6580- Introduction to Hilbert Spaces (Fall 2013)

MATH 6580

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Office Hours

Tuesday 10:00-10:55am
or by appointment
Skiles 132

Lecture Skiles 269 Tuesday- Thursday 4:35-5:55pm

Calendar of the Week

(to full Fall calendar)

August 20 & 22

Lecture 1 & 2: Section 5.12

Homework 1:
p.276-277, Exercises: 1,2,3,4,6,7,8
p.282, Exercise: 3
Due date: Thursday September 5th

- ***Course Informations*** *(please read carefully)*
- ***Calendar***

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Course Informations *(return to main page)*

Course Outline

Topics
Background: Vector spaces, dot products, norms, Cauchy-Schwartz inequality
Contrast the geometry of $\mathbf{R^n}$, $\mathbf{R^\infty}$, $\mathbf{l^2}$, $\mathbf{L^2(R)}$ and other spaces
Complete orthonormal sequences, Fourier series, Bessel's and Parseval's inequality
Projections: closest point projections, linear projections, non-expansive projections, orthogonal projections, and self-adjoint projections
Bounded linear functions, Riesz representation theorem, and the Lax-Milgram theorem
Characterizations of finite dimensional and of self-adjoint, normal, compact, or closed linear operators
A structure for unbounded linear operators, Sturm-Liouville operators
Contraction Mapping Theorem and applications
Some illustrative topics according to students' interest
Normed and Sobolev spaces

Textbook

Arch W. Naylor, George R. Sell, "*Linear Operator Theory in Engineering and Science*", Second edition. Applied Mathematical Sciences, 40. Springer-Verlag, New York-Berlin, 1982
In particular Sections 5.12-5.24, 7.1-7.5

Homework

One compulsory homework will be offered once every 2 or 3 weeks
Each homework will be graded. The homework grade will count for 35% of the final grade

Final Exam

Thursday December 12th, 2:50-5:40pm
Skiles 269

An absence to the final be graded 0 (zero). However if the absence is justified (disease, injury, ...), the student must (i) warn the instructor as soon as possible, in any case before the end of the exam week, (ii) bring the documents justifying the absence to the Instructor.
Then the student will receive an I (incomplete) and will be responsible to take action during the following semester to complete his/her curriculum.

Grades

Homeworks	35%
Final	65%

Grade distribution

90% for an A

80% for a B

70% for a C

60% for a D