

**PSY 348: Music and the Brain**  
**Winter 2011**  
**CRN: 26169**  
*last updated: January 12, 2011*



<b>Overview</b>	What are the neural correlates of our perception of tonality, harmony, melody, and rhythm? How do these relate to acoustics, auditory neurobiology, perceptual grouping mechanisms, brain damage, and cognitive neuroscience?
<b>Objectives</b>	To develop the tools and knowledge to ask meaningful questions about music and the brain, how to frame these questions, and how one might attempt to answer them.
<b>Description</b>	<p>This course uses music as a unifying theme to introduce fundamental concepts and open questions in a broad range of approaches to brain science. Throughout the course, we explore music at several levels of analysis, ranging from individual notes to melody, harmony, and rhythm. In parallel, we ask how these different levels are processed by neurons, the brain, and the mind. We cover physical and mathematical descriptions of sound, including an introduction to acoustics, spectral analysis, and the frequency domain. We go over the neurobiology of the auditory system, including fundamental concepts and methodology in sensory and systems neuroscience. We will cover several key areas of cognitive psychology, including perceptual grouping, working memory, and mental imagery. Finally we cover several approaches to cognitive neuroscience, such as human brain imaging and the specific effects of brain damage. In all of these areas, we use music and our perceptual experience of music as a unifying framework. There are no prerequisites. This course satisfies the University Science Group Requirement. This course assumes no previous knowledge of music theory or neuroscience but will introduce basic concepts and methods relevant to these fields.</p>
<b>Lectures</b>	<p>Tuesday &amp; Thursday 12:00–1:20 PM in <a href="#">146 Straub</a></p> <p>Lecture notes are available on Blackboard before the lecture, you are encouraged to print them out and bring them to class for taking notes.</p>
<b>Instructor</b>	<p>Mike Wehr wehr@uoregon.edu office hours: Monday 10:00-11:00 AM in 206 <a href="#">Huestis</a> or by appointment.</p>

**Teaching Assistant**

Andrew McCollough  
[awm@uoregon.edu](mailto:awm@uoregon.edu)  
Office hours: Wednesday 9-10 in 156 Straub

**Textbook**

none

**Readings**

All course readings will be available on Blackboard:  
<https://blackboard.uoregon.edu>  
You should also check Blackboard frequently for announcements, course materials, etc.

**Optional Reading**

"This is your brain on music," by Daniel Levitin  
"Musicophilia," by Oliver Sacks  
Both are popular best-sellers and are available at the bookstore.

**Format**

Material is presented through a combination of lectures, in-class demonstrations, and assigned readings (estimated 2-4 hours per week). There are no discussion sections or laboratories.

**Discussion Board**

Can be used to interact with instructor and other students, and is available on Blackboard. You may post anonymously.

**Plagiarism**

Is taken very seriously and is grounds for failure or expulsion. You are responsible for understanding what constitutes plagiarism and how to avoid it in your work. Excellent guides on plagiarism can be found at <http://libweb.uoregon.edu/guides/plagiarism/students/> and <http://www.plagiarism.org>. To help educate students about what constitutes plagiarism, in this course we will be using a plagiarism education blackboard plugin to submit term papers.

**Grading**

Midterm Exam	25%
Final Exam	25%
Paper	20%
Problem Sets	20%
Clicker questions	10%
	100%

## **Exams**

The midterm will be in-class, on February 3. It will be open book, open notes. You may use your laptop or phone. The final will be a take-home exam, open book, open notes, will cover the material from the entire course, and will be available on Blackboard after the last class on Thursday, March 10, and due by 5 p.m. on Monday, March 14.

## **Paper/Project**

The paper, or project write-up if you choose to complete a project, should be 8-10 pages, double spaced, and is due at the beginning of class on Thursday, February 10<sup>th</sup>. Submit your paper through the Term Paper/Project Assignment on Blackboard. Do NOT email your paper to the instructor or TAs. Emailed papers will not be accepted. The topic can be anything related to the course. A number of example topics are available on Blackboard, but regardless of which topic you choose, you must submit the topic for approval by Wednesday, January 26<sup>th</sup> (submit as part of that day's Problem Set).

Required Format for the paper:

- The filename should include your last name, for example: smith-psy348.doc.
- Include page numbers.
- Include a header with your name and a shortened title (~25 words or less).
- use .doc or .pdf

## **Problem Sets**

You must do the assigned reading *before* each lecture. The day before each lecture, after you've completed the reading, you will need to log onto Blackboard and complete the online Problem Set. These are required; they are due by 11:59 p.m. the night before each lecture, and count for 20% of your final grade in the course. Late problem sets will not be accepted, and there are no make-ups. The objective of the problem sets is to help make sure you understood the important points from the reading, to review concepts and material from lectures, and to help prepare you for the exams. You will also occasionally have a chance to share any aspects of the course that you did *not* understand, were confused by, or had any other kind of trouble with. Your responses about what you *didn't* understand (and you are surely not alone) will help guide upcoming lectures.

## **Clicker Questions**

We will use iClickers for answering in-class questions to review topics and encourage participation. iClickers are available for purchase at the UO Bookstore. You must register it to your Blackboard account: log on to Blackboard, go to Course Documents, select iClicker Registration, and fill out the form with your name, Duck ID (this is your username, NOT your student ID number), and the clicker ID number located on the back of the clicker. Please remember to bring your iClicker to class. Clicker questions will count for 10% of your total grade. Each day, about half of the clicker points are awarded regardless of whether you get the answers correct, as long as you attempt to answer at least 75% of the questions. The remaining half of the clicker points are awarded for correct answers.

**Schedule** (please be sure to download the Calendar in the Course Documents section of Blackboard for the most up-to-date schedule)

note: "Chapter X" refers to Music and the Brain Chapters. All readings are on Blackboard

1. Tuesday, January 4  
Music and the Brain  
No reading

2. Thursday, January 6  
Musical Space  
Reading: Chapter 1

3. Tuesday, January 11  
Perception of Tones  
Reading: Chapter 2

4. Thursday, January 13  
Consonance and Dissonance 1  
Reading: Chapter 3

5. Tuesday, January 18  
Consonance and Dissonance 2  
Reading: Thompson, "Music of the Hemispheres"

6. Thursday, January 20  
Tonality  
Reading: Machlis & Forney, "The Organization of Musical Sounds" and Chapter 4

7. Tuesday, January 25  
Neurobiology of the auditory system 1  
Reading: Chapter 5

8. Thursday, January 27  
Neurobiology of the auditory system 2  
Reading: Chapter 6  
Paper topics due in quiz January 26th

9. Tuesday, February 1  
Neurobiology of the auditory system 3  
No reading

10. Thursday, February 3  
Midterm exam in class

11. Tuesday, February 8

Rhythm

Reading: Chapter 7

12. Thursday, February 10

The Missing fundamental in infants

Reading: He & Trainor, 2009 "Finding the pitch of the missing fundamental in infants" and Chapter 8

Papers due at noon (in Assignments on Blackboard)

13. Tuesday, February 15

Grouping mechanisms in music 1

Reading: Deutsch, "Grouping Mechanisms in Music" and Chapter 9

14. Thursday, February 17

Grouping mechanisms in music 2

No Reading

15. Tuesday, February 22

Neural specializations for tonal processing

Reading: Zatorre, "Neural specializations for tonal processing"

16. Thursday, February 24

The topography of tonality

Reading: Janata, "The cortical topography of tonal structures underlying Western music"

17. Tuesday, March 1

Musical Imagery

Reading: Halpern, "Cerebral substrates of Musical Imagery"

18. Thursday, March 3

Songbirds

Reading: Brenowitz, "An Introduction to Birdsong and the Avian Song System"

19. Tuesday, March 8

Musical Hallucinations

Reading: Zimmer, "Neuron network goes awry, and brain becomes an iPod"

20. Thursday, March 10

Last class. Topic To Be Announced

Final exam becomes available

Monday, March 14

Final due by 5 p.m.