



Course Syllabus

Advanced Clinical Audiology

HESP 706
Spring 2019

Instructor: Samira Anderson, Au.D., Ph.D.
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Meeting Time: Wednesdays, 3:30 – 6:00 PM
Meeting Location: Lefrak Hall, Room 0135
Prerequisites: HESP 606

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Office Hours: by
appointment

Learner Outcomes*

This course covers advanced clinical and experimental methods for evaluation of the peripheral and central auditory systems, including procedural considerations and interpretation of test results. After completing this course, you will be able to:

1. Demonstrate the ability to administer, interpret, and report the results of advanced audiological evaluations that incorporate advanced immittance measures, otoacoustic emissions testing, auditory processing evaluations, tinnitus evaluations, and tests of non-organic hearing loss.
2. Demonstrate knowledge of the underlying physiological mechanisms contributing to auditory disorders and the ability to communicate this information to patients and other professionals in everyday language.
3. Critically evaluate new research that aims to improve diagnosis and management of auditory disorders.

*See p. 8 for the Audiology Knowledge and Skills addressed by specific learning outcomes

RECOMMENDED READINGS

Dhar, S. and Hall, J.W. (2018). *Otoacoustic Emissions: Principles, Procedures, and Protocols, 2nd Edition*. San Diego: Plural Publishing.

Katz, J. (2015). *Handbook of Clinical Audiology, 7th Edition*. Philadelphia: Lippincott Williams & Wilcott.

Musiek, F. and Chermak, G. (2013) *Handbook of Central Auditory Processing Disorder, Volume I: Auditory Neuroscience and Diagnosis, 2nd. Edition*. San Diego: Plural Publishing.

Musiek, F. and Chermak, G. (2013) *Handbook of Central Auditory Processing Disorder, Volume II: Comprehensive Intervention, 2nd. Edition*. San Diego: Plural Publishing.

Hunter, L. and Shahnaz, N. (2013) *Acoustic Immittance Measures: Basic and Advanced Practice*. San Diego: Plural Publishing.

Course Schedule

Module 1 – Otoacoustic Emissions	
January 30	Introduction; Class expectations; Otoacoustic emissions: Overview, Anatomy & Physiology
In-class activities	Kahoot! Lecture
Outside activities	Readings: 1. Dhar and Hall, Text, Chapters 1 and 2 2. Kemp, D. T. (2002). Otoacoustic emissions, their origin in cochlear function, and use. <i>British Medical Bulletin</i> , 63, 223-241. 3. *Abdala, C., and Keefe, D. H. (2006). "Effects of middle-ear immaturity on distortion product otoacoustic emission suppression tuning in infant ears," <i>J Acoust Soc Am</i> 120, 3832-3842.
February 6	Otoacoustic Emissions: Classification, instrumentation, calibration
In-class activities	Kahoot! Lecture Article review #1 Lab 1 review
Outside activities	Quiz 1 Lab 1 Readings: 1. Dhar and Hall, Text, Chapters 3 and 4 2. Katz, Text, Chapter 19, 57-64 3. Shera, C. A., and John J. Guinan, J. (1999). "Evoked otoacoustic emissions arise by two fundamentally different mechanisms: A taxonomy for mammalian OAEs," <i>J Acoust Soc Am</i> 105, 782-798. 4. *Reuven, M. L., Neely, S. T., Kopun, J. G., Rasetshwane, D. M., Allen, J. B., Tan, H., and Gorga, M. P. (2012). "Effect of Calibration Method on Distortion-Product Otoacoustic Emission Measurements at and Around 4 kHz," <i>Ear Hear</i> 34, 779-788.
February 13	Otoacoustic Emissions: Clinical measurement, protocols, and analyses
In-class activities	Kahoot! Article review #2 Lecture
Outside activities	Quiz 2 Readings: 1. Dhar and Hall, Text, Chapters 5 and 6 2. Katz, Text, Chapter 19, 64-72 3. *Blankenship, C. M., Hunter, L. L., Keefe, D. H., Feeney, M. P., Brown, D. K., McCune, A., Fitzpatrick, D. F., Lin, L. J. E., and hearing (2018). "Optimizing clinical interpretation of distortion product otoacoustic emissions in infants," 39, 1075-1090. 4. *Cedars, E., Kriss, H., Lazar, A. A., Chan, C., and Chan, D. K. J. P. o. (2018). "Use of otoacoustic emissions to improve outcomes and reduce disparities in a community preschool hearing screening program," 13, e0208050.
February 20	SNOW DAY!
Outside activities	Panopto recordings: OAE analyses and Efferent measurement
February 27	Otoacoustic Emissions: Clinical applications
In-class activities	Kahoot! Lecture

	Case studies Exam review
Outside activities	Readings: 1. Dhar and Hall, Text, Chapters 7-9 2. *Iliadou, V. V., Weihing, J., Chermak, G. D., and Bamiou, D. E. J. I. J. o. P. O. (2018). "Otoacoustic emission suppression in children diagnosed with central auditory processing disorder and speech in noise perception deficits." 3. *Konrad-Martin, D., Knight, K., McMillan, G. P., Dreisbach, L. E., Nelson, E., and Dille, M. (2017). "Long-Term Variability of Distortion-Product Otoacoustic Emissions in Infants and Children and Its Relation to Pediatric Ototoxicity Monitoring," Ear Hear. 4. *Helleman, H. W., Jansen, E. J., and Dreschler, W. A. (2010). "Otoacoustic emissions in a hearing conservation program: general applicability in longitudinal monitoring and the relation to changes in pure-tone thresholds," Int J Audiol 49, 410-419.
Module 2 - Advanced Immittance Measures	
March 6	Exam I; Multifrequency tympanometry
In-class activities	Lecture
Outside activities	Readings: 1. Katz, Text, Chapter 9, pp 149-161 2. *Sugasawa, K., Iwasaki, S., Fujimoto, C., Kinoshita, M., Inoue, A., Egami, N., Ushio, M., Chihara, Y., and Yamasoba, T. (2013). "Diagnostic usefulness of multifrequency tympanometry for Meniere's disease," Audiol Neurootol 18, 152-160.
March 13	Wideband reflectance
In-class activities	Kahoot! Lecture Article 3 Review Lab 2 Review OAEs/Wideband immittance counseling presentation
Outside activities	Quiz 3 Readings: 1. *Niemczyk, E., Lachowska, M., Tataj, E., Kurczak, K., and Niemczyk, K. (2018). "Wideband tympanometry and absorbance measurements in otosclerotic ears," The Laryngoscope. 2. *Hunter, L. L., Keefe, D. H., Feeney, M. P., Fitzpatrick, D. F., and Lin, L. (2015). "Longitudinal development of wideband reflectance tympanometry in normal and at-risk infants," Hear Res. 3. *Prieve, B. A., Feeney, M. P., Stenfelt, S., and Shahnaz, N. (2013). "Prediction of conductive hearing loss using wideband acoustic immittance," Ear Hear 34, 54S-59S.
Module 3 - Tinnitus; Non-organic Hearing Loss	
March 20	SPRING BREAK!!
March 27	Tinnitus: Neural mechanisms and assessment
In-class activities	Kahoot! Lecture Article 4 Review
Outside activities	Readings: Quiz 4 1. Henry, J. A., Roberts, L. E., Caspary, D. M., Theodoroff, S. M., & Salvi, R. J. (2014) 2. *Gu, J.W., Herrmann, B.S., Levine, R.A., and Melcher, J.R. (2012) 3. *Engineer, N. D., Riley, J. R., Seale, J. D., Vrana, W. A., Shetake, J. A., Sudanagunta, S. P. et al. (2011)

	<ol style="list-style-type: none"> 4. *Leaver, A.M., Renier, L., Chevillet, M.A., Morgan, S., Kim, H.J., and Rauschecker, J.P. (2011) 5. *Watts, E. J., Fackrell, K., Smith, S., Sheldrake, J., Haider, H., and Hoare, D. J. (2018). "Why Is Tinnitus a Problem? A Qualitative Analysis of Problems Reported by Tinnitus Patients," Trends in Hearing 22, 233121651881225. 6. *Berger, J. I., Owen, W., Wilson, C. A., Hockley, A., Coomber, B., Palmer, A. R., and Wallace, M. N. (2018). "Gap-induced reductions of evoked potentials in the auditory cortex: A possible objective marker for the presence of tinnitus in animals," Brain Res 1679, 101-108. 7. *Henry, J. A., Griest, S., Thielman, E., McMillan, G., Kaelin, C., and Carlson, K. F. (2015). "Tinnitus Functional Index: Development, validation, outcomes research, and clinical application." 8. *Skarzynski, P. H., Raj-Koziak, D., Rajchel, J. J., and Skarzynski, H. (2017). "Management of non-organic hearing loss in children - A case study," International Journal of Pediatric Otorhinolaryngology 97, 223-227.
April 3	Exam II (take-home)
April 10	Non-organic hearing loss, Introduction to APD, Anatomy and Physiology
In-class activities	Tinnitus counseling presentation Article Review #5 Lab 3 Review Lecture
Outside activities	Quiz 5 Lab 3 Readings: <ol style="list-style-type: none"> 1. Katz, Text, Chapters 27-28 2. *Sanes, D., and Constantine-Paton, M. (1985). "The sharpening of frequency tuning curves requires patterned activity during development in the mouse, <i>Mus musculus</i>," J Neurosci 5, 1152-1166. 3. *Kopp-Scheinflug, C., and Tempel, B. L. (2015). "Decreased temporal precision of neuronal signaling as a candidate mechanism of auditory processing disorder," Hear Res 330, 213-220. 4. Kraus and Anderson (2017)
Module 4 – Auditory Processing Disorder	
April 17	APD screening and evaluation
In-class activities	Kahoot! Lecture Article Review #6 Non-organic hearing loss presentation
Outside activities	Prepare for APD debate Readings: <ol style="list-style-type: none"> 1. *Moncrieff, D., Miller, E., and Hill, E. (2018). "Screening tests reveal high risk among adjudicated adolescents of auditory processing and language disorders," 61, 924-935. 2. *O'Hara, B., and Mealings, K. J. I. j. o. a. (2018). "Developing the Auditory Processing Domains Questionnaire (APDQ): A differential screening tool for auditory processing disorder," 57, 764-775. 3. Iliadou, V., and Kiese-Himmel, C. (2018). "Common misconceptions regarding pediatric auditory processing disorder," Front Neurol 8. 4. Moore, D. R. (2018). "Guest Editorial: Auditory Processing Disorder," 39, 617-620. 5. Iliadou, V., (2018). "Letter to the Editor: An Affront to Scientific Inquiry Re Moore, D. R. (2018) Editorial Auditory Processing Disorder, Ear Hear, 39, 617-620," 39, 1236-1242.
April 24	Guest Lecturer – Dr. Larry Medwetsky – Sensory Processing Disorder

In-class activities	Kahoot! Lecture Lab 4 demo
Outside activities	Lab 4
May 1	APD differential diagnosis and management
In-class activities	Kahoot! Article review #7 Lecture
Outside activities	Quiz 6 Lab 4 Readings: 1. Katz, Text, Chapters 29 and 30 2. *Stavrinos, G., Iliadou, V.-M., Edwards, L., Sirimanna, T., and Bamiou, D.-E. (2018). "The Relationship between Types of Attention and Auditory Processing Skills: Reconsidering Auditory Processing Disorder Diagnosis," <i>Front Psychol</i> 9. 3. *Saunders, G.H., Frederick, M.T., Arnold, M., Silverman, S., Chisolm, T.H., and Myers, P. (2015) 4. * Osisanya, A., and Adewunmi, A. T. (2018). "Evidence-based interventions of dichotic listening training, compensatory strategies and combined therapies in managing pupils with auditory processing disorders," <i>Int J Audiol</i> 57, 115-123. 5. *Loo, J. H. Y., Rosen, S., and Bamiou, D.-E. (2016). "Auditory training effects on the listening skills of children with auditory processing disorder," <i>Ear Hear</i> 37, 38-47.
May 8	1. Review for Final; Case studies
In-class activities	Jeopardy review for final Article Review #8 APD Counseling Presentation
May 15	Reading Day
May 22	Final

Learning Assessments

- 1. Practical Lab Exercises and Reports:** Students will complete practical lab assignments using appropriate assessment tools and will submit a report for each lab. See the course ELMS site for more specific information on these assignments, including due dates.
- 2. Counseling presentations:** Students will work in pairs to prepare a demonstration of a clinician-patient discussion regarding a specific case history that involves APD, tinnitus, and OAEs/Wideband reflectance. The demonstration will be presented in powerpoint form, using slides that could be presented in a flip-chart format. A grading rubric will be posted on ELMS.
- 3. Online Reading Quizzes:** Students are expected to be familiar with the assigned readings prior to coming to class. Each student will be required to complete 7 quizzes on the course ELMS site that cover lecture content and readings from the textbook and articles. These quizzes are “open-book” in that students have access to the text while taking the quiz. The students will have one week to complete the quiz. The quizzes are timed – but you will have 4 hours to complete it. Once you’ve started the quiz, you must finish it – you can’t go back to it later.
- 4. Article reviews:** Student will choose one article from the syllabus and will prepare and present powerpoint slides that summarize the article’s introduction, method, results (review each figure), and discussion. In addition, students will critique the article, suggest ways to improve the research, and propose a new research question. The presentation should not exceed 15 minutes. A grading rubric will be posted on ELMS.
- 5. Exams:** Two tests and one final examination will be given. Exam questions will come from class lectures, quizzes, review questions, and assigned readings.

Guidelines for Practical Lab Exercises & Reports

The lab exercises are designed to help you put into practice the concepts and procedures we cover in class. Handouts outlining instructions for the test procedures and reports can be obtained on the ELMS site.

Lab Reports

You must follow all guidelines for written work listed in this syllabus. The typed portion of the lab report should be limited to one page or less. Electronic copies of all relevant printouts, graphs, tables or other raw data must be submitted online by the due date. Although you may consult your textbooks and other resources, including your classmates, as you work on each lab, please make sure your write-up is your own.

Submission of Reports

Lab reports are by midnight on the dates indicated below. Three points will automatically be deducted from your lab grade for every day the report is late. The labs will cover the following topics:

Lab #1: Otoacoustic Emissions Testing	due February 20
Lab #2: Advanced Immittance Measures	due March 27
Lab #3: Nonorganic Hearing Loss	due April 10
Lab #4: Auditory Processing Evaluation	due May 1

Questions/Difficulties

Please contact me as soon as possible if you have difficulties with or questions about a particular lab assignment, so that they can be resolved in plenty of time for you to complete the lab by the due date, and so that you have a better understanding the relevant concepts prior to exams.

Learning Assessments	#	Points Each	Category Total	Category Weight
Labs	4	25	100	16%
Counseling presentations	1	25	25	4%
Quizzes	7	20	140	22%
Article review	1	25	25	4%
Exams	2	100	200	31%
Final	1	150	150	23%
Total Points:			640	

Final Grade Cutoffs					
+	98.00%	+	88.00%	+	78.00%
A	94.00%	B	84.00%	C	74.00%
-	90.00%	-	80.00%	-	70.00%
				D	64.00%
				F	<60.0%
				-	60.00%

Campus Policies

It is our shared responsibility to know and abide by the University of Maryland's policies that relate to all courses, which include topics like:

- Academic integrity
- Student and instructor conduct
- Accessibility and accommodations
- Attendance and excused absences
- Grades and appeals
- Copyright and intellectual property

Please visit <http://apps.gradschool.umd.edu/Catalog/policy.php?the-academic-record> for the Graduate School's full list of campus-wide policies and follow up with me if you have questions.

Make-up Exams/Assignments

If you are aware ahead of time that you will be absent on the day of an exam, you may schedule a make-up exam provided that (1) you have an approved University Acceptance (e.g., religious observance) and (2) I am notified in writing within the first two weeks of the semester. Assignments are expected to be submitted by the dates indicated on the syllabus or in advance of the due date if you anticipate being absent from class on the due date. You should inform me that you will be absent ahead of time to make arrangements to submit the assignment.

When the reason for an absence on the day of an exam or assignment is not foreseeable, you must inform me as soon as possible. Please make every effort to contact me by phone or by email prior to class if you will be absent due to illness or other emergency. Campus Senate policy requires students who are absent due to illness/injury to furnish documentary support to the instructor. You must provide written documentation verifying your illness/injury on the day that you return to class. You will not be allowed to turn in missed assignments or make up exams if you have not provided this documentation. In addition, if it is found that you have falsified the documentation provided, you will be referred to the University's Student Conduct Office.

Make-up exams will be scheduled at a time that is mutually agreeable to both the instructor and the student. Assignments are due immediately by electronic submission if possible or upon the student's return to school. All missed exams and assignments not turned in will result in a grade of zero for that exam/assignment.

Problems/Questions

Please do not hesitate to make an appointment to speak with me if you are having difficulty with the material or with an assignment, if you have questions about how something was graded, or if you have other problems or issues related to the course you wish to discuss. Email is an excellent way to reach me outside of course meetings.

Get Some Help!

You are expected to take personal responsibility for your own learning. This includes acknowledging when your performance does not match your goals and doing something about it. Everyone can benefit from some expert guidance on time management, note taking, and exam preparation, so I encourage you to consider visiting <http://ter.ps/learn> and schedule an appointment with an academic coach. Sharpen your communication skills (and improve your grade) by visiting <http://ter.ps/writing> and schedule an appointment with the campus Writing Center. Finally, if you just need someone to talk to, visit <http://www.counseling.umd.edu>.



Everything is free because you have already paid for it, and **everyone needs help**... all you have to do is ask for it.

Audiology Knowledge and Skills addressed by specific learning outcomes:

3.1.2A PROFESSIONAL PRACTICE COMPETENCIES

- Clinical Reasoning (Outcomes 1 to 3)
- Evidence-Based Practice (Outcomes 1 to 3)
- Collaborative Practice (Outcomes 1 and 2)

3.1.2A FOUNDATIONS OF AUDIOLOGY PRACTICE

- Embryology, anatomy, and physiology of the auditory, vestibular, and related body systems (Outcomes 1 and 2)
- Effects and role of genetics in auditory function, diagnosis, and management of hearing loss (Outcomes 1 and 2)
- Effects of pathophysiology on the auditory, vestibular, and related body systems (Outcomes 1 and 2)
- Medical and surgical interventions that may be used to treat the results of pathophysiology in these systems (Outcomes 1 and 2)
- Principles of psychoacoustics as related to auditory perception in individuals with normal hearing and those with hearing loss (Outcome 1 and 2)

3.1.3A IDENTIFICATION AND PREVENTION OF HEARING LOSS, TINNITUS, AND VESTIBULAR DISORDERS

- The prevention of the onset of loss of auditory system function, loss of vestibular system function, development of tinnitus, and development of communication disorders (Outcomes 1 and 2)
- The use of protocols to minimize the impact of the loss of hearing, tinnitus, loss of vestibular system function, and development of communication disorders (Outcomes 1 and 2)
- Applying the principles of evidence-based practice (Outcome 3)

3.1.4A ASSESSMENT OF THE STRUCTURE AND FUNCTION OF THE AUDITORY AND VESTIBULAR SYSTEMS

- Evaluate information from appropriate sources to facilitate assessment planning (Outcomes 1 and 2)
- Obtain a case history (Outcomes 1 and 2)
- Perform and otoscopic examination (Outcome 1)
- Perform audiologic assessment using behavioral, physiological (e.g., immittance, wideband reflectance, evoked potentials), psychophysical, and self-assessment tools (Outcomes 1 and 2)
- Perform audiologic assessment using techniques that are representative of the challenges listeners may face in everyday communication situations (Outcomes 1 and 2)
- Perform assessment to characterize tinnitus (Outcomes 1 and 2)
- Document evaluation procedures and results (Outcomes 1 and 2)
- Generate recommendations and referrals resulting from the evaluation processes (Outcomes 1 and 2)

- Provide counseling in a culturally sensitive manner to facilitate understanding of the hearing loss, tinnitus, or balance disorder of the individual being served (Outcomes 1 and 2)
- Maintain records in a manner consistent with legal and professional standards (Outcomes 1 and 2)
- Communicate results and recommendations orally and in writing to the individual being served and other appropriate individual(s) (Outcomes 1 and 2)
- Apply the principles of evidence-based practice (Outcomes 1 to 3)
- Select and use outcomes measures that are valid and reliable indicators of success in assessment protocols that are used (Outcomes 1 to 3)

3.1.5A ASSESSMENT OF THE IMPACT OF CHANGES IN THE STRUCTURE AND FUNCTION OF THE AUDITORY AND VESTIBULAR SYSTEMS

- Administer clinically appropriate and culturally sensitive self-assessment measures of communication function for individuals across the lifespan and the continuum of care (Outcomes 1 and 2)
- Select and use outcomes measures that are valid and reliable indicators of success in determining the impact of changes in structure and function of the auditory and vestibular systems (Outcomes 1 and 2)

3.1.6A INTERVENTION TO MINIMIZE THE EFFECTS OF CHANGES IN THE AUDITORY AND VESTIBULAR SYSTEMS ON AN INDIVIDUAL'S ABILITY TO PARTICIPATE IN HIS OR HER ENVIRONMENT

- Perform assessment for tinnitus intervention (Outcomes 1 and 2)
- Apply the principles of evidence-based practice (Outcome 3)