

University of Macau
Faculty of Science and Technology
Department of Mathematics

Coordinating Unit:	Department of Mathematics, Faculty of Science and Technology		
Supporting Unit(s):	Nil		
Course Code:	MATB325	Year of Study:	3
Course Title:	Introduction to real analysis and Hilbert spaces		
Compulsory/Elective:	Compulsory elective		
Course Prerequisites:	MATB 221 Mathematical Analysis II		
Prerequisite Knowledge:	Nil		
Duration:	One semester	Credit Units:	3
Class/Laboratory Schedule:	Three hours of lecture and one hours of tutorial per week.		
Laboratory/Software Usage:	Nil		
Course Description:	This course introduces some basic theory of point topology, Lebesgue measure, Lebesgue integral and a brief introduction to Hilbert space. The content includes: Open and closed sets, Compact sets, Metric spaces, Out measure, Lebesgue measurable set, Lebesgue measurable function, simple function, Lebesgue integration, Comparison of Lebesgue integral and Riemann integral, Fubini's Theorem, Hilbert space.		
Course Objectives:	<ol style="list-style-type: none"> 1. To introduce basic knowledge of point topology 2. To study Lebesgue measure, measurable set and measurable function 3. To study Lebesgue integral and understand the difference between Lebesgue integral and Riemann integral. 		
Learning Outcomes (LOs):	<p>Upon completion of this course, students are expected to:</p> <ol style="list-style-type: none"> 1. Understand Lebesgue measure, measurable set, measurable function, Lebesgue integral 2. Understand the properties of Lebesgue measure and Lebesgue integral 3. Understand the difference between Lebesgue integral and Riemann integral 4. Be able to solve some problems related to Lebesgue measure and Lebesgue integral 		
Texts & References: <i>(* recommended textbook(s))</i>	<ol style="list-style-type: none"> 1. Introduction to real analysis (4th edition) by R. G. Bartle and D. R. Sherbert, John Wiley & Sons. 2. Analysis II (2nd edition) by Terence Tao, Hindustan book agency 		
Student Assessment:	<ul style="list-style-type: none"> • Assignments: 20% • Midterm examination: 30% 		

	<ul style="list-style-type: none"> Final examination: 50%
Learning Outcome Assessment:	<ul style="list-style-type: none"> Assignments, midterm and final examination

Pedagogical Methods:	<input checked="" type="checkbox"/> Lecture <input type="checkbox"/> Guest speakers <input type="checkbox"/> Case study <input type="checkbox"/> Role playing <input type="checkbox"/> Student presentation <input type="checkbox"/> Project <input type="checkbox"/> Simulation game <input checked="" type="checkbox"/> Exercises and problems	<input type="checkbox"/> Service learning <input type="checkbox"/> Internship <input type="checkbox"/> Field study <input type="checkbox"/> Company visits <input type="checkbox"/> e-learning <input type="checkbox"/> Independent study <input type="checkbox"/> Others: _____
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Major Assessment Methods: For each Major Assessment Method below, please indicate the specific pedagogical methods involved (by putting a ✓ in the relevant box(es) on the right-hand side).	Case Study	Role Playing	Student Presentation	Individual project/paper	Group project/paper	Simulation Game	Exercises & problems	Internship	Field Study	Written examination	Oral examination	Others (please specify)
Class Participation/ Discussion (0%)												
Assignments (20%)							✓					
Quizzes (0%)												
Midterm Exam (30%)										✓		
Final Exam (50%)										✓		
Others (please specify)												
Course Web: (if any)												

Lecturer: Dr. Lihu Xu

Lecture Venue: E11-1042

Office: E11-3075

Office hours: 11:00 am-12:00 am (Thursday and Friday)

Teaching assistant: Mr. Wankai Liu (PhD student)

Office: E11-3083

Midterm exam: 7th week

Grading System:

The credit is earned by the achievement of a grade from ‘A’ to ‘D’; ‘F’ carries zero credit.

Grades are awarded according to the following system:

Letter Grades	Grade Points	Percentage
A	4.0 (Excellent)	93-100
A-	3.7 (Very good)	88-92
B+	3.3	83-87
B	3.0 (Good)	78-82
B-	2.7	73-77
C+	2.3	68-72
C	2.0 (Average)	63-67
C-	1.7	58-62
D+	1.3	53-57
D	1.0 (Pass)	50-52
F	0 (Fail)	Below 50

Comment:

All students are expected to attend all lectures and examinations. Classroom attendance will contribute numerically to the final course grade, active class participation is also expected of all students and may help to boost up the course grade in those “borderline cases” between failing and passing. It is your responsibility to read the relevant chapters in the text before and after class and to ask questions during class discussion. In order to be successful in this course, you should get as much practice as possible in solving problems outside the class hours. This must be done on a timely and regular basis, as a good understanding of the material covered in any particular section of this course depends heavily on an equally good understanding of the material covered in previous sections.

Homework Policy:

All homeworks must be an individual effort unless specifically noted. Your work must be neat, with answers clearly noted and supporting information provided. Late homework will not be accepted in general.

Note:

- Cheating in any form will not be tolerated. STUDENTS WHO CHEAT ON ANY ASSIGNMENT, OR DURING ANY QUIZ OR EXAMINATION WILL BE ASSIGNED A FAILING GRADE FOR THE COURSE AND MAY RESULT IN SUSPENSION OR EXPULSION FROM THE UNIVERSITY. Therefore avoid all appearance of improper behavior. Students who witness cheating should report the incident to the instructor as soon as possible.
- Photocopies of the textbooks are illegal and are violation of the Macao copyright laws

學生身心障礙支援服務

澳門大學致力為身心障礙人士提供平等的學習機會，若您在肢體、視力、聽力、語言、學習或心理上的障礙，導致您在學習或日常活動中受到嚴重的限制，我們鼓勵您與老師溝通，讓他/她知道你的狀況，並作出適當的安排。此外，我們也鼓勵您與學生輔導及發展處之學生身心障礙支援服務聯繫，該服務將為有需要的學生提供相應的資源和設施，讓所有學生都能在大學裏享有同等的教育機會、大學生活及服務。如閣下對此服務有任何疑問，歡迎聯絡學生輔導及發展處（電郵：scd.disability@umac.mo；電話：83974901；瀏覽網頁 http://www.umac.mo/sao/scd/sds/aboutus/cn/scd_mission.php）。

STUDENT DISABILITIES SUPPORT SERVICE

The University of Macau is committed to providing an equal opportunity in education to persons with disabilities. If you are a student with a physical, visual, hearing, speech, learning or psychological impairment(s) which substantially limit your learning and/or activities of daily living, you are encouraged to communicate with your instructors about your impairment(s) and the accommodations you need in your studies. You are also encouraged to contact the Student Disability Support Service of the Student Counselling and Development Section (SCD), which provides appropriate resources and accommodations to allow each student with a disability to have an equal opportunity in education, university life activities and services at the University of Macau. To learn more about the service, please contact SCD at scd.disability@umac.mo, or 8397 4901 or visit the following website: http://www.umac.mo/sao/scd/sds/aboutus/en/scd_mission.php

Serviço de Apoio aos Estudantes Portadores de Deficiência

A Universidade de Macau (UM) compromete-se a oferecer oportunidades iguais de educação para as pessoas portadoras de deficiência. Caso o aluno tenha deficiência física, visual, auditiva, mental, ou dificuldades de fala ou de aprendizagem, que afectem consideravelmente a sua aprendizagem ou actividades quotidianas, convém comunicar estas dificuldades aos professores para pedir apoio necessário. É também aconselhável contactar o Serviço de Apoio à Deficiência dos Alunos da Secção para Aconselhamento e Desenvolvimento dos Estudantes (SADE), à qual compete oferecer recursos e condições para que os alunos portadores de deficiência tenham oportunidades iguais na educação, actividades e serviços universitários na UM. Para mais informações sobre este serviço, é favor contactar a SADE via email: scd.disability@umac.mo, telefone 8397 4901 ou visitar a página electrónica http://www.umac.mo/sao/scd/sds/aboutus/en/scd_mission.php.