



教學計劃表 Syllabus

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| 課程名稱(中文) Course Name in Chinese | 資料科學 | | 學年/學期 Academic Year/Semester | 112/1 |
| 課程名稱(英文) Course Name in English | Data Science | | | |
| 科目代碼 Course Code | EC_M5700 | 系級 Department & Year | 碩士 | 開課單位 Course-Offering Department |
| 修別 Type | 選修 Elective | 學分數/時間 Credit(s)/Hour(s) | 3.0/3.0 | |
| 授課教師 Instructor | /李同蘇 | | | |
| 先修課程 Prerequisite | | | | |
| 課程描述 Course Description | | | | |
| Data Science is the study of the generalizable extraction of knowledge from data. Data scientist use those studies to make predictions and find insights from the data. In this class R is the primary tool to do the analytical works. I will introduce various methods in three major areas which are data manipulation, visualization and fundamental statistical learning. | | | | |
| 課程目標 Course Objectives | | | | |
| 1、Manipulating data for analysis 2、Visualizing data for analytical purpose 3、Utilizing different statistical tools to analyze data | | | | |
| 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 | 數理分析能力：通曉經濟學的進階理論技巧，應用數學與賽局解決經濟議題的能力。 Mathematical analysis skills: Mastering in intermediate application of mathematical theories and game theory in analyzing economic issues. | | | ● |
| B | 實證經濟分析能力：通曉經濟學的進階實證技巧，善用資訊科技進行資訊蒐集、資料統計與計量分析。 Empirical analysis skills: Mastering in intermediate application of statistics and econometrics in data collection and examination. | | | ● |
| C | 微觀經濟之闡釋能力：通曉進階個體經濟學相關的理論與應用。 Microeconomic perspective: Thorough understanding of intermediate microeconomic theories and relevant application. | | | ○ |
| D | 宏觀經濟之闡釋能力：通曉進階總體經濟學相關的理論與應用。 Macroeconomic perspective: Thorough understanding of intermediate macroeconomic theories and relevant application. | | | |
| E | 自我調整適應社會之能力：具備適應現代社會的學養以及就業能力。 Employment opportunities: capabilities of working on important policy and decision challenges in business and government | | | |
| F | 溝通表達能力：思路清晰，有能力與人溝通並撰寫進階專業研究報告。 Communication skills: Having a clear mind and capability in writing an intermediate professional academic report. | | | ○ |
| 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 | Introduction | | | |

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|----|---|--|
| 2 | R Basic | |
| 3 | Data wrangling | |
| 4 | Graphics and Statistical learning, ISL, Ch. 2 | |
| 5 | No class, national holiday | |
| 6 | Linear regression, ISL, Ch. 3 | |
| 7 | Classification, ISL, Ch. 4 | |
| 8 | Resampling methods, ISL, Ch. 5 | |
| 9 | Midterm project presentation | |
| 10 | Linear model selection and regularization, ISL, Ch. 6 | |
| 11 | Moving beyond linearity, ISL, Ch. 7 | |
| 12 | Tree-based methods, ISL, Ch. 8 | |
| 13 | Support vector machine, ISL, Ch. 9 | |
| 14 | Unsupervised learning, ISL, Ch. 10 | |
| 15 | Association analysis | |
| 16 | Neural networks and deep learning | |
| 17 | no class, New Year Day | |
| 18 | Final exam and project presentation | |

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:

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 | 20% | | ✓ | | | | | | |
| 期中考成績 Midterm Exam | | | | | | | | | |
| 期末考成績 Final Exam | | | | | | | | | |
| 作業成績 Homework and/or Assignments | 40% | | ✓ | | | | | | |
| 其他 Miscellaneous (Project) | 40% | | ✓ | | ✓ | | | | |

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.)

Recommended Textbook: Introduction to Statistical Learning (ISL), James, Witten, Hastie and Tibshirani, 2017.

R for Data Science, Golemund and Wickham, r4ds.had.co.nz

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)