國立陽明交通大學資訊工程學系	課程名稱: **Deep Learning (深度學習)**		
授課/指導教師	彭文孝(Peng)、吳毅成(Wu)、陳永昇(Chen)	連絡方式	wpeng@cs.nctu.edu.tw icwu@cs.nctu.edu.tw yschen@nycu.edu.tw
助教	高宗霖 林廷翰 曾昱仁 廖唯辰 陳昱丞 劉子齊 石偉辛		zxc1679876.cs11@nycu.edu.tw freefrit.en11@nycu.edu.tw alan90817@gmail.com xaviliaoweichen@gmail.com yucheng.cs11@nycu.edu.tw jonathan.tzuchi.liu@gmail.com s0302.cs11@nycu.edu.tw
先修課程	Linear Algebra, Probability Theory, Machine Learning (suggested)	授課對象	大四及研究生

分組方式	師資人力	其他規劃
3人/組(Paper and Final) 1人/組(Lab)	指導教師 3 人 助教 7 人	(1) To submit final projects as academic papers (2) To hold exhibition to showcase final projects (3) To encourage students to participate in various challenges in the fields of computer vision, gaming, data analytics, etc.

課程目標 (objectives)	(1) To understand the math of deep learning techniques (2) To familiarize with deep learning tools, such as PyTorch, Tensor Flow, etc. (3) To understand the latest developments and applications of deep learning techniques (4) To develop practical working systems
評分方式	Labs (done individually) 40%, Paper presentation (done in groups of 3 members) 20% Final project (done in groups of 3 members) 20% Final exam 20%

預定使用教材	用途	教材名稱	教材來源(請註明所佔比重) 自行編寫	現有出版品
	上課	1. I. Goodfellow, Y. Bengio, and A. Courville, *Deep Learning*, 1st Ed., MIT Press, Dec. 2016 2. R. S. Sutton and A. G. Barto, Reinforcement Learning: An Introduction, Nov. 2017	50%	50%

課程內容及上課方式

課程內容大綱 (下午)	date	課程內容大綱 (晚上)	date
A. Introduction	July. 4 (Peng)	Warm-up (Python + PyTorch)	July. 4
B. Machine Learning Basics ■ Linear Algebra ■ Probability and Information Theory ■ Numerical Computation	July. 6 (Peng)	**C . Deep Networks** ■ Deep Feedforward Networks ■ Convolutional Networks	July. 6 (Chen)
Back-Propagation (Lab 1)	July. 11	■ Convolutional Networks	July. 11 (Chen)
■ Convolutional Networks & Transformers	July. 13 (Chen)	**D. Deep Reinforcement Learning** ■ Introduction to Reinforcement Learning	July. 13 (Wu)

Convolutional Nets (Lab 2)	July. 18	■ Reinforcement Learning for Lightweight Model	July. 18 (Wu)
■ Recurrent and Recursive Nets	July. 20 (Peng)	No class	July. 20
E. Deep Learning Research ■ Linear Factor Models ■ Autoencoders	July. 25 (Peng)	■ Valued Based Reinforcement Learning	July. 25 (Wu)
■ Autoencoders ■ Generative Adversarial Networks	July. 27 (Peng)	Convolutional Nets (Lab 3)	July. 27
■ Generative Adversarial Networks	Aug. 1 (Peng)	No class	Aug. 1
■ Normalizing Flows	Aug. 3 (Peng)	Recurrent Nets and Variational autoencoders (Lab 4)	Aug. 3
■ Diffusion Models	Aug. 8 (Peng)	No class	Aug. 8
■ Monte Carlo Method	Aug. 10 (Peng)	Deep Reinforcement Learning (Lab 5)	Aug. 10
■ Graph Convolutional Neural Networks	Aug. 15 (Peng)	Diffusion models (Lab 6)	Aug. 15
No class	Aug. 17	Paper Presentation	Aug. 17
Paper Presentation	Aug. 22	Paper Presentation	Aug. 22
Paper Presentation	Aug. 24	Paper Presentation	Aug. 24
Final Exam	Aug. 29	No class	Aug. 29
Final Project Presentation	Aug. 31		