

Syllabus Real Analysis 2013/14

The textbook used was Folland, Real Analysis, but any of the other standard books on the subject (Bass, Royden, Rudin etc. etc.) will cover much of the same material. The section numbers below refer to the 2nd edition of Folland.

1. basic properties and construction of measures, outer measures, Caratheodory's theorem, Borel measures on \mathbb{R} (1.1–1.5)
2. definition and basic properties of the integral, convergence theorems, Egoroff's theorem (2.1–2.4)
3. product measure, Fubini-Tonelli (2.5)
4. signed and complex measures, absolute continuity and mutual singularity of measures, Radon-Nikodym theorem (3.1–3.3)
5. differentiation on \mathbb{R}^n , Hardy-Littlewood maximal function, Lebesgue's differentiation theorem, absolutely continuous and bounded variation functions (3.4, 3.5)
6. basic properties of L^p spaces, distribution functions, image measure (6.1, 6.3, 6.4)
7. Riesz representation theorem, Radon measures (7.1, 7.2)
8. classical analysis on \mathbb{R}^n : convolutions, Fourier transforms (8.1–8.4)
9. introduction to distributions (9.1, 9.2)