

# 實變數函數論一

## REAL ANALYSIS (I)

NTHU | MATH 5130 | 2025 Fall

### 課程安排 Arrangements

教師：陳國璋 Kuo-Chang Chen

時間：T567 (See Syllabus)

教室：化二223

助教：森田展弘、梁孟豪

### 聯繫方式 Contact Info.

教師辦公室：綜三609

分機：33067

辦公室時間：T8F8

email: kchen@math.nthu.edu.tw

助教將建立Line群組以便聯繫，  
加入方式於課堂宣布

### 教科書 Textbook

E. M. Stein and R. Shakarchi: *Real Analysis*, Princeton University Press, 2005.

### 參考書 References

H. L. Royden: *Real Analysis*, Macmillan, 1988.R. L. Wheeden and A. Zygmund: *Measure and Integral - An introduction to Real Analysis*, Marcel Dekker, 1977.

### 課程簡介 Course Description

This course is an introduction to the theory of measure and integration. In the first semester we will introduce Lebesgue's theory of measure and integration. Topics to be covered include:

1. Preliminaries on set theory
2. Lebesgue measure
3. Lebesgue integral
4. Differentiation and integration

### 課程大綱 Syllabus

There will be a total of 14 lectures, 6 recitation classes, two exams. Lectures and exam are scheduled as follows.



## 評分方式 Grading

小考/作業 Quizzes/Homework  
Selected exercises from Chapter 1~3 in Stein-Shakarchi's book will be assigned. Some of them will be collected and graded. Quizzes will be based on homework assignments.

期中考 Midterm (1.1~2.2)  
2025/10/28

期末考 Final Exam (2.3~3.3)  
2025/12/16

計分方法一：  
作業小考、期中考、期末考各佔1/3

計分方法二：  
期中考、期末考各佔1/2

## 出席與缺席 Attendance

Students are expected to attend every scheduled class. It is the student's responsibility to keep informed of any announcements, syllabus adjustments or policy changes made during scheduled classes.

You should miss an exam only for the most compelling reasons and you should obtain permission in advance, except in some extraordinary circumstances. If you miss an exam for legitimate reasons, then a make-up exam will be arranged.

週次	日期	進度	備註
1	9/2	Chap 1. Preliminaries – sets, algebra, topology	
2	9/9	Chap 1. Exterior measure	
3	9/16 $\ominus$	Chap 1. Measurable sets	研習課
4	9/23	Chap 1. Lebesgue measure	
5	9/30	Chap 1. Measurable functions	研習課
6	10/7	Chap 1. Approximations Littlewood's principles	
7	10/14 $\ominus$	Chap 2. Lebesgue integral	研習課
8	10/21	Chap 2. Convergence theorems	
9	10/28	期中考	
9	10/31 $\oplus$	Chap 2. Integrable functions	
10	11/4	Chap 2. Repeated integration	
11	11/11	Chap 3. Covering lemma Maximal function	研習課
12	11/18 $\ominus$	Chap 3. Lebesgue differentiation	
13	11/25	Chap 3. Good kernels, Approximation to identity	研習課
14	12/2	Chap 3. Functions of bounded variations	
15	12/9 $\ominus$	Chap 3. Absolute continuous functions	研習課
16	12/16	期末考	

**The course will be held from**

**13:20-14:40, 15:00-16:20,**

**except on dates with special symbols:**

**9/16  $\ominus$**

**14:30-15:20, 15:30-16:20,**

**10/31 (Friday)  $\oplus$**

**15:30-16:20, 16:30-17:20,**

**10/14, 11/18, 12/9  $\ominus$**

**13:10-14:00, 15:30-16:20.**

