Course Syllabus for CS&D 860, Fall 2018

Course Subject, Number and Title
CS&D 860: Physiological Assessment in Audiology II

Instructor: Cynthia G. Fowler

Fall, 2018

Credits:

Credits: 2 semester hours

Format: 1 lecture/discussion session per week

Canvas Course URL www.learnuw.wisc.edu

Course Designations and Attributes
Required course for the AU.D. program

Meeting Time and Location Class meets from 2:30-4:10 PM on Mondays

Instructional Mode Face-to-face.

How Credit Hours are met by the Course

Traditional Carnegie Definition – One hour (i.e. 50 minutes) of classroom or direct faculty/instructor instruction and a minimum of two hours of out of class student work each week over approximately 15 weeks, or an equivalent amount of engagement over a different number of weeks.

INSTRUCTOR

Instructor Title and Name
Cynthia Fowler, Ph.D.

Instructor Availability

- One hour before class, whenever my office door is open, or by appointment
- We will be using Learn@UW for the class. I will post announcements on the "News" section of the course. Be sure to check it regularly.

Instructor Email/Preferred Contact

cynthia.fowler@wisc.edu

OFFICIAL COURSE DESCRIPTION

Course 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.

Requisites

Graduate/professional standing
Grad st, cons inst, Com Dis 850, 851, 852, 853, 858, 859, con reg in 861

LEARNING OUTCOMES

Course Learning Outcomes

- 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
- Describe when these methods are appropriate in clinical assessment.
- Describe some of the advanced auditory evoked potentials, including the middle and late auditory evoked potentials and the cognitive potentials
- Explain when and why these physiological potentials are useful in clinical assessments

GRADING

Exams = 75% @ 25% each, and Presentation @ 25%

UW-SP Letter Grade	**A**	**A-**	**B+**	**B**	**B-**	**C+**	**C**	**C-**	**D+**	**D**	**F**
Percent	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-Mad Letter Grade	A	A-B		B	B-C		C	C-D		D	F

REQUIRED TEXTBOOK, SOFTWARE & OTHER COURSE MATERIALS

Required texts:

- Katz, J. et al. (Ed.). Handbook of Clinical Audiology, Baltimore: Lippincott Williams & Wilkins, 7th Edition, 2015.
- Burkard RF, Don M, Eggermont JJ. (Ed.) Auditory Evoked Potentials: Basic Principles and Clinical Application. Wolters Kluwer/Lippincott Williams & Wilkins, 2007.

Recommended texts (optional):

- Wiley T.L. & Fowler C.G. Acoustic Immittance Measures in Clinical Audiology: A Primer, Singular Publishing Group, Inc., San Diego, CA, 1997. (Relevant chapters will be posted). Students typically like this book as an overview of tympanometry, but it is getting old. If you do want to purchase it, you can find cheap books online.
- Hunter L.L. and Shanaz N. 2014. Acoustic Immittance Measures. Plural Publishers, Inc San Diego. This book does overlap quite a bit of the information that is in the Katz book, so it isn't required that you purchase it. I will post some of the relevant chapters and you can let me know if they are helpful.
- Additional readings accompany each topic.

EXAMS, QUIZZES, and OTHER MAJOR GRADED WORK

- The first quiz is online, in class, and closed book.
- The second and third quizzes are take-home, online, and open book.

HOMEWORK & OTHER ASSIGNMENTS

- Assignments and tests are to be submitted online

RULES, RIGHTS & RESPONSIBILITIES

- See the Guide's to Rules, Rights and Responsibilities

ACADEMIC INTEGRITY

By enrolling in this course, each student assumes the responsibilities of an active participant in UW-Madison's community of scholars in which everyone's academic work and behavior are held to the highest academic integrity standards. Academic misconduct compromises the integrity of the university. Cheating, fabrication, plagiarism, unauthorized collaboration, and helping others commit these acts are examples of academic misconduct, which can result in

disciplinary action. This includes but is not limited to failure on the assignment/course, disciplinary probation, or suspension. Substantial or repeated cases of misconduct will be forwarded to the Office of Student Conduct & Community Standards for additional review. For more information, refer to studentconduct.wiscweb.wisc.edu/academic-integrity/.

ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES

McBurney Disability Resource Center syllabus 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." http://mcburney.wisc.edu/facstaffother/faculty/syllabus.php

DIVERSITY & INCLUSION

Institutional statement on diversity: "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." https://diversity.wisc.edu/

Course content and meeting dates.

Date Topic

Sept 10 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 17. 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.

Calandruccio 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 24. 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 1. Acoustic Reflectance

Keefe & Feeney (2009). Ch 8, Principles of acoustic immittance and acoustic transfer functions, in Katz et al (eds): Handbook of Clinical Audiology, 6th edition

Feeney MP & Keefe DH. (1999). Acoustic reflex detection using wide-band acoustic reflectance, admittance, and power measurements. J Speech Lang Hear Res. 42(5):1029-41.

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 8 MFT and Reflectance Cases

Oct 15 Quiz 1 (in class)

Oct 22. INTRODUCTION TO ADVANCED AEP

Davis H & Hirsh S (1979). *Audiology,* 18: 445-461.

McPherson D. & Starr A. (1993). Binaural interaction in auditory evoked potentials: brainstem, middle, and long-latency components. Hear Res 66:91-98

Oct 29. 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

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

Pratt (2007) Ch 22, Middle Latency Responses. In Burkard, Don, & Eggermont.

Martin, Tremblay, & Stapells (2007). Ch. Principles and Applications of Cortical Evoked Potentials, in Burkard, Don, & Eggermont.

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 5. CORTICAL EVENT RELATED POTENTIALS (MMN AND P300)

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 12. 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 (online)

Nov 19. STUDENT PRESENTATIONS: Tympanomtry-multifrequency; resonance; norms in special populations

Nov 26. STUDENT PRESENTIONS: Middle ear measures: energy reflectance; measures in disorders; specific applications of acoustic reflexes

Dec 3. STUDENT PRESENTATIONS: AEP and aging; AEP and binaural processing; AEP in specific disorders

Dec 10. STUDENT PRESENTATIONS: AEP and cognition; AEP**, c**ochlear implants, and auditory development; electric-evoked potentials in CI

Quiz 3 (online)

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:

Choose your topic and have it approved by October 1.

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, also send me by email 1 peer-reviewed article on your topic. These will be posted for the class members, who should read the articles and be prepared to engage in a discussion of the topic on the day of presentation.

You will email to the class and me the finished presentation in NO LATER than 5 PM the day before the presentation.

Members of the class should print out the presentations and have them ready by the start of the class.

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 primary, peer-reviewed literature, although you may use illustrations from the web.