

Syllabus for Math 7211, Autumn 2017

Professor. David Penneys

Office. Math Tower (MW) 752

Hours. (Subject to change) F 11:30-12:30 or by appointment

Email. penneys.2(at)osu.edu

Course website. The course website is:

<https://people.math.osu.edu/penneys.2/7211/2017/Math7211Autumn2017.html>

Textbooks. The official textbook is Lax, with supplementary material taken from Pedersen, Rudin, and some notes of mine from when I took a similar class.

- Lax, Peter D. Functional analysis. Pure and Applied Mathematics (New York). Wiley-Interscience [John Wiley & Sons], New York, 2002. xx+580 pp. ISBN: 0-471-55604-1 MR1892228
- Pedersen, Gert K. Analysis now. Graduate Texts in Mathematics, 118. Springer-Verlag, New York, 1989. xiv+277 pp. ISBN: 0-387-96788-5 MR0971256
- Rudin, Walter. Functional analysis. Second edition. International Series in Pure and Applied Mathematics. McGraw-Hill, Inc., New York, 1991. xviii+424 pp. ISBN: 0-07-054236-8 MR1157815

Prerequisites. Math 6212: Real Analysis II.

I expect that students have covered the material in the first 8 chapters of Folland:

- Folland, Gerald B. Real analysis. Modern techniques and their applications. Second edition. Pure and Applied Mathematics (New York). A Wiley-Interscience Publication. John Wiley & Sons, Inc., New York, 1999. xvi+386 pp. ISBN: 0-471-31716-0 MR1681462

In particular, I expect that students are already familiar with the following topics:

- measure theory and integration
- normed linear spaces, Banach spaces, Hilbert spaces, locally convex topological vector spaces, and bounded linear transformations
- topologies: weak, weak*, strong operator, weak operator
- theorems: Stone-Weierstrass, Baire Category, Open Mapping, Banach-Steinhaus (Uniform Boundedness Principle), Closed Graph, Hahn-Banach, Banach-Alaoglu
- convolution, Fourier transform
- examples: ℓ^p , $L^p(X, \mathcal{M}, \mu)$, $C_0(X)$, $C(X)$, $\mathcal{L}(X, Y)$, $B(H)$

We'll begin with a rapid review of some of these topics.

Homework. I will assign weekly homework assignments. The assigned problems are a lower bound of what students are expected to do. Students may work together to solve problems, but each student is responsible for their own solutions. In particular, students must write up solutions separately, and any copying will be regarded as academic misconduct/plagiarism. Students may use whatever resources they want for their homework, but they must cite all resources.

Homework will be due at the beginning of lecture on Mondays. Students may choose to email me their homework before the deadline.

There is a strict format for homework. Students should hand in a final copy of their homework on plain white paper without lines, perforations, or holes. Please use a new page for each problem. The final copy should represent the student's best effort, as homework counts for the entire class grade. Students may choose to typeset their homework with L^AT_EX, in which case they do not need to stick to one page per problem.

In the event that homework is not completed in the required format, the homework will be directly returned to the student, who may hand it in at the next class at a penalty of half the points for that homework.

Grading. Students' grades will be entirely based on homework and attendance. In rare circumstances, and with prior consent from me, a student may write a survey article on a topic of my choice and give a lecture to the class on their article to replace some percentage of the homework grade.

Incomplete grades. From

<http://artsandsciences.osu.edu/academics/current-students/advising/policies>

An 'I' indicates that a student has completed a major portion of the work in the course in a satisfactory manner, but for reasons judged by the instructor to be legitimate, a portion of the course requirements remains to be completed. If illness or an emergency prevents you from finishing a course, you may request an 'Incomplete' from the instructor. When you receive this grade, you must consult with the instructor as soon as possible to make arrangements for completing the course requirements. Incomplete work must be completed no later than the sixth week of the following semester. If the work is not made up by the due date, the 'I' mark will be changed to the alternate grade the instructor reported.

Academic Misconduct Statement. It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term "academic misconduct" includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-48.7). For additional information, see the Code of Student Conduct at <http://studentlife.osu.edu/csc/>.

Disability Services Statement. Students with disabilities (including mental health, chronic or temporary medical conditions) that have been certified by the Office of Student Life Disability Services will be appropriately accommodated and should inform the instructor as soon as possible of their needs. The Office of Student Life Disability Services is located in 098 Baker Hall, 113 W. 12th Avenue; telephone 614- 292-3307, slds@osu.edu; <http://slds.osu.edu>