Syllabus for NYCU students

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)、陳永昇(Chen) 、謝秉均(Hsieh)	連絡方式	wpeng@cs.nctu.edu.tw yschen@nycu.edu.tw pinghsieh@cs.nycu.edu.tw
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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 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	Part I (3 credits) - 深度學習 4 Labs (including Labs 0, 2, 5, and 6) (done individually) 80% Final exam 20% Part II (3 credits) - 深度學習與實務 4 Labs (including Labs 1, 3, 4, and 7) 50% Paper presentation (done in groups of 3 members) 25% Final project (done in groups of 3 members) 25%

	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
預定使用教材	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. 2020	50%	50%

課程內容及上課方式

課程內容大綱 Afternoon Class	date	搭配實驗/實習項目 Evening Class	date
Introduction & Machine Learning Basics ■ Linear Algebra ■ Probability and Information Theory ■ Numerical Computation	7/1	**Warm-up (Lab 0)**	7/1
Deep Networks ■ Deep Feedforward Networks	7/3	**Back-Propagation (Lab 1)**	7/3

■ Convolutional Networks			
■ Convolutional Networks	7/8	Convolutional Networks & Transformers **Convolutional Nets (Lab 2)**	7/8
■ Introduction to Reinforcement Learning	7/10	No class	7/10
■ Recurrent and Recursive Nets	7/15	**MaskGIT (Lab 3)**	7/15
■ Linear Factor Models ■ Autoencoders	7/17	No class	7/17
■ Generative Adversarial Networks	7/22	**CVAE (Lab 4)**	7/22
■ Valued-Based Reinforcement Learning	7/24	No class	7/24
■ Policy-Based Reinforcement Learning	7/29	**Discrete Control (Lab 5)**	7/29
■ Diffusion Models	7/31	No class	7/31
■ Normalizing Flows	8/5	**Diffusion (Lab 6)**	8/5
Final Project Proposal	8/7	**Final Project Proposal**	8/7
■ Model-Based RL	8/12	**Continuous Control (Lab 7)**	8/12
No class	8/14	No class	8/14
Paper Presentation	8/19	**Paper Presentation**	8/19
Paper Presentation	8/21	**Paper Presentation**	8/21
Final Exam	8/26	No class	8/26
Final Project Demo	8/28	No class	8/28