



課 綱 Course Outline  
應用數學系博士班

中文課程名稱 Course Name in Chinese	應用統計線性模型				
英文課程名稱 Course Name in English	Applied Statistical Linear Models				
科目代碼 Course Code	AM_72200	班 別 Degree	博士班 Ph. D.		
修別 Type	選修 Elective	學分數 Credit(s)	3.0	時 數 Hour(s)	3.0
先修課程 Prerequisite	線性代數、基礎機率統計 Linear Algebra, Introduction to Probability				
課程目標 Course Objectives					
Applied linear models for regression, analysis of variance and experimental design are widely used in various application domains. Starting with the simple linear models, we will cover the main topics in linear statistical models such as multiple linear regressions, ANOVA, logistic regression, etc. Students will be exposed to both theoretical and practical aspects of applied linear models. Selected topics such as statistical machine learning, variable selection and PCA will also be briefly addressed if time permits.					
系教育目標 Dept.'s Education Objectives					
1	訓練嚴謹思考與推理能力。 To provide a solid training in rigorous thinking and reasoning ability.				
2	奠定理論與應用數學的基礎知識。 To establish well-founded background knowledge in pure and applied mathematics.				
3	具備跨領域學習能力。 To prepare the students for interdisciplinary study in the future.				
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	具備專業知識及邏輯推理能力 Have well-founded expertise and be capable of logical reasoning.			●	
B	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.			○	

C	具備獨立思考與解決問題的能力。 Be capable of independent thinking and have the problem-solving skills.	○
圖示說明Illustration : ● 高度相關 Highly correlated ○ 中度相關 Moderately correlated		
課程大綱 Course Outline		
1. Simple Linear Regression, Multiple Regression in Matrix Form 2. Gauss-Markov Theorem, Statistical Inferences of General Linear Models 3. Diagnosis, Variable Selection, Model Building and Remedial Measures 4. Qualitative variables, ANOVA, ANCOV		
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.)		
統計專長專任教師、統計計算軟體以及硬體支援。 Faculty with expertise in statistics, statistical computing and hardware supports		
課程要求和教學方式之建議 Course Requirements and Suggested Teaching Methods		
上課方式以講授、問答及討論為主。觀念瞭解及對定理的直覺及詮釋尤其被強調。除理論探討外，將使用統計軟體如R等作一些資料分析的練習並訓練資料分析報告的撰寫 Some possible topics/problems for group projects will be announced early in the class. These projects will be integrated with lectures, data analysis, class discussion and presentation. The statistical freeware R will be used for data analysis.		
其他 Miscellaneous		
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