Hearing Aids II
ASLP 6695-001
Fall, 2020

Instructor: Sharon Miller, Ph.D., CCC-A
Office: SPHS 214
Office Hours: By appointment

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Office telephone: (940)-369-7385

Class Schedule: Mondays, 9:00-10:50AM
Location: LANG 211
Course credits: 2 credits

Lecture Materials and Required Readings

All of my Power Point lecture slides, handouts, and required readings will be posted online to the Canvas course site for students to print before each class meeting.

Required textbook
Dillon, H. Hearing Aids. Thieme: New York, USA.

Course Description:
This advanced course in amplification will cover topics related to selection, fitting, and verification of currently available hearing aid features, for both adult and pediatric populations. Content will be presented and learned through lecture, labs, exams, individual presentations, and assignments.

COVID-19 NOTE: This course meets face-to-face until November 28, 2020 when all classes transition to remote teaching. In the event UNT makes courses fully remote before November 28, our class will meet SYNCHRONOUSLY via Zoom at the regularly scheduled class time. All changes to the course schedule will be posted on the Canvas site. In the event the instructor contracts COVID-19, lectures will be held remotely (synchronously and/or asynchronously) while the instructor is quarantined at home. If the instructor is unable to deliver the materials remotely, alternate instructors and lecture formats will be developed.

Student Learning Outcomes

Knowledge and Skills

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

- Describe basic and advanced amplification technology
- Measure hearing aid performance in the real ear
- Use prescriptive targets to fit hearing aid gain and compression characteristics for adults and children, including difficult-to-fit cases
- Describe typical classroom acoustics and the need for assistive listening devices for children with hearing loss
Research and Writing
Upon completion of the course, student will be able to:

- Use evidence from academic journal articles to complete a research paper on advanced hearing aid technology
- Obtain extensive knowledge on different hearing aid manufacturers and present to a professional audience

Collaborative Learning and Oral Skills
Upon completion of the course, students will be able to:

- Engage in a collaborative problem solving learning environment.
- Work with other students to complete laboratory assignments on different hearing aid topics.

Course Requirements and Grading:
1. Attendance is required for all class sessions.
2. Assigned HA manufacturer updates 10%
3. In-class Exams (2) at 25% each 50%
4. Lab assignments (5 total) 15%
5. Review paper 20% (10% based on first draft; 10% based on final draft).
6. Review paper presentation 5%

Grading:
A  100-90%
B  89-80%
C  79-70%

Policy on Incompletes: All writing assignments, exams, and presentations must be completed during the Fall semester. A grade of “I” will not automatically be given to students who cannot hand in the assignments on the due dates. Grades of “I” will only be given to students with specific health problems or emergencies. Each student must talk to the instructor in order to be considered for a grade of “I.” If a student and I agree that she or he has a reasonable request for the receipt of a grade of “I,” then the student must complete a written contract with me, stipulating the date that the incomplete will be finished.

Course Requirement Descriptions

In-class Exams
There will be two in-class exams, each worth 25% of the final grade. Questions will primarily be in the short answer, graph interpretation, and multiple choice format. Exams will be based on my lectures, lab assignments, and assigned readings.

Lab Reports: There will be a few lab assignments introduced as part of class (although they may require time outside of class to complete). Active participation and completion of any assigned homework will account for 15% of your grade. Due to COVID and reduced clinic access, students should contact the instructor ASAP if they are unable to complete the labs in a timely fashion.
Lab “re-do” assignments: You may be given the opportunity to redo a lab assignment to increase your score. If this is the case, your revised lab assignment must be received within 1 week. No late revisions will be accepted.

Lab Procedures: Face-to-Face COVID protocols
1. All students and instructors will need to self-monitor and be symptom free before they are allowed to enter the clinic to complete the labs.
2. Students MUST sign up ahead of time to complete the labs using the clinic Google Drive Sheet
   1. Date, time, and acknowledgement that student was symptom free must be recorded by student on the lab document.
3. Instructors, students, and lab partners are required to wear protective face coverings at all times during the labs.
4. Instructors and students are encouraged to wear gloves when interacting with a lab partner.
5. Students and instructors are required to wash hands frequently (especially before and after completing the lab) and exhibit safety precautions as recommended by the Centers of Disease Control (CDC) in order to ensure the safety of everyone in the clinic space.
6. All equipment and rooms that are utilized for the labs are to be thoroughly sanitized between lab groups.
   1. This will include proper use of disinfectants.
7. No more than 2 students are allowed in a hearing aid room at one time.

Research paper: The purpose of this research paper is to provide students with an opportunity to investigate more thoroughly one topic in amplification technology, using research techniques based on evidence based practice. Students will be expected to write a critical review of a topic that will include at least two current journal articles describing new technology in hearing aids. Alternatively, a student might write a detailed and critical comparison of two signal processing hearing aid systems. Each paper should be 6-8 typed pages (double-spaced) and should include clinical data and a conclusion as to the proven effectiveness of the chosen technology or hearing aid system. Technology topics may include amplitude compression algorithms, feedback reduction techniques, noise reduction mechanisms, or other similar topics of the student’s choice. Students should confirm their topic and references with the instructor as early as possible in the semester. Topics and references must be approved by September 21. The first draft of the paper is due October 19. Paper will be returned to students by November 2. Students will also prepare a presentation to share with the class. These will take place on November 23 & November 30. A grading rubric will be provided. Final drafts will be due December 9. Please note that both versions will receive a grade (see grading breakdown).

Potential Paper topics include evidence supporting:
- Compression thresholds and number of channels
- Assistive device efficacy in classrooms
- Technology for severe hearing loss options
- Efficacy of noise reduction algorithms
- Pediatric fittings using advanced features
- Feedback cancellation versus feedback management
Multi-microphone technology
Current status of tinnitus management/treatment
Additional topics subject to instructor approval

Class Participation: Students will also be asked to research relevant information on the current class topic and to present that information to the group. Each student will keep track of a particular hearing aid manufacturer and report on its current products. It is further expected that all students will regularly participate in the general discussion of topics. Finally, “common sense” rules apply: i.e., arrive on time, do not leave early, pay attention during lectures/discussions; do not use personal electronic devices for non class-related material during class, etc.

- Each student will ‘adopt’ one of the major manufacturers. Assignments will be made during the first few class sessions. Each student will bring information about that manufacturer’s products and software from time to time (i.e. if we are discussing noise reduction, you will provide information regarding that particular manufacturer’s noise reduction strategy).
  - Starkey
  - Oticon
  - Widex
  - GN ReSound
  - Phonak
  - Signia (Siemens)

Laboratory Assignments
There will be 5 laboratory assignments. You will have a minimum of 2 weeks to complete each of the lab assignments. Labs will be introduced in lecture and students are to complete the labs outside of regular class time.
## Tentative Course Schedule*

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<tr>
<th>Date</th>
<th>Topics</th>
<th>Required Reading(s)/Assignment(s)</th>
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| August 24  | Syllabus Overview<br>Introduction to Course<br>Amplification I - Real Ear Refresher<br>Introduction to Lab 1: Real ear measures I<br>Ethics | Readings:  
- Hawkins et al. (2006)  
Hearing Aid (HA) manufacturers assigned  
Assignment: Lab 1                                                                 |
| August 31  | Ethics, contd.<br>Introduction to Lab 2: Real Ear II and Testing advanced digital features     | Assignment: Lab 2                                                                 |
| September 7| NO CLASS – LABOR DAY                                                                             |                                                                                                  |
| September 14| Directional Technology<br>Noise Reduction Technology                                              | Due: Lab 1                                                                                       |
| September 21| Feedback cancellation; Additional Hearing Aid (HA) features<br>Introduction to Lab 3: Testing Advanced Features | Due: HA Update: Directional Technology & Noise reduction  
Due: Paper Topic and 2-3 references  
Due: Lab 2  
Readings:  
- Textbook: pp. 234-239 (Feedback reduction)  
- Freed and Soli (2006)                                                                 |
| September 28|                                                                                                 | HA Update Assignment: FB cancellation technology.  
Assignment: Lab 3                                                                 |
| October 5  | Dead regions, steeply sloping losses                                                            | Due: FB cancellation technology.  
Frequency lowering technology update  
Reading(s)  
- Textbook: pp298-304  
- Moore, 2001                                                                 |
<p>| October 12 | Introduction to Lab 4: Frequency lowering                                                       | Due: Lab 3                                                                                       |</p>
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<th>Date</th>
<th>Topic</th>
<th>Due/Lab/Assignment</th>
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<tr>
<td>October 19</td>
<td>Bone Anchored Devices Middle Ear Implants</td>
<td>Frequency lowering technology Due: Lab 4 Assignment: Lab 4</td>
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<td>October 26</td>
<td>Pediatric Amplification Classroom Acoustics/FM Systems</td>
<td>First draft of paper Due: Lab 4 Reading(s)</td>
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<td>Textbook: pp. 520-535 (Bone-conduction and implanted hearing aids)</td>
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<td>November 2</td>
<td>EXAM 2</td>
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<td>November 9</td>
<td>Introduction to Lab 5: RECDs</td>
<td>Pediatric options &amp; recommendations update Due: Lab 5 RECD Lab</td>
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<td>November 16</td>
<td>Hearing aids for tinnitus</td>
<td>Reading(s)</td>
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<td>Sereda et al. 2015</td>
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<td>Tyler and Bentler chapter</td>
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<td>HA Update Assignment: tinnitus options</td>
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<td>November 23</td>
<td>Research Paper Presentations</td>
<td>tinnitus options update Due: Lab 5</td>
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<td>November 30</td>
<td>Research Paper Presentations – REMOTE DELIVERY</td>
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<tr>
<td>December 9</td>
<td>Research Paper due by Wednesday, December 9, 8:00 AM</td>
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*Topics and dates subject to change at instructor’s discretion*
ASHA STANDARDS: ASHA Standards for the Certificate of Clinical Competence in Audiology consist of standards related to academic and clinical training as well as continuing education for individuals who wish to obtain/maintain certification. This course provides students with foundational knowledge and an introduction to clinical skills in the area of medical audiology and implantable hearing devices.

A9: Patient characteristics (e.g., age, demographics, cultural and linguistic diversity, medical history and status, cognitive status, and physical and sensory abilities) and how they relate to clinical services
A11 Principles, methods, and application of psychometrics
A13 Instrumentation and bioelectrical hazards
A14 Physical characteristics and measurement of electric and other nonacoustic stimuli
A15 Assistive technology
A16 Effects of cultural diversity and family systems on professional practice.
A17 American Sign Language and other visual communication systems.
A18 Principles and practices of research including experimental design, statistical methods, and application to clinical populations (we cover this at an introductory level when discussing evidence based practice)
A19 Legal and ethical practices (e.g., standards for professional conduct, patients’ rights, credentialing, and legislative and regulatory mandates)
A20 Health care and educational delivery systems
A22 Oral and written forms of communication
A23 Principles, methods, and applications of acoustics (we cover this when discussing signal processing algorithms used in digital hearing aids)
A24 The use of instrumentation according to manufacturer’s specifications and recommendations
A25 Determining whether instrumentation is in calibration according to accepted standards.
A26 Principles and applications of counseling
A28 Management and business practices, including but not limited to cost analysis, budgeting, coding and reimbursement, and patient management
A29 Consultation with professionals in related and/or allied service areas

B1 Implement activities that prevent and identify dysfunction in hearing and communication, balance and other auditory-related systems
C3 Evaluating information from appropriate sources and obtaining a case history to facilitate assessment planning
C4 Performing otoscopy for appropriate audiological assessment/management decisions, determining the need for cerumen removal, and providing a basis for medical referral
C9 Evaluating functional use of hearing
C10 Preparing a report, including interpreting data, summarizing findings, generating recommendations, and developing an audiologic treatment/management plan
D1 The provision of intervention services (treatment) to individuals with hearing loss, balance disorders, and other auditory dysfunction that compromises receptive and expressive communication
D2 Development of a culturally appropriate, audiologic rehabilitative management plan
D4 Treatment and audiologic management of tinnitus
D5 Provision of treatment services for infants & children with HL; collaboration/ consultation with early interventionists, school based professionals, & other service providers regarding development of intervention plans (IEPs &/or IFSPs)
D6  Management of the selection, purchase, installation, and evaluation of large-area amplification systems
D7  Evaluation of the efficacy of intervention (treatment) services
F1  Measuring functional outcomes, consumer satisfaction, efficacy, effectiveness, and efficiency of practices and programs to maintain and improve the quality of audiologic services
F2  Applying research findings in the provision of patient care (evidence-based practice)
F3  Critically evaluating and appropriately implementing new techniques and technologies supported by research-based evidence
F5  Identifying internal programmatic needs and developing new programs
F6  Maintaining or establishing links with external programs, including but not limited to education programs, government programs, and philanthropic agencies

COVID-19 Statements

Attendance
While attendance is mandatory, it is important for all of us to be mindful of the health and safety of everyone in our community, especially given concerns about COVID-19. Please contact me if you are unable to attend class because you are ill, or unable to attend class due to a related issue regarding COVID-19. It is important that you communicate with me prior to being absent so I may make a decision about accommodating your request to be excused from class.

If you are experiencing any symptoms of COVID-19 (https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html) please seek medical attention from the Student Health and Wellness Center (940-565-2333 or askSHWC@unt.edu) or your health care provider PRIOR to coming to campus. UNT also requires you to contact the UNT COVID Hotline at 844-366-5892 or COVID@unt.edu for guidance on actions to take due to symptoms, pending or positive test results, or potential exposure. While attendance is an important part of succeeding in this class, your own health, and those of others in the community, is more important.

Class Materials for Remote Instruction
The UNT fall schedule requires this course to have fully remote instruction beginning November 28th. Additional remote instruction may be necessary if community health conditions change or you need to self-isolate or quarantine due to COVID-19. Students will need access to Canvas, a webcam, and microphone to participate in fully remote portions of the class. Information on how to be successful in a remote learning environment can be found at https://online.unt.edu/learn.

Statement on Face Covering
Face coverings are required in all UNT facilities. Students are expected to wear face coverings during this class. If you are unable to wear a face covering due to a disability, please contact the Office of Disability Access to request an accommodation. UNT face covering requirements are subject to change due to community health guidelines. Any changes will be communicated via the instructor.

Class Recordings
If COVID-19 prevents a student from attending the course, or if due to changing conditions, classes are moved to remote delivery, classes may be recorded. Class recordings are the intellectual property of the university or instructor and are reserved for use only by students in this class and only for educational purposes. Students may not post or otherwise share the recordings outside the class, or
outside the Canvas Learning Management System, in any form. Failing to follow this restriction is a violation of the UNT Code of Student Conduct and could lead to disciplinary action.

Student Policy Statements

1. **Office of Disability Accommodation (ODA):** “The University of North Texas makes reasonable academic accommodation for students with disabilities. Students seeking reasonable accommodation must first register with the Office of Disability Accommodation (ODA) to verify their eligibility. If a disability is verified, the ODA will provide you with a reasonable accommodation letter to be delivered to faculty to begin a private discussion regarding your specific needs in a course. You may request reasonable accommodations at any time, however, ODA notices of reasonable accommodation should be provided as early as possible in the semester to avoid any delay in implementation. Note that students must obtain a new letter of reasonable accommodation for every semester and must meet with each faculty member prior to implementation in each class. Students are strongly encouraged to deliver letters of reasonable accommodation during faculty office hours or by appointment. Faculty members have the authority to ask students to discuss such letters during their designated office hours to protect the privacy of the student. For additional information see the Office of Disability Accommodation website at [http://www.unt.edu/oda](http://www.unt.edu/oda). You may also contact them by phone at 940.565.4323.”

2. **Academic Dishonesty:**
   “UNT promotes the integrity of learning processed and embraces the core values of trust and honesty. Academic integrity is based on educational principles and procedures that protect the rights of all participants in the educational process and validate the legitimacy of degrees awarded by the university. In the investigation and resolution of allegations of student academic dishonesty, the university’s actions are intended to be corrective, educationally sound, fundamentally fair, and based on reliable evidence.”

   The faculty expects a high level of responsibility and academic honesty. Any form of academic dishonesty will not be tolerated and will result in formal disciplinary action.

3. **Statement of Diversity and Inclusion** “The University of North Texas values diversity and individuality as part of advancing ideals of human worth, dignity and academic excellence. Diverse viewpoints enrich open discussion, foster the examination of values and exposure of biases, help educate people in rational conflict resolution, responsive leadership and prepare us for the complexities of a pluralistic society. As such, the University of North Texas is committed to maintaining an open, welcoming atmosphere that attracts qualified students, staff, and faculty from all groups to support their success. The University of North Texas does not discriminate on the basis of race, color, national or ethnic origin, religion, sex, sexual orientation, gender identity or expression, age, political affiliation, disability, marital status, ancestry, genetic information, citizenship, or veteran status in its application and admission process, educational programs and activities, employment policies and use of university facilities.”

4. **Student Absence Due to Religious Holy Day.** “A student may be excused from attending classes or other activities, including examinations, for observance of a religious holy day, including travel for that purpose. A. A student should notify a faculty member of anticipated absence to observe religious holy days as early in the semester as possible. B. An excused student may not be penalized for the absence and must be allowed to complete any examination or an assignment
missed during the absence within a reasonable period after the absence. The faculty member may take appropriate action if a student fails to satisfactorily complete an assignment or examination within a reasonable time. C. If a student and faculty member disagree about whether the absence is due to observance of a religious holy day or whether the student has been given reasonable time to complete any missed assignment or examination, they may appeal the decision using the process outlined in UNT Policy 07.016, Student Complaint Policy or UNT Policy 06.040, Grade Appeals.”

5. **Sexual Harassment.** “It is the policy of the University of North Texas that acts of sexual harassment, as defined herein, toward guests of and visitors to the campus or any member of the University community including faculty, staff, students and candidates for positions at the University (regardless of the individual's gender) will not be tolerated. All members of the administration, faculty, staff and students will be subject to disciplinary action for violation of this policy. Members of the public doing business with the University who violate this policy may be subject to sanctions.” Full policy available at [https://policy.unt.edu/sites/default/files/16.005_SexualHarassment_2003.pdf](https://policy.unt.edu/sites/default/files/16.005_SexualHarassment_2003.pdf)

This syllabus is available in alternative formats upon request.