Subject Information Guide

Measure Theory and Integration

Semester 2, 2019

Administration and contact details

Host Department	School of Mathematics and Applied Statistics
Host Institution	University of Wollongong
Name of lecturer	Dr Marianito Rodrigo
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Name of Honours coordinator	Dr Marianito Rodrigo
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Subject details

Handbook entry URL	
Subject homepage URL	
Honours student hand-out URL	
Start date:	29 July 2019
End date:	01 November 2019
Contact hours per week:	2
Lecture day and time:	THU 12:30 - 14:30
Description of electronic access arrangements for students (for example, WebCT)	Resources will be hosted and available for download from the lecturer's website. Details will be given at the commencement of the course.

Subject content

1. Subject content description

This is a first course in measure theory and Lebesgue integration. The development of abstract measure spaces underpins modern probability theory and mathematical finance, while the theory of

the Lebesgue integral is essential in many areas of mathematics such as functional analysis and partial differential equations.

2. Week-by-week topic overview

- Measurable functions
- Abstract measures
- Lebesgue integral
- Spaces of integrable functions
- Product measures
- Radon-Nikodym theorem
- Limit theorems

3. Assumed prerequisite knowledge and capabilities

A first course in real analysis (e.g. MATH222 at UOW)

- Supremum/infimum and the Axiom of Completeness
- Proofs using ε - δ arguments
- Pointwise and uniform convergence of sequences of functions
- Basic theory of the Riemann integral
- Open and closed sets in the set of real numbers

4. Learning outcomes and objectives

At the end of this course, the student will be able to demonstrate:

- Proficiency with all relevant vocabulary
- Familiarity with standard examples and counterexamples
- Understanding of the content of the major theorems and of the ideas in their proofs
- Ability to apply the results to related problems

AQF specific Program Learning Outcomes and Learning Outcome Descriptors (if available):

AQF Pr subject		scriptors for

Learning Outcome Descriptors at AQF Level 8

Knowledge

K1: coherent and advanced knowledge of the underlying principles and concepts in one or more disciplines

K2: knowledge of research principles and methods

Skills

S1: cognitive skills to review, analyse, consolidate and synthesise knowledge to identify and provide solutions to complex problem with intellectual independence

S2: cognitive and technical skills to demonstrate a broad understanding of a body of knowledge and theoretical concepts with advanced understanding in some areas

S3: cognitive skills to exercise critical thinking and judgement in developing new understanding

S4: technical skills to design and use in a research project

S5: communication skills to present clear and coherent exposition of knowledge and ideas to a variety of audiences

Application of Knowledge and Skills

A1: with initiative and judgement in professional practice and/or scholarship

A2: to adapt knowledge and skills in diverse contexts

A3: with responsibility and accountability for own learning and practice and in collaboration with others within broad parameters

A4: to plan and execute project work and/or a piece of research and scholarship with some independence

5. Learning resources

Lecture notes and other resources in PDF format will be available from the lecturer's website.

6. Assessment

Exam/assignment/classwork breakdown					
Exam	50%	**Assignment**	50%	**Class work**	
Assignment due dates		TBA			
Approximate exam date				04 November 2019	

Institution Honours program details

Weight of subject in total honours assessment at host department	1/8
Thesis/subject split at host department	BMath (Hons): Thesis worth 25% BMathAdv (Hons): Thesis worth 37.5%
Honours grade ranges at host department:	
H1	85-100
H2a	75-84
H2b	65-74
H3	50-64