

King Fahd University of Petroleum and Minerals
Department of Mathematics and Statistics
Math531 – Syllabus
Semester II, 2011-2012 (112)

Title: Real Analysis

Textbook: Real Analysis by H. L. Royden (Third Edition)

Instructor: Dr. Muhammad Islam Mustafa

Objective: This course is an introduction for graduate students to Lebesgue measure and Lebesgue integration.

Week #	Topic s	
1 - 3	Lebesgue Measure	Outer measure, Measurable sets, Measurable functions, Almost everywhere notion, Egoroff's theorem.
4 - 7	The Lebesgue Integral	The Riemann Integral, The Lebesgue integral of bounded functions, Bounded convergence theorem, Integral of a nonnegative function, Fatou's lemma, Monotone Convergence Theorem, General Lebesgue Integration, Dominated convergence Theorem, Convergence in measure.
8 - 10	Differentiation and Integration	Monotone functions, Functions of bounded variation, Differentiation of an integral, Absolute continuity.
11 - 13	The Classical Banach Spaces	The L^p Spaces, Minkowski's inequality, Holder's inequality, Convergence and completeness, Approximation and density, Bounded linear functional.
14 - 15	Measure and Integration	Measure spaces, Measurable functions, Integration, General convergence theorems, Signed measures, The Radon-Nikodym theorem, The L^p Spaces.