

9/7/16

COM. DIS. 850: HEARING SCIENCE

Instructor: Prof. Ruth Litovsky
Office: Goodnight Hall, Rm. 378; Waisman Center Room 521.
Office Hours: by appointment.
Phone: 262-5045 (WAISMAN)
Email: LITOVSKY@WAISMAN.WISC.EDU
Meets: MW, Rm 412, Goodnight Hall

Texts:

1. *An Introduction to the Psychology of Hearing*. Brian C.J. Moore. Academic Press: New York.
2. *Auditory Neuroscience. Making Sense of Sound*. By Jan Schnupp, Israel Nelken, Andrew J. King. MIT Press.

Web Page:

Learn@UW

Course Description and Objectives:

CD850 is a 3 credit graduate level course, which is offered by the Department of Communication Sciences & Disorders as part of the Doctorate in Audiology, PhD in any area, or Masters in Speech & Language Pathology. It is a required course for students specializing in audiology. It is recommended for students with basic or applied research interests in hearing, or students wishing simply to broaden their understanding of a rapidly developing hearing science. Prerequisites for the course are: enrollment in the AuD program, or in a PhD program in CSD or related field, or prior consent of the instructor. The purpose of the course is to provide a basic understanding of the terminology, concepts, theories, and experimental procedures entailed in the scientific study of hearing. The course covers the physical laws underlying sound generation and the physical means by which sound and sound systems are measured, basic functions of anatomy and physiology involved in sound transduction and neural response in the central auditory system; and psychological aspects of humans' response to sound including absolute and differential sensitivity, masking, binaural phenomena, and the perception of complex sounds and speech.

Specific course objectives are:

- (1) To provide a basic understanding of the physical principles underlying the generation and propagation of sound, and the behavior of vibrating systems.
- (2) To review what is known about peripheral and central auditory function (normal and abnormal) as it potentially pertains to sound perception.
- (3) To engender appreciation for the types of questions that motivate modern hearing research, this includes but is not restricted to possible clinical significance.
- (4) To promote critical understanding of procedures and methodologies used to answer questions.
- (5) To provide the basic background information necessary to read, understand and benefit from the scientific literature on hearing.

9/7/16

Grading:

Grading is based on performance on two in-class exams (40% each), and an in-class presentation or discussion leading (20%). Each of these is scored on an absolute scale ranging from 1-100.

Final grades are as follows: A=100-94, AB=93-89, B=88-84, BC=83-79, C=78-74 etc.

Presentations/discussions:

Students will work in small teams of 2 students from UWM and 1 student from UWSP. Each team will work on selected topics and will receive input and feedback from the instructor in preparation for these. Students will be responsible for: (i) preparing to lead or co-lead discussions, (ii) preparing questions for the discussion, and (iii) selecting a reading assignment for the class that compliments the assigned reading in the syllabus.

More information will be provided on the first day of class. Topics for class dates of Oct 26 – Dec 7.

Course Format:

Lectures, demonstrations, discussion. Students are encouraged to ask questions and participate in class discussion. I will be available to answer questions or to deal with any other matters that might affect your progress in the course.

Special Accommodations:

Please let me know within the first 2 weeks of class if you need any special accommodations in the curriculum, instruction, or assessments of this course to enable you to fully participate. For example, students with learning disabilities (and certification from the McBurney Center) or for whom English is the second language may need extended time to take the exam and/or an environment that is free of distractions. I can also provide assistive-listening devices for hard-of-hearing individuals. I am interested in ensuring that all persons are fully included in this course and will make any reasonable accommodations that are needed.

Students who require special accommodation due to religious observance are also asked to let me know within 2 weeks of the beginning of the semester of any conflicts.

Academic Honesty:

All students are urged to read the UW-Madison Misconduct Guidelines, posted at <http://www.wisc.edu/students/amsum.htm>. It is *your* responsibility to read and understand these guidelines.

LAB TOURS:

We will select a Friday during which students will gather in Madison to visit science labs that conduct research in the field of audiology and related areas.

The tour will last approximately 8.5 hours (8:30am-4pm). We will cancel two class periods to offset some of the time used for lab tours.

REQUIREMENT FOR UW-MADISON STUDENTS

In order to fulfill the requirement for breadth in the program, UW-Madison students are required to attend a minimum of 4 Prosem seminars during the fall semester.

Each student will be required to write a 300-500 word summary of the prosem that week. The summary should include: questions asked, methods used, results, conclusions. Those summaries should be uploaded to a dropbox on Learn@UW. They will not be graded as part of the final grade for 850 but submission is required.

9/7/16

CS&D Fall 2015 Calendar:

Objectives for each topic: Answer the following questions:

1. Why is this important for an audiologist to understand this topic?
2. How will knowing this information improve my clinical practice?
3. If I do not understand this topic, what kind of mistakes can I make that will make it more challenging for me to be able to treat my patients?

Class Orientation, Requirements, Overview

SEP 7: Current Topics in Psychological and Physiological Acoustics

Physics of Sound Review (Read: Moore Ch. 1.1-1.5; Schnupp et al., Ch. 1)

SEP 12: Nature of Sound, sine-waves and dB
SEP 14: Spectral Analysis, sound propagation
SEP 19: Transfer Function and Impulse Response; Digital Sound Systems, Nonlinearity

Physiological Acoustics Review (Read: Moore Ch. 1.6-1.9 & Ch. 2; Schnupp et al., Ch. 2)

SEP 21: The Outer and Middle Ear
SEP 26: Cochlear Mechanics and Transduction
SEP 28: Sensorineural Hearing Loss and the Role of Auditory Nonlinearity
OCT 3: SNHL and Hearing Aids **Guest lecture**
OCT 5: Midbrain nuclei (cochlear nucleus, superior olive, inferior colliculus)

Psychoacoustics, part I, Basic (Read: Moore Ch. 3, 4)

OCT 10: Masking and the Critical Band
OCT 12: no class
OCT 17: Loudness perception
OCT 19: Review for Exam I
OCT 24: EXAM I (in class, closed book)

Psychoacoustics, part II, Complex

OCT 26: Pitch perception I (Read: Moore Ch. 6; Schnupp et al., Ch. 3)
OCT 31: Pitch Perception II **Guest lecture**
NOV 2: no class
NOV 7: **Speech perception I** (Read: Moore Ch. 9; Schnupp et al., Ch. 4)
NOV 9: **Speech perception II** (Read: TBA)
NOV 11 (Friday) All-day lab tours at UW Madison; arrive night before and stay in hotel
NOV 14: **Spatial and Binaural Hearing I** (Read: Moore Ch. 7; Schnupp et al., Ch. 5)
NOV 16: **Spatial and Binaural Hearing II** (Read: TBA)
NOV 21: **Spatial and Binaural Hearing III** – clinical applications (Read: TBA)
NOV 23: **Scene analysis and pattern perception** (Read: Moore Ch. 8; Schnupp et al., Ch. 6)
NOV 28: no class
NOV 30: no class
DEC 5: Development, learning and plasticity I (Read: Schnupp et al., Ch. 7)
DEC 7: **Development, learning and plasticity II** (Read: TBA)
DEC 12: Review for exam II
DEC 14: Exam II

9/7/16

ASHA Standards addressed by this course:

Knowledge assessed through written or oral examination.	ASHA Ref	Assessed through
The student will. . .		
Be able to describe embryology and development of the auditory and vestibular systems, anatomy and physiology, neuroanatomy and neurophysiology, and pathophysiology.	A1	assignments and exams
Be able to describe normal aspects of auditory physiology and behavior over the life span.	A3	assignments and exams
Be able to understand principles, methods, and applications of psychometrics.	A11	assignments and exams
Be able to understand principles, methods, and applications of psychoacoustics.	A12	assignments and exams
Be able to understand and conduct principles and practices of research, including experimental design, statistical methods, and application to clinical populations.	A18	assignments and exams