國立東華大學

教學計劃表 Syllabus

課程名稱(中文) Course Name in Chinese	資料科學			學年/學期 Academic Year/Semester	111/1
課程名稱(英文) Course Name in English	Data Science				
科目代碼 Course Code	EC__D0060	系級 Department & Year	博士	開課單位 Course-Offering Department	經濟學系
修別 Type	選修 Elective	學分數/時間 Credit(s)/Hour(s)	3.0/3.0		
授課教師 Instructor	/李同龢				
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 anlaysis
2、Visualizing data for analytical purpose
3、Utilizing different 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：通曉經濟學的高階理論技巧，應用數學與賽局解決經濟議題的能力Mathematical analysis skills: Mastering in advanced application of mathematical theories and game theory in analyzing economic issues	●
B	實證經濟分析能力：通曉經濟學的高階實證技巧，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 advanced application of statistics and econometrics in data collection and examination	●
C	微觀經濟之闡釋能力：通曉高階個體經濟學相關的理論與應用Microeconomic perspective: Thorough understanding of advanced microeconomic theories and relevant application	○
D	宏觀經濟之闡釋能力：通曉高階總體經濟學相關的理論與應用Macroeconomic perspective: Thorough understanding of advanced macroeconomic theories and relevant application	
E	樂活能力：具備適應現代社會的高階學養以及就業能力Employment opportunities: Capabilities of advanced 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高階專業研究報告Communication skills: Having a clear mind and profound ability in presenting advanced professional academic research	○

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	
2	R Basic	

3	Data wrangling	
4	No class, national holiday	
5	Graphics and Statistical learning, ISL, Ch. 2	
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	Text mining	
18	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 Industy-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, Grolemund 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.)

Online class, if any.
https://meet.google.com/wxm-xmtn-yqj

其他補充說明 (Supplemental instructions)