Math 5340 Functional Analysis Fall 2006

Room/Time: 3:00-4:00 PM MWF, Room Math 109
Instructor: Dr. David S. Gilliam
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Office Hours: 9:00-10:00, 2:00-3:00 MWF and by appointment

Prerequisite: Students should have a basic understanding of Real Analysis (MATH 5322). Students must have a good background from Intermediate Analysis I, II (or Baby Reals, MATH 5318, 5319).

What is functional analysis: Functional analysis is the branch of mathematics concerned with the study of spaces of functions (there geometry, structure and properties) and linear operations between these spaces. It has its historical roots in the study of differential and integral equations. This usage of the word functional goes back to the calculus of variations, implying a function whose argument is a function.

Expected Learning Outcomes: Topics include Hilbert and Banach space theory, linear operator theory, the Hahn Banach Theorem (and applications), the closed graph theorem, the open mapping theorem, the principle of uniform boundedness, linear functionals, dual spaces and weak topologies, spectral theory of compact and unbounded self-adjoint and unitary operators, and semigroup theory.
In particular, students will learn to Basic notions, Duality, Linear operators, The Riesz theory for compact operators, Fredholm operators, Spectral theory.

Chapters to cover and approximate days for each

1. Chapter 1 ................................................................. 5 days
2. Chapter 2 ................................................................. 7 days
3. Chapter 3 ................................................................. 7 days
4. Chapter 4 ................................................................. 7 days
5. Chapter 5 ................................................................. 4 days
6. Chapter 6 ................................................................. 7 days
   Total 37 days

Assessment of Learner Outcomes (Grading Policy): Assessment of learning outcomes will be based on classroom activities including, in-class exams and student presentation of homework problems and a final exam.

Important Dates:
(1) August 31, Thursday, Last day for student-initiated add on the Web.
(3) September 13, Wednesday, Last day for student-initiated drop on the Web.
(4) October 30, Monday, Last day to drop a course. Last day to declare pass/fail intentions.
(5) November 22 - 26, Wednesday - Sunday, Thanksgiving holiday.
(6) November 30 - December 6, Thursday - Wednesday, Period of no examinations.
(7) December 6, Wednesday, Last day of classes.
(8) Final Exam: Saturday, December 9, 7:30 a.m. to 10:00 a.m. (location announced in class before exam time)

Attendance: Students are expected to attend every class and are responsible for all information given in class.

ADA Accommodations: Any student who, because of a disability, may require special arrangements in order to meet course requirements should contact me as soon as possible to make necessary arrangements. The instructor may request verification of need from the Dean of Students Office.

Religious Holy Day: 1. “Religious holy day” means a holy day observed by a religion whose places of worship are exempt from property taxation under Texas Tax Code B11.20. 2. A student who intends to observe a religious holy day should make that intention known to the instructor prior to the absence. 3. Any a student who is to be absent from classes for the observance of a religious holy day should arrange with the instructor to make up the missed work. 4. A student who is excused for religious observance may not be penalized for the absence; however, the instructor may respond appropriately if the student fails to complete the assignment satisfactorily.