

Schedule & Homework

Date	Topic	Reading	Assignments
Aug 30	Introduction: basic definitions and notations Null sets	1, 2.1	
Sept 1	The Cantor middle-thirds set Outer measure	2.1, 2.2	HW1 (Due Sept 8) Solutions
Sept 6	<i>no class (Labor day)</i>		
Sept 8	σ -algebras Properties of measurable sets	2.3, 2.4	HW2 (Due Sept 20) Solutions
Sept 13	Lebesgue measure & properties	2.4, 2.5, 2.7	
Sept 15	Borel sets Regularity of Lebesgue measure	2.5, 2.7	
Sept 20	Example of a non measurable set Lebesgue-measurable functions	Appendix, 3.1	HW3 (Due Sept 29) Solutions
Sept 22	Measurable functions	3.1, 3.2	
Sept 27	Properties of measurable functions & examples	3.3, 3.4, 3.6	
Sept 29	The Lebesgue integral	4.1, 4.2, 4.8	HW4 (Due Oct 6) Solutions
Oct 4	Integrable functions Modes of convergence; Egorov's Theorem	4.2, 4.3, 8.1	
Oct 6	Fatou's Lemma The Monotone Convergence Theorem	4.2, 4.8	HW5 (Due Oct 20) Solutions
Oct 11	The Dominated Convergence Theorem	4.3, 4.4	
Oct 13	Relations to the Riemann integral Applications of the convergence theorems	4.4, 4.5	
Oct 18	Approximation of measurable functions	4.6, 4.8	
Oct 20	Spaces of integrable functions: introduction	5.1	HW6 (Due Nov 3) Solutions
Oct 25	Midterm (10:00-11:20am) Covers: 1, 2.1-2.5, 2.7, 3.1-3.4, 3.6, 4.1-4.6, 4.8 -- Solutions Practice Midterm FA2014 & Solutions .		
Oct 27	The space L^1 ; completeness	5.2	
Nov 1	Inner product spaces The Hilbert space L^2	5.2, 5.5	

Nov 3	L^p spaces	5.3, 5.5	HW7 (Due Nov 10) Solutions
Nov 8	L^p spaces & examples The L^∞ space	5.3	
Nov 10	Multi-dimensional Lebesgue measure	6.1, 6.2 Video	HW8 (Due Nov 22) Solutions
Nov 15	Construction of the product measure	6.3	
Nov 17	Fubini's Theorem & applications	6.4, 6.6	
Nov 22	Abstract measure theory: absolutely continuous measures, singular measures, examples	7.1, 7.2	HW9 (Due Nov 29) Solutions
Nov 24	<i>no class (Thanksgiving)</i>		
Nov 29	The Radon-Nikodym Theorem I	7.2, 7.5	HW10 (Due Dec 8) Solutions
Dec 1	The Radon-Nikodym Theorem II	7.2, 7.3	
Dec 6	Lebesgue-Stieltjes measures & FTC	7.2	
Dec 8	Lebesgue decomposition theorem Review	7.3	
Dec 16	Final Exam (11:15am-1:45pm) -- cumulative, covers everything Practice Final FA2014 & Solutions .		