

Sensation and Perception

NEU 220 / PSY 220 (3 credits)
Cedar Crest College, Spring 2010

Lecture 9:00-9:50 AM Monday, Wednesday, and Friday
Alumni Hall 211

Prerequisites: Psychology 100 or Neuroscience 200/Psychology 229

Instructor:

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Office hours: Monday 11:30-1:30, Tuesday 9:30-11, and by appointment.

Textbook:

Sensation and Perception , Eighth Edition by E. Bruce Goldstein

Course Description and Objective:

How do our eyes, ears, and other sensory organs detect and process subtle sensory stimuli? How do our brains cause us to perceive colors, shapes, movement, speech, musical harmony, tastes, and many other experiences? Do we have any experience of the “real world” out there, or is it all in our heads? These are some of the questions that we will address in this course.

The course will begin by examining the startling proposition that *we have no direct experience of reality*. Instead, we create a mental model of the outside world through the combined processes of sensation and perception. **Sensation** includes all of the biological mechanisms that detect physical stimuli and translate them into neural activity. Our senses are the means by which information from the outside world enters our bodies. **Perception** refers to the processes the brain uses to actively interpret sensory information and form a representation of the external world.

The focus of this course will be the biology and theories of sensation and perception and, in particular, the experimental evidence on which our understanding is based. We will explore these issues through readings, lectures, discussion, and some in-class demonstrations. Evaluation for the course will consist of quizzes, three midterm exams and a final, an online discussion of sensation and perception in the news, written problems and assignments, and class participation. Successful completion of this course will form a basis for higher level study in Neuroscience or Psychology.

Learning Outcomes and Assessment:

1. Students will understand the neurobiology of sensation, including basic neural signaling, sensory transduction, and the neuroanatomy of sensory systems

Assessment: Quizzes, midterm and final exams, online discussion, assignments, class participation.

2. Students will understand the perceptual mechanisms of the major senses.
Assessment: Quizzes, midterm and final exams, assignments, online discussion, class participation
3. Students will understand the research methods used in historical and modern investigations of perception.
Assessment: Quizzes, midterm and final exams, assignments, online discussion, class participation
4. Students will improve their scientific writing skills
Assessment: Online discussion, midterm and final exams.

Student Responsibilities:

Course material: You are responsible for all material in lectures and assigned readings. Text readings must be read before class. Any additional readings must be completed one week after they are assigned.

Lecture attendance:

Lecture attendance is not mandatory, but you are responsible for understanding the material from any lecture that you may miss, and you will have more opportunities to answer “clicker questions” if you attend class regularly. Some material in the lectures will not be described in the textbook. Repeated absences may also lower your participation grade. Attendance at all exams is required; if you miss an exam, you must have a note from the Dean of Students to allow a make-up session.

Laboratory:

NEU 220/PSY 220 Laboratory is offered as a separate one-credit course taught by Dr. Kent Fitzgerald. Grading for the two courses will be entirely separate. Topics for the laboratory exercises will correspond to those taught in the lecture course.

Assignments and Grading:

Quizzes (5) 10%

There will be short quizzes on the dates indicated on the syllabus. Six quizzes will be given, and the lowest score will be dropped. There will be no make-up quizzes. The first missed quiz will count for your “dropped” grade, and any future absences must be excused by the Dean of Students or they will be averaged in as 0%.

Clicker Questions 10%

At the beginning of most classes, there will be 2-4 questions presented for you to answer with the response clickers. Questions will usually focus on the previous lecture’s material. There will be a minimum of 85 questions asked over the course of the semester, with only 75 questions counting toward your grade. Therefore, it should not affect your grade if you miss class occasionally. Clickers will also be used to answer questions during the lectures; these will usually not count toward your grade.

Midterm exams (3)**15% each, 45% total**

If you will miss an exam due to documentable illness you must obtain an official excuse from the Dean of Students and contact the instructor as soon as possible to arrange a make-up exam. Make-up exams will not be given for any other reason.

Final exam**20%**

The exam will be given during Exam Week and will be scheduled by the Registrar. The exam will be comprehensive.

Sensation and Perception in the News**10%**

The purpose of this assignment is to give you an opportunity to consider how course-related topics are presented in the news. News reports might describe recent scientific progress about Sensation and Perception and/or applications of the field that are particularly relevant to the public, including medical applications and “human interest” cases.

Logistics

An “eCompanion” online classroom has been established for this course. You will find it at <http://cedarcrestonline.net>. You should have received login information by email.

When you log on to the page, you will see a tab marked “Courses” near the top. Click on that link. The “Courses” page will have a link to this course. You will also see a list of “Special courses.” PLEASE take the time to do the Student Orientation Tutorial, as this will make the rest of the semester easier for everyone. I will be monitoring whether you have viewed the tutorial.

Course-related emails can be sent to me through the eCompanion site or directly from your Cedar Crest account. You are responsible for reading any email sent to your Cedar Crest account, and I will only send mail to that address.

Assignment**DUE DATES: Article 1 - Friday, 2/5 Article 2 – Wednesday, 3/3 Article 3 – Friday, 4/9**

- Identify a news article related to recent discoveries in Sensation and Perception. The article should be no more than one year old and should come from a reliable general news source, such as the New York Times, Associated Press, or CNN, or from a local newspaper or television station’s website. You may want to visit the links on the Society for Neuroscience webpage (www.sfn.org, then select “About Neuroscience” from the top menu bar, followed by “Neuroscience in the News”) for a weekly listing of articles.
- If possible, upload the news article to the “Document Sharing” area of the eCollege site for your classmates to peruse, or add a link to the “Webliography.”

- Consider the following questions, and write an entry for the “Discussion Board”. Your posting should be several paragraphs in length. Make sure to incorporate information learned in the course into your explanations!
 - What was the scientific information described in the news article?
 - Could you tell anything about the experimental approach used?
 - Why was this “news” chosen for presentation to the public?
 - Did your Neuroscience background help you to understand the article from the general press?
 - Would members of the public understand the news article if they had never taken a Neuroscience or Psychology course?
- Finally, read an article posted by one of your classmates and respond to her posting. Do you agree with her interpretation?

Assignments

5%

Short assignments pertaining to the course material will be distributed in class.

Class Participation

+/- 5%

Class participation and adherence to the classroom protocol may raise or lower your course grade by up to 5%. Your grade for participation will be based on attendance, contribution to classroom discussions, and preparation for class. The participation grade will be determined solely at the discretion of the instructor.

Grades

Grades will be assigned as follows:

93.0-100% A	90.0-92.9% A-	87.0-89.9% B+	83.0-86.9% B
80.0-82.9% B-	77.0-79.9% C+	73.0-76.9% C	70.0-72.9% C-
67.0-69.9% D+	60.0-66.9% D	less than 60.0% F	

The instructor reserves the right to “curve” exam grades to your benefit.

Honor Code

I fully support the Cedar Crest College Honor Code and the associated Community Standards for Academic Conduct. I adhere to its positions on Academic Misconduct, Academic Dishonesty or Plagiarism, Classroom Protocol, and Attendance. Students are responsible for reading the current versions of these documents in “A Student’s Guide to Cedar Crest College.”

Students with documented disabilities who may need academic accommodations should discuss these needs with their instructor during the first two weeks of class. Students with disabilities who wish to request accommodations should contact the Advising Center.

Course schedule: This is an *approximate* schedule of lecture topics and the accompanying reading assignments. You should adjust your reading based on the figures shown in the lectures. All readings listed are from Sensation and Perception by Goldstein. Additional readings may be assigned in class. The “cut off” for material included on each quiz and exam will be announced in class.

W 1/20		Introduction and practical matters	--
F 1/22		History and basic principles	Ch 1 3-12
M 1/25		Threshold and classic psychophysics	Ch 1 12-18
W 1/27		Signal detection theory	Appendix 1 401-406
F 1/29		Some basic neuroscience	Ch 2 22-28
		[Optional reading: Ch. 2 pg. 32-39 for additional background information]	
M 2/1	QUIZ 1	Light, the retina	Ch 3 43-46
W 2/3		Visual transduction	Ch 3 47-57
F 2/5	ART. #1	Convergence and inhibition	Ch 3 58-68
M 2/8		Receptive fields, moving toward the cortex	Ch 2 34-35
			Ch 4 74-81
W 2/10	QUIZ 2	Maps, columns, and streams	Ch 4 82-95
F 2/12		Face neurons, plasticity, and coding	Ch 2 36-38
			Ch 4 91-95
M 2/15		Object perception and Gestalt	Ch 5 100-108
W 2/17		Figure/ground and more on objects	Ch 5 108-113
F 2/19	EXAM 1		
M 2/22		Seeing the big picture (Scene perception)	Ch 5 114-127
W 2/24		Selective attention	Ch 6 134-143
F 2/26		The binding problem and physiology of attention	Ch 6 135-137
M 3/1	QUIZ 3	Color and the Trichromatic Theory	Ch 9 202-211
W 3/3	ART. #2	Color deficiency, Opponent-process Theory, and the cortex	Ch 9 211-224
F 3/5		Seeing motion	Ch 8 178-184
3/8 – 3/12	Spring break		
M 3/15		How neurons signal motion	Ch 8 184-195
W 3/17	QUIZ 4	Oculomotor and monocular cues	Ch 10 230-235
F 3/19		Hey, Two Eyes! Binocular cues	Ch 10 235-242
		<i>Saturday, March 20: Brain Awareness Week volunteer opportunity</i>	
M 3/22		Size perception and size illusions	Ch 10 243-254
W 3/24		Sound physics , ear anatomy	Ch 11 260-272
F 3/26	EXAM 2		
M 3/29		How the ear hears	Ch 11 272-279
W 3/31		Into the brain, loudly	Ch 11 280-287
4/2-4/5	Easter break		
TUES. 4/6**		Sound localization	Ch 12 292-298
W 4/7	QUIZ 5	Auditory scene analysis (AKA party conversations)	Ch 12 299-307
F 4/9	ART. #3	I want... to sing! (and talk, too)	Ch 13 312-319

M 4/12	Touch me, feel me: Skin to cortex	Ch 14 330-332
W 4/14	Touch: Sensitivity and acuity	Ch 14 332-334
F 4/16	Touch: Details, vibration, texture and objects	Ch 14 335-343
M 4/19	Touch: Ouch!	Ch 14 343-349
W 4/21	EXAM 3	
F 4/23	Olfaction: What smells?	Ch 15 356-366
M 4/26	Olfaction: Anatomy and receptors	Ch 15 356-366
W 4/28	Olfaction: Psychophysics, memory	Ch 15 356-366
F 4/30	QUIZ 6	
M 5/3	Taste: Anatomy and neural code	Ch 15 366-375
M 5/3	Taste: Flavor and individual differences	Ch 15 366-375
W 5/5	Conclusions and Review	

****TUESDAY April 6 is a MONDAY schedule day**

TBA FINAL EXAM. Final exam times are determined by the Registrar. You should NOT make travel plans until you know when our exam is scheduled.