



課 綱 Course Outline
經濟學系博士班國際組

中文課程名稱 Course Name in Chinese		經濟數學			
英文課程名稱 Course Name in English		Mathematics in Economics			
科目代碼 Course Code		EC__D0280	班 別 Degree	博士班 Ph. D.	
修別 Type		選修 Elective	學分數 Credit(s)	1.0	時 數 Hour(s) 1.0
先修課程 Prerequisite					
課程目標 Course Objectives					
The course covers the mathematical structures commonly found in economics. It provides the basic mathematical background needed in quantitative economic analysis. The main focus of the course is the study of optimization theory and its applications to economics.					
系教育目標 Dept.'s Education Objectives					
1	培育具獨立學術研究與專業能力之優秀經濟人才。 Foster potential talents with professional knowledge and empirical skills in economics.				
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	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		
課程大綱 Course Outline		
1. Review of linear algebra: matrix operations; inverse matrix; Cramer' s rule. 2. Univariate calculus and optimization: derivative and differential for functions; rules of differentiation; concavity and convexity of a function. 3. Calculus for functions of n-variables: partial differentiation; total differentials; total derivatives; implicit function theorem; comparative statics. 4. Optimization of functions of n-variables: first-order conditions; second-order conditions. 5. Constrained optimization: Lagrange multiplier method; second-order conditions.		
資源需求評估（師資專長之聘任、儀器設備的配合．．．等） Resources Required (e.g. qualifications and expertise, instrument and equipment, etc.)		
課程要求和教學方式之建議 Course Requirements and Suggested Teaching Methods		
其他 Miscellaneous		