**Instructor**  
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Office hrs by appointment only.

**Course description:** Different types of sensory systems with their functional modalities will be presented. The biological bases for how these functions are generated and modified will then be described. As vision is historically well studied, we will focus in this course most on visual processing. Scientific data will be integrated into the lectures, such that students develop critical skills in analyzing data, proposing hypotheses and designing experiments.

**Prerequisite:** Biology 35400 or 31590 or 46400 (Intro Neurobiology), or permission of instructor

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<tr>
<th>Week</th>
<th>Lecture topic</th>
<th>Textbook readings</th>
<th>Assignments</th>
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<tr>
<td><strong>Week 1</strong>&lt;br&gt;Aug 29 &amp; 31</td>
<td>The origin of human perception &lt;br&gt;Introduction to sensory systems &lt;br&gt;What is psychophysics? &lt;br&gt;Using Pubmed &amp; Citation Index</td>
<td>Ch1, Appendix, &amp; Jerison (1973)</td>
<td>A1: Akre et al. 2011. Signal perception in frogs and bats and the evolution of mating signals. PMID 21817052</td>
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<td><strong>Week 2</strong>&lt;br&gt;Sept 7 &amp; 12</td>
<td>The eye</td>
<td>Ch2</td>
<td>Quiz 1: on Ch1 &amp; Appendix A1 due on Sept 7 A2: Pubmed &amp; Citation Index</td>
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<td><strong>Week 4</strong>&lt;br&gt;Sept 21 &amp; 26</td>
<td>How neurons in the visual cortex affect perception</td>
<td>Ch4</td>
<td>Quiz 3: on Ch3 A3 due on Sept 21 A4: Maimon G. Modulation of visual physiology by behavioral state in monkeys, mice, and flies. PMID 21628097</td>
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<td><strong>Week 5</strong>&lt;br&gt;Oct 3 &amp; 5</td>
<td>Spatial vision</td>
<td>Ch5</td>
<td>Quiz 4: on Ch4 A4 due on Oct 3 A5: Sharma et al. 2000. Induction of visual orientation modules in auditory cortex. PMID 10786784</td>
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<td><strong>Week 6</strong>&lt;br&gt;Oct 12 &amp; 17</td>
<td>Object perception / Perceptual learning</td>
<td>Ch6</td>
<td>Quiz 5: on Ch5 A5 due Oct 12 A6: Anjum et al. 2006. Tactile guidance of prey capture in Etruscan shrews. PMID 17060642 Exam 1 on Oct 17: Chs1-5</td>
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| Week 7  | Oct 19 & 24 | Color perception | Ch7 | Quiz 6: on Ch6  
A6 due on Oct 19  
A7: Choose a topic for your term paper and write a draft |
| Week 8  | Oct 26 & 31 | Depth perception | Ch8 | Quiz 7: on Ch7  
A7 due on Oct 26  
A8: van der Willigen et al. 2011. Disparity sensitivity in man and owl: psychophysical evidence for equivalent perception of shape-from-stereo. PMID 21216754 |
| Week 9  | Nov 2 & 7  | Motion perception | Ch9 | Quiz 8: on Ch8  
A8 due on Nov 2  
| Week 10 | Nov 9 & 14 | The ear and hearing | Chs10 &11 | Quiz 9: on Ch9  
A9 due on Nov 9  
A10: Evans et al. 2011. An automated paradigm for drosophila visual psychophysics. PMID 21738736  
Pulver et al. 2011. Optogenetics in the teaching laboratory: using channelrhodopsin-2 to study the neural basis of behavior and synaptic physiology in Drosophila. PMID 21386006 |
| Week 11 | Nov 16 & 21| Auditory perception | 12 | Quiz 10: on Chs10 &11  
A10 due on Nov 16  
Exam 2 on Nov 21: Chs6-11 |
| Week 12 | Nov 23 & 28| Touch and pain | 13 | Quiz 11: on Ch12  
A11 due on Nov 23  
A12: Kayser et al. 2010. Visual enhancement of the information representation in auditory cortex. PMID 20036538 |
| Week 13 | Nov 30 & Dec 5| Olfaction | 14 | Quiz 12: on Ch13  
A12 due on Nov 30  
A13: Lemus et al. 2010. Do sensory cortices process more than one sensory modality during |
perceptual judgements?
PMID: 20670839

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<th>Week 14</th>
<th>Taste</th>
<th>Quiz 13: on Ch14 A13 due on Dec 7 A14: Weiss et al. 2011. Loss-of-function mutations in sodium channel Nav1.7 cause anosmia. PMID 21441906</th>
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<td>Dec 7</td>
<td>15</td>
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<td>Week 15</td>
<td>Course evaluation and review</td>
<td>Quiz 14: on Ch 15 A14 due on Dec 12 Term paper due on Dec 12</td>
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<td>Dec 12</td>
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**Final Exam:** Chs11-15 |

**Text:** Blake and Sekuler, *Perception (5th edition)*. McGraw Hill, 2006. Supplementary texts and readings are available in blackboard and from the CCNY and CUNY library system. Contact the instructor if you experience problems accessing the library resources.

**Grading**

Quizzes: 5%
Writing assignments: 15%
Term paper: 20%
Exam 1: 20%
Exam 2: 20%
Final Exam: 20%

**Lectures:** Developing a sense of confidence and good communication with your peers and professors is a very important skill to succeed in the professional world. Therefore, you are highly encouraged to ask as many questions and initiate debates related to the course materials during and outside class.

**Exams & quizzes:** There will be 3 exams, in weeks 6 and 11 plus the final exam. Each midterm exam will cover topics since the start of the course or previous exam (i.e. are non-cumulative). In addition there will be a brief quiz at the start of most Monday classes (when we start a new topic); quizzes will be brief, and will start promptly at the start of each lecture. The quiz will consist of questions on the textbook readings assigned that week (I might ask you to explain a figure from the reading).

Missed quizzes cannot be made up, but I will drop the lowest 3 quiz grades. I will expect you to have read the assigned reading from the text for each lecture before class, since the lectures will typically assume that you have read the material. You will probably wish to read the assigned material again more carefully after the lecture. You will be responsible on the exams both for material covered in class and in other readings. In other words, I expect you to come to class and to do the readings.

**Writing:** In this course I would like you to exercise your scientific reading and writing skills. Starting from week 1, a weekly assignment will be to write a one-page critique on selected articles: In three short paragraphs explain a) the goal of the paper, and b) the major strength and c) weakness of the paper. Turn your weekly writing assignment after taking the weekly quiz. If you cannot attend a quiz class, make sure you give advance notice to the instructor, and arrange for a time to turn your assignment (before the quiz class).
Starting from week 7 you will be expected to write a term paper. We will discuss the format in more detail in class, but the paper will be in a topic directly related to the material covered in the course that interests you, and will consist of a summary and critique of readings you choose, at least 2 or 3 of which should be primary sources (i.e. a journal article). Before choosing the primary sources, you should read at least one review article concerning the topic you are writing about. Your term paper should also include a brief description of an experiment that addresses the issues you describe in your introduction. By week 8 I will expect you to have decided on a topic for your term paper. I will then expect you to turn a draft version of your paper, several weeks ahead of the final submission date (December 12, 2011). I will read your draft and give it back to you with comments so you can improve your paper, and obtain a better grade.

The scientific community relies on being able to accept at face value what is written in journals; the most serious act of dishonesty is to present something as being written by you when it has in fact been written by someone else. In this course we will use the standard that if more than a sentence is copied verbatim or text longer than a paragraph paraphrased without being given a source, that will be considered plagiarism, and will lead to a failing grade in the assignment or course. (see statement on Academic Integrity policy below)

**Learning outcomes:** After completing this course, students should be able to:
1) describe what the different sensory modalities encompass.
2) describe the process of transduction in each sensory modality.
3) describe the basic brain circuits mediating the different sensory modalities.
4) design, perform, and interpret psychophysical experiments.
5) plot psychophysical data and generate psychometric functions from them.
6) explain how sensory processing can be modified by other brain processes such as attention or memory.
7) describe the relationship between brain activity and perceptual (behavioral) state.
8) interpret scientific data from primary research papers on sensory perception and its neural basis.
9) propose experiments to test hypotheses on different aspects of perception.

**Statement on Academic Integrity**
The CCNY policy on academic integrity will be followed in this course. The document can be found through the CCNY website by clicking on Current Students → Academic Services → Policy on Academic Integrity.

http://www1.ccny.cuny.edu/upload/academicintegrity.pdf

All students must read the details regarding plagiarism and cheating in order to be familiar with the rules of the college. Cases where academic integrity is compromised will be prosecuted according to these rules. In addition, the Policy of Academic Integrity can be found in the Undergraduate Bulletin 2007-09 in Appendix B.3 on pg 312.

**Important dates to remember:**
September 1, 2011 Last day to drop classes with a 75% refund
September 8, 2011 Last day to drop classes with a 50% refund
September 15, 2011 Last day to drop classes with a 25% refund
September 16, 2011 "W" grade begins for withdrawal from classes - No refund