Syllabus for Math 7320: Functional Analysis
Fall 2014

Instructor: Dr. Mark Tomforde
Office: 601 PGH
Instructor Web Site: www.math.uh.edu/∼tomforde
Course Web Site: www.math.uh.edu/∼tomforde/Math7320.html
Meeting Times: MWF 10AM–11AM in 301 AH.
Office Hours: MWF, Noon–1PM *(or by appointment)*

Note About Office Hours: I encourage you to come by my office if you have any questions, need help with homework problems, or would just like to talk about the material. I will be in my office during my office hours, but if you plan to come by it may help to send an email before to let me know to expect you. If you want to meet with me but cannot make it to office hours, email me and we can set up a mutually convenient time to meet.

Prerequisites: Point-Set Topology and Undergraduate Linear Algebra

Course Description: This course provides an introduction to the methods and language of functional analysis, including Hilbert spaces, Banach spaces, and linear operators on theses spaces. This course is part of a two semester sequence. The second semester will be a more technical development ofthe theory of linear operators on Hilbert spaces and the study of operator algebras and C^*-algebras.

It is expected that students will be proficient in reading and writing proofs. Proofs in homework should be written in textbook style. In particular, you should keep the following in mind:

(1) Writing mathematics requires full English sentences, with the understanding that certain mathematical symbols can replace the words they represent. (So, for instance, the phrase "x is a member of the set of real numbers and x^2 is not equal to 4" may be written as "$x \in \mathbb{R}$ and $x^2 \neq 4$".)

(2) When you write up a proof I will grade it for the way it is written as well as the ideas that are in it. Consequently, you should follow the rules of English usage, such as using proper grammar and punctuation.

(3) Your proofs will be graded on the degree to which they are: Correct, Clear, and Concise.

Text: *A Course in Functional Analysis (2^{nd} Edition)* by John B. Conway

Course Web Page: The course web page is located at

www.math.uh.edu/∼tomforde/Math7320.html

On the course web page you will find the homework as it is assigned, as well as a copy of this syllabus, exam dates, and announcements as they are made.

Grading: The final grade for the class will be determined as follows:

Class Participation:	10%
Homework:	25%
Exam 1:	20%
Exam 2:	20%
Final Exam:	25%

Attendance: It is vital to attend every lecture and take careful notes. Some lecture material does not appear in the textbook. Questions on the exams will be drawn from homework, reading, and lectures. I also encourage you to ask questions and participate in class. As stated above, 10% of your final grade will be based on class participation.

Homework: A list of homework problems will be given on the course web page every few weeks. Not all homework will be collected. Nonetheless, it is important for you to do all the homework to keep up with the material we are learning and to prepare for exams.

Writing Up Solutions: Proofs should be written up as near to perfect as you can. Proofs should be written in textbook style, and your writing should be *correct*, *clear*, and *concise*. The problem will be graded on a 10-point scale, and spelling, punctuation, and grammar will count. Any proofs that you turn in should be written in "Claim . . . Proof . . ." style; i.e., when

writing up proofs, you should write out the statement you are proving followed by your proof. For example, if a problem asked you to show that A and B imply C, then you should write

Claim: If A and B, then C.

Proof: Since A and B hold we see that . . . argument . . . hence C.

□

With regards to the homework and exams that are turned in, the following policies will be in effect:

- Homework or Exams without a name will not be accepted.
- Homework or Exams will not be accepted by email.
- Write legibly, and use only one side of the paper. Leave enough room for comments to be made when grading.
- If more than one page, your papers should be stapled in the upper-left-hand corner.
- Homework and Exams should be written on standard-sized paper (8.5" x 11"), with no "fringe" running down the side as a result of the paper having been torn out of a spiral notebook
- Solutions to Homework and Exams should be written up in sequential order. (That is, #1 first, #2 second, etc., or Part (a) first, Part (b) second, etc.)
- Homework and Exams are due at the beginning of class on the day it is due. Late homework will not be accepted. Homework and Exams are considered late once I have started lecturing.
- Homework or Exams that is not picked up within two weeks of the date it is handed back will be discarded.

Points will be deducted if these rules are not followed.

Doing the homework is essential. Remember:

"You learn mathematics by doing mathematics."

Exams: There will be three exams: two midterm exams during the semester and one final exam at the end of the semester. Each exam will be a take-home exam.

Exam 1: Due Friday, Sept. 26 at the beginning of class.

Exam 2: Due Friday, Oct. 31 at the beginning of class.

Final Exam: TBA.

The take-home exams are to be worked on independently. You are allowed to use your notes, the course textbook, and old homework from this class. You are also allowed to talk to the instructor. You are NOT allowed to use other books besides the course textbook, information from the internet, other notes besides those you took in class, or any other sources besides the allowed ones stated above. You are also NOT allowed to talk to each other about the exam, or the problems on it, until after the time the exam is due.

Makeup Policy: In general, turning in late homework results in a score of zero. Likewise, not turning in a Take-Home Exam when it is due results in a score of zero, and you will not be allowed to make up the work.

No Class: There will be no class on Friday, November 7, because I will be out of town attending a conference. Office Hours that day will also be cancelled.

Policy on Incompletes: Incompletes are given only in very unusual circumstances, and never just to prevent a bad grade or provide the student with more time to prepare for an exam.

Honor Principal: University of Houston students are expected to adhere to the Academic Honesty Policy (see the Student Handbook for more details). In this course this shall mean the following: Homework can and should be worked on and discussed with others. However, the write-up should be independent and in your own words. In addition, exams should be worked on independently. For take-home exams, you are allowed to use the class textbook, your class notes, your old homework, or talk with the instructor. You are not allowed to use other books, information from the internet, other sets

of notes, or talk with other people besides the instructor. In addition, if you are aware of anyone who is cheating or receiving unfair outside assistance, you are honor bound to inform the instructor of what is occurring.

Anyone caught cheating will receive a failing grade in the course and be turned over to the department chair and dean for further disciplinary action.

Special Needs: Any student with a disability or chronic health problem for whom special accommodations would be helpful is encouraged to discuss with the instructor the types of assistance that might be offered.

Important Dates:

September 1, Labor Day, No Class.
September 10, Last day to Drop/Withdraw without receiving a grade.
September 26, Exam 1 due.
October 31, Exam 2 due.
October 31, Last day to Drop/Withdraw with a W grade.
November 7, Dr. Tomforde at a conference. No Class and No Office Hours.
November 26 – November 30, Thanksgiving Break, no class.
December 6, Last Day of Classes.