

CEng 783 Deep Learning

Department of Computer Engineering @ METU – Fall 2019

Instructor: Asst. Prof. Dr. Emre Akbas; Office B-208; emre@ceng.metu.edu.tr; Office hours by appointment.

Lectures: Tuesdays 13:40-16:30 at BMB-2

Webpage: <http://bit.do/ceng783>¹. ODTUClass² will be used for online discussions and homework submissions.

Credits: METU: 3 theoretical, 0 laboratory; ECTS: 8.0.

Description: This course aims to teach the fundamentals of deep learning. We will study the three major types of deep neural networks, namely, Multi-layer Perceptrons, Convolutional Neural Networks, and Recurrent Neural Networks, and take an in-depth look at their use in various machine learning problems such as supervised learning, unsupervised learning, generative modeling, and reinforcement learning. We will also explore the most recent developments in the field and state of the art applications of deep neural networks in computer vision and natural language processing. (Also see the description at METU Course Catalog³).

Textbook: There is no official textbook for the class. We will follow the state of the art mainly with papers and by using parts of the “Deep Learning” book by Goodfellow et al.⁴, which is available online.

Grading: Homework assignments 25%; Written exam 30%; Project 45%

Prerequisites: Foundational knowledge in machine learning, elementary calculus, linear algebra. Proficiency in Python.

Tentative schedule:

Date		Topic	Activities
1	Sep 24	Course logistics. High-level introduction to deep learning.	Hw1 given on Sep 24
2	Oct 1	Machine learning background and basics	Hw1 due Oct 6
3	Oct 8	Artificial neural networks. Multi-layer Perceptrons	
4	Oct 15	Convolutional neural networks (ConvNets)	Hw2 given Oct 15. Project proposals due Oct 18
5	Oct 22	Convolutional neural networks (ConvNets)	
6	Oct 29	Applications of ConvNets (Oct 29 is national holiday. This lecture will be re-scheduled to another day.)	Hw2 due Oct 29
7	Nov 5	Recurrent and recursive neural networks (RNNs)	Midterm exam
8	Nov 12	Applications of RNNs	
9	Nov 19	Deep generative models	
10	Nov 26	Deep reinforcement learning (DRL)	
11	Dec 3	Project progress demos & presentations	Project progress report due
12	Dec 10	Applications of DRL	
13	Dec 17	Latest trends, limitations, frontiers. Deep hierarchies in human vision	
14	Dec 24	Project demos & presentations	Projects due

¹Full url: <http://user.ceng.metu.edu.tr/~emre/Fall2019-DeepLearning.html>

²<https://odtuclass.metu.edu.tr/>

³https://catalog.metu.edu.tr/course.php?prog=571&course_code=5710783

⁴<https://www.deeplearningbook.org/>