

10920IPHD501400
Introduction to Deep Learning

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Course Overview:

In this Introduction to Deep Learning course, you will learn the mathematical foundations, how to build neural networks from scratch via Python, take advantage of different frameworks such as tensorflow and keras and learn how to duplicate the results from previous deep learning scientific papers.

Tentative Calendar (Monday 17:30~19:20)

| Week | Date | Topic |
|------|------|--|
| 1 | 2/22 | Course Overview |
| 2 | 3/1 | 228 Peace Memorial Day (No Class) |
| 3 | 3/8 | Neural Network Basics (Part I) |
| 4 | 3/15 | Neural Network Basics (Part II) |
| 5 | 3/22 | Hyperparameters Tuning |
| 6 | 3/29 | Deep Learning Strategy |
| 7 | 4/5 | Tomb Sweeping Festival and Children's Day (No Class) |
| 8 | 4/12 | CNN (Part I) |
| 9 | 4/19 | CNN (Part II) |
| 10 | 4/26 | CNN/RNN |
| 11 | 5/3 | Mid-term Exam |
| 12 | 5/10 | Github Code Demo |
| 13 | 5/17 | Guest Lecture by NVIDIA |
| 14 | 5/24 | Student Projects Presentation |
| 15 | 5/31 | Student Projects Presentation |

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| 16 | 6/7 | <i>Student Projects Presentation</i> |
| 17 | 6/14 | <i>Dragon Boat Festival (No Class)</i> |
| 18 | 6/21 | <i>Company Tour</i> |

Grading:

Homeworks (40%)

Assignments to get familiar with deep learning programming.

Midterm (30%)

Basic concepts of deep learning and related mathematical derivation.

Final Project Presentation (30%)

A project presentation of a research paper in Deep Learning fields and implement its github code.

References:

- Goodfellow, I., Bengio, Y., and Courville, A., "Deep Learning," 2016.
- Francois Chollet (creator of Keras), "Deep Learning with Python," 2017.
- Schmidhuber, Juergen, "Deep Learning in Neural Networks: An Overview," Neural Networks 61: 85-117, 2015.
- Bengio, Y., LeCun, Y., and Hinton, G., "Deep Learning," Nature 521: 436-44, 2015.

Online Resources:

- Goodfellow, I., Bengio, Y., and Courville, A., "Deep Learning," 2016. (<http://www.deeplearningbook.org>)
- Deep Learning Specialization by Andrew Ng <https://www.youtube.com/c/Deeplearningai/playlists>
- NVIDIA Deep Learning Institute <https://www.nvidia.com/en-us/training/>
- TensorFlow 2 quickstart for beginners <https://www.tensorflow.org/tutorials/quickstart/beginner>
- NVIDIA NGC <https://www.nvidia.com/zh-tw/gpu-cloud/containers/>
- Python Tutorial <https://www.w3schools.com/python/>
- Python Numpy Tutorial (with Jupyter and Colab) <https://cs231n.github.io/python-numpy-tutorial/>
- 莫烦Python <https://mofanpy.com/>