

Last name of instructor (Semester Year)

## California State University, Sacramento

### ACOUSTICS AND PSYCHOACOUSTICS

CSAD612 - 3 units

Fall 2019 (AUD-1)

#### **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**

Speaks, C.E. (2017). *Introduction to sound acoustics for the hearing and speech* (4<sup>th</sup> ed.). Plural Publishing.

Fastl, H., & Zwicker, E. (2007). *Psychoacoustics: Facts and models*. Springer.

#### **OPTIONAL TEXTS**

#### **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

##### **COURSE DESCRIPTION**

Overview

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This course is designed to provide first-year Doctor of Audiology students with an understanding of acoustics and psychoacoustics, which is the basis for many audiological tests and rehabilitation and intervention. The first part of the course will focus on the physical parameters of sound, intensity, and sound transmission. The second part of the class will cover the perception of sound in humans with normal hearing and hearing impairment.

Approved Course Description (from CSUS Course Catalog)

Basic properties of the acoustics of simple and complex sounds. Psychophysical aspects of frequency and pitch, intensity and loudness, and temporal processes will be discussed. Speech perception for listeners with normal hearing and those with hearing loss.

**WHY IS THIS COURSE IMPORTANT?**

This course serves as the foundation for the principles that underlie the physical and psychophysical characteristics of sound, speech, and environments. These characteristics are essential for understanding the methods and procedures of sound measurement, audiologic evaluations, diagnosis and management of hearing impairment, and intervention.

**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

**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. Define the physical and psychophysical aspects of sound, sound measurement, and sound perception
2. Describe the normal and disordered structure, function, and perception for perceiving sound
3. Explain how the physical and psychophysical aspects of sound relate to the audiologic evaluation, identification and rehabilitation of patients with hearing loss, and the acoustic environment for listening.

Graduate Learner Outcomes	Components Indicating Competence	Grade(s) Received
1-3	Exams (100%)	
1-3	Quizzes (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, two exams, and one final exam.

### Quizzes

Quizzes on selected topics will be given in class during the first 10 minutes.

### 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/umannual/AcademicHonestyPolicyandProcedures.htm>

*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.

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### **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](mailto:sswd@csus.edu)

### **Course Requirement Grading**

<b><u>Activity</u></b>	<b><u>Points Available</u></b>
Quizzes (5 points x 12)	60
Exam (date and material covered)	200
Exam (date and material covered)	200
Final exam (date and material covered)	300
<b><u>TOTAL COURSE POINTS AVAILABLE</u></b>	760

### **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.

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

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Date	Topic and Activity or Quiz and Exam	Readings/ Assignment
8/26	Introduction to class; overview of course	
8/28	The nature of sound: Introduction	Speaks- Ch. 1
9/2	The nature of sound: Frequency	Speaks- Ch. 1
9/4	The nature of sound: Intensity	Speaks- Ch. 1
9/9	The nature of sound: Temporal	Speaks- Ch. 1
9/11	Simple harmonic motion Quiz 1	Speaks- Ch. 2
9/16	Impedance	Speaks- Ch. 3
9/18	Resistance Quiz 2	Speaks- Ch. 3
9/23	Review for Exam 1	
9/25	<b>Exam 1</b>	
9/30	The logarithm Quiz 3	Speaks- Ch. 4
10/2	Decibels Quiz 4	Speaks- Ch. 5
10/7	Sound pressure level, root-mean-square pressure	Speaks- Ch. 5
10/9	Complex waves Quiz 5	Speaks- Ch. 6
10/14	Resonance Quiz 6	Speaks- Ch. 7
10/16	Microphones and dual-microphone systems	Christensen, L.A. (2013). The evolution of directionality: Have developments led to greater benefit for hearing aid users. <i>The Hearing Review</i> .
10/21	Acoustic feedback Cancellation	Kuk, F., & Ludvigsen, C. (2002). Understanding feedback and digital feedback cancellation strategies. <i>The Hearing Review</i> .
10/23	Review for Exam 2	
10/28	<b>Exam 2</b>	
10/30	Psychophysical methods and signal detection theory Quiz 7	Fastl & Hugo- pp. 23-60, 277-291
11/4	Critical bands	Fastl & Hugo- pp. 149-173
11/6	Perception of sound and the auditory system Quiz 8	Speaks- Ch. 8 Fastl & Hugo- pp. 23-60
11/11	Analysis of sound frequency and pitch	Fastl & Hugo- pp. 111-148
11/13	Masking Quiz 9	Fastl & Hugo- pp. 61-110
11/18	Analysis of sound intensity and loudness	Fastl & Hugo- pp. 203-238
11/20	Just-noticeable differences Temporal processing Quiz 10	Fastl & Hugo- pp. 175-202, 271-276
11/27	Binaural hearing Quiz 11	Fastl & Hugo- pp. 293-313

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12/2	Binaural hearing and hearing technology/amplification Quiz 12	Speaks- Ch. 10 Fastl & Hugo- pp. 315-368
12/4	Review for final exam	
12/12	<b>Final exam</b>	

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.

# DRAFT