



**SWE 591: Sp. Tp. Principles of Neural Networks and Deep Learning**  
**Spring 2020**

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**Office:** BM 24

**Office Hours:** TBA

**Time:** TBA

**Location:** TBA

**Course Material**

- E. Alpaydın, *Introduction to Machine Learning*, 3rd edition, The MIT Press, 2014.
- I. Goodfellow, Y. Bengio, and A. Courville, *Deep Learning*, The MIT Press, 2016.

**Course Description**

An introduction to artificial neural networks, deep learning concepts and their applications.

**Objectives and Learning Outcomes**

The objective of this course is to provide the foundations of neural networks and introduce common deep learning models. Upon successful completion of the class, students are expected to gain an understanding on:

- fundamentals of learning from data paradigm
- biological inspiration of neural networks
- perceptron and multilayer perceptron
- backpropagation algorithm
- training neural networks, parameter tuning
- deep network architecture design
- differences between deep, shallow, narrow, and wide networks
- advanced deep learning models; convolutional neural networks, recurrent neural networks, autoencoders, and deep generative models.

## Course Topics

Topics
Introduction
Machine Learning Review
Linear Algebra Review
Multilayer Perceptron
Training Deep Networks
Convolutional Neural Networks
Convolutional Neural Networks
Recurrent Neural Networks
Variational Autoencoders
Generative Adversarial Networks

## Schedule

Date	Assignment
15 April - 24 April	Project 1 (5%)
26 April - 13 May	Project 2 (counts for 2 projects 10%)
29 April	Quiz
6 May	Quiz + Bonus Quiz
20 May	Quiz
27 May	Bonus Quiz
13 May-29 May	Project 3 (counts for 2 projects 10%)

## Assessment

- Project (5) 25%
- Quiz (7) 35%
- Final 40%

Final grades will be assigned as follows:

Absolute Percentage	Grade
[100, 90]	4.0
(90, 80]	3.5
(80, 75]	3.0
(75, 70]	2.5
(70, 65]	2.0
(65, 60]	1.5
(60, 50]	1.0
(50, 0]	0.0

**Class Participation:** There will be a roll call every week. Students should participate the quiz and in-class projects to be successful in this class.

**Course Announcements:** Announcements and assignments will be sent via Piazza.

**Makeup Exams:** There will not be any makeup of the midterm exam, quiz, and in-class projects.

**Academic Integrity:** Students are expected to complete all assignments and exams on their own. Cheating is extremely forbidden. If students cheats during quiz, in-class projects, midterm, and final exams, they will automatically fail the class and disciplinary actions will be taken.