

**University of Wisconsin-Madison
Communication Sciences and Disorders**

Course: CSD 850 Hearing Science I - Basic Acoustics and Psychoacoustics

Term: Fall 2018

Number of credits: 3

This course covers the physical aspects of sound, anatomy and physiology of the auditory system, and basic concepts in psychoacoustics. The course entails two 75-minute class periods each week over the Fall term and carries the expectation that students will work on course learning activities for about 3 hours outside of the classroom for every class period.

Schedule

Time: Mondays and Wednesdays 9-10:15 AM (see class calendar below)

Location: Goodnight hall Rm 412

Instructor

Name: Viji Easwar, PhD, MSc Audiology

Email: veaswar@wisc.edu (Please include "CSD 850" in the subject line of emails)

Office hours: Mondays and Wednesdays 10:30 AM – 11:30 AM or meet by appointment

Office location: Room 475, Goodnight Hall, 1975 Willow Dr, Madison, WI 53706

Required texts

1. Moore, B.C.J. (2012) An Introduction to the Psychology of Hearing. 6th Edition. Emerald press: Bingley. ISBN: 9004252428
2. Schnupp, J., Nelken, I., & King, A.J. (2011) Auditory Neuroscience – Making sense of sound. MIT Press: Cambridge. ISBN: 9780262113182

Course webpage

Access through <https://canvas.wisc.edu/>

All course materials (syllabus, lectures, assignments) will be available on canvas. It is the student's responsibility to check for updates. Lectures slides will be made available at least 1 hour before class.

Course Objectives

Upon successful completion of this course, students will be able to

- Describe physical aspects of sound as it pertains to auditory perception
- Explain the role of the peripheral and central auditory pathway in sound perception
- Explain key psychological concepts in sound processing involved in human communication
- Describe the consequences of hearing loss and the use of prosthesis on perception

Course content

This course consists of 5 units in the following order:

- Acoustics (taught by CSD 854 instructor)
- Anatomy and physiology
- Perception
- Hearing loss, prosthesis and plasticity
- Self-study (all topics)

Course calendar

Reading assigned for each class must be completed before class. Non-text book readings will be posted on canvas a week before class.

Unit	Date	Topic	Readings	Deadlines
	Wed, Sep 5	Review of syllabus and introduction	No readings	Presentation day assigned
<i>Acoustics (CSD 854)</i>	Mon, Sep 10	Dr. Sriram Boothalingam - Acoustics	See CSD 854	
	Wed, Sep 12	Dr. Sriram Boothalingam - Acoustics	See CSD 854	
<i>Anatomy & Physiology</i>	Mon, Sep 17	Anatomy & Physiology	Schnupp Ch 2 (p.51-64); Moore Ch 1 (p.23-24)	Q of the day
	Wed, Sep 19	Anatomy & Physiology	Schnupp Ch 2 (p.64-75); Moore Ch 1 (p.24-35)	Q of the day; picture upload due 20 Sep
	Mon, Sep 24	Anatomy & Physiology	Schnupp Ch 2(p.75-86); Moore Ch 1 (p. 38-55)	Q of the day; presentation topics due
	Wed, Sep 26	Anatomy & Physiology	Schnupp Ch 2 (p.86-92); Pickles 2015 (canvas); Moore Ch 1 (p.51-55)	Q of the day; Anatomy assignment due on 29 Sep
	Mon, Oct 1	Anatomy & Physiology		Q of the day
	Wed, Oct 3	Midterm I (acoustics not included)		
<i>Perception</i>	Mon, Oct 8	Auditory thresholds	Moore Ch 2	Q of the day
	Wed, Oct 10	Frequency selectivity	Moore Ch 3 (p.67-89)	Q of the day
	Mon, Oct 15	Masking	Moore Ch 3 (p. 89-131)	Q of the day
	Wed, Oct 17	Loudness perception	Moore Ch 4	Q of the day
	Mon, Oct 22	Pitch perception - Sean Anderson (TBD)	Schnupp Ch 3 Moore Ch 6	Q of the day
	Wed, Oct 24	Spatial/binaural hearing	Schnupp Ch 5; Moore Ch 7	Binaural assignment opens; Q of the day
		Fri, Oct 26	Lab Tours in Madison, WI	
	Mon, Oct 29	NO CLASS- class tours compensation		
	Wed, Oct 31	Spatial/binaural hearing	Schnupp Ch 5; Moore Ch 7	Q of the day
	Mon, Nov 5	Auditory scene analysis	Schnupp Ch 6; Moore Ch 8	Q of the day
	Wed, Nov 7	Speech perception	Schnupp Ch 4; Moore Ch 9	Q of the day
	Mon, Nov 12	Midterm II (non-cumulative)		
<i>Hearing loss, prosthesis, plasticity</i>	Wed, Nov 14	Effects of cochlear hearing loss	Moore pdf, Moore 1996 (canvas)	Q of the day
	Mon, Nov 19	Auditory prosthesis	Schnupp Ch 8; Moore 2003 (canvas)	Q of the day
	Wed, Nov 21	NO CLASS- class tours compensation/ Thanksgiving		
	Mon, Nov 26	Plasticity	Schnupp Ch 7	Binaural assignment due; Q of the day
<i>Self-study (all topics)</i>	Wed, Nov 28	Presentations - Normal aspects		Q of the day
	Mon, Dec 3	Presentations - Hearing loss		Q of the day
	Wed, Dec 5	Presentations - Perception with auditory prosthesis		Q of the day
	Mon, Dec 10	Presentations - Plasticity		Prosem summaries due; Q of the day
	Wed, Dec 12	Final Exam (non-cumulative; presentations included)		

Final grade is based on

- Three non-cumulative exams
 - Exam I – 20%
 - Exam II – 20%
 - Exam III – 15%
- Three assignments
 - Anatomy – 15%
 - Question of the day for all classes (except Acoustics) – 5%
 - Binaural listening – 10%
- One presentation – 15%

Grading scale

Percentage	100-92	91.9-90	89.9-88	87.9-82	81.9-80	79.9-78	77.9-72	71.9-70	69.9-68	67.9-60	<60
UW-SP Letter Grade	A	A-	B+	B	B-	C+	C	C-	D+	D	F
UW-Madison Letter Grade	A	A-B		B	B-C		C	C-D		D	F

Exams

- Are closed book and conducted in class
- Format: short answers, multiple choice, fill in the blanks, True/False, matching, labelling
- Questions regarding exams sent after 6 PM the day before the exam may not be answered

Anatomy assignment

- The goal of the anatomy assignment is to practice identifying landmarks of the ear. Upon successful completion of this assignment, students will be able to identify main landmarks of the external, middle and the inner ear.
- Students will be asked to upload pictures of external, middle and inner ear. Among all the pictures uploaded, students will be required to pick a subset and label each of the requested parts.
- Assignment details including instructions and grading rubric are provided in the document "AnatomyAssignment" uploaded in "files" (folder: AnatomyAssignment)

Binaural assignment

- The goal of this take-home assignment is to experience interaural time and level differences under headphones. Upon successful completion of this assignment, students will be able to differentiate time and level cues and describe their level/frequency limits.
- Listening exercises that run on Praat will be available in files (folder: BinauralListeningAssignment). Instructions with a template for assignment will be available in the same folder.

Presentations

- The goal of student presentations is to improve self-directed learning, assimilation of research findings and presentation skills. Upon successful completion of the presentation, students will be able to evaluate the literature, understand and summarize a focused topic in Hearing Science.
- There are 4 classes dedicated for presentations with specific themes (normal hearing, hearing loss, prostheses, plasticity)
- Instructions, suggested topics and grading rubric are provided in the document "Presentations_Instructions_Topics" uploaded in "files" (folder: presentations)

Question of the day

- The goal of Q of the day task is to review and check understanding of covered concepts before moving on to new materials. Upon successful completion of the presentation, students will be able to create questions and apply theoretical concepts/knowledge to clinical applications.
- At the end of each class (by midnight on Mondays and Wednesdays), each student must contribute ONE content question (including the answer) and answer ONE of the

implications-for-audiologists question to the course question bank via “Assignments” on canvas.

- Content questions must be one of the 3 types: multiple choice, fill in the blanks or short answers and can be based on lectures and/or readings. Tips for writing questions will be provided on canvas in each assignment description.
- ONE of following three implications-for-audiologists questions also needs to answered
 - Why is this important for an audiologist to understand this topic?
 - How will knowing this information improve my clinical practice?
 - If I do not understand this topic, what kind of mistakes would I likely make when treating my patients?
 - Keep the answer short (maximum 3 to 4 sentences)
- These questions will be compiled for every class and made available for review. Questions from these banks may appear in the exam.
- No questions are needed for the Acoustics unit taught by the CSD 854 instructor.

Lab tours

- The goal is to increase student awareness about different aspects of hearing/hearing-related research
- Scheduled for Friday the 26th of October
- Attendance is mandatory
- Students from Stevens points arrive the previous night (25th of Oct) and join for dinner
- On Friday, students will attend the Brains and Bagels seminar at 830 AM at the Waisman centre and tour labs until ~4PM.
- Breakfast and lunch will be provided
- Schedule is in currently being planned. Notifications will be sent soon
- Clinical supervisors are aware of this tour date. However, it is the student’s responsibility to talk to their clinical supervisors about compensating for missed clinic hours

Requirement for UW-Madison students

- UW-Madison students are required to attend a minimum of 3 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: research questions asked, methods used, results, conclusions. They will not be graded as part of the final grade for CSD 850 but submission is required.
- Submit the 3 summaries in pdf document via “Assignments”.

Academic honesty

It is the responsibility of students to read and understand the UW-Madison Misconduct Guidelines, posted at <https://conduct.students.wisc.edu/>.

Lectures should not be recorded (audio as well as video), unless the student has accommodations and they have obtained permission from the instructor beforehand.

Special accommodations

If the student needs any special accommodations in the curriculum, instruction or assessments of this course to enable them to fully participate, please let the instructor know within the first 2 weeks of class (by the 18th of Sep, 2017). If students require special accommodation due to religious observance, please let me know within the first 2 weeks of class (also by the 12th of Sep, 2018).

ASHA standards addressed by this course/KASA statements associated with CSD 850

ASHA reference	Topic	Type of documentation/experience
	3.1.2A FOUNDATIONS OF AUDIOLOGY PRACTICE	
A1	Embryology, anatomy, and physiology of the auditory, vestibular, and related body systems	Assignments and Exams
A2	Normal aspects of auditory and vestibular function across the lifespan	Assignments and Exams
A10	Effects of pathophysiology on the auditory, vestibular, and related body systems	Assignments and Exams
A12	Principles of psychoacoustics as related to auditory perception in individuals with normal hearing and those with hearing loss	Assignments and Exams
A18	Principles and practices of research, including experimental design, evidence-based practice, statistical methods, and application of research to clinical populations	Assignments and Exams
	3.1.3A IDENTIFICATION AND PREVENTION OF HEARING LOSS, TINNITUS, AND VESTIBULAR DISORDERS	
	Applying the principles of evidence-based practice	Assignments and Exams