國立東華大學

教學計劃表 Syllabus

課程名稱(中文) Course Name in Chinese	時間序列分析			學年/學期 Academic Year/Semester	113/1
課程名稱(英文) Course Name in English	Time Series Analysis				
科目代碼 Course Code	AM__50700	系級 Department & Year	碩士	開課單位 Course-Offering Department	應用數學系
修別 Type	選修 Elective	學分數/時間 Credit(s)/Hour(s)	3.0/3.0		
授課教師 Instructor	/黃灝勻				
先修課程 Prerequisite					

課程描述 Course Description

This course delves into the fundamental principles and advanced techniques of time series analysis, aiming to equip students with the ability to analyze, forecast, and interpret time series data. By combining theoretical learning with practical application, students will gain a comprehensive understanding of time series analytical methods. The course integrates theoretical lectures with case study analyses, aiming to enhance students' critical thinking abilities and problem-solving skills. It is suitable for students or professionals in the fields of statistics, economics, and finance. Through this course, students will be able to independently conduct analysis and forecasting of time series data and apply the knowledge in various practical applications.

課程目標 Course Objectives

介紹時間序列分析方法及其理論推展
Introduction of time series models and their mathematical basis.

	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	具備專業機率、統計知識與應用分析能力。Have well-founded expertise in probability and statistics, and good analytical ability in solving real problems.	●
B	具備程式設計與統計計算能力。Have the computer programming and statistical computing skills.	●
C	具備學習其它學科的能力，以期能邁向跨領域研究。Be able to study other fields of science so as to conduct interdisciplinary research in the future.	●

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	Autocorrelation and Partial Autocorrelation Functions	
3	Autocorrelation and Partial Autocorrelation Functions Estimation in Stationary Time Series	
4	Estimation in Stationary Time Series (Autoregressive Moving Average Model)	
5	Estimation in Stationary Time Series (ARMA)	

6	Nonstationary process Autoregressive-integrated Moving Average Model (ARIMA) Seasoanl ARMA Models	
7	Parameter Estimation and Central Limit Theorem for AR(p) Model Autoregressive Conditionally Heteroscedastic Model	
8	Threshold Models, Vector ARIMAX	
9	期中考試週 Midterm Exam	
10	全校運動會	
11	Midterm Exam Review	
12	State Space Models (I)	
13	Discussion	
14	State Space Models (II) Data Analysis	
15	Discussion	
16	Presentation	
17	期末考試週 Final Exam	
18		

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									
期中考成績 Midterm Exam	40%	✓							
期末考成績 Final Exam	60%		✓		✓				
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.)

Analysis of Financial Time Series, by Ruey S. Tsay Publisher: Wiley Time Series Analysis : Univariate and Multivariate Methods Author: William W.S. Wei Publisher: Pearson Addison Wesley Reference: The Econometrics of Financial Markets, by Campbell, Lo and MacKinlay Publisher: Princeton University Press Time Series Analysis, by James D. Hamilton Publisher: Princeton University Press Time Series: Theory and Methods, 2nd ed., by Brockwell and Davis Publisher: Springer-Verlag Time Series Analysis and Its Applications: with R examples Authors: R. H. Shumway and D. S. Stoffer Publisher: Springer

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)