105 學年第 1 學期 機器學習 Machine Learning 課程綱要

課程名稱：（中文）機器學習		開課單位	電信碩
（英文）Machine Learning		永久課號	ECM9032

授課教師： 簡仁宗					
學分數	3	必/選修	選修	開課年級	*

先修科目或先備能力：

Calculus, Linear Algebra, Probability & Statistics

課程概述與目標：

Machine learning, a branch of artificial intelligence, is a scientific discipline concerned with the design and development of algorithms that allow computers to evolve behaviors based on empirical data from sensor data or databases. A major focus is to automatically learn to recognize complex patterns and make intelligent decisions based on data. This course shall deliver fundamental theories of machine learning which can be applied for many intelligent information systems.

教科書（請註明書名、作者、出版社、出版年等資訊）	1. C. M. Bishop, Pattern Recognition and Machine Learning, Springer, 2006. 2. S. Watanabe and J.-T. Chien, Bayesian Speech and Language Processing, Cambridge University Press, 2015.

課程大綱		分配時數				備註
單元主題	內容綱要	講授	示範	習作	其他	
	1. Introduction 2. Probability Distributions 3. Linear Models for Regression 4. Linear Models for Classification 5. Kernel Methods 6. Sparse Kernel Methods 7. Mixture Models and EM 8. Approximate Inference					

教學要點概述：

1.學期作業、考試、評量
Midterm Exam (30%), Final Exam (40%), Homework (30%), Class Attendance (<30%)

2.教學方法及教學相關配合事項(如助教、網站或圖書及資料庫等)
Lecture notes and slides will be provided. Teacher assistants are available at PM 19:30-20:30 in ED 912 in week days.

師生晤談	排定時間	地點	連絡方式

		PM17:00-PM18:00 on Monday	ED912	jtchien@nctu.edu.tw

每週進度表

週次	上課日期	課程進度、內容、主題
1		Introduction to Machine Learning
2		Curve Fitting & Model Selection
3		Decision Theory & Information Theory
4		Probability Functions - Binomial, Multinomial, Beta, Dirichlet, Gaussian & Student t Distributions
5		Generative Models - Least Squares & Regularized Least Squares, Maximum Likelihood, Maximum a Posteriori
6		Bayesian Linear Regression, Bayesian Model Comparison & The Evidence Framework
7		Discriminant Function - Least Squares, Fisher's Discriminant & Perceptron Algorithm
8		Discriminative Model - Logistic Regression, Laplace Approximation & Bayesian Logistic Regression
9		Midterm Exam & Homework
10		Kernel Methods
11		Gaussian Process
12		Sparse Kernel Methods
13		Support Vector Machine
15		Relevance Vector Machine
15		Mixture Models and EM
16		Hidden Markov Models
17		Approximate Inference
18		Final Exam & Homework

※ 請同學遵守智慧財產權觀念及勿使用不法影印教科書。

備註：

1. 其他欄包含參訪、專題演講等活動。
2. 請同學遵守智慧財產權觀念及勿使用不法影印教科書。