

CS&D 860 section 001 Syllabus

Physiological Assessment in Audiology II



Physiological Assessment in Audiology II
CS&D 860 001 (2 Credits)
2021 Fall

Description

Advanced study of physiological measures used by audiologists in threshold and diagnostic evaluations, including acoustic immittance, middle and long latency auditory evoked potentials, and P300, and MMN. Course includes an introduction to evaluation of the balance system. Enroll Info: Grad st, cons inst, Com Dis 850, 851, 852, 853, 858, 859, con reg in 861

Prerequisite(s)

Graduate/professional standing

Instruction Mode

In person

Department: Communication Sciences & Disorders

College: Letters and Science

Canvas Course URL

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

2021 Fall Class

Term Start Date: Monday 13-Sep-132021

Term End Date: Thursday, 5-Jan 5-2022

Location and Schedule: GN Hall 2:30 -4:10 PM

CRN: 252004073

How the Credit Hours are Met

The credit standard for this course is met by an expectation of a total of 90 hours of student engagement with the courses learning activities (45 hours per credit), which include regularly scheduled instructor: student meeting times [insert meeting time expectations], reading, writing, problem sets, studio time, labs, field trips, and other student work as described in the syllabus.

Instructor

Cynthia FOWLER, Ph.D.
CGFOWLER@WISC.EDU

Instructor Availability

Methods of communication:

We will be using Learn@UW/Canvas for the class. I will post announcements on the “announcements” site for the class. Be sure to check it regularly.

For comments and questions, email is the best way to contact me.

Office hours are one hour before class or by appointment in person or by zoom or telephone. Please email your request to me and we will schedule the appointment.

GRADING AND COURSE MATERIALS

Course Website, Learning Management System and Instructional Tools

Canvas

Date Topic

Sept 13 COURSE LOGISTICS, PRINCIPLES OF AI, and VECTOR TYMPANOMETRY

Wiley, T.L., & Stoppenbach, D.T. (2002). Basic principles of acoustic immittance measures, in J. Katz (Ed.). Handbook of Clinical Audiology, Baltimore: Williams & Wilkins, 5th Edition, Chapter 11.

Zwislocki, J. (1963). An acoustic method for clinical examination of the ear, Journal of Speech and Hearing Research, 6, 303-314.

ANSI (1987, R2012). American National Standard Specifications for Instruments to Measure Aural Acoustic Impedance and Admittance (Aural Acoustic Immittance), New York: American National Standards Institute, ANSI S3.39-1987 (2002).

ACOUSTIC IMMITTANCE: VECTOR TYMPANOMETRY

Hunter & Sanford (2015) Ch 9, Tympanometry and Wideband Acoustic Immittance, in Katz et al (eds): Handbook of Clinical Audiology, 7th edition

Fowler, C.G., & Shanks, J. E. (2002). Tympanometry, in J. Katz (Ed.). Handbook of Clinical Audiology, Baltimore: Williams & Wilkins, 5th Edition, Ch. 12.

Shanks, J.E., Stelmachowicz, P.G., Beauchaine, K.L., & Schulte, L. (1992). Equivalent ear canal volumes in children pre- and post-tympanostomy tube insertion, J Speech Hear Res, 35, 936-941.

ASHA (1997). American Speech-Language-Hearing Association. Guidelines for Audiologic Screening. Rockville, MD: American Speech-Language-Hearing Association, 1. Guidelines for Screening Infants and Children for Outer and Middle Ear Disorders, Birth Through 18 Years, 15-22.

DeChicchis, A.R., Todd, N.W., & Nozza, R.J. (2000). Developmental changes in aural acoustic admittance measurements, J Am Acad Audiol, 11(2), 97-102.

Roup C, Wiley TL, Safady S, & Stoppenbach DT. (1998). Middle-ear screening in adults: Tympanometric norms, Am J Audiol, 7, 1-6.

Wiley, T.W., and Fowler, C.G. (1997). Screening Applications, in Acoustic Immittance Measures in Clinical Audiology: A Primer. San Diego: Singular Publishing Group, Inc., Ch. 7.

Nozza R.J., et al. ((1992). Towards the validation of aural acoustic immittance measures for diagnosis of middle ear effusion in children. Ear Hear. 13 (6): 442-453.

Nozza R.J. et al. (1994) Identification of middle ear effusion by aural acoustic admittance and otoscopy. Ear Hear. 15 (4): 310-323.

Sept 20. ACOUSTIC IMMITTANCE: MULTIFREQUENCY, COMPONENT TYMPANOMETRY

Fowler, C.G., & Shanks, J.E. (2002). Tympanometry, in J. Katz (Ed.). Handbook of Clinical Audiology, Baltimore: Williams & Wilkins, 5th Edition, Chapter 12.

Calandrucchio L, Fitzgerald TS, & Prieve BA. (2006). Normative Multifrequency Tympanometry in Infants and Toddlers. J Am Acad Audiol 17: 470-480.

Colletti, V. (1976). Tympanometry from 200 to 2000 Hz probe tone, Audiology, 15, 106-119.

Shanks, J.E., Wilson, R.H., Cambron, N (1993). Multifrequency tympanometry: Effects of ear canal volume compensation on static acoustic admittance and estimates of middle ear resonance. JSHR 36(1): 178-185

Sprague, B., Wiley, T. L., & Goldstein, R. (1985). Tympanometric and acoustic-reflex studies in neonates, Journal of Speech and Hearing Research, 28, 265-272

Holte, L. (1996). Aging effects in multifrequency tympanometry. Ear Hear 17 (1) 12-18.

Margolis et al. (2003). Tympanometry in newborn infants—1 kHz norms. JAAA 14(7): 383-392.

Zhao et al. (2002) Middle ear dynamic characteristics in patients with otosclerosis. Ear Hear 23 (2): 150-158.

Sept 27. ACOUSTIC IMMITTANCE: ACOUSTIC REFLEXES

Feeney and Schairer SA. (2015). Ch 10, Acoustic Stapedius Reflex Measurements, in J. Katz et al. (Ed.). Handbook of Clinical Audiology, 7th edition.

Wiley TW & Fowler CG. (1997). Stapedial Reflex Measures, in Acoustic Immittance Measures in Clinical Audiology: A Primer. San Diego: Singular Publishing Group, Inc., Ch 6.

Lyon MJ. (1978). The central location of the motor neurons to the stapedius muscle in the cat, Brain Research, 143, 437-444.

Wilson RH. & Margolis RH. (1999). Acoustic-reflex measurements, in Musiek, FE. & Rintelmann, WF. (ed.), Contemporary Perspectives in Hearing Assessment, Chapter 5, 131-165.

Wiley T & Block MG.(1984). Acoustic and Nonacoustic Reflex Patterns in Audiologic Diagnosis, in Silman S. (ed.), The Acoustic Reflex: Basic Principles and Clinical Applications, New York: Academic Press, Chap. 11, 387-411.

Fowler CG & Wilson RH. (1984). Adaptation of the acoustic reflex. Ear Hear, 5, 281-288.

Hunter LL, Ries DT, Schlauch RS, Levine SC, & Ward WD. (1999). Safety and clinical performance of acoustic reflex tests. Ear Hear. 20: 506-514.

Oct 4. Wideband Acoustic Immittance

Hunter L & Sanford (2015). Ch 9. Tympanometry and Wideband Admittance. Katz, J. et al. (Ed.). Handbook of Clinical Audiology, Baltimore: Lippincott Williams & Wilkins, 7th Edition, 2015.

Feeney MP, Grant IL, Marryott LP. (2003). Wideband energy reflectance measurements in adults with middle-ear disorders. J Speech Lang Hear Res. 46(4):901-11.

Feeney MP, & Sanford CA (2005). Detection of acoustic stapedius reflex in infants using wideband energy reflectance and admittance. J Am Acad Audiol 16: 278-290.

Keefe DH et al. (2000). Identification of neonatal hearing impairment: Ear canal measurements of acoustic admittance and reflectance. Ear Hear 21 (5): 443-61.

Oct 11. MFT and Reflectance Cases

Oct 18. MFT and Wideband Admittance Cases and Review

Oct 25. Quiz 1

Nov. 1. AUDITORY MIDDLE AND LATE POTENTIALS

Cacace A. & McFarland D. (2015). Ch 17, Middle latency auditory evoked potentials. Katz et al. (Ed.). Handbook of Clinical Audiology, 7th edition

Kraus N, McGee TJ, & Comperatore (1989). MLRs in children are consistently present during wakefulness, stage 1, and REM sleep. Ear Hear, 17:419-429

Galambos, Makeig, & Talmachoff, Proc Natl Acad Sci 78:2643-2647

Kileny P. & Kimink, (1987). Electrically evoked middle latency auditory evoked potentials in cochlear implant candidates. Arch Otolaryngol 113: 1072-1077

Woods D. & Clayworth, (1986) Age related changes in human middle latency auditory evoked potentials. Electroelectrogr and Clin Neurophysiol 65-297-303

Nov 8. CORTICAL EVENT RELATED POTENTIALS (MMN AND P300)

Tremblay & Clinard. (2015). Ch 18, Cortical Auditory-Evoked Potentials Katz et al. (Ed.). Handbook of Clinical Audiology, 7th Edition.

Starr & Golob. (2007). Ch. 24, Cognitive Factors Modulating Auditory Cortical Potentials. In Burkard, Donn, & Eggermont (eds).

Polich J, Howard L, Starr A. (1985). Effects of age on the P300 component of the event-related potential from auditory stimuli: peak definition, variation, and measurement. *J Gerontol.* 40(6):721-6

Polich & Herbst (2000). The P300 as a clinical assay: Rationale, Evaluation, and Findings. *Int J Psychophysiol* 38: 3-19.

Naatanen, R. (1995). The mismatch negativity: A powerful tool for cognitive neuroscience. *Ear and Hearing* 16: 6-18

Kutas & Hillyard, (1980). Reading senseless sentences: Brain potentials reflect semantic incongruity. *Science* 207: 203-205

Nov 15. AUDITORY STEADY STATE POTENTIALS

Dimitrinjevic & Cone (2015). Ch 15, Auditory Steady-State Response. Katz et al. (eds) *Handbook of Clinical Audiology*, 7th edition.

Picton TW et al. (2007). Ch. 21, Audiometry Using Auditory Steady-State Responses. Burkard, Don, & Eggermont (eds).

Rance, Rickards, Cohen, DeVidi, & Clark R, (1998). The automated prediction of hearing thresholds in sleeping subjects using auditory steady state evoked responses. *Ear Hear* 19: 48-61.

Boettcher FA, Poth, EA, Mills, JH, & Dubno, JR. (2001). The amplitude-modulation following response in young and aged human subjects. *Hear Res*, 153(1-2), 32-42.

Quiz 2

Nov 22. STUDENT PRESENTATIONS: Tympanometry-multifrequency; resonance; norms in special populations

Nov 29. STUDENT PRESENTATIONS: Middle ear measures: wideband admittance measures in disorders; specific applications of acoustic reflexes

Dec 6. STUDENT PRESENTATIONS: AEP and aging; AEP and binaural processing; AEP and cognition; AEP and auditory development with CI; AEP, cochlear implants, and auditory development; electric-evoked potentials in CI

Dec 13. STUDENT PRESENTATIONS: AEP and aging; AEP and binaural processing; AEP and cognition; AEP and auditory development with CI; AEP, cochlear implants, and auditory development; electric-evoked potentials in CI

PRESENTATIONS:

You will make one presentation (20 minutes) to the class that investigates in more depth one of the topics covered in class.

Your responsibilities regarding the presentation are the following:

1. Choose your topic and have it approved by October 1.
2. One week prior to the presentation, you will email a draft copy of your powerpoint presentation to the instructor. I will review and comment on the draft and get it back to you for corrections, suggestions, etc. At this time, the presenter also send me by email 1 or 2 peer-reviewed articles on your topic. Also post these readings on the discussion board under your name so that the class members, who should read the articles and be prepared to engage in a discussion of the topic on the day of presentation.
3. You will post your final finished presentation NO LATER than 8 AM the morning the presentation.
4. Members of the class should print out the presentations and have them ready by the start of the class.
5. The presentation should contain the following elements: Title page, Outline, Short literature review, case (if appropriate), and “take home points”, and references. References must be from the peer-reviewed literature, although you may use illustrations from the web.
6. At the end of the presentation, you should post some questions related to your topic so the class can discuss them.

Grading Scale:

All grades will be awarded based upon the percentage score earned. Because UW – Madison and UW – Stevens Point have different grading scales, grades will be assigned based upon the home campus of the student using the table below:

UW – SP Letter Grade	A	A-	B+	B	B-	C+	C	C-	D+	D	F
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 – Madison Letter Grade	A	A-B		B	B-C		C	C-D		D	F

Outcome Measures

By the end of the class, the student will be able to do the following: Describe advanced concepts of middle ear analysis, including multifrequency tympanometry

S10577

Describe when these measures of middle ear function are appropriate in clinical assessment.

S10578

Describe some of the advanced auditory evoked potentials, including the middle and late auditory evoked potentials and several cognitive potentials

S10579

S10580

KASA & CFCC Standards	CSD 860 Physiological Assessment in Audiology II	How standard is met
Standard II-A: Foundations of Practice		
• A1. Genetics, embryology and development of the auditory and vestibular systems, anatomy and physiology, neuroanatomy and neurophysiology, and pathophysiology of hearing and balance over the life span	860	Students must pass a test on the topic with a grade of B or better.
• A5. Calibration and use of instrumentation according to manufacturers' specifications and accepted standards	860	Students must pass a test on the topic with a grade of B or better.
Standard II-C: Audiologic Evaluation		
• C7. Selecting, performing, and interpreting a complete immittance test battery based on patient need and other findings; tests to be considered include single probe tone tympanometry or multifrequency and multicomponent protocols, ipsilateral and contralateral acoustic reflex threshold measurements, acoustic reflex decay measurements, and Eustachian tube function. NEW!	860	Students must pass a test on the topic with a grade of B or better. Students must interpret cases in class and on a test
• C11. Selecting, performing, and interpreting physiologic and electrophysiologic test procedures, including electrocochleography, auditory brainstem response with frequency-specific air and bone conduction threshold testing, and click stimuli for neural diagnostic purposes. NEW!	860	Students must pass a test on the topic with a grade of B or better. Students must interpret cases in class and on a test
• C13. Selecting, performing, and interpreting tests for nonorganic hearing loss. NEW!	860	Students must pass a test on the topic with a grade of B or better. Students must interpret cases in class and on a test
• C15. Selecting, performing, and interpreting tests to evaluate central auditory processing disorder. NEW!	860	Students must interpret cases in class and on a test
• C16. Electrophysiologic testing, including but not limited to auditory steady-state response, auditory middle latency response, auditory late (long latency) response, and cognitive potentials (e.g., P300 response, mismatch negativity response). NEW!	860	Students must pass a test on the topic with a grade of B or better.

Grading

The course is graded as follows: Exam 1=25%, Exam 2=25%, Brief Quizzes= 25%, Presentation 25%,

Exams are not cumulative.

Exams, Quizzes, Papers & Other Major Graded Work

Exams and quizzes are given in class time, but they are online. Exams and quizzes are a mixture of objective and short answer questions.

Exam Proctoring

Exams and quizzes will not be proctored. Students are expected to follow the rules of the tests, and are on the honor system.

Privacy of Student Records and the Usage of Audio Recorded Lectures

See information about [privacy of student records and the usage of audio-recorded lectures](#).

Usage of Audio Recorded Lectures Statement

Lecture materials and recordings are protected intellectual property at UW- Madison. Students in this course may use the materials and recordings for their personal use related to participation in this class. Students may also take notes solely for their personal use. If a lecture is not already recorded, you are not authorized to record my lectures without my permission unless you are considered by the university to be a qualified student with a disability requiring accommodation. [Regent Policy Document 4-1] Students may not copy or have lecture materials and recordings outside of class, including posting on internet sites or selling to commercial entities. Students are also prohibited from providing or selling their personal notes to anyone else or being paid for taking notes by any person or commercial firm without the instructor's express written permission. Unauthorized use of these copyrighted lecture materials and recordings constitutes copyright infringement and may be addressed under the university's policies, UWS Chapters 14 and 17, governing student academic and non-academic misconduct

Other Course Information

ADDITIONAL COURSE INFORMATION AND ACADEMIC POLICIES



OTHER INSTRUCTIONAL REQUIREMENTS

Practice physical distancing (staying at least six feet apart from others), in both indoor and outdoor spaces, including when entering and exiting building and instructional spaces.

- Monitor symptoms using the [COVID-19 Symptom Tracker](#) daily and, if symptoms exist, stay home and immediately get tested. Free testing is available to the entire campus community including students. Find more [information on testing](#) including on-campus testing locations, getting test results and what to do if you test positive for COVID-19.
- Follow specific guidance on classroom seating and furniture use. “Sit Here Signs” will be placed in classrooms to indicate where students should sit, as well as floor decals to indicate where furniture should be placed and remain.
- Limit the sharing of materials (papers, books, writing utensils, calculators, etc.) with others in class. Any materials brought to class must be taken with you when leaving the classroom.
- Food and beverages are not allowed in instructional spaces. For students who may need access to food or beverages during class (e.g., medical condition, other accommodation or circumstance) may do so while wearing face coverings. If this will be a reoccurring situation, students should discuss their on-going need with their instructor.
- Carefully observe and follow health and safety signs posted inside and outside the classroom.
- Course start and stop times are not staggered. At their discretion, instructors may start or end class a few minutes off schedule to avoid congestion in the halls.

Additionally, students should:

- Clean desks and seats before and after class with the provided classroom supplies and wipe off hands with disinfectant wipes. The provided cleaning supplies will be safe for skin contact; gloves are not needed. See [guidance for cleaning classrooms](#).
- Exit the classroom as quickly as possible to allow the next section to transition in safely
- Be aware of and sensitive to others around you, particularly those who may be struggling or having difficulties.



HOW TO SUCCEED IN THIS COURSE

Resource links to other campus services:

- [University Health Services](#)
- [Undergraduate Academic Advising and Career Services](#)
- [Office of the Registrar](#)
- [Office of Student Financial Aid](#)
- [Dean of Students Office](#)



STUDENTS' RULES, RIGHTS & RESPONSIBILITIES

During the global COVID-10 pandemic, we must prioritize our collective health and safety to keep ourselves, our campus, and our community safe. As a university community, we must work together to prevent the spread of the virus and to promote the collective health and welfare of our campus and surrounding community. [Rights & Responsibilities](#)



UW-MADISON BADGER PLEDGE

[Badger Pledge](#)



UW-MADISON FACE COVERING GUIDELINES

UW-Madison [face covering guidelines](#). While on campus all employees and students are required to [wear appropriate and properly fitting](#) face coverings while present in any campus building unless working alone in a laboratory or office space.

Face Coverings During In-person Instruction Statement (COVID-19)

Individuals are expected to wear a face covering while inside any university building. Face coverings must be [worn correctly](#) (i.e., covering both your mouth and nose) in the building if you are attending class in person. If any student is unable to wear a face-covering, an accommodation may be provided due to disability, medical condition, or other legitimate reason.

Students with disabilities or medical conditions who are unable to wear a face covering should contact the [McBurney Disability Resource Center](#) or their Access Consultant if they are already affiliated. Students requesting an accommodation unrelated to disability or medical condition, should contact the Dean of Students Office.

Students who choose not to wear a face covering may not attend in-person classes, unless they are approved for an accommodation or exemption. All other students not wearing a face covering will be asked to put one on or leave the classroom. Students who refuse to wear face coverings appropriately or adhere to other stated requirements will be reported to the [Office of Student Conduct and Community Standards](#) and will not be allowed to return to the classroom until they agree to comply with the face covering policy. An instructor may cancel or suspend a course in-person meeting if a person is in the classroom without an approved face covering in position over their nose and mouth and refuses to immediately comply.



QUARANTINE OR ISOLATION DUE TO COVID-19

Students should continually monitor themselves for COVID-19 [symptoms](#) and get [tested](#) for the virus if they have symptoms or have been in close contact with someone with COVID-19. Students should reach out to instructors as soon as possible if they become ill or need to isolate or quarantine, in order to make alternate plans for how to proceed with the course. Students are strongly encouraged to communicate with their instructor concerning their illness and the anticipated extent of their absence from the course (either in-person or remote). The instructor will work with the student to provide alternative ways to complete the course work.



COURSE EVALUATIONS

Students will be provided with an opportunity to evaluate this course and your learning experience. Student participation is an integral component of this course, and your feedback is important to me. I strongly encourage you to participate in the course evaluation.

Digital Course Evaluation (AEFIS)

UW-Madison uses an online course evaluation survey tool, AEFIS. In most instances, you will receive an official email two weeks prior to the end of the semester when your course evaluation is available. You will receive a link to log into the course evaluation with your NetID where you can complete the evaluation and submit it, anonymously. Your participation is an integral component of this course, and your feedback is important to me. I strongly encourage you to participate in the course evaluation.



ACADEMIC CALENDAR & RELIGIOUS OBSERVANCES

See: <https://secfac.wisc.edu/academic-calendar/#religious-observances>



ACADEMIC INTEGRITY STATEMENT

By virtue of enrollment, each student agrees to uphold the high academic standards of the University of Wisconsin-Madison; academic misconduct is behavior that negatively impacts the integrity of the institution. Cheating, fabrication, plagiarism, unauthorized collaboration, and helping others commit these previously listed acts are examples of misconduct which may result in disciplinary action. Examples of disciplinary action include, but is not limited to, failure on the assignment/course, written reprimand, disciplinary probation, suspension, or expulsion.



ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES STATEMENT

The University of Wisconsin-Madison supports the right of all enrolled students to a full and equal educational opportunity. The Americans with Disabilities Act (ADA), Wisconsin State Statute (36.12), and UW-Madison policy (Faculty Document 1071) require that students with disabilities be reasonably accommodated in instruction and campus life. Reasonable accommodations for students with disabilities is a shared faculty and student responsibility. Students are expected to inform faculty [me] of their need for instructional accommodations by the end of the third week of the semester, or as soon as possible after a disability has been incurred or recognized. Faculty [I], will work either directly with the student [you] or in coordination with the McBurney Center to identify and provide reasonable instructional accommodations. Disability information, including instructional accommodations as part of a student's educational record, is confidential and protected under FERPA. (See: [McBurney Disability Resource Center](#))



DIVERSITY & INCLUSION STATEMENT

Diversity is a source of strength, creativity, and innovation for UW-Madison. We value the contributions of each person and respect the profound ways their identity, culture, background, experience, status, abilities, and opinion enrich the university community. We commit ourselves to the pursuit of excellence in teaching, research, outreach, and diversity as inextricably linked goals.

The University of Wisconsin-Madison fulfills its public mission by creating a welcoming and inclusive community for people from every background — people who as students, faculty, and staff serve Wisconsin and the world.