

## THE COURSE

**Functional Analysis**

Meets 1:25 – 2:15, in VinH 301, MWF.

## INSTRUCTOR

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 Office Hours 10:30am – noon, MWF

## TEXT

*Functional Analysis*, Second edition, by Walter Rudin.

## MATERIAL COVERED

To begin we'll start with inner-product and Hilbert spaces. Notes on this will be posted on the class Web site. They, and related spaces, can serve as examples as we look at the fundamentals, Chapters 1 – 4. During the year, we'll cover most of the book, with emphasis on Spectral Theory and Distributions. Material from Chapter 5 and elsewhere will be interspersed so that we can have plenty of examples available. You will be asked to study some sections or parts of sections on your own. You may always ask for those to be covered. Chapters 6 – 8 will follow, and Chapter 9 may be omitted. This is highly likely to be more than we can finish in one semester. I anticipate “covering” about six pages of text per day. At the risk of making you huffy, I suggest making a list of definitions! There will be many, in many contexts, from the “Banach Space” context to that of “Semigroups of operators on a locally convex Topological Linear Space.” Many of the more general definitions are ignored for long periods of time, then recur without warning!

Among the first exercises, that you might start on as soon as you can, are those at the end of Ch. 1, pp 38–41, numbers 1(c thru i), 2–8 and 11, 12.

## GRADING

If we have a papergrader, there will be some Homework Assignments. In either case there will be Further Problems – somewhat challenging or entertaining (or both, I hope) – that I will score. Perhaps we will have two Midterm Tests or three Quizzes. There will be a Final Exam, possibly a Take-Home. We'll discuss these matters early in the Fall Semester.

Each Test may involve material covered in lectures up to the Test. Thus, you are responsible for material covered in the lectures!

Your grade in this course will reflect what you did in it, not your ability or potential. It is very important, then, for you to be able to put your work on paper, under time pressure. If you have problems taking tests, there are people on campus who might be able to help you overcome them. Ask about it at an office hour!

You'll have a GPA grade for each Quiz or Test, your Homework, the Further Problems, and the Final. The weighting of the grades, though subject to change, is, at present: 20% for Tests, 20% for Homework, 25% for Further Problems, and 35% for the Final. Grades will perhaps amount to 80–85% for A, 65–70% for B, 50–55% for C, 40–45% for D.

Each grading item will have “Gradelines” assigned to it. For example, if the B gradeline is 70, the A gradeline is 85, and your score is 80, then your GPA grade,  $G$ , for that item is  $G := 3 + \frac{80 - 70}{85 - 70} = 3.67$  ( $G$  is rounded to 2 places).

In other words, your GPA grade is B, plus 2/3 of the way between B and A. Your GPA grade,  $G$ , on any grading item is computed using your score on it, and numbers  $g$  (the grade corresponding to the highest gradeline smaller or equal to your score),  $glb$  (the highest gradeline smaller than or equal to your score),  $gla$  (the lowest gradeline greater than your score):

$$G = g + \frac{\text{your score} - glb}{gla - glb}$$

where  $glb$  is the gradeline just below your score,

$gla$  is the next gradeline - above your score,

and  $g$  is the grade number: 5 for a 100% score, 4 for the A gradeline, 3 for B, etc.

If your score falls on a gradeline, then  $G = g$ . If your score is 100% on a Test, your  $G = 5$ .

When the  $G$  are combined, with weights, and added, the result is your GPA grade for the course. If your total is within 0.025 of one of the University of Minnesota's official GPA numbers that define one of the valid letter or letter-plus-or-minus grades, your grade is "borderline." Case-by-case decisions are made then, whether to award the higher or the lower grade. One important factor is the direction your grades have taken at the course's end.

**Be sure to talk to me in advance if you have to miss a Test!** If you do miss a Test, and you don't make arrangements in advance, your  $G$  for that Quiz or Test is zero!

If, for documented reasons beyond your control, you're passing and you can't complete the course, your grade up to that point may "stay with you" as part of an Incomplete; all I's must be issued according to department guidelines.

#### SCHOLASTIC CONDUCT

Please read the (appropriate for you) notices in the IT Bulletin, the CLA Bulletin, and so on. You are encouraged to work with others in understanding what problems say, setting up solutions, and so on. If you get ideas from a reference or from someone else, GIVE CREDIT! You must submit as YOUR work only what YOU have written up yourself: DON'T COPY! Graders will be asked to bring answers that look alike to my attention.