

# 實變數函數論二

## REAL ANALYSIS (II)

### 課程安排 Arrangements

教師：陳國璋 Kuo-Chang Chen

時間：M56R56

教室：綜三101

助教：劉振宏

### 聯繫方式 Contact Info.

教師辦公室：綜三609

分機：33067

辦公室時間：T78

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 second semester we will introduce some elements of functional analysis, abstract measure and integration. Topics to be covered include:

1. Introduction to Banach spaces and  $L^p$
2. Introduction to Hilbert spaces and  $L^2$
3. Abstract measure and integration
4. Hausdorff measure and fractals

For the first topic, I will use my lecture notes, together with materials from Wheeden-Zygmund's book [WZ] (section 5.4, Chap 8, 9). We follow Stein-Shakarchi's book [SS] for other topics.



## 評分方式 Grading

### 作業 Homework

Selected exercises from lecture notes and Chapters 4~7 in [SS] will be assigned. Some of them will be collected and graded.

Recitations (optional) are discussions of homework assignments.

### 期中考 Midterm

2024/4/18 Banach spaces and  $L^p$ , Hilbert spaces and  $L^2$

### 期末考 Final Exam

2024/06/17 Abstract measure and integration, Hausdorff measure and fractals (Chapters 6, 7 of [SS])

### 計分方法一：

作業20%、期中考40%、期末考40%

### 計分方法二：

期中考、期末考各佔50%

## 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.

## 課程大綱 Syllabus

There will be a total of 23/24 lectures, 6 recitation classes, each of them will be 2 hours long. They are scheduled as follows.

週次	週一	進度	週四	進度
1	2/19	Banach & $L^p$	2/22	Banach & $L^p$
2	2/26	Banach & $L^p$	2/29	Banach & $L^p$
3	3/04	演習課	3/07	Banach & $L^p$
4	3/11	Banach & $L^p$	3/14	Banach & $L^p$
5	3/18	Hilbert & $L^2$	3/21	演習課
6	3/25	Hilbert & $L^2$	3/28	Hilbert & $L^2$
7	4/01	Hilbert & $L^2$	4/04	清明節放假
8	4/08	Hilbert & $L^2$	4/11	演習課
9	4/15	Chapter 6	4/18	期中考
10	4/22	Chapter 6	4/25	Chapter 6
11	4/29	Chapter 6	5/02	演習課
12	5/06	Chapter 6	5/09	Chapter 6
13	5/13	Chapter 7	5/16	Chapter 7
14	5/20	演習課	5/23	Chapter 7
15	5/27	Chapter 7	5/30	Chapter 7
16	6/03	(Chapter 7)	6/06	演習課
17	6/10	端午節放假	6/13	溫書假
18	6/17	期末考		

