國立東華大學

課　　綱　Course Outline

應用數學系博士班

中文課程名稱 Course Name in Chinese	統計機器學習				
英文課程名稱 Course Name in English	Statistical Machine Learning				
科目代碼 Course Code	AM__75150	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					

課程目標
Course Objectives

Statistical machine learning is one of the emerging unifying themes arising from statistics, information science. It is important in both theory and practice. This course will provide a general overview of this exciting new branch of research. Using the textbook as our guideline along with hand-on computing exercises, we aim to pave a good ground for further application and theoretical exploration. Because most of the research results are relatively new and fast developing, we will familiar the students with the resources and portals such as related websites, literature databases and benchmark data sites.

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

Introduction: Motivating Questions/Problems
Linear Methods for Regression, Linear Methods for Classification
Basis Expansions and Regularization, Kernel Methods
Boosting, Additive Trees and Ensemble Learning Methods

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.)

Faculty members with expertise in statistical machine learning, softwares for data analysis and exercises, such as R and Matlab.

課程要求和教學方式之建議
Course Requirements and Suggested Teaching Methods

Students will first learn about the important topics in statistical machine learning through lectures and discussions in class. 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

規劃負責老師： 曹振海
系課程委員會審議通過日期：102-1-2：102年11月6日(三)系課委會通過。