introduction to the model theory of fields, presenting Ax's foundational results on the infinite models of the theory of all finite fields - these so-called pseudofinite fields allow for an elegant axiomatization. We will then study various aspects of the model theory of pseudofinite fields and in particular see the construction of the Chatzidakis-van den Dries-Macintyre measure for definable sets in pseudofinite fields.