

CSE 5526 - Autumn 2014

## **Introduction to Neural Networks**

**Time/Place:** TR 9:35am - 10:55pm, 369 Dreese Labs

**Instructor:** Dr. Michael Mandel, 258 Dreese Labs; Phone: 614-247-7331

Email: mandelm@cse.ohio-state.edu (preferred)

Office Hours: MR 11 - 12pm

**Class website:** Carmen page

**Grader:** Yuzhou Liu (liu.2376@osu.edu), Office Hours: MW 3 - 4pm, 578 Dreese Labs

**Course Description:** A survey of fundamental methods in neural networks. Single- and multi-layer perceptrons; radial-basis function networks; support vector machines; stochastic machines and deep networks; recurrent and dynamic networks; supervised and unsupervised learning; application to pattern classification and function approximation problems.

**Prerequisite:** CSE 3521/5521 (Intro to AI), or ECE 5200 (Intro to DSP)/ECE 5362 (Computer Architecture/Design)

**Text (required):** "Neural networks and learning machines," by Simon Haykin. Pearson, 2009

**Class Project:** There will be three class projects. Each student is required to write programs to implement three of the neural network models studied in the class. Each student needs to turn in their own report for each programming assignment, which summarizes what they have done, along with their own code. More detailed information will be provided in due time.

**Grading Plan:** Homework: 20% (5 x 4%), Projects: 30% (3 x 10%),  
Midterm: 20%, Final exam: 30%

**Policy:** Homeworks and projects are due at the beginning of class (9:35AM). Late projects result in a 10% penalty each calendar day. Excuse from scheduled exams or late homework will not be accepted without substantial documentation. Cell phones must be turned off during class.

**Disabilities:** Any student who feels s/he may need an accommodation based on the impact of a disability should contact the instructor privately to discuss your specific needs. Please contact the Office for Disability Services at 614-292-3307 in room 150 Pomerene Hall to coordinate reasonable accommodations.

## Tentative Schedule

<b>Dates</b>	<b>Topic</b>	<b>Readings (Ch.Sec)</b>	<b>Due</b>
8/28:	Introduction & McCulloch-Pitts networks	Intro.1-6	
9/2, 9/4:	Perceptrons	1.1-3, 1.5, 1.7	
9/9, 9/11:	Regression & least mean square algorithm	2.1-5,9, 3.1-5,10-14	HW1
9/16, 9/18:	Multilayer perceptrons	4.1-8	HW2
9/23, 9/25:	Multilayer perceptrons	4.11-13, 4.17, 4.20	
9/30, 10/2:	Radial-basis function networks	2.7, 5.1-4	Proj1
10/7, 10/9:	Radial-basis function networks	5.5-8, 5.11	Proj2
10/14:	<i>Midterm</i>		<i>Exam</i>
10/16:	Support vector machines	6.1-3	
10/21, 10/23:	Support vector machines	6.4-7, 6.11	
10/28, 10/30:	Unsupervised learning & self-organization	9.1-5, 9.11	HW3
11/4, 11/6:	Hopfield networks	13.7-8	Proj3
11/11:	<i>No class (Veterans day)</i>		
11/13:	Hopfield networks	13.1-3, 13.12	
11/18, 11/20:	Stochastic methods & Boltzmann machines	11.1-2, 11.5-7	HW4
11/25:	Deep networks	11.8	
11/27:	<i>No class (Thanksgiving)</i>		
12/2:	Deep networks	11.9	
12/4, 12/9:	Catch up, review, and current topics		HW5

Finals Week: **Final Exam:** 10:00 to 11:45am, Friday, Dec. 12