Hearing Aids II
ASLP 6695-001
Fall, 2018

Instructor: Sharon Miller, Ph.D., CCC-A
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Office Hours: By appointment
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Class Schedule: Mondays, 8:00-9:50AM
Location: AUDB 218
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.

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 lecture and assigned readings to complete an essay-based take home exam
- 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 5%
3. In-class Exams (2) at 25% each 50%
4. Lab assignments (3 total) 15%
5. Review paper 20% (10% based on first draft; 10% based on final draft).
6. Review paper presentation 5%
7. Final exam essay question 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. Labs must be turned in on time or points will be deducted, as specified below. Please note that an incomplete lab assignment will be considered late. If you forget to bring a lab assignment to class on the due date, you may email it to the instructor by 10 p.m. that same day without it being considered late.

Late/incomplete penalties:
- 1 day late: -10%
- 2 days late: -25%
- 3 days late: -50%
- Lab assignments over 3 days late will not be accepted and you will receive no credit for those particular assignments.

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.

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 24. The first draft of the paper is due October 22. Students will also prepare a presentation to share with the class. These will take place on November 26 – December 3. A grading rubric will be provided. Final drafts will be due December 3. 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
- Noise reduction algorithms
- Pediatric fittings using advanced features
- Feedback cancellation versus feedback management
- Use of expansion
- Multi-microphone technology
- Current status of tinnitus management/treatment
- Additional topics subject to instructor approval

Class Participation: Students may 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, he/she will provide information regarding that particular manufacturer’s noise reduction strategy).
  - Starkey
  - Oticon
  - Widex
  - GN ReSound
  - Phonak
  - Sonic
  - Signia (Siemens)

Laboratory Assignments
There will be 3 laboratory assignments. You will have 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.

Final Exam
There will be 1 take home final essay exam question (tentative topics: pediatric fittings, assistive devices, and binaural/ bilateral fittings). The exam will be assigned December 3 and due December 10.
**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 27  | Syllabus Overview  
Introduction to Course  
Amplification I - Formative Assessment and Review                      |                                                                                                  |
| September 3| NO CLASS – LABOR DAY                                                   |                                                                                                  |
| September 10| Compression                                                            | Reading(s):  
- Compression Handbook (Starkey)  
- Textbook: Ch. 6 (same for both editions)  
- Moore, 2008                                                                 |
| September 17| Hearing Aid Prescriptive Formulas                                      | Reading(s):  
- Textbook: Ch. 9  
- Textbook (2nd Edition): Ch. 10  
Introduction to Lab 1: Using prescriptions and real ear measures to match target |
| September 24| Selecting and Adjusting Hearing Aids                                   | Reading(s):  
- Textbook: 4.2-4.5  
- Textbook (2nd Edition): 4.2-4.6  
- Mueller and Ricketts, 2006  
- AJA: Guidelines for HA fitting, 1998  
- Kuk et al., Hearing Review, 2008  
Due: Paper Topic and 2-3 references |
| October 1  | EXAM 1                                                                 | Due: Lab 1                                                                                       |
| October 8  | Directional Technology  
Feedback cancellation  
Noise Reduction  
Introduction to Lab 2: Testing advanced digital features               | Reading(s):  
- Ricketts and Mueller, 1999  
- Valente et al., 2000  
- Ricketts and Henry, 2002  
- Wouters, 2002                                                                 |
| October 15 | Binaural/bilateral fittings  
Dead regions, steeply sloping losses                                    | Reading(s):  
- Textbook, Ch. 14  
- Textbook (2nd Edition): Ch. 15  
- Moore, 2001                                                                 |
| October 22 | Bone Anchored Devices  
Middle Ear Implants                                                       | Due: First draft of paper  
Due: Lab 2                                                                                      |
| October 29 | EXAM 2                                                                 |                                                                                                  |
| November 5 | Pediatric Amplification  
Classroom Acoustics/FM Systems                                            | Reading(s):  
- Bagatto et al., 2016  
- AAA Pediatric Guidelines  
- Pediatric Working Group paper  
- ASHA (1999), FM system fitting and monitoring guidelines  
- Ching, 2003                                                                 |
| November 12| Current affairs with hearing aids: PSAPS, pricing, unbundling/bundling, marketing | Reading(s):  
- Humes et al. 2017  
- AAA OTC Guidelines                                                                 |
| November 19| Hearing aids for tinnitus                                              | Reading(s):  
- Sereda et al. 2015  
- Tyler and Bentler chapter                                                                 |
<p>| November 26| Presentations                                                           | Due: Lab 3                                                                                       |</p>
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<tr>
<th>Date</th>
<th>Event</th>
<th>Notes</th>
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<tr>
<td>December 3</td>
<td>Presentations</td>
<td>Research Paper Due</td>
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<td></td>
<td>Take Home Exam Question Assigned</td>
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<tr>
<td>December 10</td>
<td>Take Home Final Exam Question due by 10:00 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 Principlles, 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
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. 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

This syllabus is available in alternative formats upon request.