

C4.1 Further Functional Analysis – Course Information

Classes: Classes will be held in the Andrew Wiles Building on Friday mornings in weeks 2, 4, 6 (final class either Friday week 8 or week 1 HT), and Tuesday mornings weeks 3,5,7 and TBA week 1 HT.

Problem sheets: There will be four problem sheets, one for each class. The problem sheets and classes will supplement the lectures by filling gaps and illustrating how the general theory works in concrete examples. Some of the problems are starred. These may be harder than the others, or just less central to the course. You may treat starred problems as optional if you are pressed for time. Please hand in your answers to the first three problem sheets in the hand-in area of the Andrew Wiles Building as specified for the classes (12:00 Wed for Friday classes, 17:00 Fri for Tuesday classes). Hand in information for the final class will be determined later.

There is also a preparatory Problem Sheet 0, with solutions. These problems are intended for revision and consolidation, during the long vacation and Week 1 of MT..

Lecture notes: Complete lecture notes are posted on the course website; my thanks to the previous lecturer for this course, Dr David Seifert, who developed these notes and allowed me to use them. They are likely to be updated slightly in the course of the term. If you spot any mistakes, I would be grateful if you could let me know by sending an email to stuart.white@maths.ox.ac.uk.

Preliminary reading: Available on the course website is a document (written by Richard Haydon) which contains some background material from previous courses. The section in these notes which deals with probability will not be required for the course in its present form, but you should make sure that you are comfortable with the rest of the material. Note that some of the notation in these notes differs from that used in the course lecture notes.

Books: There are many good books on Functional Analysis. Among those particularly relevant to this course are the following:

- B. Bollobas, *Linear Analysis: An Introductory Course*, CUP, 1999
- H. Brezis, *Functional Analysis, Sobolev Spaces and PDEs*, Springer, 2011
- N.L. Carothers, *A Short Course on Banach Space Theory*, CUP, 2004
- J. Conway, *A Course in Functional Analysis*, Springer, 2007
- M. Fabian et al., *Functional Analysis and Infinite-Dim. Geometry*, Springer, 2001
- R.E. Megginson, *An Introduction to Banach Space Theory*, Springer, 1998
- W. Rudin, *Functional Analysis*, McGraw-Hill, 1991
- A.E. Taylor and D.C. Lay, *Introduction to Functional Analysis*, Wiley, 1980

Perhaps the most useful of these is the book by Fabian et al. If your college library doesn't already own a copy of it, you might consider asking it to buy one.

Past papers: A large number of past papers is available through the Mathematical Institute's webpages. The syllabus for Part C (Further) Functional Analysis has not changed significantly since 2010, except that the material on the Baire Category Theorem and its consequences moved from Part C to Part B in 2011. Some of the questions would have been set differently on the basis of the lectures as they are currently given.

Mini-projects: If you are a DPhil student taking this course as part of your broadening requirement, please contact me so that we can agree a topic for your mini-project.

SAW MT19