課程大綱
Program Syllabus

系所 Department	企業管理研究所 / Graduate Institute of Business Administration	必選修 compulsory/elective	選修 elective
課程名稱 (含英文名稱) Course title	大數據程式設計(含 Python)(一) Big Data Analysis with Python (I)	學分數 Credit(s)	3
學年/學期 academic year/Semester	109-2 學期 Spring semester 2021	上課地點 Classroom	管院 441
講授教師 Instructor	宋豪漳 Hao-Chang Sung	上課時間 Time	Monday, 13:10PM~16:00PM

教師辦公室&諮詢時間 Instructor office number & office hour	管院 421 Thursday, 14:30-16:00 PM	教師聯絡資訊 Instructor Contact	Phone: TBA Email: frrg4125@hotmail.com
助教 Teaching assistant	TBA	助教聯絡資訊 TA contact	Email: TBA

先修課程 Pre-requisite courses	統計學、微積分、基礎編程能力 Statistics, Calculus, Basic Programming Skills
課程目標 Course Objective	This course is an introduction to use Python and stochastic and statistics for financial Big data analysis. Issues to be explored include: a. Visualizing and Munging Stock Data b. Statistics: Radom variables and Distribution, Sampling and Inference, Linear Regression Models for Financial Analysis, Bayesian Regression. c. Stochastics: Random Numbers, Simulation for stochastic process, asset pricing, stock option valuation, risk management: VaR, credit risk management, etc.

AACSB 學習品質保證學習目標 Assurance of Learning (AOL) Learning goals
***請先選填為主要或次要學習目標(Major or minor learning goal)，再選擇對應之學習目標**

主要學習目標 Major learning goal **目標 1：創新思考 LG1:Creative Thinking**	**主要學習目標 Major learning goal** **目標 4：全球視野 LG4:Global Perspectives**	**次要學習目標 Minor learning goal** **目標 2：溝通能力 LG2:Communication Skills**

教材 Teaching materials	Teaching materials are selections of texts and handouts used in class. These handouts are made available only for the personal use of the students.
網址 Course website	TBA
教科書/參考書 Textbooks/Reference	**Textbooks:** 1. Wes McKinney, (2018). *Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython*. 2nd edition, O'Reilly Media.

<table>
<tr><td></td><td colspan="4">2. Yves Hilpisch, (2019). Python for Finance: Analyze Big Financial Data. 2nd edition, O’Reilly Media.
Reference:
2. Jake VanderPlas, (2017). Python Data Science Handbook: Essential Tools for Working with Data. O'Reilly Media.
3. Stefanie Molin, (2019). Hands-On Data Analysis with Pandas: Efficiently perform data collection, wrangling, analysis, and visualization using Python. Packt Publishing.</td></tr>
<tr><td rowspan="6">評量方式(請填百分比)
Assessment</td><td>課堂參與 Participation</td><td>20%</td><td>個案討論 Case study</td><td>%</td></tr>
<tr><td>作業 Homework</td><td>20%</td><td>專題 Project</td><td>30%</td></tr>
<tr><td>小考 Quiz</td><td>30%</td><td>其他 1 other ( )</td><td>%</td></tr>
<tr><td>期中考 Midterm</td><td>%</td><td>其他 2 other ( )</td><td>%</td></tr>
<tr><td>期末考 Final</td><td>%</td><td>其他 3 other ( )</td><td>%</td></tr>
<tr><td>報告 Presentation</td><td>%</td><td>其他 4 other ( )</td><td>%</td></tr>
<tr><td>其他說明
Other description</td><td colspan="4">1. 研究生、開放大三、大四上修
The course will be offered for graduate students and undergraduate (junior and senior).
2. Teaching Approach(es):
講述 Lecture: 70%
課堂討論 Class Discussion: 10%
小組活動 Group Activity: 20%
3. Course Contents:
i. Class Participation/Attendance (20%)
Class attendance and participation are important. Students need to send an e-mail for their excuse of absences in advance. (In case of an emergency or illness, they are allowed to send me an e-mail after their absence)
ii. Homework Assignments (20%)
Homework assignments will be provided once a week or once two weeks. Students are required to hand in before the deadline.
iii. Quiz (30%)
There will be two quizzes for this course. Each quiz will consist of 2 to 3 essay questions and analyses and calculations problems. Each exam grading is based on a 100-point basis.
iv. Final Project (30%)
a. Students need to do a final data project designed to engage in the data science process using this course's tools and the data analysis from end-to-end using knowledge of this course.
b. Students will form a team (2-3 students) and present the projects in the last two weeks. Each group will be required to analyze a topic of choice and present the findings.</td></tr>
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	c. Each group will acquire and clean the data; use tools from the course to explore, describe, analyze the data, and evaluate the results to make predictions. By engaging in the final project, each group should be confident in the course material knowledge.

課程規劃表 Course Schedule

週次 week	日期 Date	內容 Description	教材章節 Textbook	其他說明 Remark
1.	2/22	1. Course Overview 2. Introduction: a. Why Python for Financial data analysis b. Essential Python Libraries	Ch.1 of Hilpisch, (2019)	
2.	3/1	228 Peace Memorial day		
3.	3/8	Python Programming Basic: a. Python Language Semantics b. Scalar Types	Ch.2 of McKinney (2018)	
4.	3/15	Python Programming Basic: c. Control Flow	Ch.2 of McKinney (2018)	
5.	3/22	Built-in Data Structures	Ch.3 of McKinney (2018)	
6.	3/29	NumPy Basics: Arrays and Vectorized Computation (I)	Ch.4 of Hilpisch, (2019) & Ch.4 of McKinney (2018)	
7.	4/5	Tomb Sweeping Day/Qingming Festival		
8.	4/12	NumPy Basics: Arrays and Vectorized Computation (II)	Ch.4 of Hilpisch, (2019) & Ch.4 of McKinney (2018)	
9.	4/19	Getting Started with Pandas.	Ch.5 of Hilpisch, (2019) & Ch.5 of McKinney (2018)	
10.	4/26	Quiz 1 a. Quiz for Python Basic Skills		

11.	5/3	Application in Data Analysis (1): Data visualization	Ch.7 of Hilpisch, (2019) & Ch.9 of McKinney (2018)	
12.	5/10	Application in Data Analysis (2): Financial Time Series	Ch.8 of Hilpisch, (2019) & Ch.11 of McKinney (2018)	
13.	5/17	Application in Data Analysis (3): Stochastic and Statistics	Ch. 12, 13 of Hilpisch, (2019)	
14.	5/24	Application in Data Analysis (4): Stochastic and Statistics	Ch. 12, 13 of Hilpisch, (2019)	
15.	5/31	Application in Data Analysis (5): Linear Regression	Ch. 15 of Hilpisch, (2019)	
16.	6/7	Application in Data Analysis (6): Simulation of Financial Markets	Ch.18 of Hilpisch (2019)	
17.	6/14	Dragon Boat Festival		
18.	6/21	Final Project Presentation		