I. Bulletin description

PSYC W3265 Auditory Perception (seminar)
4 pts S Woolley M 2:10-4:00 Schermerhorn Hall Room 200c.

Prerequisite: At least two other psychology courses or the instructor’s permission.
The reception, organization and understanding of sounds are crucial functions of the brain. We will study the perceptual rules by which humans and other animals make sense of the acoustic world, what those rules suggest about how the brain forms acoustic percepts, and what is known about the neural basis of auditory perception.

II. A full description of the content of the course

How does the human brain make sense of the acoustic world? What properties of sound are important for the discrimination and recognition of sounds with specific meaning? What aspects of auditory perception do humans share with other animals? How does the brain perform the computations necessary for skills such as sound localization? How do we focus our auditory attention on one voice in a crowd? What acoustic cues are important for speech perception? What’s special about music? We will address these questions and more by studying the basics of auditory perception in a textbook, and reading classic and current literature to understand the scientific progress in the field today. Our reading of the literature will be critical, with a focus on good scientific design.

This course will systematically review the main topics of auditory perception such as: 1) the physics of sound; 2) the anatomy and physiological functioning of the auditory system; 3) perception of loudness; 4) frequency selectivity and discrimination; 5) perceptual phenomena such as forward and backward masking; 6) temporal processing; 7) pitch and timbre perception in simple and complex sounds; 8) auditory attention; 9) scene analysis; 10) speech and music perception. We will examine the current literature on such topics as sound localization in humans and other animals, how the brain forms a map of auditory space, acoustic communication in humans, birds and other mammals, and how the brain may be specialized to encode the unique communication sounds of individual species. We will analyze the studies demonstrating categorical perception and lateralization of the brain for language processing. And we will study how people perceive and process music.
III. The rationale for giving the course

PSYC W3265 is an advanced seminar, most fitting for undergraduates who are majoring in Psychology or in Neuroscience and Behavior, and for students participating in the Postbac Psychology Program. In covering the behavioral phenomena of auditory perception and the neural mechanisms of auditory processing across taxa, the course provides an integrated perspective on topics of current interest in the fields of psychology, organismal biology and neuroscience. This course is intended to explore the topic with a comparative approach and would therefore be appropriate for biology students in addition to psychology students.

It fulfills the following degree requirements:

- For the Psychology major or concentration in the College and in G. S., for the Psychology minor in Engineering, and for the Psychology Post-bac, PSYC W2265 will meet the Group I (Perception and Cognition) distribution requirement.

- For the Neuroscience and Behavior joint major, W3265 will fulfill the 5th Psychology requirement: “one advanced psychology seminar from a list approved by the Psychology Department advisor to the program.”

- For the science requirements of the College and GS, W3265 meets the second term of the requirement, provided that students obtain the necessary permission and have taken the prerequisite two psychology courses. Students who are majoring in Psychology or in Neuroscience and Behavior will have priority over Biology and E3B students, or students who are taking the course for the science requirement.

- For the Barnard Psychology major, PSYC W3265 will fulfill the senior seminar requirement

IV. The reading list and weekly syllabus

Representative reading assignments are provided but may change.


**Week 1:** Introduction and organization

**Week 2:** The physical properties of sound, the ear, and the auditory system

**Reading**

Moore, chapter 1, pgs. 1-45

Students will select presentation topics this week
Week 3:   Sound Intensity and Loudness Perception

Reading
Moore, chapter 2, pgs. 47-83


Week 4:   Pitch, Frequency Selectivity, Discrimination

Reading
Moore, chapters 3 and 5, pgs. 84-136 and 158-193.


Week 5:   Temporal Information and Processing, Masking

Reading
Moore, Chapter 4, pgs. 137-157


Others tba

Week 6:   Sound Localization

Reading
Moore, Chapter 6, pgs. 194-228.


**Week 7:** Midterm Exam

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**Week 8:** Auditory Attention

**Reading**


Others tba

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**Week 9:** Complex Sounds, Streaming and Scene Analysis

**Reading**
Moore, Chapter 7, pgs. 229-253


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**Week 10:** Speech and Categorical Perception

**Reading**
Moore, Chapter 8, pgs. 254-284.

Others tba

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**Week 11:** Neural Basis of Speech Perception

**Reading**

Others tba
Week 12: Communication in Birds, Bats and Other Mammals

Reading
tba

Week 13: Music Perception

Reading


Others tba

V. Course requirements

Each week, students will attend a two-hour seminar. Class time will be devoted to the presentation and discussion of book chapters and journal articles. The reading is intended to provide background knowledge on the relevant topics, to cover the current and most exciting research on those topics, and to serve as a stimulus for discussion. Two students sign up to lead the discussion each week.

The students take a written midterm exam with essay questions covering the material in the textbook, the papers and the class discussions. During the second half of the semester, the students write a term paper due on the Monday of Reading Week. The 10-15 page paper should take the form of a critical review paper that addresses a specific question related to the topics of the seminar.

Grading is allocated as follows:

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<tbody>
<tr>
<td>Midterm exam</td>
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<tr>
<td>Term paper</td>
<td>30%</td>
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<tr>
<td>Participation and Presentations</td>
<td>50%</td>
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