Subject Information Guide

ANALYSIS – ANALYSIS 701

Semester 1, 2018

Administration and contact details

Host Department	Department of Mathematics
Host Institution	Macquarie University
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Subject details

Handbook entry URL	http://www.handbook.mq.edu.au/2018/Units/ResearchUnit/MATH701
Subject homepage URL	To be advised
Honours student hand-out URL	To be advised
Start date:	26/02/2018
End date:	8/06/2016
Contact hours per week:	2
Lecture day and time:	To be advised
Description of electronic access arrangements for students (for example, WebCT)	To be advised

Subject content

1. Subject content description

This is an advanced analysis course, following closely the first five chapters of the textbook "Real and Complex Analysis" by Walter Rudin:

1) Abstract integration
2) Positive Borel measures

3) L^p spaces
4) Banach spaces
5) Hilbert spaces

2. Week-by-week topic overview

Weeks 1, 2 and 3: Abstract integration: Riemann integration, and the construction and important properties of Lebesgue integration.
Weeks 4 and 5: Construction and properties of Borel measures.
Weeks 6 and 7: Lebesgue L^p spaces and convergence properties.
Weeks 8,9 and 10: Banach spaces and their important properties.
Weeks 11, 12 and 13: Hilbert spaces and their important properties.

3. Assumed prerequisite knowledge and capabilities

A basic course in Real and Functional Analysis (e.g. MATH 339 at Macquarie University which is a first course in Real and Functional Analysis of 4 hours of lectures per week for 13 weeks for third year level).

4. Learning outcomes and objectives

1) Understanding logical arguments and recognising any gaps or faults in such arguments.
2) Solving problems, including: formulating a precise mathematical question from a "real world" problem; identifying and applying appropriate mathematical techniques.
3) Expressing yourself clearly and logically in writing.
4) More broadly, you are expected to improve your generic skills in the following areas: literacy and numeracy, self-awareness and interpersonal skills, communications, critical analysis, problem solving and creative thinking.

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

AQF Program Learning Outcomes addressed in this subject	Associated AQF Learning Outcome Descriptors for this subject
K1	Coherent and advanced knowledge of the underlying principles and concepts in one or more disciplines
K2	Knowledge of research principles and methods
S1	Cognitive skills to review, analyse, consolidate and synthesise knowledge to identify and provide solutions to complex problems with intellectual independence
S2	Cognitive and technical skills and 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
A1	With initiative and judgement in professional practice and/or scholarship

A2	To adapt knowledge and skills in diverse contexts

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

Walter Rudin's textbook "Real and Complex Analysis".
Royden's textbook: "Real Analysis"

6. Assessment: There are 5 assignments, worth 20% each. No final exam.

Exam/assignment/classwork breakdown					
Exam	0%	**Assignment**	100 %	**Class work**	0 %
Assignment due dates		**28/03/2016**	**11/04/2016**	**9/05/2016**	**23/05/2016**
Assignment due dates:		**|07 /06/2016**			
Approximate exam date				**N/A**	

Institution Honours program details

Weight of subject in total honours assessment at host department	**12.5% of BPhil**
Thesis/subject split at host department	**1-year BPhil has no thesis;** **Thesis is 90% of 2-year MRES**

Honours grade ranges at host department:	
H1	85
H2a	75
H2b	65
H3	50