King Fahd University of Petroleum and Minerals
Department of Mathematical Sciences
SYLLABUS
Semester II, 2006-2007 (062)
(Dr. A. Lyaghfouri)

Course #:   **Math 531**
Title: Real Analysis
Textbook: Real Analysis by H. L. Royden (Third Edition)

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

Week #	Topic
1	Elementary Set Theory
2	The Real Number System
3 & 4	**Lebesgue Measure** : Outer measure, Measurable sets, Measurable functions, Almost everywhere notion, Egoroff's theorem
5	**The Riemann Integral** : Darboux sums, Riemann Characterization theorem, integrable functions, defects of Riemann integration
6 & 7	**The Lebesgue Integral** : Integral of bounded functions, Bounded convergence theorem Integral of nonnegative function, Fatou's lemma, Monotone Convergence Theorem, General Lebesgue Integration, Dominated convergence Theorem.
8	Conergence in measure, Relations between different types of convergence
9 & 10	**Differentiation** : Monotone functions, Bounded Variation functions, Total 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 in L^p, 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

- Tuesday, February 27, 2007: Last day for dropping courses without permanent record
- Tuesday, April 3, 2007: Last day for dropping courses with a grade of "W" thru Internet
- Midterm Break: 12-15 April.
- Sunday, April 29, 2007: Last day for withdrawal from all courses with grade of "W" thru Registrar Office.
- Sunday, May 27, 2007: Last day for withdrawal from all courses with grade of "WP/WF"