

Neural Basis of Vision
Neuroscience 1033
Fall 2017

Dr. Marlene R. Cohen, Department of Neuroscience
 Lectures: Monday and Wednesday, 10:00 - 11:15 a.m., Mellon Institute, Room 130
 Office hours: M/W 11:15 a.m - noon.
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Tentative schedule of topics:

Week	Date	Topic	Reading
1	Aug 28	Psychophysics and Vision	Chapter 1
	Aug 30	Physiology and Vision	Chapter 2
2	Sep 4	NO CLASS (Labor Day)	
	Sep 6	The eye/Retina 1	Chapter 3
3	Sep 11-13	NO CLASS	
4	Sep 18	Retina 2/ LGN	Chapter 4
	Sep 20	Cortex (guest lecture, Dr. Amy Ni)	
5	Sep 25	First exam	
	Sep 27	Visual Motion	Chapter 8
6	Oct 2	Signal Detection Theory	Appendix
	Oct 4	Decisions 1	handout
7	Oct 9	NO CLASS (Fall Break)	
	Oct 10 (Tues)	Decisions 2 (stay tuned for probable room change)	
8	Oct 11	Second exam	
9	Oct 16	Objects and Scenes 1	Chapter 5
	Oct 18	Objects and Scenes 2	
10	Oct 23	Vision and Action	Chapter 7
	Oct 25	Visual Attention 1	Chapter 6
11	Oct 30	Visual Attention 2 (guest lecture, Dr. Doug Ruff)	
	Nov 1	Third exam	
12	Nov 6	Color 1	Chapter 9
	Nov 8	Color 2	
13-14	Nov 13-22	NO CLASS (Society for Neuroscience meeting and Thanksgiving)	
15	Nov 27	Depth and Size	Chapter 10
	Nov 29	Visual Development	Chapter 16
16	Dec 2	What I really want you to know	
	Dec 6	Fourth exam	

Prerequisites

Neuroscience 1000 (Introduction to Neuroscience)

Neuroscience 1011 (Functional Neuroanatomy)

Course goals

One of the primary purposes of the nervous system is to take in information about the outside world and allow us to act based on that information. As primates, the majority of our sensory information comes in through our visual system. This course examines the neural basis of visual perception and action. The course is divided into four units. The first unit covers methods for studying visual perception and its neural basis and discusses the neural hardware that underlies our ability to see. We will focus on how to establish a link between a set of neurons and perception. The second unit focuses on perceptual decision-making, using visual motion as a model system. We will also touch on some data analysis methods for using psychophysical and neuronal data to figure out how we make decisions based on visual information. The third unit covers object recognition, cognitive factors that influence visual perception, and the way we are planning to use visual information affects the way it is encoded in the brain. The fourth unit will focus on perception of color and depth and on how visual perception develops after birth. Throughout the course, we will focus on what neural mechanisms can tell us about how we perceive the visual world and on how we can design experiments to better understand the relationship between neural mechanisms and perception.

Website

Much information essential to the course will be available at our Web site, which can be accessed through the University of Pittsburgh CourseWeb site (<http://courseweb.pitt.edu/>). Please familiarize yourself with the site and check it often.

Readings

The required text is "Sensation and Perception" by Bruce Goldstein, 8th edition. This is an excellent text with a specific emphasis on psychophysics with some neuroanatomy and physiology thrown in. Additional readings will be posted on the website. The textbook includes a very complete and up to date reference list for further reading.

Evaluation

There will be four exams, each of which counts for 22.5% of your grade. Material included in a test will not be re-examined in a subsequent test except that the fourth exam may require some overall perspective on the material covered. Exams will cover material equally from the lectures and from the textbook and the supplementary readings. No make-up exams will be given.

While there will be some definitions, methods, and facts that you need to learn, I am not interested in having you simply memorize and regurgitate information. The exams are designed to see whether you have mastered the concepts, can apply them to new ideas, can design experiments, and can critically evaluate experimental data. The exams will be difficult so that I can really see what you have learned. They will be graded on a curve if and only if it is to your benefit. If you all earn A's, you will all get A's. If not, the scores will be normalized to ensure a reasonable distribution of grades.

The exams will be closed book/notes/electronic devices with one exception. For each exam, you are welcome to bring one, double-sided 8.5x11 sheet of notes that are **hand written** by you. I allow these notes (and require them to be hand written) because I think the process of figuring out what is the important information and writing it out (as opposed to copying and pasting) will help you learn. You will be required to turn in your notes along with your exam, but they will not be graded.

After many classes, there will be an extra credit question posted on Courseweb. These questions are designed to get you to think more deeply about some of the concepts we discuss or to think about issues that are slightly outside the scope of the class. Answers to these questions are worth an extra 1-2 points on the next exam. They are due before class one week after the class for which they are assigned (e.g. questions assigned following a Monday lecture will be due before 10 am the following Monday). Answers will only be given credit if they are submitted through Courseweb.

The final 10% of your grade will be based on your effort and participation. I am very interested in having this be an interactive class, and you should aim to speak at least once during each class. Please do not hesitate to ask questions or share ideas. I promise that for every stupid question you ask, I have asked a dozen more.

Academic integrity

Students in this course are expected to comply with the University of Pittsburgh Policy on Academic Integrity, which can be found online at: <http://www.provost.pitt.edu/info/ai1.html>

Email communication policy

Students in this course are also expected to comply with the University's email policy outlined at www.bc.pitt.edu/policies/policy/09/09-10-01.html. Email will be the best way of communicating with me throughout the semester. I do not typically respond to email outside of business hours. *This means that I will not answer questions about course material the night before an exam.* If you have questions, please ask during/after class, come to office hours, or email me to schedule an appointment.

Information for students with disabilities

If you have a disability that requires special testing accommodations or other classroom modifications, please notify both me and the Disability Resources and Services (web site: <http://www.drs.pitt.edu/>) no later than the 2nd week of the term. You may be asked to provide documentation of your disability to determine the appropriateness of accommodations. To notify Disability Resources and Services, call 412-648-7890/412-383-7355 (TTY) to schedule an appointment. The Office is located in 216 William Pitt Union.