Term Information

Effective Term	Autumn 2018

General Information

Course Bulletin Listing/Subject Area	Speech and Hearing Science
Fiscal Unit/Academic Org	Speech & Hearing - D0799
College/Academic Group	Arts and Sciences
Level/Career	Graduate
Course Number/Catalog	6850
Course Title	Advanced Hearing Science
Transcript Abbreviation	Ad. Hearing Sc.
Course Description	This course is designed to provide beginning graduate students with an understanding of the measurement of stimuli and responses commonly used in clinical and experimental hearing testing
Semester Credit Hours/Units	Fixed: 4

Offering Information

Length Of Course	14 Week
Flexibly Scheduled Course	Never
Does any section of this course have a distance education component?	No
Grading Basis	Letter Grade
Repeatable	No
Course Components	Lecture
Grade Roster Component	Lecture
Credit Available by Exam	No
Admission Condition Course	No
Off Campus	Never
Campus of Offering	Columbus

Prerequisites and Exclusions

Prerequisites/Corequisites	graduate student status, or permission of the instructor
Exclusions	SHS 6766 or 6858
Electronically Enforced	Yes

Cross-Listings

Cross-Listings

Subject/CIP Code

Subject/CIP Code	51.0202
Subsidy Level	Doctoral Course
Intended Rank	Masters, Doctoral

Requirement/Elective Designation

Required for this unit's degrees, majors, and/or minors

Course Details

Course goals or learning objectives/outcomes
- see syllabus

Content Topic List
- Acoustics, Instrumentation,Psychophysics, and Electrophysiology

Sought Concurrence
No

Attachments

- 6850_Syllabus_Autumn_2018 %281%29.docx: Syllabus

(Syllabus. Owner: Ellawadi,Allison Bean)

Comments

Workflow Information

Status	User(s)	Date/Time	Step
Submitted	Ellawadi,Allison Bean	11/02/2017 02:04 PM	Submitted for Approval
Approved	Fox,Robert Allen	11/02/2017 02:07 PM	Unit Approval
Approved	Haddad,Deborah Moore	11/02/2017 04:20 PM	College Approval
Pending Approval	Nolen,Dawn Vankeerbergen,Bernadette Chantal Oldroyd,Shelby Quinn Hanlin,Deborah Kay Jenkins,Mary Ellen Bigler	11/02/2017 04:20 PM	ASCCAO Approval

Advanced Hearing Science
SHS 6850
Fall 2018
4 credits – Lecture / Recitation

Instructor:	Lawrence Feth, PhD	**Office:**	103 Pressey
E-mail:	feth.1@osu.edu (best way to reach me)	**Telephone:**	614.292.1643
Schedule:	Tu/Th 10:15 am – 12:30 pm Pressey 001	**Office Hours:**	By appointment

Course Description: This course is designed to provide beginning graduate students with an understanding of the measurement of stimuli and responses commonly used in clinical and experimental hearing testing.

Course Objectives: At the conclusion of the course, students will have knowledge of:

- Theories and methods of scientific measurement
- Generation and propagation of sound in air
- Measurement of sound: Electroacoustics
- Applications of signals and systems in hearing science
- National and International Standards used in calibration
- Applications of Statistical Decision Theory in Psychoacoustics
- Psychophysical methods used in hearing science
- Measurement of hearing sensitivity and frequency selectivity
- Attributes of sound: pitch, loudness, and timbre
- Spatial Hearing: Lateralization and localization
- Information processing in the human auditory system
- Bases of behavioral testing of humans with hearing loss
- Measurement of Electrophysiological responses

At the conclusion of the course, students will have the skills needed to:

- Generate and calibrate signals for use in testing of human listeners
- Conduct psychoacoustic testing of human listeners
- Interpret and critique recently published literature
- Evaluate new theories and models of auditory processing
- Interpret the results of testing of listeners with hearing loss

Required Text: ***Communication Acoustics: An Introduction to Speech, Audio, and Psychoacoustics***
By: Ville Pulkki & Matti Karjalainen John Wiley & Sons, Ltd, London, (2015)

Required Readings: **Standards and Calibration. Part 1: Standards Process, Physical Principles, Pure Tone and Speech Audiometry**, *Seminars in Hearing*, vol. 35, #4 November 2014.
Standards and Calibration. Part 2: Brief Stimuli, Immittance, Amplification and Vestibular Assessment, *Seminars in Hearing*, vol. 36, #1 February 2015.

Additional recommended journal articles, monographs and book chapters (not from the required text) will be available on CARMEN in pdf format.

Course Notes: PowerPoint slides, handouts, the required seminar readings, and the syllabus will be available on CARMEN. It is not required that students use the slides; they are made available should students find them helpful in mastering the material.

Course Outline

Dates	Topics Covered	Reading Assignments
8/21 – 8/23	Introduction to Measurement: Measurement Scales, Precision, Validity Fundamental and Derived Units of Physical measurement	Chapter 1 CA (text)
Part A: Specifying the Stimulus: Acoustics and Instrumentation		
8/28– 8/30	Acoustics: Physics of Sound Sound Generation and Propagation Simple harmonic motion and vibration Wave vs. particle models for sound propagation	Chapter 2 CA
9/04 – 9/06	Electrical Fundamentals: Signals & Systems	Chapter 3 CA
9/11 – 9/13	Waveforms & Spectra ac and DC circuits	
9/18 – 9/20	Classification of systems: Linear, time-invariant vs. non-linear, time dependent Continuous (analog) vs. discrete (digital)	
9/25 – 9/27	Electroacoustics Transducers: Loudspeakers, headphones & microphones Measurement and recording of sound	Chapter 4 CA
10/2 – 10/4	Standards & Calibration	Seminars in Hearing & On-line tutorial
10/09 –	Calibration Project Presentations	
Part B: Measuring Human Responses: Psychophysics and Electrophysiology		
10/16 – 10/18	Psychophysics: Theory & Methods Classical Psychophysics Signal Detection Theory Direct Scaling	Chapter 8 CA
10/23 – 10/25	Basic Functions: sensitivity, selectivity & acuity	Chapter 9 CA
10/30 – 11/01	Psychoacoustic Quantities: Pitch, Loudness, & Sound Quality	Chapter 10 CA
11/06 – 11/08	Spatial (Binaural) Hearing	Chapter 12 CA
11/13 –11/15	Speech, Music & Environmental Sounds	Chapters 11 & 17 CA
11/20 – 11/29	Hearing Loss & Auditory Perception	Chapter 19 CA
12/04 –	Psychoacoustics Presentations	

Grading:

Calibration Project: In-class presentation and RETSPL replication exercise (60% of the course grade)

A. Each student will be assigned a topic related to the calibration of electroacoustic devices used in research or clinical testing. They will be directed to one or more chapters in the *Seminars in Hearing* monographs. Each student will be required to prepare a 15 minute, in-class presentation, using appropriate visual aids (e.g., Power Point slides) on their assigned topic, and to upload the presentation to the Carmen site for the class. (40%)

B. The instructor will demonstrate the measurements required to replicate Real Ear Threshold Sound Pressure Level (RETSPL) data for a given headphone and ear simulator combination. Students will participate as listeners and data collectors to accumulate RETSPL data. Each student will submit a written report of the replication exercise describing the background literature, the procedures used, the data collected, the results of the comparison, and conclusions drawn from them. (20%)

Psychoacoustics Project: Replication of "classical" psychoacoustics results (40% of the course grade)

Students will be assigned an established psychoacoustic experimental procedure to review and replicate. Using a laboratory computer system, the students will act as experimenters and as listeners to produce data for the assigned topics. Every student will be expected to serve as "experimenter" for one topic and as a listener for all other topics. A written report must include a review of relevant literature, methods used, results obtained, a discussion of the results, and conclusions drawn from the exercise

Academic Misconduct: "It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term "academic misconduct" includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct http://studentlife.osu.edu/csc/."

Accommodations: "Students with disabilities (including mental health, chronic or temporary medical conditions) that have been certified by the Office of Student Life Disability Services will be appropriately accommodated and should inform the instructor as soon as possible of their needs. The Office of Student Life Disability Services is located in 098 Baker Hall, 113 W. 12th Avenue; telephone 614- 292-3307, slds@osu.edu; slds.osu.edu."