



## 教學計劃表 Syllabus

課程名稱(中文) Course Name in Chinese	偏微分方程AB		學年/學期 Academic Year/Semester	113/2	
課程名稱(英文) Course Name in English	Partial Differential Equations				
科目代碼 Course Code	AM_4061AB	系級 Department & Year	學三	開課單位 Course-Offering Department	應用數學系
修別 Type	學程 Program	學分數/時間 Credit(s)/Hour(s)	3.0/3.0		
授課教師 Instructor	/胡鎔				
先修課程 Prerequisite					
課程描述 Course Description					
介紹一階偏微分方程，二階線性偏微分方程(包含雙曲，橢圓，拋物三種型態)，簡易的傅立葉變換，波方程與熱傳導方程。					
課程目標 Course Objectives					
1. 讓學生瞭解偏微分方程的發展和一般方程基本模型建構過程。 2. 讓學生熟習偏微分方程的思考方式以及熟悉這門領域對物理、工程以及生態科學等的直接影響。 1.To understand the recent development of PDE and mathematical modeling. 2.To study the analysis method of PDE and how this subject effects the fields of physics, engineering and ecology sciences.					
系專業能力 Basic Learning Outcomes					課程目標與系專業能力相關性 Correlation between Course Objectives and Dept.'s Education Objectives
A	具備基本數學知識及邏輯推理能力。Have well-founded background in mathematics and be capable of logical reasoning.				●
B	具備學習數學相關領域的預備知識。Be knowledgeable about fields related to mathematics.				●
C	具備軟體應用與科學計算能力。Be able to use mathematics software and scientific computation skill in problem-solving.				○
圖示說明Illustration : ● 高度相關 Highly correlated ○ 中度相關 Moderately correlated					
授課進度表 Teaching Schedule & Content					
週次Week	內容 Subject/Topics				備註Remarks
1	Chapter 1: First-Order Equations				Exercises: Section 1.1: 1~8 Section 1.2: 1, 3, 6, 8, 10, 13
2	Chapter 1: First-Order Equations Chapter 2: Linear Second-Order Equations				Section 1.3: 2, 4, 6 Section 1.4: 2, 4, 6, 8, 10, 11 Section 2.1: 2~10
3	Chapter 2: Linear Second-Order Equations				Section 2.2: 2(a,d), 3(b,d), 4, 5 Section 2.3: 3(b,c), 4 Section 2.4: 2, 4, 5

4	Chapter 2: Linear Second-Order Equations	Extra exercises (p.37): 4, 6, 10 Section 2.6: 2, 4, 7, 9, 10 Section 2.7: 3, 4, 7
5	Chapter 3: Elements of Fourier Analysis	Section 2.8: 1 Section 3.1: 1~3 Section 3.2: 1~2
6	Chapter 3: Elements of Fourier Analysis	Section 3.3: 2, 3(a, c, g), 4(c, d), 5-8 Section 3.5: 1, 3, 5, 8
7	Chapter 3: Elements of Fourier Analysis Chapter 4: The Wave Equation	Section 3.6: 3, 5, 7, 9, 11, 13, 15~27 Section 3.7: 1, 3, 4, 6, 7
8	Chapter 4: The Wave Equation	Section 4.1: 1, 3, 7, 10~13 Section 4.2: 1, 3, 5 Section 4.3: 1, 2
9	期中考試週 Midterm Exam: 04/15期中考 Chapter 4: The Wave Equation	Section 4.4: 1, 5, 9 Section 4.5: 1, 5, 9 Section 4.6: 1, 5, 9
10	Chapter 4: The Wave Equation	Section 4.7: 5, 7, 9
11	Chapter 4: The Wave Equation	
12	Chapter 4: The Wave Equation Chapter 5: The Heat Equation	
13	Chapter 5: The Heat Equation	
14	Chapter 5: The Heat Equation	
15	Chapter 5: The Heat Equation	
16	Chapter 5: The Heat Equation Section 8.3: Burger's Equation	
17	期末考試週 Final Exam: 06/10期末考	
18	彈性補充教學	

教學策略 Teaching Strategies

- 課堂講授 Lecture       分組討論 Group Discussion       參觀實習 Field Trip  
 其他 Miscellaneous:

教學創新自評 Teaching Self-Evaluation

創新教學 (Innovative Teaching)

- 問題導向學習 (PBL)       團體合作學習 (TBL)       解決導向學習 (SBL)  
 翻轉教室 Flipped Classroom       磨課師 Moocs

社會責任 (Social Responsibility)

- 在地實踐 Community Practice       產學合作 Industry-Academia Cooperation

跨域合作 (Transdisciplinary Projects)

- 跨界教學 Transdisciplinary Teaching       跨院系教學 Inter-collegiate Teaching  
 業師合授 Courses Co-taught with Industry Practitioners

其它 other:

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學期成績計算及多元評量方式 Grading & Assessments

配分項目 Items	配分比例 Percentage	多元評量方式 Assessments							
		測驗 會考	實作 觀察	口頭 發表	專題 研究	創作 展演	卷宗 評量	證照 檢定	其他
平時成績 General Performance									
期中考成績 Midterm Exam	50%								
期末考成績 Final Exam	50%								
作業成績 Homework and/or Assignments									
其他 Miscellaneous (_____)									

評量方式補充說明

Grading & Assessments Supplemental instructions

教科書與參考書目 (書名、作者、書局、代理商、說明)

Textbook & Other References (Title, Author, Publisher, Agents, Remarks, etc.)

(教科書) 請至學校圖書館網頁下載或線上閱讀以下電子書一冊。 使用時切勿觸犯著作權。

Peter V. O'Neil: Beginning Partial Differential Equations, 2nd. Ed., Wiley Interscience, 2008.

(參考書) 請至學校圖書館網頁下載或線上閱讀以下電子書一冊。 使用時切勿觸犯著作權。

Marcelo Epstein: Partial Differential Equations, Mathematical Techniques for Engineers, Springer, 2017.

課程教材網址(含線上教學資訊, 教師個人網址請列位於本校內之網址)

Teaching Aids & Teacher's Website(Including online teaching information.  
Personal website can be listed here.)

其他補充說明 (Supplemental instructions)

實際教學進度或有調整。