Presentation Topics

1. Radon-Nikodym Theorem [Bass, Ch. 13]; 1 unit.

2. Key Lemma + corollary on Hausdorff dimension [Lecture notes; hints in Falconer, p.7]; 1 unit.

3. A set $X \subset \mathbb{R}^n$ is Hausdorff measurable iff X is contained in a G_δ-set G with $G \setminus X$ of measure 0 iff X contains an F_σ-set F with $X \setminus F$ of measure 0 [cf. Falconer, Thm. 1.6]; 1 unit.

4. Vitali Covering Theorem [Falconer, Thm. 1.10]; 1 unit.

5. In $\mathbb{R}^n$, the n-dimensional Hausdorff measure coincides with Lebesgue measure [Falconer, Thm. 1.12]; 1 unit.

NB. Each unit should be presented by one student, and should take between 20 and 30 minutes.

References:

1. R. F. Bass, *Real analysis for graduate students*, online, 2016.

2. K. J. Falconer, *The geometry of fractal sets*, Cambridge University Press, 1985.