Acoustics and Psychoacoustics

SPHS-6313

Spring 2020  Section 47F  3 Credits  01/21/2020 to 05/12/2020  Modified 01/21/2020

Meeting Times

ONLINE COURSE. Video lectures and related materials will be available biweekly. See course schedule on syllabus for information about assignments, readings, and deadlines related to the course.

Contact Information

PROFESSOR: Ashley L. Dockens, Ph.D., Au.D., CCC-A, Director of Audiology, Assistant Professor of Speech and Hearing Sciences

OFFICE: 120 L

PHONE: 409-880-8181

OFFICE HOURS: Tuesdays/Thursdays BY APPOINTMENT or BY EMAIL - other days may be scheduled by email as needed

EMAIL: adockens@lamar.edu - Please use Coursemall for emails regarding the course and reserve emails to this address for questions or statements about the program or other non-course related concerns.

Catalog Description

The study of acoustics (physics of sound) and psychoacoustics (perception of sound) are covered. The aim of this course is an understanding of the comprehensive physical, physiological, and cognitive issues related to production of sound and listening. Principles and application of acoustics and psychoacoustics as they apply to clinical audiology and communication are provided.

Prerequisite: Acceptance into Au. D. program

Objectives

Student Objectives and Outcomes are based on certification requirements of the American Speech-Language-Hearing Association (ASHA) expectation of knowledge and skills, as well as instructor expectations for the students in this course. This class will fulfill, in whole or in part, the following Standards as required by the American Speech-Language-Hearing Association (ASHA) for Certification of Clinical Competence in Audiology: A1, A3, A12, and A23. See "outcomes" for more detail on objectives, measurement of objectives, and for expected learning outcomes.

Outcomes

This class will fulfill, in whole or in part, the following Standards as required by the American Speech-Language-Hearing Association (ASHA) for Certification of Clinical Competence in Audiology:

Standard IV-A: Foundations of Practice

OBJECTIVE: The student must have knowledge of:

A1. Embryology and development of the auditory and vestibular systems, anatomy and physiology, neuroanatomy and neurophysiology, and pathophysiology and

A3. Normal aspects of auditory physiology and behavior over the life span
How educated: Lectures/discussions/readings

Formative assessment: Quizzes, Homeworks

Summative assessment: Examinations, Presentations, Papers

Expected Student Learning Outcome:

Basic Peripheral Auditory Anatomy & Physiology; The Abnormal Auditory System: Synthesize understanding of acoustics and apply to biologic processes.

1. Explain the factors involved in efficiently transferring sound energy from low-impedance air to high-impedance inner-ear fluids
   1. Describe passive (and, to a lesser extent, active) cochlear processes/mechanics and neurotransmission underlying frequency representation
   2. Explain the biology of hearing related to sound processing and perception (physiological variables of sound reception: peripheral auditory system; critical bands and masking; neural processing; non-linearity of the hearing mechanism).

A12. Principles, methods, and applications of psychoacoustics

How educated: Lectures/discussions/readings

Formative assessment: Quizzes, Homeworks

Summative assessment: Examinations, Presentations, Papers

Expected Student Learning Outcome:

Combine understanding of physics and apply it to psychological perception of sound. Describe the concepts of psychoacoustics and synthesize the acoustic, biologic, and psychologic processes that lead to perception.

1. Describe/define the perceptual aspects of sound and sound waves (perceptual attributes of auditory sensation and their physical/physiological correlates: pitch; loudness; duration; timbre; sensory consonance/dissonance; sound - source localization; subjective evaluation of room acoustics).
2. Formulate learning questions that guide learning about the perceptual characteristics of sounds (including pitch, loudness, and perceived location)
3. Explain the ability of the auditory system to analyze the auditory input into separate frequency components (frequency selectivity)
4. Explain the concepts of loudness, pitch, periodicity, and temporal coding
5. Explain the ability to perceive sounds in the presence of other (extraneous) sounds
6. Describe the auditory scene
7. Describe the cognitive aspects of sound (introduction to cognitive variables of sound organization/interpretation, in the context of sound perception).
8. Conjecture and offer potential solutions from evidence-based research to the unsolved “cocktail party effect”.
9. Examine a spectrogram and discuss its psychoacoustic principles.
10. Apply the knowledge of speech acoustics to hearing loss and discuss the benefits and limitations of modern amplification.
11. Describe the basics of speech perception.

A23. Principles, methods, and applications of acoustics (e.g., basic parameters of sound, principles of acoustics as related to speech sounds, sound/noise measurement and analysis, and calibration of audiometric equipment), as applicable to:

1. occupational and industrial environments
2. community noise
3. classroom and other educational environments
4. workplace environments

How educated: Lectures/discussions/readings

Formative assessment: Quizzes, Homeworks

Summative assessment: Examinations, Presentations, Papers
Expected Student Learning Outcome:

The Auditory Stimulus (Sound): Understand and describe the physical parameters of sound.

a. Recall and describe basic concepts and terminology of physical acoustics, including: the basic facts (nature of sound), principles, and methods of sound generation, propagation, processing, measurement and analysis

b. Describe the physical nature of sound and sound waves (physical variables of sound generation, transmission, and measurement: frequency, amplitude, phase, time, and spectrum; wave propagation, speed, reflection, absorption, refraction, and diffraction; interference; resonance).

c. Understand calculation of the speed of sound, amounts of acoustic energy, intensity, power, and sound pressure levels
d. Understand the decibel scale and standard acoustic references; determine differences (in decibels) between different acoustic sound pressure levels or intensities
e. Describe the concept and relationships of decibels and the various relative measures of acoustic power.

f. Apply basic concepts of logarithms and antilogarithms as related to sound.
g. Explain complex sound and Fourier's theorem.
h. Have a basic understanding of simple and complex sounds and describe the relationships between time-domain waveforms and resulting frequency spectra

i. Understand measurement and analyses of sound; calibration of equipment for such analyses; application of analyses in a variety of environments as listed in A23 of ASHA standards.

Course Materials


Almost all of the published works of Michael Carley. https://orcid.org/0000-0003-2965-8984

Course Policies

ABSENCE POLICY:

Attendance is required - even if virtually, as exhibited via participation in the course. It is expected that you participate in all class
sessions as this is crucial to your learning of principles of your chosen field. Graduate level study is your final preparation before entering this profession. As such, attendance is expected. Notification of absences must be provided with documentation prior to missed classes. Absences may be excused at the instructor’s discretion. Examples of typically excused absences include absences with documentation for: 1) participation in university sponsored activity/event, 2) bereavement or major illness of immediate family, 3) illness of dependent family member, 4) participation in legal proceedings, 5) documentable religious observation, 6) injury or illness that is contagious or too severe to attend class, 7) participation required for military duties, 8) pregnancy or chronic health condition need, etc. Other documentable or emergency absences may be considered for excuse. Should excused and unexcused absences exceed 3 missed classes, an appointment must be made with the instructor to discuss a plan for positive progression in the course and any negative effects that absences may have had on the student’s ability to meet expected learning outcomes. Every attempt to schedule non-emergency appointments, work, visits, etc. outside of class time should be made. Regardless of your reason for missing class, you are responsible for contacting your instructor as soon as reasonably possible via Blackboard CourseMail to discuss making up any missed work and ways to learn the missed material. The instructor is not obligated to accommodate a student who has missed so much of the critical components of a course that arrangements for makeup work would not be reasonable. However, in the case of excused absences, every effort to assist the student in finding ways to make up missed work and to progress positively in the course will be made. Unexcused absences will result in lowering of your grade. Attendances/absences will be monitored for this course via participation in weekly assignments. The following reduction in grade will occur for unexcused absences as determined by missed participation in weekly work:

<table>
<thead>
<tr>
<th>UNEXCUSED ABSENCES</th>
<th>PERCENT REDUCTION IN FINAL GRADE</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>1</td>
<td>1%</td>
</tr>
<tr>
<td>2</td>
<td>2%</td>
</tr>
<tr>
<td>3</td>
<td>3%</td>
</tr>
<tr>
<td>4</td>
<td>6%</td>
</tr>
<tr>
<td>5</td>
<td>9%</td>
</tr>
<tr>
<td>6+</td>
<td>10%</td>
</tr>
</tbody>
</table>

LATE WORK POLICY:

To be fair to students who complete their work on time, late work will not be accepted. In emergency, health, or related issues, the instructor may review the case and determine that the work may be submitted late. This should not be expected and is up to the discretion of the instructor.

ONLINE WORK SUBMISSION:

Please submit all assignments via Blackboard assignment by the deadline time listed on its due date. If no assignment tab is listed or the assignment tab will not let you submit your assignment, then submit via Coursemail with the subject of the coursemail as the title of the assignment. If Blackboard is unavailable or having technical difficulties, email your assignment to adockens@lamar.edu by the deadline. It is YOUR responsibility to notify the instructor immediately of any technical issues. Screenshot or photograph evidence of dysfunction and email the instructor immediately. Assignments that are delayed by technical issues with sufficient evidence will be accepted as submitted on time.

CLASS PARTICIPATION/READINGS:

As a student in a doctoral level program of an accredited University, you are required to complete all assigned readings prior to class
and participate in class discussions. Students are expected in class to interact with other students, discuss ideas, perform ungraded writing, and similar activities. **Your instructor will not waste anyone’s time regurgitating a textbook.** This is your opportunity to become proficient in knowledge and skill before entering your profession. As such, class participation is expected, as it will aid in your understanding of the presented material.

**POLICY ON ATTITUDE:**

Students are expected to treat each other with respect. Disruptive behavior of any kind will not be tolerated. Students who are unable to demonstrate civility with one another or the instructor will be subject to referral to the Office of Student Conduct or to the University Campus Police. You are expected to adhere to the Student Code of Conduct.

**EMAIL POLICY:**

For the course, please send emails only through Blackboard Coursemail. For other emails, the instructor only send and accept emails through the Lamar University email system. While it is appreciated that you may have a more frequently used alternate email address, the University recommends this form of communication. If you feel it is cumbersome to check multiple emails, it is suggested that you have your university emails forwarded to your more frequently checked email address. However, make certain that you can reply through your lamar.edu email address.

**ONLINE INTERACTIONS:**

Please be professional in your online interactions with your peers and your instructor. In your emails, please identify yourself, and clearly state your question with the necessary detail. Please address your instructor as Dr. Dockens or Professor Dockens, not [blank] or “Hey” or “Yo”. Your instructor will do her best to respond to your emails as quickly as possible.

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### Accreditation Standards

The doctoral education program in Audiology and master of science education program in Speech-Language Pathology at Lamar University are accredited by the Council on Academic Accreditation in Audiology and Speech-Language Pathology of the [American Speech-Language-Hearing Association](https://www.asha.org/), 2200 Research Boulevard, #310, Rockville, MD 20850, 800-498-2071 or 301-296-5700.

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### Evaluation

**GRADE SCALE**

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Grade</th>
<th>Points Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>90 – 100 %</td>
<td>A</td>
<td>716 – 800 points</td>
</tr>
<tr>
<td>80 – 89 %</td>
<td>B</td>
<td>636 – 715 points</td>
</tr>
<tr>
<td>70 – 79 %</td>
<td>C</td>
<td>556 – 635 points</td>
</tr>
<tr>
<td>&lt; 70 %</td>
<td>F</td>
<td>000 – 555 points</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ASSIGNMENTS</th>
<th>POINTS PER ASSIGNMENT</th>
<th>TOTAL POINTS POSSIBLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Examinations [3]</td>
<td>100</td>
<td>300</td>
</tr>
<tr>
<td>Quizzes and Homeworks [12]</td>
<td></td>
<td>240</td>
</tr>
<tr>
<td>Presentations with Handouts [2]</td>
<td></td>
<td>100</td>
</tr>
<tr>
<td>Discussion Board [1]</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>Research Paper [1]</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>
FORMATIVE and SUMMATIVE ASSESSMENTS with rubrics:

EXAMINATIONS (3) – 100 points each, 300 points total: There will be three examinations throughout the semester. While there is no comprehensive examination, the material does build comprehensively. This means in order to do well on the later examinations, you must understand the topics from earlier in the semester. Multiple question formats will be used; however, the majority of examination questions will require the student to synthesize and discuss the information presented in class across topics. Please note that NO MAKEUP EXAMINATIONS WILL BE ALLOWED WITHOUT PRIOR APPROVAL AND PROPER DOCUMENTATION. Please observe the dates set for the examinations in the course schedule. Every effort will be made to return the exams in a timely manner. See rubric for discussion questions below.

<table>
<thead>
<tr>
<th>Content --- 90%/Question</th>
<th>Question is addressed properly with relevant facts included.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organization --- 2.5%/Question</td>
<td>Organization was clear and in logical order. Information well-integrated.</td>
</tr>
<tr>
<td>Writing Style --- 5%/Question</td>
<td>Tone is professional &amp; vocabulary/syntax are at expected maturity.</td>
</tr>
<tr>
<td>Writing Use/Mechanics --- 2.5%/Question</td>
<td>Proper grammar, spelling, and punctuation are utilized.</td>
</tr>
</tbody>
</table>

READING QUIZZES and HOMEWORKS (12; 20 points each, 240 points total): Where listed, a quiz on your assigned readings or a homework related to your lecture topic will be available on Blackboard. See course schedule for clarity on dates. Points are given per question on a correct or incorrect answer basis. For discussion based questions, the following rubric is used:

<table>
<thead>
<tr>
<th>Content --- 90%/Question</th>
<th>Question is addressed properly with relevant facts included.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organization --- 2.5%/Question</td>
<td>Organization was clear and in logical order. Information well-integrated.</td>
</tr>
<tr>
<td>Writing Style --- 5%/Question</td>
<td>Tone is professional &amp; vocabulary/syntax are at expected maturity.</td>
</tr>
<tr>
<td>Writing Use/Mechanics --- 2.5%/Question</td>
<td>Proper grammar, spelling, and punctuation are utilized.</td>
</tr>
</tbody>
</table>

PSYCHOACOUSTICS PRESENTATIONS (2, 50 points, 100 points total): Using no fewer than 5 references per topic (each student is assigned to two topics below via alphabetical order of last name), the student will create a brief 10-15 minute presentation on each topic they are assigned with handouts for each classmate and instructor. PowerPoints (per topic) should be between 5-10 slides with notes on what you plan to say aloud in the notes section. The notes section should NOT be identical to the slide itself and should include references in APA format. No fewer than 5 legitimate sources should be used in the lecture and must be sourced throughout the PowerPoint. A handout should be 2-4 pages long and should summarize your lecture with images provided where appropriate and helpful to students. Handouts and videoed presentations will be shared with your classmates. Audio must be recorded to Powerpoint and submitted on the assignment tab “video lecture.” It is not required that your face be visible. Once you download your recording, upload it to Microsoft OneDrive and send the sharelink via the methods described above. See rubrics for grading detail. Get creative, informative, and have fun with this assignment. These videos will be shared with the class and made available for discussion. See discussion board assignment. See course schedule for deadlines. See rubrics for grading.

- Continuity illusion (Picket fence effect in speech)
- Glissando illusion
- Auditory pareidolia (Hearing indistinct voices in random noise)
- Illusory discontinuity
- Binaural beats
- Phantom words/lyrics
- Constant spectrum melody
- Speech-to-Song illusion
- Shepard-Risset tone/scale (aka 'Shepard tone') & Deutsche tritone paradox
- The Precedence Effect
- Deutsch’s scale illusion
- Yanny or Laurel
- ASMR
- Octave illusion (Deutsch’s High-Low Illusion)
- Hearing a “missing fundamental” frequency, given other parts of a harmonic series
- McGurk Effect
- Illusory continuity of tones
- Infrasonic, sonic, and ultrasonic frequencies in non-lethal warfare techniques

PowerPoint rubric (20 points per topic):

<table>
<thead>
<tr>
<th>CONTENT (15)</th>
<th>Content is clear but (ONE OF THE FOLLOWING):</th>
<th>Most content is clear but (two of the following):</th>
<th>Content is not clear OR (THREE OR MORE OF THE FOLLOWING):</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Content is clear</td>
<td>Content is clear but (ONE OF THE FOLLOWING):</td>
<td>Content is not clear OR (THREE OR MORE OF THE FOLLOWING):</td>
</tr>
<tr>
<td></td>
<td>&quot; Relevant facts included; irrelevant facts left out</td>
<td>&quot; Some relevant facts are missing</td>
<td>&quot; Some relevant facts are missing</td>
</tr>
<tr>
<td></td>
<td>&quot; Content is unified</td>
<td>&quot; Irrelevant facts are included</td>
<td>&quot; Irrelevant facts are included</td>
</tr>
<tr>
<td></td>
<td>&quot; Good summarization of information</td>
<td></td>
<td>&quot; Information is poorly summarized</td>
</tr>
<tr>
<td></td>
<td>(12-15)</td>
<td>(9-11)</td>
<td>(5-8)</td>
</tr>
<tr>
<td></td>
<td>(5-8)</td>
<td>(0-4)</td>
<td></td>
</tr>
</tbody>
</table>

7 of 20
<table>
<thead>
<tr>
<th>ORGANIZATION (2.5)</th>
<th>&quot;Organization is clear&quot;</th>
<th>One of the following:</th>
<th>TWO of the following:</th>
</tr>
</thead>
<tbody>
<tr>
<td>- There are clear topic sentences and transitions</td>
<td>- Some topic sentences &amp; transitions are missing</td>
<td>- Some topic sentences &amp; transitions are missing</td>
<td></td>
</tr>
<tr>
<td>- Information is presented in a logical manner</td>
<td>- Some information is not logically presented</td>
<td>- Some information is not logically presented</td>
<td></td>
</tr>
<tr>
<td>(2-2.5)</td>
<td>(1.5-2)</td>
<td>(1-1.5)</td>
<td>ANY OF THE FOLLOWING:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Organization is confusing and lacking focus</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Topic sentences and transitions are not clear or are missing</td>
</tr>
<tr>
<td>(0-1)</td>
<td></td>
<td></td>
<td>(0-1)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>WRITING STYLE, USE, &amp; MECHANICS (2.5)</th>
<th>&quot;Tone is professional&quot;</th>
<th>ONE OF THE FOLLOWING:</th>
<th>ONE OF THE FOLLOWING:</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Vocabulary and syntax are mature</td>
<td>- Syntax or vocabulary is over-complex, awkward, or jargon-filled, reducing clarity</td>
<td>- Syntax or vocabulary is FREQUENTLY over-complex, awkward, or jargon-filled, greatly reducing clarity</td>
<td></td>
</tr>
<tr>
<td>- Writing style contributes to the clarity of the answer</td>
<td>- Words are sometimes used incorrectly, are missing, or are redundant</td>
<td>- Words are FREQUENTLY used incorrectly, are missing, or are redundant</td>
<td></td>
</tr>
<tr>
<td>- Answer is free of spelling, grammar, and punctuation errors</td>
<td>- Minimal spelling, punctuation, or grammar errors. Does not distract significantly from the answer</td>
<td>- Frequent spelling, punctuation, or grammar errors. Distracts from the answer</td>
<td></td>
</tr>
<tr>
<td>(2-2.5)</td>
<td>(1.5-2)</td>
<td>(1-1.5)</td>
<td>ANY OF THE FOLLOWING:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Writing style makes it difficult to read, follow, and understand the answer</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Frequent errors in writing mechanics that significantly reduce clarity of the overall paper are present</td>
</tr>
<tr>
<td>(0-1)</td>
<td></td>
<td></td>
<td>(0-1)</td>
</tr>
</tbody>
</table>
### Lecture Presentation Rubric (20 points per topic)

<table>
<thead>
<tr>
<th>Category</th>
<th>Mastered (95-100% of pts)</th>
<th>Proficient (85-94% of pts)</th>
<th>Basic (75-84% or pts)</th>
<th>Below Expected (74% or less pts)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Organization</strong> (1)</td>
<td>Specific introduction and conclusion; material presented in logical order; cohesive content</td>
<td>Specific introduction and conclusion; material inconsistently presented in logical order; somewhat cohesive content</td>
<td>Provided an introduction or conclusion; material inconsistently presented in logical order; content rarely cohesive</td>
<td>No introduction or conclusion provided; material not presented in logical order; content not cohesive</td>
</tr>
<tr>
<td><strong>Terminology</strong> (2)</td>
<td>Uses terminology applicable to the topic area, audience level, and to the field of audiology consistently</td>
<td>Uses terminology applicable to the topic area, audience level, and to the field of audiology most of the time</td>
<td>Uses terminology applicable to the topic area, audience level, and to the field of audiology some of the time</td>
<td>Does not use terminology applicable to the topic area, audience level, and to the field of audiology</td>
</tr>
<tr>
<td><strong>Delivery</strong> (2)</td>
<td>Speaks clearly with good volume and rate of speech; has confidence; does not appear to &quot;read&quot; lecture; is within time frame</td>
<td>Speaks clearly with good volume and rate of speech most of the time; has some confidence; mostly does not appear to &quot;read&quot; lecture; is within time frame</td>
<td>Speaks clearly with good volume and rate of speech some of the time; has poor confidence; appears to somewhat &quot;read&quot; lecture; under or overshoots time frame</td>
<td>Unclear speech with poor volume and/or rate of speech; delivers with heavy reliance on &quot;reading&quot; lecture; poor confidence; under or overshoots time frame</td>
</tr>
<tr>
<td><strong>Content</strong> (15)</td>
<td>Presents on subject with mastered detail; presentation indicates what was learned; describes topics in understandable manner; research integrated</td>
<td>Presents on subject with great detail; presentation indicates what was learned; mostly describes topics in understandable manner; research integrated</td>
<td>Presents on subject with some detail; presentation does not indicate well what was learned; research poorly integrated</td>
<td>Presents with little to no detail; unable to indicate what was learned; no research integrated</td>
</tr>
</tbody>
</table>
DISCUSSION BOARD (1) – 60 points total: Students will participate in a discussion board on Blackboard regarding the video psychoacoustic lectures. A board will be created for each video. Students will be expected to discuss and interact with each other on each topic. See rubric for grading of discussion board below. Note that it is possible to earn more than the 60 points listed as possible. While this is true, students earning above the 60 points assigned to the discussion board will be allowed to gain bonus points, but this bonus point award will be limited to 4 points total.

Discussion board point system:

<table>
<thead>
<tr>
<th>Comment Type</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student makes their first comment on video lecture</td>
<td>1 point per each unique video lecture (up to 18 points)</td>
</tr>
<tr>
<td>Student interacts with at least 2 interchanges and discusses a topic thoughtfully within a video lecture thread (beyond first comment)</td>
<td>2 points per each unique video lecture (up to 36 points)</td>
</tr>
<tr>
<td>Student begins a thoughtful discussion that connects to course (beyond first comment)</td>
<td>3 points per each unique video lecture (up to 54 points)</td>
</tr>
<tr>
<td>Student begins a thoughtful discussion that provokes a response and discussion from classmates (beyond first comment)</td>
<td>3 points per each unique video lecture (up to 54 points)</td>
</tr>
</tbody>
</table>

RESEARCH PAPER (100 points): Students will be assigned to one of the topics below and will prepare an informative evidence-based paper on the following assigned topics:

- Spatial release from masking (the benefit of space for persons with hearing loss)
- Head Related Transfer Function and Hearing Aids
- Auditory Masking: temporal and frequency masking
- Decibels, SPL, HL, and weighting systems
- Psychoacoustics of normal versus impaired hearing
- Auditory Scene Analysis
- Theories of pitch and how they reflect our understanding of the cochlea
- Psychophysical methods (limits, constant stimuli, adjustment, forced choice, and adaptive methods) for measuring auditory threshold
- Psychoacoustics and its significance to modern hearing aid amplification

A MINIMUM of 8 legitimate sources (scholarly journals, books, etc) is required. With the exception of scholarly/professional associations (e.g., AAA, ASHA, etc.) and .gov websites, no Internet sources will be accepted without prior approval requested via Blackboard CourseMail. Request such approval by email at least 2 weeks before the assignment due date (see course schedule). The minimum length is eight pages and the maximum acceptable length is ten pages, not including your reference page. Keep your information concise, direct, and professional. All papers should be completed in typed 11-point, Calibri font, double-spaced with 1-inch margins all around. Current APA format should be used, but a cover sheet is not required and if included should not be part of the page count. If you are uncertain about APA, please visit Lamar’s Writing Center on campus and visit https://owl.english.purdue.edu/owl/section/2/10/. See the rubric below to understand how the paper is evaluated.

Rubric for Paper:
<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>SATISFACTORY (80-100% of point value)</th>
<th>UNSATISFACTORY (0-79% of point value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONTENT (80)</td>
<td>Written work exhibits evidence proper response to the topic with critical evaluation and synthesis of sources, and provides adequate discussion that indicates student understanding.</td>
<td>Written work is unclear, off-topic, or provides inadequate or minimal discussion of ideas; may also lack appropriate or sufficient sources.</td>
</tr>
<tr>
<td>ORGANIZATION/ COHERENCE (5)</td>
<td>Written work exhibits identifiable structure for topics, including a clear thesis statement and topic sentences.</td>
<td>Written work lacks clear organization, may lack logical association of ideas, and may also lack transitions to guide the work.</td>
</tr>
<tr>
<td>SUPPORT/ ARGUMENT (5)</td>
<td>Written work exhibits confident and convincing presentation of ideas, with evidence. At minimum work provides at least generalized discussion of ideas or adequate discussion with at least weak support for arguments.</td>
<td>Documents make weak generalizations, providing little or no support, and may fail to provide critical analysis.</td>
</tr>
<tr>
<td>STYLE (5)</td>
<td>Written work exhibits a writing style that uses appropriate word choice (in context and in discipline) and professionalism. Sentences should demonstrate logical structure and complexity.</td>
<td>Written work is unprofessional or uses inappropriate word choice and layout for the context and discipline. Sentences may either be overly long or short with awkward construction. Word use may also be improper.</td>
</tr>
<tr>
<td>MECHANICS (5)</td>
<td>Written work exhibits correct and error-free presentation of ideas. Where applicable, APA referencing is correct. At minimum, papers may contain a few spelling, punctuation, or grammatical errors that remain unobtrusive and do not obscure the paper’s argument/points. Minor errors in APA may meet the lower point value of the satisfactory range.</td>
<td>Written work contains many mechanical or grammatical errors, and impedes the reader’s understanding or undermines the writer’s credibility. Where applicable, APA referencing is mostly incorrect or improperly presented.</td>
</tr>
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</table>

**Academic Honesty Policy**

Lamar University expects all students to engage in academic pursuits in a manner that is above reproach. Students are expected to maintain complete honesty and integrity in their academic experiences both in and out of the classroom. Any student found guilty of dishonesty in any phase of academic work will be subject to disciplinary action.
The University and its official representatives may initiate disciplinary proceedings against a student accused of any form of academic dishonesty including, but not limited to, cheating on an examination or other academic work which is to be submitted, plagiarism, collusion, and the abuse of resource materials.

All persons involved in academic dishonesty will be disciplined in accordance with University regulations and procedures. Discipline may include failure of the assignment and/or course up to suspension or expulsion from the university. The penalty may vary by instructor.

Additional information is available on the Academic Policy website (https://students.lamar.edu/academic-support/academic-policies.html).

Course Drop Policy

Students may drop a course and receive a grade of "Q" during the penalty-free period of the semester or session. For drops after this penalty-free period, grades are recorded as "Q" or "F," indicating the student was passing or failing at the time of the drop. A grade of "Q" may not be assigned unless an official drop has been processed through the Records Office. Students may drop a course online up to the census day by logging into Self-Service Banner. After the census day, courses must be dropped through the Records Office. For additional help, contact the academic advisor or the Records Office at registration@lamar.edu. Students may not drop a course during the last 20 percent of the term. Students should check the academic calendar at https://www.lamar.edu/academic-calendar for specific dates.

Students with Disability Policy

Lamar University is committed to providing equitable access to learning opportunities for all students. The Disability Resource Center (DRC) is located in the Communication building, room 105. Office staff collaborate with students who have disabilities to provide and/or arrange reasonable accommodations.

If you have, or think you may have, a disability (e.g. mental health, attentional, learning, chronic health, sensory, or physical), please contact the DRC at 409-880-8347 or drc@lamar.edu to arrange a confidential appointment with the Director of the DRC to explore possible options regarding equitable access and reasonable accommodations.

If you are registered with the DRC and have a current letter requesting reasonable accommodations, we encourage you to contact your instructor early in the semester to review how the accommodations will be applied in the course.

Additional information is available at the DRC website (http://www.lamar.edu/disability-resource-center/).

Academic Support

Academic Support can be located at http://students.lamar.edu/academic-support/index.html.

There are many areas (i.e. Advising, Writing Center, etc.) of academic support. Each area provides their own specific contact information and days and hours of operation.

Student Services

Lamar University recognizes that students may experience challenges that hinder success in their academics and/or college experience. We believe in giving all students access to resources that allow them to overcome these challenges. If you are struggling with stress, procrastination, anger management, depression, anxiety, substance abuse and/or eating disorders, please reach out to our counseling professionals at the Student Health Center at 880-8466 to call for an appointment or visit our website https://www.lamar.edu/students/student-engagement/student-health-center/index.html for more information about our services.

Students who face challenges securing food or housing, tuition and/or books and believes this may affect their performance in the course is urged to contact the LU Strong program. The program is located in the Setzer Student Center, Room 230 at 409-880-8458 or at lustrong@lamar.edu. Furthermore, please notify your professor if you are comfortable in doing so. This will enable them to provide any additional resources they may possess.

Your information and situation will be treated with the utmost privacy and is protected by Texas law. These services are available to all currently enrolled students at Lamar University and Lamar Institute of Technology.
Information on Student Services can be located at http://students.lamar.edu/index.html. There are many resources (i.e. Course schedules, important phone numbers, etc.) available. Each area provides their own specific contact information and days and hours of operation.

**Academic Continuity Policy**

In the event of an announced campus closure in excess of four days due to hurricane or other disaster, students are expected to check Lamar University’s website and login to LU Connect for instructions about continuing courses remotely.

**Emergency Procedures**

Many types of emergencies can occur on campus; instructions for severe weather or violence/active shooter, fire, or chemical release can be found at the Office of Environmental Health/Safety and Risk Management (https://www.lamar.edu/about-lu/administration/risk-management/index.html) webpage.

**Severe Weather**

Follow the directions of the instructor or emergency personnel.

Seek shelter in an interior room or hallway on the lowest floor, putting as many walls as possible between you and the outside.

If you are in a multi-story building and you cannot get to the ground floor, pick a hallway in the center of the building.

Stay in the center of the room, away from exterior walls, windows, and doors.

**Violence/Active Shooter**

CALL - 7777 from a campus phone (Text 409-241-8002 from a cell phone). Note: Calling 911 from either a campus or cell phone will contact the City of Beaumont dispatch rather than the LU police.

AVOID - If possible, self-evacuate to a safe area outside the building. Follow directions of police officers.

DENY - Barricade the door with desks, chairs, bookcases or any other items. Move to a place inside the room where you are not visible. Turn off the lights and remain quiet. Remain there until told by police it is safe.

DEFEND - Use chairs, desks, cell phones or whatever is immediately available to distract and/or defend yourself and others from attack.

**Copyright Policy Statement**

Copyright is defined as the ownership and control of the intellectual property in original works of authorship which are subject to copyright law. As an institution of higher learning that values intellectual integrity, Lamar University prohibits the distribution of published materials (print or electronic) in violation of copyright law.

**LU Connect Portal**

Students are asked to obtain a Lamar Electronic Account username and password so they can log onto the LU CONNECT website. Students may get information on how to get into the LU CONNECT website from the University’s homepage (http://www.lamar.edu) by clicking on the LU CONNECT link on the left top corner of the screen. Follow the steps to secure your LU CONNECT username and password.

**LU Learn/Blackboard Learning Management System (LMS)**

Students will utilize the Lamar University’s Learning Management System (LMS), Blackboard, for online courses.

For Blackboard technical support go to https://blackboardsupport.lamar.edu.

Phone: 866-585-1738

Phone and chat are available 24/7/365

Exams and quizzes taken within LULearn (Blackboard) may require online proctoring. Lamar University uses Proctorio for online proctoring. For additional information about online proctoring click here (https://www.lamar.edu/lu-online/student-support-
Network Use

ACCEPTABLE USE

Students must respect the integrity and security of Lamar University computer systems and network, and the privacy and preferences of other users. Responsibility for learning about and complying with Lamar University Acceptable Use Policy ultimately rests with the individual. The network may be used to download, copy, or store any software, shareware, digital media files or freeware, as long as the use complies with copyright law licensing agreements, and campus policies, such as storage space limitations and network bandwidth restrictions. The network may not be used for any activity, or to transmit any material, that violates United States or local laws.

UNACCEPTABLE USE

The network may not be used for commercial purposes. Advertising and sponsorships on Lamar University websites is restricted. In addition, students may not permit other persons to use their usernames, passwords, accounts or disk space, or disclose their usernames, passwords or account information to any third party. Students may not log on to someone else's account, internet address, or other network codes, or attempt to access another user's files. Students may not create false or dummy accounts to impersonate someone else. Students may not try to gain unauthorized access ("hacking") to the files or computer systems of any other person or organization. Students may not impersonate another person by forging e-mail, web pages or other electronic media. Students who maliciously access, alter, delete, damage or destroy any computer system, computer network, computer program, or data will be subject to disciplinary action by Lamar University, and criminal prosecution as well. Students may not disrupt or attempt to disrupt network traffic, and they may not attempt to monitor or capture network traffic in any way. Finally, students may not intentionally create, store, display, print or transmit information that violates the university's Sexual Harassment Policy.

Netiquette (Online Etiquette) Statement

Please adhere to the same standards of behavior and professional respect online that you would follow in face-to-face communication with others, but most particularly when writing email and when taking part in collaborative and discussion board activities. Lamar provides access to network resources, including the Internet, in order to support learning and to prepare students for the 21st century world. Students, however, are expected to adhere to the Lamar University Acceptable Use Policies when Using Networks. More comprehensive student code of conduct can be found at https://students.lamar.edu/academic-support/code-of-conduct.html.

GENERAL GUIDELINES TO RESPECT ALL PARTICIPANTS

✔ Respect the right of each person to disagree with others.
✔ Treat people the same as you would face-to-face.
✔ Respect the time of others.

GUIDELINES WHEN COMMUNICATING WITH OTHERS (EMAIL, DISCUSSIONS, BLOGGING, AND ETC.)

✔ Always sign your name to any contribution you choose to make.
✔ Be constructive in your responses to others in the class.
✔ Do not use all caps (Doing so may be interpreted as shouting).
✔ Re-read your postings before sending them.
✔ Always think before you write.
✔ Respond respectfully.
✔ Use appropriate grammar and structure.
✔ Spell-check your postings.
✔ Use short paragraphs focused on one idea.
✔ Use appropriate business language at all times.

Technical Support

Technical Support can be located at http://students.lamar.edu/it-services-and-support/index.html.

Phone: 409-880-2222
Email: servicedesk@lamar.edu
Attendance Verification

Students must complete an Attendance Verification Quiz for ALL COURSES - both on-campus and online - in which they are enrolled each term by the third class day to comply with U.S. Department of Education attendance requirements. Failure to complete this quiz by the deadline may result in loss of course enrollment and/or financial aid. The quiz is located in EVERY COURSE through LULearn (Blackboard) even if the course meets on campus.

Course Subject Outline

*denotes a deadline

All quizzes and assignments will be due at 11:59 PM on date listed unless otherwise noted in the schedule below.

Note re: lectures – Some lectures were pre-recorded in another semester offering. If any dates, deadlines, or assignments mentioned in the video do not match up with your syllabus, you should ALWAYS default to your syllabus.

<table>
<thead>
<tr>
<th>WEEK 1 January 21-24</th>
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<tbody>
<tr>
<td>First Day of Class</td>
</tr>
<tr>
<td>Topic: Syllabus/The Nature of Sound – Part 1</td>
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<tr>
<td>To do: Watch Lecture; Read Handout “The Physics of Sound”</td>
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<tr>
<th>WEEK 2 January 27-31</th>
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<tbody>
<tr>
<td>Topic: The Nature of Sound – Part 2</td>
</tr>
<tr>
<td>To do: Watch Lecture; Read Handout “Sound Attenuation”</td>
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<tr>
<td>Notable: 1 Quiz/Homework posts</td>
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<tr>
<td>Topic: Simple Harmonic Motion</td>
</tr>
<tr>
<td>To do: Watch Lecture: Read Chapter 2 Master Handbook of Acoustics</td>
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<tr>
<td>Notable: *1 Quiz/Homework on Week 1 Readings due</td>
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WEEK 2 Assignments due by Saturday 2/1

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<tr>
<th>WEEK 3 February 3-7</th>
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Topic: Acoustic Impedance
To do: Watch Lecture; Read Sound Intensity & Sound Level at https://opentextbc.ca/physicstestbook2/chapter/sound-intensity-and-sound-level/ & “Sound Power and Pressure Measurements” Handout
Notable: 2 Quiz/Homework posts

Topic: Logs and Antilogs
To do: Watch Lecture; Read “A Poor Man’s Tour of Sound Levels and the Decibel” Handout
Notable: *2 Quiz/Homework on Week 2 Readings due

WEEK 3 Assignments due by Saturday 2/8

WEEK 4 February 10-14

Topic: Intensity and Pressure
To do: Watch Lecture; Read pages 14-18 of “Basic Acoustics and Acoustic Filters” and Chapter 7 of Speaks “Intro to Sound”
Notable: 3 Quiz/Homework posts

Topic: dB and RMS
To do: Watch Lecture; Read pages 14-18 of “Basic Acoustics and Acoustic Filters” and Chapter 7 of Speaks “Intro to Sound”
Notable: *3 Quiz/Homework on Week 3 Readings due

WEEK 4 Assignments due by Saturday 2/15

WEEK 5 February 17-21

Topic: Group Review – Online Discussion via Blackboard Collaborate
To do: Participate in online discussion; Read “Pipes Resonances and Standing Waves” Handout
Notable: 4 Quiz/Homework posts

To do:

*EXAMINATION 1 – opens 8 AM 2/17 – closes 11:59 PM (timed 2 hour exam)

Notable: *4 Quiz/Homework on Week 4 Readings due

WEEK 5 Assignments due by Saturday 2/22

WEEK 6 February 24-28
Topic: Filters / Resonance & Standing Waves – Part 1
To do: Watch Lecture; Read "Distortion Intro" handout
Notable: 5 Quiz/Homework posts – due Wednesday 1/30 by 11:59 PM

Topic: Filters / Resonance & Standing Waves – Part 2
To do: Watch Lecture; Read chapter 4 of Master Handbook of Acoustics
Notable: *5 Quiz/Homework on Week 5 Readings due

WEEK 6 Assignments due by Saturday 2/29

WEEK 7 March 1-6

Topic: Distortion
To do: Watch Lecture; Read chapter 10 Speaks Intro to Sound
Notable: 6 Quiz/Homework posts

Topic: Sound Transmission
To do: Watch Lecture; Read http://www.splab.net/APD/G500/index-e.html and listen to audio samples
*Research Paper due
Notable: *6 Quiz/Homework on Week 6 Readings due

WEEK 7 Assignments due by Saturday 3/7

WEEK 8 March 9-13

Topic: Room acoustics
To do: Watch Lecture; Read MacKay Chapter 5
Notable: 7 Quiz/Homework posts

Topic: Source-Filter Theory, Vowels, Consonants
To do: Watch Lecture; Read MacKay Chapter 5
Notable: *7 Quiz/Homework on Week 7 Readings due

WEEK 8 Assignments due by Saturday 3/14

WEEK 9
<table>
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<tr>
<th>WEEK 10 March 23-27</th>
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| **Topic:** Signals, analog, digitization, recording – part 1  
To do: Watch Lecture; Read handout "History of Psychoacoustics  
Notable: 8 Quiz/Homework posts |
| Topic: Signals, analog, digitization, recording – part 2  
To do: Watch Lecture; Read Chapter 1 Lentz - History  
Notable: *8 Quiz/Homework on Week 9 Readings due |
| WEEK 10 Assignments due by Saturday 3/28 |

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<tr>
<th>WEEK 11 March 30-April 3</th>
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<tr>
<td>*EXAMINATION 2 – opens 8 AM on 3/30 – closes 11:59 PM (timed 2 hour exam)</td>
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| To do: Read Chapter 2 Lentz – Estimating Threshold in Quiet  
Notable: 9 Quiz/Homework posts |
| Topic: Introduction to & History of Psychoacoustics  
To do: Watch Lecture; Chapter 3 Lentz – Estimating Threshold in Noise  
Notable: *9 Quiz/Homework on Week 10 Readings due |
| WEEK 11 Assignments due by Saturday 4/4 |

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<th>WEEK 12 April 6-10</th>
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| **Topic:** Estimating threshold in quiet  
To do: Watch Lecture; Chapter 4 – Lentz Loudness and the Perception of Intensity  
Topic: Estimating threshold in noise (masking)  
To do: Watch Lecture; Read Chapter 5 – Lentz Temporal Processing |
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<tr>
<th>WEEK 13 April 13-17</th>
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| **Topic:** Loudness and the perception of intensity  
To do: Watch Lecture; Read Chapter 6 – Lentz Pitch Perception  
Notable: 10 Quiz/Homework posts |
| **Topic:** Temporal Processing  
To do: Watch Lecture; Read Chapter 7 – Hearing with two ears  
Notable: *PowerPoints and Handouts due for Psychoacoustics Presentation 4/17 by 11:59 PM  
Notable: *10 Quiz/Homework on Week 12 Lecture topics due Saturday 4/18 |

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<tr>
<th>WEEK 14 April 20-24</th>
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| **Topic:** Pitch Perception  
To do: Watch Lecture; Read Chapter 8 – Lentz Clinical Implications  
Notable: 11 Quiz/Homework posts |
| **Topic:** Hearing with two ears  
To do: Watch Lecture; Read "Some Auditory Illusions" handout  
*Videos for Psychoacoustics Presentation due 4/25 by 11:59 PM  
Notable: *11 Quiz/Homework on Week 13 Readings due  

* WEEK 14 Assignments due by Saturday 4/25 |

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<tr>
<th>WEEK 15 April 27-May 1</th>
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| **Topic:** Clinical Implications  
To do: Watch Lecture  
Notable: 12 Quiz/Homework posts |
| **Topic:** Auditory Illusions  
To do: View Video Presentations/Discussion Board  

* WEEK 15 Assignments due by Saturday 5/2 |

| WEEK 16 May 4 |
Review/Wrap-Up

To do: View Video Presentations/Discussion Board - Notable: *Final Discussion Board comments due by 5/4 at 11:59 PM

FINAL: Per final schedule calendar date

*EXAMINATION 3 – opens 8 AM – closes 5:00 PM (timed 2 hour exam)