## School of Mathematics

Module MA342E — Measure theory (Optional JS & SS Mathematics, JS & SS Two-subject Moderatorship)

Lecturer: Prof. T. Dorlas

Requirements/prerequisites: prerequisite: MA2223, MA2224

Duration: Michaelmas term, 10 weeks

Number of lectures per week: 3 lectures including tutorials per week

## Assessment:

**End-of-year Examination:** This module will be examined jointly with MA342F in a 3-hour examination in Trinity term, except that those taking just one of the two modules will have a 2 hour examination. However there will be separate results for MA342E and MA342F.

**Description:** This module will meet at the Dublin Institute for Advanced Studies, 10 Burlington Road, Dublin 4. Most likely the lectures will be scheduled on Tuesday afternoons (and clash with MA4445).

Draft outline (perhaps not all this is possible):

Measures on Topological (Hausdorff) Spaces. General measure theory and the difference between Lebesgue and Riemann integral.  $L^p$  spaces. Introduction to general topology; in particular the concepts of separation (Hausdorff and regular spaces), sequences versus nets, metrizability, compactness. Choquet's construction theorem using inner and outer measure. Examples: Lebesgue measure, Haar measure on compact groups, the general unitary ensemble of matrices. The Riesz-Markov-Kakutani theorem. Possibly Prokhorov's theorem and the Wiener measure.

## References.

P. R. Halmos, *Measure Theory*, Van Nostrand (1950).

July 6, 2010

2010-11