

King Fahd University of Petroleum & Minerals
Department of Mathematics and Statistics

Semester II, 2010-2011 (102)

Instructor	Dr. Nasser-eddine Tatar
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Course	Math 531
Title:	Real Analysis
Textbook	Real Analysis by H. L. Royden, Third Edition
References	1) An Introduction to Lebesgue Integration by A-Rahim Khan 2) Introduction to Real Analysis by Munroe 3) Real and Complex Analysis by W. Rudin 4) An Introduction to Integration and Measure Theory by O.A. Nielsen 5) An Introduction to Measure and Integration by I.K. Rana 6) Measure Theory and Integration by De Barra
Objective	This course is intended to give to the graduate students an exposure to the Lebesgue measure and integration theory
Material	Chapters 1 - 6, and 11 from the textbook

Office hours

	10-10:50	11-11:50	12-12:50	1-1:50			
Saturday	O		O	O			
Sunday	N	N	N	N			
Monday	O		O	O			
Tuesday	N	N	N	N			
Wednesday	O		O	O			

O: Official office hours

N: Non-official office hours

Week #	Topic	Home work
1	Elementary Set Theory	
2	The Real Numbers System	
3 & 4	Lebesgue Measure : Outer measure, Measurable sets, Measurable functions, Almost everywhere notion, Egoroff's theorem	
5	Riemann Integrals : Darboux sums, Riemann Characterization theorem, integrable functions, defects of Riemann integration	
6 & 7	The Lebesgue Integrals : Integral of bounded functions, Bounded convergence theorem Integral of nonnegative function, Fatou's lemma, Monotone Convergence Theorem, General Lebesgue Integration, Dominated convergence Theorem.	
8	Convergence in measure, Relations between different types of convergence	
9 & 10	Differentiation : Monotone functions, Bounded Variation functions, Total variation Absolute continuity	
11 - 13	The L^p Spaces : The L^p Spaces, Minkowski's inequality, Holder's inequality, Approximation and density, Bounded linear functionals, Riesz Representation theorem	
14 & 15	The Abstract Measure and Integration : Measurable spaces, measure spaces, Measurable functions, Integration, Signed measures, The Radon-Nikodym theorem	