AMSI 2013: MEASURE THEORY
GENERAL INFORMATION

LECTURER: Marty Ross

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OFFICE: G48, Ph: 83448051 (However, I'm more likely to be found at *Castro's Cafe.*)

PHONE: 0434332709. (Early morning calls are punishable by death.)

OFFICE HOURS: Let's play it by ear. I'll be around a lot, and you're always welcome to grab me and/or make an appointment.

LECTURE NOTES: These will be provided, and will be quite thorough. They will be posted on http://www.qedcat.com/AMSI2013, and will be handed out in lectures. I will try to have the notes available soon after we cover the material.

SYLLABUS: The plan is for a reasonably standard introductory course on measure theory (Lebesgue and general measures, integrals and convergence theorems, L^p spaces, product measures). In the latter part of the subject there will be more emphasis on geometric aspects (Hausdorff measure and dimension, covering theorems, the area formula). If there is interest, I may give some extra lectures on more advanced topics (rectifiable sets, differentiation of measures, coarea formula, Haar measure, Banach-Tarski paradox): any extra lectures would be completely voluntary and would not be examinable.

ASSESSMENT: The proposal is to have 50% assigned problems and 50% final exam.

ASSIGNMENT PROBLEMS: About 35 problems will be assigned, and you will be expected to hand in solutions to **25 problems**. You may hand in up to 30 problems, and you will be graded on your best 25 solutions. A due date for a first batch of the problems will be announced soon.

Working hard on the problems is critical to getting the most out of this subject. You may definitely consult texts, and discuss the problems with each other, and I'm willing to give you very substantial help on the problems. However, *submitted solutions should be your work, in your words, citing all references used.*

EXAM: The intention is to have an open book take-home exam, to be done once you return to your home institution. Further details will be forthcoming.

TEXTS: There is no prescribed text, but there are tons of texts worth consulting (and scouring for problem solutions). In general, it's best to browse a lot, and to see which texts appeal to you (*and please do share the texts amongst yourselves!*). Below are a few (pretty random) suggestions.

WARNING: Try to stay away from texts with an emphasis upon probability theory. The material covered is similar, but the emphasis and the terminology is very different. Such texts are more likely to be confusing than helpful.

Real Analysis, H. Royden (Prentice Hall, 3rd ed., 1988)

Modern Real Analysis, R. Gariepy and W. Ziemer (Brooks, 1994)

The Elements of Integration and Lebesgue Measure, R. Bartle (Wiley, 1995)

An Introduction to Measure and Integration, I. Rana (AMS, 2nd ed., 2002)

Measure Theory and Integration, G. de Barra (Albion, 2nd ed., 2003)

Real Analysis, G Folland (Wiley, 1984)

Foundations of Real and Abstract Analysis, D. Bridges (Springer, 1997)

The Elements of Integration and Lebesgue Measure, F. Jones (Jones and Bartlett, 2000)

Measure Theory, A. Cohn (Birkhauser, 1994)

Geometry of Sets and Measures in Euclidean Space, P. Mattila (Cambridge, 1999)

Measure Theory and Fine properties of Functions, L. Evans and R. Gariepy (CRC, 1991)

Lectures on Geometric Measure Theory, L. Simon (CMA, 1984)

A Beginner's Guide to Geometric Measure Theory, F. Morgan (Academic, 4th ed., 2009)

The Geometry of Fractal Sets, R. Falconer (Cambridge, 1986)