

### Presentation Topics

1. Radon-Nikodym Theorem [Bass, Ch. 13].
2. Hausdorff outer measure (of any dimension) is a metric outer measure & 0-dimensional Hausdorff measure is the counting measure [hints in Falconer, p.7].
3. Key Lemma + corollary on Hausdorff dimension [Lecture notes; hints in Falconer, p.7].
4. A set  $X \subset \mathbb{R}^n$  is Hausdorff measurable iff  $X$  is contained in a  $G_\delta$ -set  $G$  with  $G \setminus X$  of measure 0 iff  $X$  contains an  $F_\sigma$ -set  $F$  with  $X \setminus F$  of measure 0 [cf. Falconer, Thm. 1.6].
5. Vitali Covering Theorem [Falconer, Thm. 1.10].
6. In  $\mathbb{R}^n$ , the  $n$ -dimensional Hausdorff measure coincides with Lebesgue measure [Falconer, Thm. 1.12].

### 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.