Math 318 (Analysis II)—Spring 2007

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Office: Koshland H207C, 896-1210

Office Hrs: MTW 1-3, or by appointment.

Text: "Real Analysis with Real Applications", Davidson and Donsig, (Prentice Hall, 2002).

Homework: Weekly problem sets due Fridays (give to me in class or leave in drop box opposite printer in Hilles 207 by 5 PM). After the 2nd test, HW will become a little less frequent, to allow you time to work on the project.

Homework Rewrites: On any HW problem for which you receive a grade of 8/10 or lower, you may submit a rewritten version of the problem, due one week after your receive the graded HW. If you do, your final grade for the problem will be the average of the original grade and the rewrite grade. Please submit the original problem along with the rewrite.

Late homework: If I receive your HW before I grade that assignment, I will not assign a grade penalty (but I can not predict how often I will be checking my drop box). Thereafter, there will be a 25% grade penalty, up until the exam that covers that material. If a solution set has been posted to Blackboard, you may not look at it until after you have submitted the late assignment.

Tests: Instead of HW on 2/23 and 3/30, there will be a test due. Each test will have two parts: Part I ($\approx$ 90 minutes, self-scheduled, closed-book) covers basic definitions, True/False with short explanation, etc.; Part II (take-home, open-book) typically consists of 4–6 examples and proofs.

Project: Instead of a final exam, we will have projects, done either individually or as a group of two. I will provide a set of project assignments to choose from, or you may design your own in consultation with me. Each project will have analysis as its core, but this theory may also be combined with an application or computation depending on student interest. The project consists of two parts: a 25-minute in-class presentation (during the last two weeks of classes), and a 8-15 page project report (draft due on the day of your in-class presentation, final version due during finals period).

(*Preview of some possible project topics: Definition of exponential and trigonometric functions by series; convexity and optimization (see Ch. 16); fixed point theorems and applications to game theory; distributions and delta "functions"; introduction to Lebesgue integration; discrete dynamical systems and chaos (see Ch. 11); wavelets (see Ch. 15)*)

Grades:

Homework : 25%
Project: 25%
Tests (2): 25% each

Collaboration: For homework problems, discussion with other students in the class or with me is highly encouraged. The actual writing of the assignment should be done individually, without using notes from your collaborative discussions, so that you can be sure that it represents your personal understanding of the problems. To keep these guidelines clear, I would like to try a "reminder" system that other faculty have used. When you are working with someone, work on paper that you explicitly mark as "Collaboration" (and, similarly, if you are working on the blackboard, write that title on the board). Study these collaboration materials before you write up your assignment, make sure that you understand the ideas, and then get rid of them (or erase the board). If you can not write up the solution without using the collaboration material, then probably you have not yet understood the problem in full, and you should start the process again: get rid of your final solution, go back to discussions with fellow students and/or me, and try again later to write up the final solution on your own.

For projects, you may collaborate with a partner, but not with anyone else.

For tests, no collaboration is allowed (you may ask me for clarification of test questions, but I will not give suggestions about the actual solutions).

Blackboard: All assignments and solution sets (and perhaps some other stuff) will be posted on Blackboard.

Anticipated Schedule:

1/22-1/26	Uniform continuity (5.5), Inner product spaces (7.3)
1/29-2/2	Pointwise, uniform convergence of functions (8.1)
2/5-2/9	Properties of uniformly convergent sequences (8.2–8.3)
2/12-2/16	Series of functions (8.4–8.5)
2/19-2/23	Orthonormal sets, projections, best approximations (7.4–7.6)
	Test # 1 due Fri. 2/23, on material thru 2/14
2/26-3/2	Approximation of a function by a polynomial (10.1–10.2, 10.5–10.6
3/5-3/9	Fourier Series (Ch. 14)
3/12-3/16	**Spring break**
3/19-3/23	Fourier series (con't) (Ch. 14, maybe some of Ch. 13)
3/26-3/30	Differential Equations (12.1–12.3)
	Test # 2 due Fri. 3/30, on material 2/16 thru 3/21
4/2-4/6	Differential Equations (con't) (12.4–12.5)
4/9-4/13	Calculus of Variations (outside source)
4/16–4/20	Calculus of Variations (con't) (outside source)
4/23–4/30	Calculus of Variations (con't) (outside source)
4/30–5/4	Student project presentations
	Draft of project due on 4/20; final version due during finals period