KING FAHD UNIVERSITY OF PETROLEUM & MINERALS
Department of Mathematics
MATH535- Functional Analysis I (212)
Course Syllabus

Instructor:
Dr. Manal Alotibi
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Office hours:
Sunday-Wednesday 11:30 am -13:00 pm (or set an appointment if needed)

Course Description:
Normed linear spaces, Banach spaces, Hilbert spaces, Banach Algebras (definitions, examples, geometric properties), bounded linear operators, convex sets, linear functionals, duality, reflexive spaces, weak topology and weak convergence, Banach fixed point theorem, Hahn-Banach theorem, uniform boundedness principle, open mapping theorem, closed graph theorem, representation of functionals on Hilbert spaces (Riesz Representation Theorem).

Textbook:
Functional Analysis, Erdogan Suhubi, Kluwer Academic Publishers, (2003)

Grading Policy:
- Exam 1: 25%
- Exam 2: 25%
- Homework and other Assignments: 20%
- Final Exam 30% (Comprehensive; Date and Location: To Be Announced)

Homework Policy:
Homework should be submitted by e-mail (pdf format) by the midnight of the due date. Each late submission will be penalized by 5%. Use the following subject line to submit your homework:

MATH 535 HOMEWORK [NUMBER] - [NAME - KFUPM STUDENT ID]
In case you do not use the above format, I might miss your submission and you might be penalized for late submission.

Week	Date	Sec.	Topic
1	Jan 17 -19	2.2	Linear Vector Space
		2.3	Subspaces
		2.4	Linear Independence and Dependence
2	Jan 24 -26	2.5	Basis and Dimension
		2.7	Linear Transformation
		2.10	Linear Functionals, Algebraic Dual
3	Jan 31- Feb 2	5.2	The Metric and Metric Topology
		5.3	Various Metric Spaces
		5.4	Topological Properties of Metric Spaces
4	Feb 7- 9	5.5	Completeness of Metric Spaces
		5.6	Contraction Mappings
		5.7	Compact Metric Spaces: The Ascoli-Arzela Theorem
5	Feb 14 -16	6.2	Normed Spaces
		6.3	Semi-Norms

6	Feb 21 - 23	6.4	Series of Vectors
7	Feb 28 – Mar 2	6.5	Bounded Linear Operators: Banach Algebra, Principle of Uniform boundedness, Open Mapping Theorem
8	Mar 7 - 9	…	**Exam 1 (2.2 – 6.3)**
		6.6	Equivalent Normed Spaces
9	Mar 14 - 16	6.7	Bounded Below Operators
		6.8	Continuous Linear Functionals
10	Mar 21 -23	6.9	Topological Dual
		6.10	Strong and Weak Topologies
11	Mar 28 - 30	6.13	Conjugate Operators
		6.14	Classification of Continuous Linear Operators
12	April 4 - 6	7.2	Inner Product Spaces
13	April 11 - 13	7.3	Orthogonal Subspaces
		7.4	Orthonormal Sets and Fourier Series
		…	**Exam 2 (6.4 – 7.2)**
14	April 18 -20	7.5	Duals of Higher Spaces
		7.6	Linear Operators in Hilbert Spaces
Eid Al-fiter break		
15	May 9 - 11	…	Review