



Instructor: Samira Anderson, Au.D., Ph.D. Email: sander22@umd.edu
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Office Hours: Tuesdays and Fridays 12:30 to 2pm or by appointment
Meeting Time: Wednesdays, 3:30 - 6:00 PM
Meeting Location: Lefrak Hall, Room 0135
Prerequisites: HESP 606

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.

ASHA Certification Standards (KASA)

A1, A2, A4, A5, A7, A8, A12, A13, A14, A17, B1, B2, B8, C1, C2, C3, C4, C12, C13, C14, C15, D1, E22, E24,

REQUIRED 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.

RECOMMENDED READINGS

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.

Learning Assessments

1. On-line Quizzes: Students are expected to be familiar with the assigned readings prior to coming to class. Each student will be required to complete 8 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. The quizzes can be used as a study guide for the midterm and final as many multiple choice questions come the on-line quizzes and Kahoots.

Date Assigned	Topic	Date Due
February 5	OAEs Anatomy & physiology, classification, instrumentation, calibration	February 12
February 12	OAEs Clinical measurement, protocols, analyses	February 19
February 19	OAEs Clinical applications and efferent measurement	February 26
March 4	Advanced immittance and tinnitus mechanisms	March 11
April 8	Tinnitus assessment, treatment,	April 15
April 15	Non-organic hearing loss, APD neural mechanisms	April 22
April 22	APD screening and evaluation	April 29
April 29	APD differential diagnosis and management	May 6

2. 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. Please submit all assignments in electronic format online by midnight on 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. Three points will automatically be deducted from your lab grade for every day the report is late. 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. If there are any

equipment problems or malfunctions, the due dates will be extended. The labs will cover the following topics:

Date Assigned	Topic	Date Due
February 5	OAEs	February 19
March 4	Advanced Immittance	April 8
April 8	Non-organic hearing loss	April 22
April 22	APD Evaluation	May 6

3. 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, propose a new research question, and engage the class with at least one question. The presentation should not exceed 15 minutes. A grading rubric will be posted on ELMS.

Date	Student
February 5	Abbey
February 12	Logan
February 19	Jenna
February 27	Jordan
March 4	
March 11	
April 1	
April 8	Andrew
April 15	Michelle and Amara
April 22	Paul
May 6	Sarah

Course Schedule

Module 1 - Otoacoustic Emissions

Date	Topics	Readings
January 29	Introduction; Class expectations; Otoacoustic emissions: Overview, Anatomy & Physiology	<ol style="list-style-type: none"> 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 5	Otoacoustic Emissions: Classification, instrumentation, calibration	<ol style="list-style-type: none"> 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. *Maxim T, Shera CA, Charaziak KK, Abdala C (2019) Effects of forward- and emitted-pressure calibrations on the variability of otoacoustic emission measurements across repeated probe fits. <i>Ear Hear</i> 40:1345-1358.
February 12	Otoacoustic Emissions: Clinical measurement, protocols, and analyses	<ol style="list-style-type: none"> 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 19	Otoacoustic Emissions: Clinical applications and Efferent measurement	<ol style="list-style-type: none"> 1. Dhar and Hall, Text, Chapters 7-9 2. *Iliadou, V. V., Weihing, J., Chermak, G. D., and Bamiou, D. (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," <i>Ear Hear</i>. 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," <i>Int J Audiol</i> 49, 410-419.

Module 2 - Advanced Immittance Measures

February 26	Multi-frequency tympanometry; Wideband reflectance intro	<ol style="list-style-type: none"> 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," <i>Audiol Neurootol</i> 18, 152-160.
March 4	Wideband reflectance Review for midterm	<ol style="list-style-type: none"> 1. *Niemczyk, E., Lachowska, M., Tataj, E., Kurczak, K., and Niemczyk, K. (2018). "Wideband tympanometry and absorbance measurements in otosclerotic ears," <i>The Laryngoscope</i>. 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," <i>Hear Res</i>. 3. *Prieve, B. A., Feeney, M. P., Stenfelt, S., and Shahnaz, N. (2013). "Prediction of conductive hearing loss using wideband acoustic immittance," <i>Ear Hear</i> 34, 54S-59S.

Module 3 – Tinnitus

March 11	Tinnitus neural mechanisms	<ol style="list-style-type: none"> 1. Henry JA, Roberts LE, Caspary DM, Theodoroff SM, Salvi RJ (2014) Underlying mechanisms of tinnitus: review and clinical implications. <i>J Am Acad Audiol</i> 25:5-22. 2. *Gu JW, Herrmann BS, Levine RA, Melcher JR (2012) Brainstem auditory evoked potentials suggest a role for the ventral cochlear nucleus in tinnitus. <i>J Assoc Res Otolaryngol</i> 13:819-833. 3. *Engineer ND, Riley JR, Seale JD, Vrana WA, Shetake JA, Sudanagunta SP, Borland MS, Kilgard MP (2011) Reversing pathological neural activity using targeted plasticity. <i>Nature</i> 470:101-104. 4. *Leaver AM, Renier L, Chevillet MA, Morgan S, Kim HJ, Rauschecker JP (2011) Dysregulation of limbic and auditory networks in tinnitus. <i>Neuron</i> 69:33-43. 5. *Bramhall NF, McMillan GP, Gallun FJ, Konrad-Martin D (2019) Auditory brainstem response demonstrates that reduced peripheral auditory input is associated with self-report of tinnitus. <i>J Acoust Soc Am</i> 146:3849.
March 18	Spring Break	
March 25	No Class	
April 1	Midterm	
April 8	Tinnitus Assessment and Treatment and non-organic hearing loss	<ol style="list-style-type: none"> 1. *McKenna L, Marks EM, Vogt F (2018) Mindfulness-based cognitive therapy for chronic tinnitus: evaluation of benefits in a large sample of patients attending a tinnitus clinic. <i>Ear Hear</i> 39:359-366. 2. *Pierzycki RH, Edmondson-Jones M, Dawes P, Munro KJ, Moore DR, Kitterick PT (2016) Tinnitus and Sleep Difficulties After Cochlear Implantation. <i>Ear Hear</i> 37:e402-e408. 3. *Fournier P, Cuvillier A-F, Gallego S, Paolino F, Paolino M, Quemar A, Londero A, Norena A (2018) A new method for assessing masking and residual inhibition of tinnitus. <i>Trends Hear</i> 22:1-19. 4. *Watts EJ, Fackrell K, Smith S, Sheldrake J, Haider H, Hoare DJ (2018) Why Is Tinnitus a Problem? A Qualitative Analysis of Problems Reported by Tinnitus Patients. <i>Trends Hear</i> 22:1-10. 5. *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," <i>Brain Res</i> 1679, 101-108. 6. *Henry JA, Griest S, Thielman E, McMillan G, Kaelin C, Carlson KF (2015) Tinnitus Functional Index: Development, validation, outcomes research, and clinical application. <i>Hear Res</i> 334:58-64. 7. *Durmaz A, Karahatay S, Satar B, Birkent H, Hidir Y (2009) Efficiency of Stenger test in confirming profound, unilateral pseudohypacusis. <i>J Laryngol Otol</i> 123:840-844. 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," <i>International Journal of Pediatric Otorhinolaryngology</i> 97, 223-227.

Module 4 – Auditory Processing Disorder

April 15	Introduction to APD, Anatomy and Physiology	<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>," <i>J Neurosci</i> 5, 1152-1166.
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		<ol style="list-style-type: none"> 3. *Kopp-Scheinflug, C., and Tempel, B. L. (2015). "Decreased temporal precision of neuronal signaling as a candidate mechanism of auditory processing disorder," <i>Hear Res</i> 330, 213-220. 4. Kraus and Anderson (2017)
April 22	APD screening and evaluation	<ol style="list-style-type: none"> 1. Katz Handbook, Chapter 29 2. *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. 3. *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. 4. Iliadou, V., and Kiese-Himmel, C. (2018). "Common misconceptions regarding pediatric auditory processing disorder," <i>Front Neurol</i> 8. 5. Moore, D. R. (2018). "Guest Editorial: Auditory Processing Disorder," 39, 617-620. 6. Iliadou, V., (2018). "Letter to the Editor: An Affront to Scientific Inquiry Re Moore, D. R. (2018) Editorial Auditory Processing Disorder, <i>Ear Hear</i>, 39, 617-620," 39, 1236-1242.
April 29	APD differential diagnosis and management	<ol style="list-style-type: none"> 1. Katz Handbook, 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 GH, Frederick MT, Arnold M, Silverman S, Chisolm TH, Myers P (2015) Auditory difficulties in blast-exposed Veterans with clinically normal hearing. <i>J Rehabil Res Dev</i> 52:343-360. 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 6	Final Review	
May 20	Final	

Learning Assessments	#	Points Each	Category Total	Category Weight
Labs	4	25	100	18%
Article review	1	25	25	4%
Quizzes	8	20	160	29%
Midterm	1	125	125	22%
Final	1	150	150	27%
Total Points:			560	

Final Grade Cutoffs									
+	98.00%	+	88.00%	+	78.00%	+	68.00%		
A	94.00%	B	84.00%	C	74.00%	D	64.00%	F	<60.0%
-	90.00%	-	80.00%	-	70.00%	-	60.00%		

Campus policies:

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.

Names/Pronouns and Self Identifications

The University of Maryland recognizes the importance of a diverse student body, and we are committed to fostering equitable classroom environments. I invite you, if you wish, to tell us how you want to be referred to both in terms of your name and your pronouns (he/him, she/her, they/them, etc.). The pronouns someone indicates are not necessarily indicative of their gender identity. Visit trans.umd.edu to learn more.

Additionally, how you identify in terms of your gender, race, class, sexuality, religion, and dis/ability, among all aspects of your identity, is your choice whether to disclose (e.g., should it come up in classroom conversation about our experiences and perspectives) and should be self-identified, not presumed or imposed. I will do my best to address and refer to all students accordingly, and I ask you to do the same for all of your fellow Terps.

Get Some Help!

You are expected to take personal responsibility for you 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.