

Tentative Weekly Schedule: Math 563, Analysis III

Week	Topics	Reading	Important Dates
1	Exterior measure; measurable sets	§1.1-1.3 Stein-Shakarchi	
2	Measurable functions	§1.4 Stein-Shakarchi	
3	Integration of measurable functions; Convergence of integrals	§2.1-2.2 Stein-Shakarchi	
4	Abstract measure spaces	§6.1-6.2 Stein-Shakarchi	
5	Product measures; Lebesgue-Stieltjes integrals	§6.3 Stein-Shakarchi	
6	Introduction to Hilbert Spaces	§4.1-4.2, 4.4-4.5 Stein-Shakarchi	
7	Signed measures; Radon-Nikodym derivatives	§6.4 Stein-Shakarchi	
8	Differentiation of the integral	§3.1 Stein-Shakarchi	
9	BV and absolutely continuous Functions; Normed vector spaces	§3.3 St.-Shak. §5.1 Folland	
10	Linear operators & functionals; Baire category thm. & consequences	§5.2-5.3 Folland	
11	L^p spaces; Dual of L^p	§6.1-6.2 Folland	
12	Inequalities in L^p spaces	§6.3 Folland	<i>No Class 11/3</i>
13	Distribution functions and weak- L^p ; Riesz-Thorin interpolation	§6.4-6.5 Folland	
14	Compact operators	Ch.4 Schechter	
15	Fredholm alternative	Ch.4 Schechter	<i>Thanksgiving 11/26</i>
16	Spectral theory of compact operators; Sturm-Liouville theory (time permitting)	§4.6 Stein-Shakarchi	

Textbooks:

REQUIRED: Elias M. Stein and Rami Shakarchi, *Real Analysis: Measure Theory, Integration, and Hilbert Spaces*, Princeton University Press, 2005.

RECOMMENDED: Gerald Folland, *Real Analysis: Modern Techniques and Their Applications*, Second Edition, Wiley-Interscience, 1999.

OPTIONAL: Martin Schechter, *Principles of Functional Analysis*, Second Edition, American Mathematical Society, 2001.