HEARING TESTS AND MEASURES

Communication Disorders 438 (3.0 credits)
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HEARING TESTS AND MEASUREMENTS
Audiology and Speech Language Pathology 438 (3.0 credits**)**
Monday, Wednesday, & Friday - 9:00am - 9:50am - 177 TLRB
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COURSE DESCRIPTION

This course is required for all undergraduate students majoring in Audiology and Speech-Language Pathology. This course meets the American Speech-Language-Hearing Association's (ASHA) certification requirements for course work in assessment and pathologies of the auditory system.

This course presents primary skill development in the administration and interpretation of basic tests of auditory disorders including pure tone air- and bone-conduction threshold testing, speech audiometry, fundamentals of middle ear and inner ear measurements, and rehabilitative devices and techniques.

COURSE OBJECTIVES

A. To develop a theoretical and practical knowledge of hearing tests and measurements in the field of communicative disorders.
B. To become proficient in the administration of standard audiological testing in adults and older children.
C. To understand the role of Audiology in auditory and speech-language disorders.
D. To gain the fundamentals of gathering case history information and report writing.

Mapping of Course Objectives

Objective	Assessment	Feedback	ASHA CAA Standard*	DOMSE Conceptual Framework*
1. The student will develop a theoretical and practical knowledge of hearing tests and measurements in the field of communicative disorders.	1a. On-line quizzes. 1b. Interim written exams. 1c. Final examination.	Class review of items 1a and 1b. Return of item 1c with comment and instructor meeting with student.	III-B III-C III-D III-E III-F III-G	CF-2 CF-4
2. The student will become proficient in the administration of standard audiological testing in adults and older children.	2a. On-line quizzes. 2b. Interim written exams. 2c. Final examination. 2d. Laboratory exercises	Class review of items 2a and 2b. Return of item 2c with comment and instructor meeting with student. Submission and review of item 2d.	III-B III-C III-D III-E III-F III-G	CF-2 CF-4
3. The student will understand the role of audiology in auditory and speech-language disorders.	3a. On-line quizzes. 3b. Interim written exams. 3c. Final examination. 3d. Term paper	Class review of items 3a and 3b. Return of item 3c and 3d with comment and instructor meeting with student.	III-B III-C III-D III-E III-F III-G	CF-2 CF-4
4. The student will gain the fundamentals of gathering case history information and report writing.	3a. On-line quizzes. 3b. Interim written exams. 3c. Final examination. 3d. Laboratory exercises.	Class review of items 3a and 3b. Return of item 3c and 3d with comment and instructor meeting with student.	III-B III-C III-D III-E III-F III-G	CF-2 CF-4

*More detail is available regarding these standards at: http://www.byu.edu/aslp/

TEXTBOOK

Gelfand, S. (2001). *Essentials of Audiology* (2nd ed.). New York: Thieme. [ISBN: 1-58890-017-7] Required text. It is highly recommended that this text be purchased and kept for future reference. It will be referred to in other audiology courses, and for speech-language majors it is a valuable resource.

Virtual Audiometer, Brigham Young University (purchased at the BYU Bookstore only). The CD contains a virtual audiometer with case studies. It is required for this class and is used to develop audiometric skills.

PREREQUISITES

COMD 334 and Physics 167 are prerequisites for this course. Students that have not *completed* these prerequisites are required to discontinue this course until such time the prerequisite courses have been completed. The instructor reserves the right to dis-enroll students that do not meet these prerequisites. English 315 or 316 are strongly recommended due to the major term paper project.

CONTACTING THE INSTRUCTOR

My office hours are primarily by appointment, however, if I am not involved in some activity you are welcome to see me at any time. If you call my office telephone and leave a message be sure to leave a time and phone number that you will be available for me to return your telephone call. I will make two attempts at returning your telephone call. If you contact me using e-mail be sure to put the course number (i.e. COMD 438, etc.) **in the subject heading**. I prioritize my e-mail by subject heading, with no heading getting the lowest priority. My home telephone is for 'emergencies' and is not to be used to schedule appointments or leave messages. I do not mind being contacted at home for specific questions.

WEB SITE INFORMATION

Registered students in this course are to use Blackboard for this course. Login to Route Y then select Blackboard in the lower section.

HONOR CODE

The student is expected to be familiar with the Honor Code. The Honor Code is enforced in this class and students will be required to conform to its principles and practices. Cheating and plagiarism may result in a class failure, at the discretion of the instructor.

> "Brigham Young University exists to provide a university education in an atmosphere consistent with the ideals and principles of The Church of Jesus Christ of Latter-day Saints. This atmosphere is preserved through commitment to conduct that reflects those ideals and principles" (Undergraduate Catalog, Brigham Young University).

In keeping with the principles of the BYU Honor Code, students are expected to be honest in all of their academic work. Academic honesty means, most fundamentally, that any work you present as your own must in fact **be** your own work and not that of another. Violations of this

principle may result in a failing grade in the course and additional disciplinary action by the university.

Students are also expected to adhere to the Dress and Grooming Standards. Adherence demonstrates respect for yourself and others and ensures an effective learning and working environment. It is the university's expectation, and my own expectation in class, that each student will abide by all Honor Code standards. Please call the Honor Code Office at 422-2847 if you have questions about those standards.

PREVENTING SEXUAL HARASSMENT

Title IX of the Education Amendments of 1972 prohibits sex discrimination against any participant in an educational program or activity receiving federal funds. The act is intended to eliminate sex discrimination in education. Title IX covers discrimination in programs, admissions, activities, and student-to-student sexual harassment. BYU's policy against sexual harassment extends not only to employees of the university but to students as well. If you encounter unlawful sexual harassment or gender based discrimination, please talk to your professor; contact the Equal Employment Office (D-240C ASB) at 422-5895 or 367-5689 (24-hours); or contact the Honor Code Office at 422-4440.

STUDENTS WITH DISABILITIES

Brigham Young University is committed to providing a working and learning atmosphere that reasonably accommodates qualified persons with disabilities. If you have any disability, which may impair your ability to complete this course successfully, please contact the Services for Students with Disabilities office at 422-2767 (1520 WSC). Reasonable academic accommodations are reviewed for all students who have qualified documented disabilities. Services are coordinated with the student and instructor by the Services for Students with Disabilities office. If you need assistance or if you feel you have been unlawfully discriminated against on the basis of disability, you may seek resolution through established grievance policy and procedures. You should contact the Equal Employment Office at 422-4440 (D-240C ASB).

Students in this class must be registered with the Services for Students with Disabilities office before accommodations will be made. It is in this manner that I may best, and fairly, make necessary accommodations. Accommodations will be made for all course activities, as needed, following registration, and no consideration will be given for course activities completed prior to the instructor being officially notified by the Services for Students with Disabilities office. Please see me if you should have any questions.

ARCHIVING OF STUDENT WORK

All materials not claimed by the end of the fourth week of the term following this class will be destroyed. After that date, it will not be possible to contest scores or grades, except according to University policy. The instructor reserves the right to fully review all contested material and adjust scores accordingly.

DEVOTIONALS

Brigham Young University provides devotionals and forums throughout the year on most Tuesdays from 11:00 am to 11:50 am. On days that these enriching experiences are provided, the instructor is not available nor should any of the facilities be used as part of this course during that time period.

GENERAL ACADEMIC REQUIREMENTS

All assignments must be typewritten unless otherwise noted. If computer generated, an easily readable font must be used. Originals and copies must be clear with dark print. Unless otherwise noted all assignments are due by the beginning of the class period on the due date. If late assignments are accepted, penalties may be assigned based on the assignment and the time it was submitted to the instructor. No assignments are accepted after the last day of class.

Reading assignments are to be completed prior to the beginning of the class period. Students that are unprepared may be penalized up to 2% of the final course grade for each occurrence. Absence from class is considered not being prepared.

Grading Policies and Procedures

The grade equivalent is based on the following percentages:

A	96-100 %	C+	78-80 %
A-	92-95 %	C	75-77 %
B+	88-91 %	C-	70-74 %
B	84-87 %	D	65-69 %
B-	81-83 %	E	64 % & below

I. Adjustment Procedure for Assessments

Individual assessment functions (i.e., quizzes, exams) are adjusted to account for:

1. The two highest scores on the assessment.
2. Assessment difficulty.
3. Assessment ambiguity.

This is accomplished by discounting the highest two scores on the assessment and using the third highest score as the adjusted maximum score. Adjusted individual scores are then computed by dividing the individual raw score by the adjusted maximum score and multiplying the product by 100. For example:

A	*B*	*C*
Student	Raw Score	Adjusted Score
1	38	82.6
2	50	108.7
3	***46***	***100.0***
4	48	104.3
5	**45**	**97.8**
5	32	69.6
6	15	32.6
7	43	93.5
8	36	78.3

9	29	63.0
10	40	87.0

The highest two scores were 50 and 48, respectively. The third highest score was ***46***. The adjusted score (column *C*) were computed by dividing the values in column *B* by 46 and multiplying the product by 100. Using standard rounding techniques student no. **5** obtained a raw score of **45** and an adjusted score of **97.5**.

II. Final Weighted Grades

Since each assessment may have different point values to adjust the weighting of that particular assessment to the final grade, a weighting factor is assigned each assessment and adjusted accordingly.

Possible Weighted Score

1. Multiply each possible point by the weighted factor (as a decimal).
2. Sum the possible weighted points which results in the Possible Weighted Score.

Earned Weighted Score

1. Multiply each earned point by the weighted factor (as a decimal).
2. Sum the earned weighted point to obtain the Earned Weighted Score.

Weighted Percentage

1. Divide the Earned Weighted Score by the Possible Weighted score.
2. Multiply the product by 100 to obtain the Weighted Percentage.
3. Compare Weighted Percentage with the course grade rule.

For example:

A	*B*	*C*	*D*	*E*	*F*	*G*
Assignment	Percent Weight	Decimal Weight	Possible pts	Weighted Possible pts	Earned pts	Weighted Earned pts
				*C*D*		*C*F*
1	8%	0.008	35	0.28	33	0.264
2	20%	0.02	120	2.4	105	2.1
3	10%	0.01	95	0.95	90	0.9
4	12%	0.012	10	0.12	9	0.108
5	50%	0.05	150	7.5	97	4.85
Sum	100%	0.1	410	**11.25**	334	**8.22**

The Weighted Percentage then equals (for this example): [8.22/11.25]*100 = 73.08.
Using standard rounding techniques, this would have a Final Weighted Earned Score for the course of **73**. Using the table below, this would give the student a **C-** in the course.

A	96-100 %	C+	78-80 %
A-	92-95 %	C	75-77 %
B+	88-91 %	**C-**	**70-74 %**
B	84-87 %	D	65-69 %
B-	81-83 %	E	64% & below

Examinations

Examinations will be essays or short answers. Additional points on each question may be awarded for exceptional answers without penalizing other students. Students are encouraged to meet with the instructor following examinations to discuss each question/answer. However, this must be within two weeks of the examination being returned to the student. Examinations are given as scheduled. A sample question is included in the course syllabus.

Attendance

Students are expected to attend each class session according to the course syllabus. No, it is not all right to miss class. I do not give examinations other than the posted times. Please make your lifestyle arrangements according to the University calendar. The instructor reserves the right to dis-enroll or fail students that do not attend class or fail to submit assignments in a timely manner. Please review the first two paragraphs under the heading "General Academic Requirements."

Extra Credit

In some instances extra credit may be given, at the discretion of the instructor, for participating in projects, attending seminars or other professional experiences. Extra credit is not given for purposes of grade deficiencies.

Course Participation

The student is expected to be prepared. This includes having read the material prior to class. Students that are not prepared may be penalized 2% of the final course grade for each occurrence. Absence from class, except for medical purposes, is considered unprepared. Excessive absences may result in the instructor dis-enrolling the student from the course.

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COURSE SCHEDULE AND OUTLINE

All assignments are due at the beginning of class on the date due

COMD 438

Class		Day	Date	Topic	Assignments
1*	TA	W	9/6/06	a. Introduction to class b. Introduction to Audiology b. Writing a Term Paper I	
2*	TA	F	9/8/06	Pure Tone Audiometry I: a. The Audiometer b. The Audiogram c. Patient Preparation	a. Chapter 4 (pp. 119-124, 131-137) **b. Quiz 1: Blackboard (Chapter 1&2 and pre-requisites)**
3*	TA	M	9/11/06	Pure Tone Audiometry II: a. Ascending-Descending Method b. Introduction to the Virtual Audiometer c. Air conduction testing (AC) -Transducers -Collapsible canal -Methods	a. Chapter 5 (pp. 139-164, 169-171) **a. Topic due**
4*	TA	W	9/13/06	Pure Tone Audiometry III: a. Theory of Bone Conduction (BC) b. Bone Conduction Testing (BC) -Transducer -Placement -Method -Relationship of AC to BC -Problems in BC testing (shadow curve	a. Chapter 5 (pp. 139-164, 169-171) a. Topic returned to student
5*	TA	F	9/15/06	a. Case study with Virtual Audiometer	a. Copyright Assignment http://www.lib.byu.edu/departs/copyright/tutorial/intro/page1.htm
6	DM	M	9/18/06	a. Pure Tone Audiometry (review)	**a. Quiz 2: Blackboard (Classes 2-6)**
7	DM	W	9/20/06	a. Tuning Fork Tests & Types of Hearing Loss	a. Chapter 5 (pp. 165-169) tuning forks b. Chapter 5 (pp. 156-163) hearing loss
8	DM	F	9/22/06	a. Otoscopy & Types of Hearing Loss	a. Ch. 2 (pp. 42-44), Ch. 6 (p. 190), Ch. 13 (pp. 409-410)
				a. Otoscopy lab (Lab 5)scheduled with TAs	
9*	TA	M	9/25/06	Masking I: a. Theory of Masking	a. Chapter 9 (pp. 291-314)
10	DM	W	9/27/06	Masking II: a. Plateau Method of Masking	a. Chapter 9 (pp. 291-314)
11	DM	F	9/29/06	Masking III: a. Case study with Virtual Audiometer	**a. Quiz 3: Blackboard (classes 7-11)**
				a. Masking help sessions taught by Dr. McPherson	
				a. Pure-tone AC/BC LIVE (Lab 9) scheduled with TAs	
12	DM	M	10/2/06	Masking IV: a. Case study with Virtual Audiometer	**a. Outline and annotated bibliography due**
13	DM	W	10/4/06	a. Pure-Tone Evaluation of the Patient I & II	
14	Exam	F	10/6/06	**Exam in class**	**Exam I (classes 1-14)** (Special Olympics)

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COMD 438

Class		Day	Date	Topic	Assignments
15	DM	M	10/9/06	Speech Audiometry I: a. Theory and Materials -Types of material -Methods of presentation -Types of tests (SRT,SDT,WDS,MCL,LDL,CAPD)	a. Chapter 8
16	DM	W	10/11/06	Speech Audiometry II: a. ASHA 5 dB Method b. ASHA 2 dB Method c. Virtual Audiometer d. Recruitment	a. Chapter 8 b. Chapter 6 (p.176) c. Exam I returned to student d. Outline returned to student
17	DM	F	10/13/06	Speech Audiometry III: a. Word Discrimination Testing b. MCL c. LDL	a. Chapter 8
18	DM	M	10/16/06	Speech Audiometry IV: a. Masking for speech audiometry b. Patient evaluation c. Relationship between pure tone testing and speech audiometry	a. Chapter 8 b. Chapter 9 (p.314-316)
19	DM	W	10/18/06	Speech Audiometry V: a. Patient evaluation	a. Chapter 8
20	DM	F	10/20/06	Speech Audiometry VI: a. Patient evaluation	**a. Peer review due.** **b. Reference list due.** **c. Quiz 4: Blackboard (classes 15-20)**
				a. APA help sessions available b. Tympanometry and OAE labs (Labs 13, 14) Scheduled with TAs	
21	DM	M	10/23/06	Immittance Audiometry I: a. Theory of Acoustic Immittance b. Static Immittance c. Tympanometry	a. Chapter 7
22	DM	W	10/25/06	Immittance Audiometry II: a. Tympanometry	a. Chapter 1 (pp. 24-29), 7 (pp. 223-232) b. Reference list returned to student
23	DM	F	10/27/06	Immittance Audiometry III: a. Tympanometry cont'd b. Acoustic Reflex	a. Chapter 7 (pp. 223-232, 237-249)
24	DM	M	10/30/06	Immittance Audiometry IV: a. Case study	
25	DM	W	11/1/06	Otoacoustic Emissions I: a. Theory b. Usage	a. Chapter 11 (pp. 362-369)
26	DM	F	11/3/06	Otoacoustic Emissions II: a. Clinical Evaluation -Screening -Site of Lesion -Descending Pathway	a. Chapters 11 (pp. 362-369), 13 (pp. 397-400, 413-418) **a. 2nd Draft due.** **b. Quiz 5: Blackboard (classes 21-26)**
27	DM	M	11/06/06	Otoacoustic Emissions III: a. Case study	a. Chapter 11

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COMD 438

Class		Day	Date	Topic	Assignments
28	DM	W	11/8/06	**Exam in class**	**Exam II**
29	DM	F	11/10/06	Auditory Evoked Potentials I: a. Theory b. Types	a. Chapter 11 (pp. 349-354, 354-362) b. 2nd draft returned to student
30	DM	M	11/13/06	Auditory Evoked Potentials II: a. BAEP	a. Chapter 11 (pp. 349-354)
31	DM	W	11/15/06	Auditory Evoked Potentials III: a. Middle latency b. Long Latency c. Cognitive & Linguistic	a. Chapter 11 (pp. 354-362) a. Exam II returned to student
32	DM	F	11/17/06	AEP Demonstration	(Note, ASHA Conference)
33	DM	M	11/20/06	Vestibular Assessment	a. Chapter 11 (pp.369-373)
34	DM	T	11/21/06	Aural Rehabilitation I a. Hearing Aids b. ALDs	a. Chapter 15 (pp. 443-469) **a. Writing Center report due**
35	DM	M	11/27/06	Aural Rehabilitation II: a. Cochlear Implants	a. Chapter 15 (pp. 476-481)
36	DM	W	11/29/06	Aural Rehabilitation III: a. Adult Intervention	a. Chapter 15 (pp. 481-494)
37	DM	F	12/1/06	Aural Rehabilitation IV: a. Adult Intervention, cont'd	**a. Final term paper due** **b. Quiz 6: Blackboard (classes 29-37)**
38	DM	M	12/04/06	Disorders of the Auditory System	a. Chapter 6
39	DM	W	12/06/06	Noise Induced Hearing Loss	a. Chapter 16 (pp. 501-538)
40	DM	F	12/08/06	Behavioral Tests	a. Chapter 10
41	DM	M	12/11/06	Final Exam Review	
42	DM	W	12/13/06	Final Exam Review	**NO ASSIGNMENTS ACCEPTED AFTER THIS DATE**
		Sat	12/16/06	**FINAL EXAM (comprehensive)**	**7:00 am – 10:00 am 177 TRLB**

*Dr. McPherson away from BYU

Grading Standard

Each assignment will be weighted according to the following percentages:

	Assignment	Note	%	
Term Paper				
1	Topic Approval	Topic, Paragraph of why the topic was chosen, Three reading references used to select topic.	1%	
2	Outline	Outline to 3 levels and a minimum of 6 annotated bibliographic references.	1%	
3	Reference list	A list, in APA format, of references to be used in the paper (not annotated).	1%	
4	1st Draft review	The peer review sheet for the 1st draft.	2%	
5	2nd draft	The purpose of this is for me to review and comment on your paper before grading it. The more complete the paper is, the better I can make constructive comments.	3%	
6	Writing Center	Report from Writing Center	2%	
7	Final Term Paper	It is expected that this represents your best work.	20%	30%
Examinations				
1	Exam 1	Class numbers 1-14	8%	
2	Exam 2	Class numbers 15-28	8%	
4	Final Exam	Comprehensive	20%	36%
Quizzes				
1	Quiz 1	Blackboard: Chapter 3 & Pre-requisites	2%	
2	Quiz 2	Blackboard: Class numbers 2-6	2%	
3	Quiz 3	Blackboard: Class numbers 7-11	2%	
4	Quiz 4	Blackboard: Class numbers 15-20	2%	
5	Quiz 5	Blackboard: Class numbers 21-26	2%	
6	Quiz 6	Blackboard: Class numbers 29-40	2%	12%
Laboratory				
1	Lab 1	Pure-tone AC on VA	1%	
2	Lab 2	Pure-tone AC on VA	1%	
3	Lab 3	Pure-tone AC and BC on VA	1%	
4	Lab 4	Pure-tone AC and BC on VA	2%	
5	Lab 4	Otoscopy performed on 4 ears LIVE	2%	
6	Lab 6	Pure-tone AC masking only on VA (ed)	1%	
7	Lab 7	Pure-tone AC & BC masking only on VA (ed)	1%	
8	Lab 8	Pure-tone AC & BC with masking on VA	2%	
9	Lab 9	Pure-tone AC & BC with masking on 2 ears LIVE	2%	
10	Lab 10	Speech Audiometry AC only on VA (ed)	1%	
11	Lab 11	Speech Audiometry with masking as needed on VA (ed)	2%	
12	Lab 12	All testing on VA	3%	
13	Lab 13	Tympanometry LIVE on 4 ears	1%	20%
Copyright Assignment				
1	Online Copyright Tutorial (Blackboard)		2%	2%
				100%

Laboratory Assignments

The laboratory assignments will be practical experiences in audiometric assessment. Most laboratory assignments require the use of the Virtual Audiometer, a simulation program for teaching audiometric testing procedures to beginning students. A few of the laboratory assignments require the scheduling of lab times in which the TAs will be available to assist you in using the equipment. Each laboratory assignment will be announced in class and due a week from the announced date. However, if you wait until the last day to complete the assignments scheduling problems will occur and you might not be able to complete the assignments by the due date. This is not generally accepted as a justification for submitting the assignment late.

Copyright Assignment

The Online Copyright Tutorial is located on the Blackboard page or at this link: http://www.lib.byu.edu/departs/copyright/tutorial/intro/page1.htm. Students must participate in the mini-course, including the game and feedback survey. You will receive a certificate of completion at the end of the tutorial. Be sure to follow the instructions to send a copy of the certificate to your professor, which you will need to do to receive credit for the assignment.

WRITING ASSIGNMENTS

The Function of Writing in Audiology and Speech-Language Pathology

The discipline of Audiology and Speech-Language Pathology includes both an academic area and a clinical area. Writing within both of these areas has two main objectives: first, to provide information that will advance the basic science knowledge within the profession; and second to communicate clinical findings regarding the practice of Audiology and Speech-Language Pathology. Both types of writing require a knowledge base of the topic, professional and scientific writing skills, clarity of thought, and the ability to integrate information.

Writing in Audiology and Speech-Language Pathology is primarily directed to professionals. For the academic area, it is in the form and style dictated by the scientific journals within the area of Audiology and Speech-Language Pathology. For the clinical area, it is in the form dictated by the health care profession, educators, and school administrators. Consequently, writing in Audiology and Speech-Language Pathology is a life long skill that will reflect the professional knowledge and competency of the individual.

ESSAYS

Writing to Learn

There may be essays assigned throughout the term. The purpose of these essays is to let you explain concepts obtained from your reading or laboratory experiences. Some of these concepts will not be covered in lecture.

- Each essay will be graded on a 3 point scale. A total of 3 points may be earned for each essay which include one point each for: a) completing the assignment on-time; b) grammar, syntax, and style; and c) clarity of content (i.e., . the ability to explain the concept in a clear and accurate manner using terminology consistent with the course content).

- The assignment is to be transferred to the instructor via email (unless encompassed as part of another assignment) and will be read, graded, and returned to you by email at the sending address. Do not request a different return e-mail address (it won't happen).
- The essays are to be of moderate length, not more than 100-120 lines of text using 12 point Times or Times Roman, and single spaced.
- It is recommended that you use another student in the class to review your work before submitting it.
- Class notes and the course text may be used.
- The email response must be received before 9:00am of the date it is due. Late essays will receive a two point penalty if not received within the next 24 hours.

Format: No specific format is required except for the following that is to be placed at the end of the essay:
Grading: ___/1 Completion ___/1 Style ___/1 Clarity ___/3 Total

Sample Essay

Essay 1: Cochlear Transduction
John Erickson

Transduction in the cochlea refers to the shifting of mechanical energy entering the cochlea via the oval window from the middle ear into electrical energy which results in the depolarization of the inner hair cell. Although we think of the cochlea primarily as an electrical activity, it is also mechanical in nature due to the electromotility of the outer hair cells and movement of the basilar membrane……

Grading: ___/1 Completion ___/1 Style ___/1 Clarity ___/3 Total

TERM PAPER

Each student will be required to submit a 20 to 25 page term paper. It will be typed according to the American Psychological Association's (APA) style manual. This manual is available at the bookstore, the library, and at www.apa.org. Also, the class presentation on the term paper may be found on BlackBoard at http://ry.byu.edu and login using your Route Y username and password. Then select BlackBoard in the lower section. The presentation includes more detailed examples and the student is advised to carefully review the presentation for style and format. You are held accountable for both format and style.

General Guidelines
The following guidelines outline the steps in completing the term paper. The process is designed to assist in developing skills in writing research papers and critical thinking. Although this is an extensive project, the result should be of benefit beyond the borders of this particular course. If you should have questions please contact the instructor.

Topic Approval

A topic should be selected that is directly related to audition. The topic must be approved by the instructor. As part of the approval request the student is to submit a one or two page description and justification of the topic. This assignment will also include an

annotated bibliography using at least two sources. This assignment is to be transmitted via email to david_mcpherson@byu.edu with "ComD 438-Topic" along with student's name in the subject heading.

Outline and Annotated Bibliography

An introduction, outline with at least three levels of headings, and an annotated bibliography with at least six sources will be submitted to the instructor. This assignment is to be transmitted via email to david_mcpherson@byu.edu with "ComD 438-Outline" along with student's name in the subject heading.

Reference List

The Reference List contains those sources that you have decided to use in your term paper. They differ from the Bibliography in that the bibliography may have included sources that you eventually decided not to use. It is not unusual to have a bibliography two to three times the size of thee actual reference list. The reference list does not include annotations. This assignment is to be transmitted via email to david_mcpherson@byu.edu with "ComD 438-Reference" along with student's name in the subject heading.

First Draft

A first draft will be completed and submitted for peer review. Groups of three to four students will exchange papers, make comments on the paper, and grade the paper. The groups will then meet, discuss the papers and return the "Peer Review Sheet" to the instructor. The students will be graded on the peer review process.

Second Draft

A second printed draft will be submitted in paper form to the instructor in class on the due date. The instructor will make comments on the paper and grade the paper as if it were a final product; however, the grade will not be recorded. The instructor will then return the paper to the student thus allowing for final revisions based on the instructor's comments.

Final Paper

The final paper will be submitted in paper form according to the technical requirements of the project.

Students must make use of the Writing Center. Refer to the Class Schedule for the last day a consultation with the Writing Center may be made. However, the student may use the Writing Center at any stage of the writing process and is encouraged to do so.

Technical Requirements

- Margins will be 1.5" on the bound edge (left side), and 1.0" on the top, bottom, and non-bound edge (right side).
- The paper will be typed using a 12 point Times or Times Roman font. The print must be clear, sharp, and of good contrast.
- Figures should be scanned, not taped, and placed at the end of the paragraph where it is referenced in the text, but before the following paragraph. Do not wrap text.
- Tables follow the same convention as figures. Tables should be prepared using the word processor's table function, and not with tabs etc. Be sure to check the APA manual for

style. The exception to the APA manual requirement is that tables may be single spaced instead of double spaced.

- Term papers done in other classes may not be used to complete this assignment.
- References must primarily be from scholarly journals with a few specific references from books. Internet, encyclopedias, lay publications, and the National Inquirer may not be used.
- The grading sheet at the end of this syllabus must be the first page of your term paper. A ten point penalty will be assessed if this is not included.
- Term papers are NOT to have hard covers and must be securely fastened with staples or other permanent fasteners. Do not use "sliding" fasteners.

Failure to follow these technical requirements will result in points being deducted from the term paper.

Peer Review Process

1. The first draft must be distributed to each member in the group at least three class periods prior to the group discussion.
2. Each student is to read the paper, make comments on the draft, and complete the Peer Review Sheet.
3. Twenty minutes per paper should be allowed for discussion.
4. Following the group discussion the drafts will be returned to the student and the Peer Review Sheets stapled together and returned to the instructor.

Suggested Topics

The topic for term papers must be approved by the instructor. The following are suggested topics, but are not all inclusive.

1. Age related hearing loss on the effects of speech production.
2. Behavioral development of the auditory system.
3. Disease factors causing hearing loss.
4. Effects of aging on hearing.
5. Effects of hearing loss on language development.
6. Genetic hearing loss.
7. Hearing loss in infancy.
8. Localization and hearing.
9. Neurological insults on hearing.
10. Noise induced hearing loss.
11. Ototoxic hearing loss.
12. Speech communication in noise.
13. The effects of the classroom environment on the hearing impaired.

Grading Criteria

The following table shows a summary of the grading criteria that will be used to grade your paper. Both the Peer Review Sheet and the Term Paper Cover Sheet briefly state the criteria for each area of grading.

Grading Criteria	Points
Topic Approval	2
Outline and Bibliography	3
Reference List	3

Grading Criteria	Points
First Draft	5
Second Draft	10
Relevance of Topic	5
Depth of Content	20
Clarity of Writing	15
Quality of Content	20
References	20
APA Style and Technical Requirements	10
Writing Center	5
TOTAL	118

SAMPLE APA STYLE PAPER

A sample term paper is included on the next few pages. This should assist the student in visualizing the format requirements as well as what an "A" paper represents. The sample paper is in the form and style the student submitted it to the instructor. The student received a grade of "A" on the paper.

(title page)----------

Cochlear Implants for Deaf Children

Student Name

Brigham Young University

August 19, 1999

---------- *(separate page)*----------

ABSTRACT

COCHLEAR IMPLANTS IN DEAF CHILDREN

Student Name

Brigham Young University

Cochlear implants have developed to the point where they are now routinely used in children. Eligibility for cochlear implants includes bilateral deafness and an evaluation that shows the child will not benefit from hearing aids. The main advantage of a cochlear implant over traditional hearing aid amplification is in increased ability for the recognition of speech. Rehabilitation has a significant impact on cochlear implant use and…

---------- *(new page)*----------

Introduction

In recent years, technological advances have made it possible for persons with profound hearing impairments to benefit from certain types of amplification. Of these advances, the most notable has been the cochlear implant for the profoundly hearing impaired. Otolaryngologists (ear, nose, and throat doctors) and audiologists have explored the advantages and disadvantages of such devices and agree that the cochlear implants are mostly beneficial. However, some controversies over the effects of the implant have made parents of deaf children wary of the devices. The concerns of parents warrant investigation of the positive and negative effects of cochlear implants.

The Cochlear Implant

A cochlear implant is a device that is worn both externally and internally deep inside the skull. Figure 1 shows a schematic diagram of the Nucleus cochlear implant. The implant works briefly like this: First, sound enters the system through the microphone, which rests behind the individual's ear, much like a hearing aid. The sound is then sent from the microphone through a thin cord to the speech processor. The processor selects sounds most useful for speech/sound recognition. The codes are sent back through the same cord to the transmitter coil, which sends the codes across the skin to the internal processor via the internal coil. The internal processor converts the codes into electrical signals and sends them along the electrical array implanted in the cochlea. For the Nucleus cochlear implant, twenty-two electrodes are arranged along a narrow piece of flexible tubing. Each electrode is connected, by a wire, to the internal processor. The coded electrical signal is delivered to specific electrodes, each of which is programmed separately and can deliver signals at varying intensities and pitches. The electrodes stimulate different hearing nerve fibers, which send the messages to the brain for interpretation (Cochlear,

1990). Most cochlear implants work in similar fashion, but the Nucleus cochlear implant uses the most complex technology to date (Horn, Nozza, & Dolitsky, 1991) and will be the main focus in this research.

Eligibility for Cochlear Implants

Because cochlear implants are so successful, several professionals believe that the only criterion for receiving one is possession of profound deafness. However, this is not true (Tyler, 1993). Cochlear implants are only available to a select few individuals who have the necessary background and traits required for the procedure. The first thing to consider when choosing a candidate is the degree of hearing loss the individual suffers from.

Degree of Hearing Loss. "The child must exhibit a severe to profound hearing loss. In addition, the child must not benefit significantly from hearing aids or other conventional amplification devices" (Horn, Nozza, & Dolitsky, 1991, p. 83). The degree of hearing loss is measured in decibels (dB) on various frequencies. To be severely hearing impaired, at least an average hearing loss of +70 dB would be exhibited. Profound deafness begins at the average of +90 dB. Normal hearing is anywhere between -10 and +25 dB (Bess & Humes, 1990). Some severely deafened children and adults can still hear with conventional hearing aids. Those people would not be considered for implantation since the hearing gained from the implant may be less than what they already hear from a hearing aid.

Physical Structures. The second consideration for the success of the cochlear implant depends upon the existing physical structures within the potential recipient's ear. There are numerous causes of deafness that can usually be broken down into…….

---------- *(new page)*----------

References

Bess, F. H., & Humes, L. E. (1990). *Audiology: The Fundamentals*. Baltimore, Maryland: Williams & Wilkins.

Booth, C. L., Read, T. E., Archbold, S., Dyar, D., Morgan, C., & Gray, R. F. (1989). Case study of a post-lingually deafened child with a UCH/RNID single channel cochlear implant. *The Journal of Laryngology and Otology*, *18*, 50-54.

Boothroyd, A. (1984). Auditory perception of speech contrasts by subjects with sensorineural hearing loss. *Journal of Speech and Hearing Research, 27,* 134-144.

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Cohen, N.L., Hoffman, R.A., & Stroschein, M. (1988). Medical or surgical complications related to the Nucleus multichannel cochlear implant. *Annals of Otology, Rhinology, Laryngology*, *97*, 8-13.

Cohen, N. L., Waltzman, S. B., Fisher, S. G., & Tyler, R. (1993). A prospective randomized study of cochlear implants. *New England Journal of Medicine*, *328*(4), 233-237.

Cooper, H.R., Carpenter, L., Aleksy, W., Booth, C.L., Read, T.E., Graham, J.M., & Fraser, J.G. (1989). UCH/RNID single channel extracochlear implant: results in thirty profoundly deafened adults. *The Journal of Laryngology and Otology*, *18*, 22-38.

Dawson, P., Blamey, P. J., Rowland, L. C., Dettman, S. J., Clarke, G. M., Busby, P. A., Brown, A. M., Dowell, R. C., & Rickard, F. W. (1992). Cochlear implants in children, adolescents, and prelinguistically deafened adults: Speech perception. *Journal of Speech and Hearing Research*, *35*, 401-417.

----------**(*end of paper example)*** ----------

SAMPLE EXAM QUESTION

Blue books, using double spacing, may be required for some or all examinations and quizzes <u>except</u> for 'take home' examinations which are to be typewritten, double spaced.

Exam question: Describe and characterize the measures used in the auditory brainstem evoked potential recording and their relationship to stimulus intensity.

Response: The auditory brainstem evoked potential may be described as a biphasic waveform with quantitative properties of amplitude and latency. In addition a qualitative feature may be described in terms of its morphology.

Amplitude may either be described in voltage, usually microvolts, from the baseline to corresponding peak, or from positive peak to corresponding negative peak. As stimulus intensity increases, the amplitude of the response increases. The converse is also true. The first amplitude changes from baseline, in ideal recording conditions, may be seen as early as 10 dB above behavioral threshold for the stimulus; especially sharply rising (i.e., clicks) stimuli.

Latency is defined as the time, in milliseconds, from the onset of the stimulus to a peak. For consistency, wave V, which may be broad, is defined as the breaking point, or departure point, from the linear descending slope. Latency decreases as stimulus intensity increases. The converse is also true.

It should be noted that there is a point where both amplitude and latency asymptote.

In formulating this question one point is awarded for each correct identification and discussion of the pertinent areas:

1. Description of amplitude
2. Description of latency
3. Description of morphology
4. Use of microvolts
5. Use of milliseconds
6. Relationship of amplitude to intensity
7. Relationship of latency to intensity
8. Statement of how amplitude is measured
9. Statement of how latency is measured
10. Relationship of amplitude and latency to morphological features

It should be noted that areas 1, 2, 4, 5, 6, 7 and 8 were covered providing 7 points for this answer. However additional discussions in some areas were significant enough that extra points were awarded:

1. Acknowledging that the response is biphasic.
2. Amplitude may be measured using one of two references.
3. Amplitude of a wave may first appear at about 10 dB SL.

Consequently, an additional three points are awarded for this question providing a total of 10 points. Such additional points are solely at the discretion of the instructor. Since a grading curve is not used, other students are not penalized.

SAMPLE CASE HISTORY AND REPORT

AUDIOLOGIC EVALUATION

(*Student name)*
(Course)
(Date)

Patient Name: Clyde Gates
Date of Birth: 15 June 1956
Sex: Male
Age: 35 years

Date of Evaluation: December 7, 1991

Complaint

The patient reported that he was unable to hear people in noisy situations. Also he stated that his wife complained because the television was too loud. The patient complained of ringing in his ears, aperiodic. The ringing did not keep him awake, but was annoying. He also noted that although he can "hear" people, he has difficulty understanding what they are saying.

History

No significant medical history was noted and the patient states he is in general good health. The patient is employed as a pipe fitter and works in a situation that he described as "high noise levels." The patient enjoys SCUBA diving and reports frequent acute ear infections. He also reported having difficulty clearing his ears on moderate to deep dives. The patient reported he did not experience any dizziness or gait problems. No other significant history was noted.

Clinical Observation

Speech and language appear normal for age and social conditions. The patient understood all of my questions when facing him, but on a couple of occasions had difficulty understanding when my face was not readily visible suggesting he relies on speech reading to some extent.

Evaluation

[A description of the tests or evaluations used would be placed in narrative with a summary description of the results. For example]:

Otoscopic Examination: The ear canals were clear and the tympanic membranes appeared normal, bilaterally.

Tympanometry: Jerger type B tympanograms showing reduced compliance was noted, bilaterally. The acoustic reflex at 500, 1000, 2000, and 4000 Hz was absent, bilaterally.

Pure tone Testing: Pure tone air- and bone-conduction thresholds show a 50 dB HL hearing loss in the low and middle frequencies. A sloping mid-to-high frequency hearing loss

ranging from 50 dB HL at 3000 Hz to 80 dB HL at 8000 Hz was observed. There was a 25 to 30 dB air-bone gap in the low-to-mid frequencies which was not observed in the higher frequencies. This would suggest the patient has both bilateral conductive and sensorineural hearing losses. Most likely there is a mild sensorineural hearing loss in the low frequencies, about 30 dB HL, sloping to a severe high frequency sensorineural hearing loss in the high frequencies, 70-80 dB HL.

Speech Testing: Speech recognition thresholds were 40 dB HL in the left ear and 45 dB HL in the right ear. Speech discrimination, in quiet, showed 66% in the right ear and 48% on the left ear.

Impression

This patient has a moderate-to-severe bilateral mixed (i.e., conductive and sensorineural) hearing loss with aperiodic tinnitus. The most obvious etiology is a combination of noise exposure in the work place and barotraumas from SCUBA diving.

Recommendations

1. Medical referral to an otolaryngologist.
2. Repeat audiological evaluation following any medical intervention.
3. Hearing aid evaluation to determine amplification needs.
4. Annual audiological evaluations since the patient is in high risk activities.

The patient was counseled regarding the findings and recommendations. Also, I spent time with the patient about noise exposure in the work environment and gave the patient a set of disposal earplugs to use along with the recommendations that he routinely use them in noisy environments.

(Signature)
Mark D. Smith, M.A., CCC

Attachments: Audiogram, tympanograms
cc: Chart files

REVIEW QUESTIONS

This list of review questions is under development. The instructor is under no obligation to provide review questions, but does so as a supplement to the course, as time and availability permits.

These questions are not met to be all inclusive, but represent the main themes of the lectures and readings. Many of the quizzes and examinations are based on these review questions.

1. Discuss the study of audiology.
2. What is the contribution of the Pinna to hearing?
3. Discuss the lever action of the middle ear (i.e. ossicles) and how it moves at different sound intensities.
4. Draw and label the major anatomical landmarks of the outer, middle and inner ear.
5. Draw and label the central auditory pathway from the eighth nerve leaving the cochlea through the brainstem to the central auditory cortex.
6. List and BRIEFLY discuss the major disorders of the auditory system.
7. What is an auditory evoked potential and what is its contribution to audiology?
8. What are the non-auditory pathologies (i.e. medical conditions that affect the auditory system)? BRIEFLY discuss (one or two sentences only).
9. Discuss the concept of hearing threshold and how it was derived.
10. Summarizes the concept of masking and include in your discussion special situation of narrowband masking.
11. In detail, discuss what loudness and it relationship to intensity and frequency.
12. Discuss the ability of the ear in frequency and intensity discrimination.
13. What is the advantage in frequency and intensity discrimination and the effect of threshold of hearing in binaural hearing?
14. What are the primary cues for sound localization?
15. BRIEFLY describe masking level difference.
16. What is the purpose of calibrating audiometric test equipment?
17. Explain a listening check. How frequently should this be done?
18. What is an artificial mastoid used for in audiometric calibration?
19. This is a question that requires DETAIL. Describe, in detail, the procedure for completing manual audiometric threshold testing. Discuss the variables that may affect the determination of audiometric threshold.
20. How does one determine the PTA and what does it mean?
21. What is 'automatic' audiometry and is the type commonly used in audiology?
22. What is meant by clinical masking and why is it necessary?
23. Discuss the variable affecting masking?
24. What is meant by the occlusion effect and how does that relate to masking?
25. Explain the concept of effective masking.
26. What type of masking is preferred for pure tone audiometry and why is it preferred?
27. What are the major considerations when determining when to mask?
28. DETAIL the recommended masking procedure for air conduction (this is an extensive answer). For: 1) air conduction; 2) bone conduction and 3) speech audiometry).
29. What is the effect of overmasking? How can one determine if overmasking has occurred?

30. What is the effect of undermasking? How can one determine if undermasking has occurred?
31. What is the advantage in using an insert phone in audiometric testing?
32. What is the contribution of immittance measurements to masking problems? Why might doing this procedure FIRST be of benefit to the clinician?
33. When sound is applied to the skull how is it distributed across the skull?
34. What is meant by interaural attenuation and what are the values for air-conduction and bone-conduction?
35. What is the effect of the placement of the vibrator on various locations on the skull?
36. Define the following: SRT, SAT, SDT and ST.
37. What is the definition of speech reception threshold, how is it determined and what stimulus is used to determine the speech reception threshold?
38. What is a performance-intensity function?
39. Explain, in DETAIL, the ASHA recommended method for determining SRT.
40. What is meant by a spondee word list?
41. What is a PB word and how does it differ from a Spondee word?
42. Discuss the following and how each of these variables may affect speech discrimination scores: 1) Presentation level; 2) signal to noise ratio or competing noise; 3) work familiarity; 4) closed vs. open set response; 5) response mode; 6) half- vs. full- list presentation; 7) the use of a carrier phrase; 8) recorded vs. MLV; and 9) instruction to the subject.
43. What is meant by a central auditory disorder and how does that differ from a peripheral hearing loss?
44. What type of test material is most commonly used in assessing central auditory disorders?
45. Explain the principles of acoustic immittance measurements (i.e. how it works). Be sure to include a schematic in your discussion.
46. Discuss the principles of tympanometry and how it relates to movement of the tympanic membrane.
47. Discuss the principles used in Eustachian tube function.
48. Discuss the principles used in acoustic reflex testing.
49. What is the primary use of tympanometry (i.e. what does it measure)?
50. What is the primary use of static acoustic immittance?
51. Draw a tympanogram that would be typical of a normal middle ear.
52. Draw a tympanogram that would be typical with serous otitis media.
53. Draw a tympanogram that would indicate some type of transient middle ear problem (i.e. the beginning or ending of middle ear effusion).
54. What characteristics of a normal tympanogram differ in adults vs. infants?
55. Draw and discuss the neural pathway of the acoustic reflex.
56. In using the acoustic reflex measure how would one test for recruitment?
57. What is acoustic reflex decay, how is it used and what is normal vs. abnormal (use a schematic drawing)?
58. What is meant by localization?
59. How might the acoustic reflex be used in trying to assess hearing sensitivity in infant and children?
60. What is an auditory perceptual disorder?
61. What characterizes an auditory perceptual disorder?

62. What is meant by binaural fusion?
63. What is meant by a developmental disorder of the auditory system and how or to what extent are other systems involved?
64. What is presbycusis, what effect does it have on the auditory system and how can one recognize it from an informal speech sample?
65. What does OSHA stand for?
66. What is the maximum continuous noise level in dBA that a worker may be exposed to before exceeding federal guidelines and hearing protection required?
67. What are the basic components of an industrial hearing conservation program?
68. What is pseudohypacusis?
69. Compare and contrast pseudohypacusis in adults and children.
70. What is a 'shadow' curve?
71. In comparing the SRT and PTA when would one suspect pseudohypacusis?
72. What is the Lombard test?
73. What happens in a delayed feedback test?
74. What psychoacoustic phenomenon is the Stenger test patterned after?
75. Describe the effects of hearing loss on language development in children.
76. What are the effects of hearing loss on reading and writing?
77. What is the effect of hearing loss on the development of social skills?
78. What is the effect of hearing loss on expressive language?
79. Discuss the different types of basic hearing aid cases available. Include in your discussion the physical differences and how and under what condition each of these would be used.
80. What is peak clipping?
81. What is amplitude compression?
82. Discuss monaural vs. binaural fitting of hearing aids and under what conditions each would be used.
83. Discuss the four general degrees of hearing loss and the type of amplification, the prognosis for amplification use and what might be expected to be gained from the amplification.
84. In hearing aid orientation what are the key factors in successful hearing use?
85. What is the value of hearing aid orientation and how effective is such training?
86. What are the major needs of the geriatric client and what special considerations must be undertaken in hearing aid selection and orientation (i.e. auditory training)?
87. Define the following: SPL, HL, SL, LDL, UCL, MCL, SRT, WDS
88. What is an air-bone gap?
89. How should an earmold be cleaned?
90. What is meant by attenuation?
91. What is auditory closure?
92. When is a baseline audiogram used?
93. What is meant by cochlear reserve?
94. What type of auditory problems might accompany cleft lip?
95. Discuss the differences between SPL and HL and how the two are related and derived.
96. What is an equal loudness contour?
97. What is the measure of loudness?
98. What are the differences between frequency, intensity, pitch and loudness? How is each of these measured?

99. Draw and label the complete auditory system. The detail should emphasize those anatomical sites important to hearing.
100. What does tonotopic organization mean, and how and where is it represented in the auditory system?
101. Describe both morphologically and functionally the difference between the two sets of hair cells.

Student Writer (name): _____

PEER REVIEW SHEET

All Peer Review Sheets for the same student writer are to be paper clipped together and submitted to the instructor as a single package

Area	Expectation	Reviewer Comments
Depth of content	The topic is treated in depth and focused.	
Clarity of writing	Correct terminology and concepts are used that are common to professional writing in audiology. Professional language is used.	
Quality of content	Content is accurate, current, and represents scholarly work. Research is clearly separated from anecdotal types of statements.	
References	Show a good review of the topic in scholarly papers and journals.	
Style	APA style and the technical requirements have been followed.	

I hereby acknowledge that I met with this student writer during a small group discussion of this paper and participated in the review of this paper.

Student Reviewer _____ Initial:_____
(print name)

8/23/06:8:54 AM

Student Name:_____

SECOND DRAFT COVER SHEET

(This must be attached to the front page of your second draft)

Area	Expectation	Reviewer's Comment	Points
Depth of content	The topic is treated in depth and focused.		**/20**
Clarity of writing	Correct terminology and concepts are used that are common to professional writing in audiology. Professional language is used.		**/15**
Quality of content	Content is accurate, current, and represents scholarly work. Research is clearly separated from anecdotal types of statements.		**/20**
References	Show a good review of the topic in scholarly papers and journals.		**/20**
Style	APA style and the technical requirements have been followed.		**/10**

8/23/06:8:54 AM

Student Name:_____

TERM PAPER COVER SHEET

(This must be attached to the front page of your term paper)

Area	Expectation	Instructor's Comment	Points
Relevance of topic	The topic is a current and significant to the field of audition.		**/2**
Depth of content	The topic is treated in depth and focused.		**/20**
Clarity of writing	Correct terminology and concepts are used that are common to professional writing in audiology. Professional language is used.		**/15**
Quality of content	Content is accurate, current, and represents scholarly work. Research is clearly separated from anecdotal types of statements.		**/20**
References	Show a good review of the topic in scholarly papers and journals.		**/20**
Style	APA style and the technical requirements have been followed.		**/10**
		Total Points	**/87**