



# 課 綱 Course Outline

## 資訊工程學系資工組

中文課程名稱 Course Name in Chinese	深度學習基石與實務				
英文課程名稱 Course Name in English	Foundation and Practice of Deep Learning				
科目代碼 Course Code	CSIE51200	班 別 Degree	碩士班 Master' s		
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					
傳授學生深度學習技術相關之理論與培養實務應用能力，作為日後從事機器學習與人工智慧研發之專業基礎。 To teach students the theory and practical application ability related to deep learning technologies as the professional foundation for their future research and development in machine learning and artificial intelligence.					
系教育目標 Dept.' s Education Objectives					
1	探究學科知識，善用專業技能 Explore academic knowledge, utilize professional skills.				
2	訓練評析思考，創新解決問題 Exercise analytical thinking, enhance creative problem solving skills.				
3	學習團隊分工，強化溝通表達 Participate in teamwork, strengthen communication skills.				
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	統合資工知識技術之能力 Ability to integrate knowledge and technologies of computer science and information engineering.			●	
B	設計技術理論驗證實驗之能力 Ability to design and conduct science experiments and to validate hypotheses.			●	
C	資訊軟硬體設計開發之能力 Ability to design and develop computer software and hardware.			●	

D	團隊專案開發之能力 Ability to design and develop team projects.	●
E	批判性思考與創新研發之能力 Ability of analytical thinking, creative research planning, and innovative development.	●
圖示說明Illustration：● 高度相關 Highly correlated ○ 中度相關 Moderately correlated		
課程大綱 Course Outline		
1. 深度學習簡介 (Introduction to Deep Learning) 2. 淺層神經網路與逆傳學習演算法 (Shallow Neural Networks and Backpropagation Learning) 3. 深度學習框架程式開發 (Program Development Using Deep Learning Frameworks) 4. 卷積神經網路 (Convolutional Neural Networks) 5. 循環神經網路 (Recurrent Neural Networks) 6. 生成式對戰網路 (Generative Adversarial Networks) 7. 自編碼網路 (Autoencoder Networks) 8. 加強式學習網路 (Reinforcement Learning Networks) 9. 回歸分析 (Regression) 10. 辨識物件 (Object Recognition) 11. 偵測物件 (Object Detection) 12. 風格轉移 (Style Transfer) 13. 機器翻譯 (Machine Translation) 14. 圖像生成 (Picture Generation) 15. 圖轉文字說明 (Figure to Caption) 16. 其他應用概述 (Miscellaneous Applications)		
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.)		
師資以具機器學習與神經網路研發專長與經驗為佳，課程須有安裝Tensorflow/PyTorch與Keras框架之PC配合。		
課程要求和教學方式之建議 Course Requirements and Suggested Teaching Methods		
教學方式以面授為主，線上相關教學影片為輔。 全學期應至少一次考試(期中考或期末考)並搭配至少三次程式作業或專案。 The classes are lectured by oral presentations with some online tutorial videos as supplementaries. The evaluation will be done via at least one exam (midterm or final term) and at least three programming assignments or projects.		
其他 Miscellaneous		