Syllabus: Selected chapters combinatorics 1 (2023–2024)

October 6, 2023

1. Introduction: Pigeonhole, Ramsey theorem (finite and infinite), compactness
2. Frank Ramsey, applications of Ramsey theorem
3. Van der Waerden theorem, Hales–Jewett theorem
4. Generalized infinitary Hales–Jewett theorem and the method of combinatorial forcing.
5. Dual Ramsey theorem
6. Carlson–Simpson theorem
7. Milliken tree theorem (for regularly branching trees)
8. Colouring the order of rationals: Sierpiński colouring, tree of types
9. Big ramsey degrees of rationals (Devlin's theorems)
10. Rado graph and its big Ramsey degrees
11. Structural Ramsey theory (Fraïssé theorem, Nešetřil–Rödl theorem)
12. Big Ramsey degree of universal triangle-free graphs
13. Partite construction