King Fahd University of Petroleum & Minerals
Department of Mathematics and Statistics
Course Syllabus
MATH 536 [Functional Analysis II]
Semester II---2011-2012(112)
(**Course Instructor**: *A.R. Khan*)

Textbook: E. Kreyszig, *Introductory Functional Analysis with Applications,* John Wiley & Sons, 1989.

References: i. A.L.Brown and A.Page, Elements of Functional Analysis, Von Nostrand Reinhold, 1970.

ii. C. Groetsch, *Elements of Applicable Functional Analysis,* Marcel Dekker, 1980.

iii. E.S.Suhubi, *Functional Analysis,* Kluwer Academic Publishers, 2003.

Goals: The main objective of this course is to familiarize our students with somewhat advanced concepts of functional analysis in Hilbert spaces and normed (Banach) spaces. The existence of adjoint of a bouned linear operator on a Hilbert space will be established and will be used to define certain classes of operators such as self-adjoint operators, normal operators and unitary operators. Some results about compact operators, projections and weak* convergence will be discussed in the context of a normed space. The spectral theory of some bounded linear operators on normed spaces and Hilbert spaces will be presented.

Catalogue Description: Algebra of bounded operators, self-adjoint operators in Hilbert Spaces, Normal operators, compact operators, projections, spectral theory of linear operators in normed spaces and Hilbert spaces, spectral mapping theorem, Banach-Alaoglu theorem.

Week	Date	Material
1-2	Jan 28- Feb 8	Review of basic concepts Orthonormal sets in Hilbert spaces
3	Feb 11-15	Algebra of bounded linear operators
4-5	Feb 18-29	Self –adjoint operators in Hilbert spaces Normal operators
6	Mar 3-7	Unitary operators ,Positive operators
7	Mar10-14	Weak and weak* convergence in normed spaces Banach- Alaoglu theorem
8	Mar 17-21	Projections
March 24, 2012 – March 28, 2012: Midterm Vacation		
9-10	Mar 31-Apr 11	Compact operators
11-12	Apr 14-25	Spectral theory of linear operators in Hilbert spaces
13-14	Apr 28-May 9	Spectral theory of linear operators in normed spaces
15	May12-16	Spectral mapping theorem

- KFUPM attendance policy will be enforced.
- **Evaluation Policy:** Exams I & II: 22% each; Final exam (comprehensive): 36%, Presentation & Assignments: 20%.