Deep Learning

Bernhard Kainz and Yingzheng Li

Learning outcomes

- After this course you will know a little bit more about:
  - Feature extraction, convolutions and CNNs
  - Common Network architectures
  - Automatic parameter optimisation
  - RNNs, LSTMs, GRUs
  - VAEs and GANs
  - GNNs
  - Deep learning programming frameworks
  - Applications of deep learning

Delivery team 2022

Bernhard Kainz, part I

Yingzheng Li, part II

CSLs:

- Harry Coppock
- Alex Spies
- Athanasios Vlontzos

GTAs:

- Giorgos Bouritsas
- Hadrien Reynaud
- Konstantinos Barmpas
- Matthew Baugh
- Najla Al Futaisi
- Padmanaba Srinivasan
- Qiang Ma
- Shikun Liu
- Shreshth Tuli
- Tycho Van Der Ouderaa
- Liu Li
- Weitong Zhang

Good to know

70015 Mathematics for ML (recommended)
60012 Introduction to ML (soft prerequisite, please read the basic ML notes if you haven't done this course)
60006 Computer vision
zz70014 ML for imaging
70016 Natural language processing

70028 Reinforcement learning

Reference

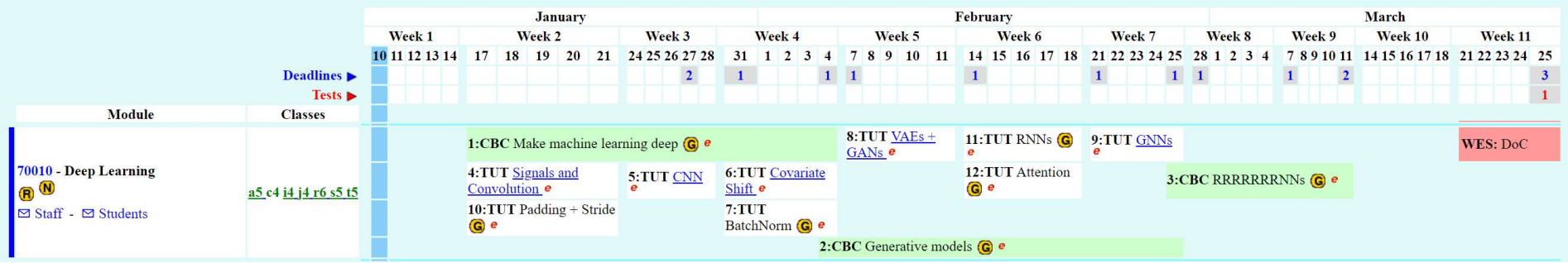
- Dive into Deep Learning https://d2l.ai/
- I. Goodfellow, Y. Bengio, A. Courville, *Deep learning*. MIT Press, 2016 www.deeplearningbook.org
- Some lectures have been heavily influenced by Material from Michael Bronstein, Kilian Weinberger, Stefanos Zafeiriou, Andreas Maier, Alex Smola, Serena Yeung, Fei-Fei Li

Structure

- Lecture – theory and main concepts: videos. Experimental new format. Feedback welcome but be lenient please.
- Lecture – Q&A on MS Teams with lecturers
  - Post and discuss questions in advance on EdStem please
- Tutorials – Q&A sessions with TAs on Teams
  - Post question in the Lab Queue Channel
- Coursework – hands-on programming exercises: individual with Q&A on Teams

coursework

- Jupyter notebooks
- Recommendation: use
  - https://www.paperspace.com/ -- use code ImperialCL22 for sufficient GPU time
  - https://colab.research.google.com/
  - Activate GPU support: Edit -> hardware accelerator -> GPU (only if you need one, e.g. CW2 and CW3)
- Submission on CATe (and via LabTS for coursework 1)



35% 35% + 20%
10% for extension

- Start early, finish in time!

Materials

- Course Website: http://wp.doc.ic.ac.uk/bkainz/teaching/70010-deep-learning/
- Materials: https://scientia.doc.ic.ac.uk/2122/modules/70010/resources
- Edstem: https://edstem.org/us/courses/14767/discussion/
- Panopto: https://imperial.cloud.panopto.eu/Panopto/Pages/Sessions/List.aspx#folderID=%22c6139bf3-cd75-4867-851d-adbf00c62b3e%22
- Coursework: https://cate.doc.ic.ac.uk/

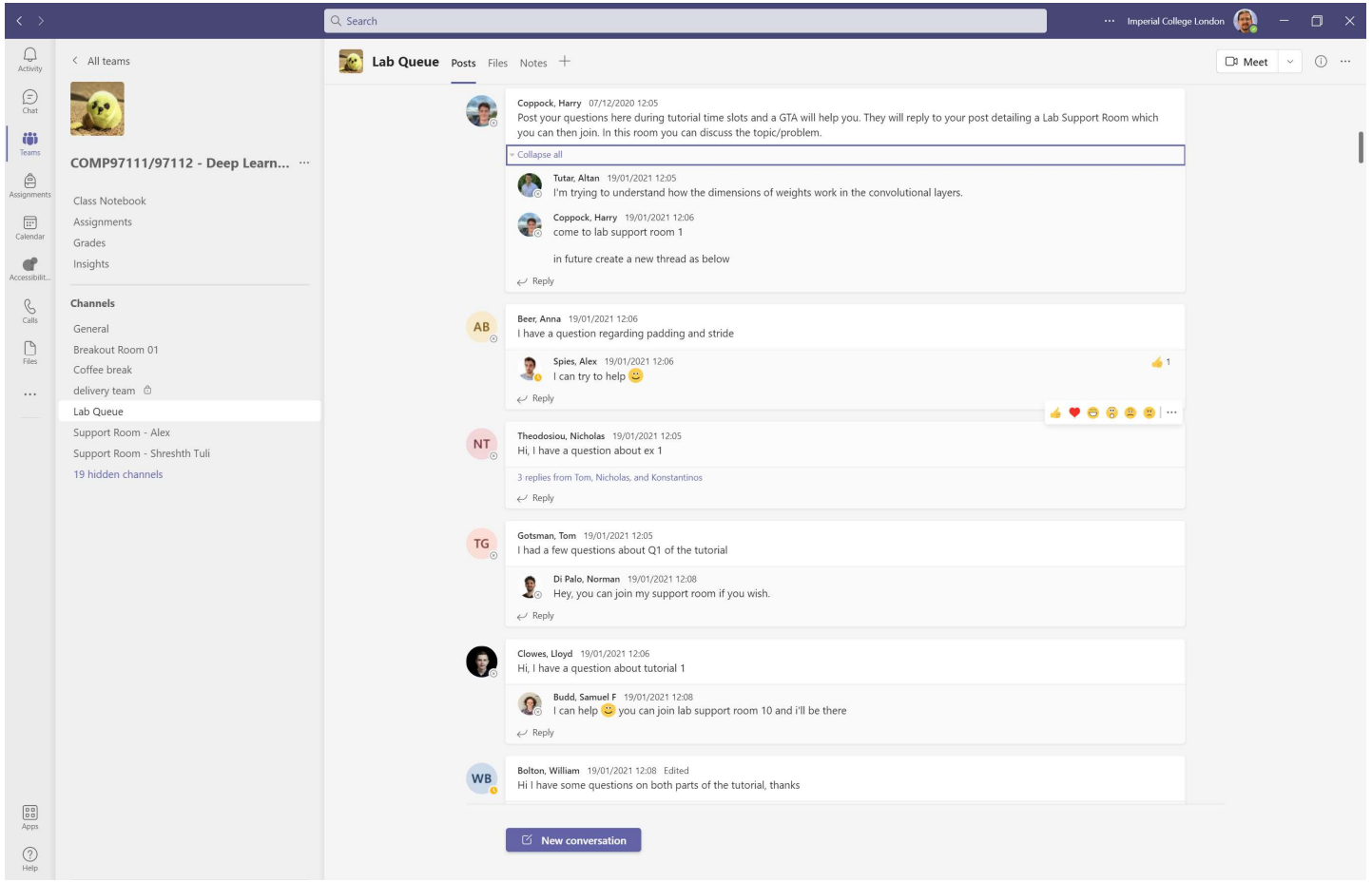
Grading

- Assignments (3 assignments): 50%
- Exam 50% (2 questions)

Support

- MS Teams Lab Queue

- https://teams.microsoft.com/l/team/19%3aqLX-dwvw6jinFKK9nvHO191Mou7bDLkDAHRiSY3SAJA1%40thread.tacv2/conversations?groupId=a546d5ac-7f95-41cf-bbd7-ea8f465ba946&tenantId=2b897507-ee8c-4575-830b-4f8267c3d307



- https://github.com/alievk/avatarify