

Last name of instructor (Semester Year)

California State University, Sacramento

OBJECTIVE MEASURES

CSAD651 - 3 units

Spring 2020 (AUD-2)

COURSE FACULTY

Course Instructor:

Folsom Hall office #:

Office Phone:

Office Hours:

E-mail address:

REQUIRED CLASS MEETINGS TIMES

Days and times:

Building: Folsom Room #:

REQUIRED TEXTS

Hall, J.W., & Swanepoel, D. (2010). *Objective assessment of hearing*. Plural Publishing.

OPTIONAL TEXTS

Katz, J. (2011). *Handbook of clinical audiology* (7th ed.). Wolters Kluwer.

COURSE WEBSITE

<https://sacct.csus.edu>

SacCT will be used as the learning management site for dissemination of course readings, handouts, slides, assignments, announcements, and tests/quizzes. The course faculty will have materials posted to SacCT at least 48 hours before class.

Instructor Communication and Response Time

Faculty strive to have open communication with students both within and outside of the classroom. Students are encouraged to contact faculty to discuss questions about the course. Responses to telephone or e-mail messages will usually be transmitted within 48 hours during regular working hours. If you do not have a response within this time period, please check your contact methods and resend the message. Faculty will generally respond to student questions received during evenings and weekends once they are back in the office during regular business hours.

***Please be aware that all content for this course is the property of the course faculty who have created it and can only be used for this course. Those wishing to use the materials outside of this course must receive written permission from the author/creator.**

GENERAL COURSE INFORMATION

PRE-REQUISITES

Admission to Doctor of Audiology program; CSAD611, CSAD612, CSAD613, CSAD614, CSAD621, CSAD622, CSAD622L, CSAD623, CSAD624, CSAD631, CSAD632, CSAD641, CSAD641L, CSAD642, CSAD643

COURSE DESCRIPTION

Overview

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This course continues exploration of physiological measures used to assess the auditory system beyond auditory evoked potentials. Students will learn about otoacoustic emissions and their use in the audiologic test battery and screenings, as well as further study of immittance and the auditory brainstem response.

Approved Course Description (from CSUS Course Catalog)

Fundamentals of otoacoustic emissions, and advanced study of immittance testing and the auditory brainstem response with some practical exercises.

WHY IS THIS COURSE IMPORTANT?

This course devotes additional time to the study of the auditory brainstem response and its clinical uses, which is important for newborn hearing screening and objective evaluation of hearing status. Otoacoustic emissions provide an opportunity to cross-check audiometric thresholds, identify hearing loss, and screen pediatric populations and people at risk for noise-induced hearing loss.

UNIVERSITY LEARNING GOALS

	1 Disciplinary knowledge	2 Communication	3 Critical thinking/analysis	4 Information literacy	5 Professionalism	6 Intercultural/global perspectives	7 Research
Addressed by this course	X	X	X	X	X		X

GRADUATE LEARNER OUTCOMES

Mastery of each student-learning outcome listed below is indicated by a grade of B or better on each component of the corresponding measures listed in the table. Students are required to track their progress towards meeting each learning outcome and must make an appointment with the instructor for any grade equal to or less than a B. The instructor will suggest strategies to help you establish competence and knowledge in these areas.

Students should track their progress towards meeting each learning outcome by listing their grades on the table below over the course of the semester.

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

1. Differentiate between types of auditory brainstem response test and their uses
2. Describe the effects of maturation and age on the auditory brainstem response (ABR)
3. Give examples of uses of the ABR for screening and evaluating hearing status
4. Explain the mechanism of the three types of otoacoustic emissions (OAEs)
5. Compare and contrast otoacoustic emission types
6. List the steps in the clinical measurement protocols for otoacoustic emissions
7. Perform DPOAE and TEOAE testing
8. Interpret OAE results for diagnosing and screening hearing status
9. Define “multi-frequency tympanometry” and “wideband reflectance”
10. Discuss the uses of immittance measures for special populations

Graduate Learner Outcome	Component Indicating Competence	Grade(s) Received
1-6,8-10	Exam (100%) Quiz (100%)	
1-6,9,10	Quiz (100%)	
7,8	Laboratory (100%)	

COURSE/CLASS POLICIES

Course Format

Lecture

Class Preparation:

All required readings are for the date listed in the course schedule, not the following class period. Students are responsible for all assigned readings, whether discussed in class or not.

Class Participation:

Students are expected to actively participate in class discussions and are required to have read the assigned material prior to class meetings.

Class Attendance:

Classroom attendance is necessary for this course. No more than three unexcused absences are allowed. Students are expected to arrive on time as class begins at X:XX am/pm.

Class Assignments

Course grades will be based on ten quizzes, lab activities in class, two exams, and one final exam.

Quizzes

Weekly quizzes will be available on SacCT one week prior to the due date. Students are expected to complete the quiz before the scheduled due date. Quizzes are based on assigned reading. Students will have 60 minutes to take the quiz; late submissions will receive a 0.

Lab Activities

Students will have scheduled lab time in class to perform otoacoustic emissions testing. Lab reports will be graded.

Exams

- **Exam absences:** No make-up examinations will be given unless there is a documented emergency for which you have written proof. Any approved make-up exams will be scheduled at the end of the semester (during finals week) and may be administered in a different format from the original exam.
- **Exam procedures:**

Test arrival/start

Test duration and completion

Commitment to Integrity

As a student in this course (and at this university) you are expected to maintain high degrees of professionalism, commitment to active learning and participation in this class and also integrity in your behavior in and out of the classroom.

Sac State's Academic Honesty Policy & Procedures

"The principles of truth and honesty are recognized as fundamental to a community of scholars and teachers. California State University, Sacramento expects that both faculty and students will honor these principles, and in so doing, will protect the integrity of academic work and student grades." Read more about Sac State's Academic Honesty Policy & Procedures at the following website: <http://www.csus.edu/um anual/AcademicHonestyPolicyandProcedures.htm>

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Definitions: At Sac State, “cheating is the act of obtaining or attempting to obtain credit for academic work through the use of any dishonest, deceptive, or fraudulent means.”

“Plagiarism is a form of cheating. At Sac State, “plagiarism is the use of distinctive ideas or works belonging to another person without providing adequate acknowledgement of that person’s contribution.” *Source:* Sacramento State University Library

Note: Any form of academic dishonesty, including cheating and plagiarism, shall be reported to the office of student affairs.

Understand When You May Drop This Course

It is the student’s responsibility to understand when he/she need to consider disenrolling from a course. Refer to the Sac State Course Schedule for dates and deadlines for registration. After this period, a serious and compelling reason is required to drop from the course. Serious and compelling reasons include: (a) documented and significant change in work hours, leaving student unable to attend class, or (b) documented and severe physical/mental illness/injury to the student or student’s family. Under emergency/special circumstances, students may petition for an incomplete grade. An incomplete will only be assigned if there is a compelling extenuating circumstance. All incomplete course assignments must be completed in accordance with the department’s policy.

Accommodations

Inform your instructor of any accommodations needed. If you have a documented disability and verification from the Office of Services to Students with Disabilities (SSWD), and wish to discuss academic accommodations, please contact your instructor as soon as possible. It is the student’s responsibility to provide documentation of disability to SSWD and meet with a SSWD counselor to request special accommodation before classes start. SSWD is located in Lassen Hall 1008 and can be contacted by phone at [\(916\) 278-6955](tel:9162786955) (Voice) or [\(916\) 278-7239](tel:9162787239) (TDD only) or via email at sswd@csus.edu

Course Requirement Grading

<u>Activity</u>	<u>Points Available</u>
Quizzes (10 points x 10)	100
Lab activities	50
Exam (date and material covered)	200
Exam (date and material covered)	200
Exam (date and material covered)	200
Final exam (date and material covered)	300
<u>TOTAL COURSE POINTS AVAILABLE</u>	1050

Overall Percentage Needed

Note: A grade of “B” or higher is required to count toward the minimum number of units needed to advance to candidacy.

<u>Grade</u>	<u>Percentage</u>
A	93-100%
A-	90-92%
B+	87-89%
B	83-86%
B-	80-82%

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C+	77-79%
C	73-76%
C-	70-72%
D+	67-69%
D	63-66%
D-	60-62%
F	< 60%

COURSE SCHEDULE OF LECTURE TOPICS AND EXAMS

Date	Topic and Activity or Quiz and Exam	Readings/ Assignment
1/20	Introduction to course Overview of electrophysiology	Hall & Swanepoel- Ch. 1
1/22	Review of neuroanatomy and neurophysiology	Hall & Swanepoel- Ch. 2
1/27	Review of auditory evoked potentials	
1/29	ABR review Stacked ABR/CHAMP	Hall & Swanepoel- Ch. 5 Don, M., Kwong, B., Tanaka, C., Brackmann, D., & Nelson, R. (2005). The stacked ABR: A sensitive and specific screening tool for detecting small acoustic tumors. <i>Audiology & Neurotology</i> , 10(5), 274-290.
2/3	ABR use with infants and children Maturation	Hall & Swanepoel- Ch. 5 Sharma, M., Bist, S.S., & Kumar, S. (2016). Age-related maturation of wave V latency of auditory brainstem response in children. <i>Journal of Audiology and Otology</i> , 20(2), 97-101.
2/5	Screening applications	Hall & Swanepoel- Ch. 5
2/10	Retrocochlear, testing	Cueva, R.A. (2004). Auditory brainstem response versus magnetic resonance imaging for the evaluation of asymmetric sensorineural hearing loss. <i>Laryngoscope</i> , 114(10), 1686-1692. Kochanek, K.M., Śliwa, L., Gołębiowski, M., Piłka, A., & Skarżyński, H. (2015). Comparison of 3 ABR methods for diagnosis of retrocochlear hearing

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		impairment. <i>Medical Science Monitor</i> , 21, 3814-3824.
2/12	Review for Exam 1	
2/17	Exam 1	
2/19	Overview of otoacoustic emissions	Hall & Swanepoel- Ch. 7 Kemp, D.T. (2002). Otoacoustic emissions their origin in cochlear function, and use. <i>British Medical Bulletin</i> , 63, 223-241.
2/24	Anatomy and physiology, OAEs	Hall & Swanepoel- Ch. 3
2/26	Instrumentation for measuring OAEs Calibration of instruments	Rasetshwane, D.M., & Neely, S.T. (2011). Calibration of otoacoustic emission probe microphones. <i>Journal of the Acoustic Society of America</i> , 130(4), EL238-243.
3/2	SOAEs	Penner, M.J., Glotzaback, L., & Huang, T. (1993). Spontaneous otoacoustic emissions: Measurement and data. <i>Hearing Research</i> , 68(2), 229-237.
3/4	TEOAEs Lab	Prieve, B.A., Gorga, M.P., Schmidt, A., Neely, S., Peters, J., Schultes, L., & Jesteadt, W. (1993). Analysis of transient-evoked otoacoustic emissions in normal-hearing and hearing-impaired ears. <i>Journal of the Acoustical Society of America</i> , 93(6), 3308-3319.
3/9	DPOAEs Lab	Abdala, C., & Visser-Dumont, L. (2001). Distortion product otoacoustic emissions: A tool for hearing assessment and scientific study. <i>Volta Review</i> , 103(4), 281-302.
3/11	Clinical use and measurement Measurement protocols	Hatzopoulos, S. et al. (2009). Optimizing otoacoustic emission protocols for a UNHS program. <i>Audiology & Neurotology</i> , 14(1), 7-16.

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3/16	Clinical use and measurement Measurement protocols	Uchida, Y., Ando, F., Shimokata, H., Sugiura, S., Ueda, H., & Nakashima, T. (2008). The effects of aging on distortion-product otoacoustic emissions in adults with normal hearing. <i>Ear & Hearing</i> , 29(2), 176-184.
3/18	No class- spring break	
3/23	Use of OAEs in screenings Efferent modulation of OAEs	TEOAE lab due Sliwinkska-Kowalska, M., & Kotylo, P. (2001). Otoacoustic emissions in industrial hearing loss assessment. <i>Noise & Health</i> , 3(12), 75-84. Zhao, W., Dewey, J.B., Boothalingam, S., & Dhar, S. (2015). Efferent modulation of stimulus frequency otoacoustic emission fine structure. <i>Frontiers in Systems Neuroscience</i> , 9, 168.
3/25	Differential diagnosis	Mills, D.M. (2006). Determining the cause of hearing loss: Differential diagnosis using a comparison of audiometric and otoacoustic emission responses. <i>Ear & Hearing</i> , 27(5), 508-525. Liberman, M.C., Epstien, M.J., Cleveland, S.S., Wang, H., & Maison, S.F. (2016). Toward a differential diagnosis of hidden hearing loss in humans. <i>PLoS One</i> , 11(9), e0162726.
3/30	Review for Exam 2	DPOAE lab due
4/1	Exam 2	
4/6	Review of immittance	Hall & Swanepoel- Ch. 2
4/8	Multi-frequency tympanometry	Norri, L.W., Burgan, B., Ramirez, N., & Velenovsky, D.S. (2013). Interaural multiple frequency tympanometry measures: Clinical utility for unilateral conductive

		hearing loss. <i>Journal of the American Academy of Audiology</i> , 24(3), 231-240.
4/13	Wideband reflectance	Margolis, R.H., Saly, G.L., & Keefe, D.H. (1999). Wideband reflectance tympanometry in normal adults. <i>Journal of the Acoustical Society of America</i>, 106(1), 265-280. Rosowski, J.J., & Wilber, L.A. (2015). Acoustic immittance, absorbance, and reflectance in the human ear canal. <i>Seminars in Hearing</i>, 36(1), 11-28.
4/15	Wideband reflectance	Soares, J.C., Urosas, J.G., Calarga, K.S., Pichelli, T.S., Limongi, S.C., Shahnaz, N., & Carvalho, R.M. (2016). Wideband reflectance in Down syndrome. <i>International Journal of Pediatric Otorhinolaryngology</i>, 87, 164-171. Feeney, M.P., Keefe, D.H., Hunter, L.L., Fitzpatrick, D.F., Garinis, A.C., Putterman, D.B., & McMillan, G.P. (2017). Normative wideband reflectance, equivalent admittance at the tympanic membrane, and acoustic stapedius reflex threshold in adults. <i>Ear & Hearing</i>, 38(3), e142-e160.
4/20	Immittance with infants	Mazlan, R., Kei, J., Hickson, L., Stapleton, C., Grant, S., Lim, S., Linning, R., & Gavranich, J. (2007). High frequency immittance findings: Newborn versus six-week-old infants. <i>International Journal of Audiology</i>, 46(11), 711-717. Aithal, S., Kei, J., Aithal, V., Manuel, A., Myers, J.,

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		Driscoll, C., & Khan, A. (2017). Normative study of wideband acoustic immittance measures in newborn infants. <i>Journal of Speech, Language, and Hearing Research</i> , 60(5), 1417-1426.
4/22	Non-organic hearing loss	Lin, J., & Staecker, H. (2006). Nonorganic hearing loss. <i>Seminars in Neurology</i> , 26(3), 321-330.
4/27	Special testing considerations	Hunter, L.L., Prieve, B.A., Kei, J., & Sanford, C.A. (2013). Pediatric applications of wideband acoustic immittance measures. <i>Ear & Hearing</i> , 34(Suppl 1), 36S-42S.
4/29	Review for final exam	
5/4	Final exam	

Please note that dates, topics, and assignments are subject to change. In the event of a change, you will be given ample notification of the change.

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