

## Subject Information Guide

### ANALYSIS – ANALYSIS 701

Semester 1, 2016

#### Administration and contact details

Host Department	Department of Mathematics
Host Institution	Macquarie University
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#### Subject details

Handbook entry URL	<a href="http://www.handbook.mq.edu.au/2016/Units/ResearchUnit/MATH701">http://www.handbook.mq.edu.au/2016/Units/ResearchUnit/MATH701</a>
Subject homepage URL	To be advised
Honours student hand-out URL	To be advised
Start date:	29/02/2016
End date:	10/06/2016
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).**

## 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.**

## 5. Learning resources

**Walter Rudin’s book “Real and Complex 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	25/03/2016	8/04/2016	6/05/2016	27/05/2016	
Assignment due dates:	10 /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	BPhil has no thesis; Thesis is 90% of MRES
Honours grade ranges at host department:	
H1	85
H2a	75
H2b	65
H3	50