OTOACOUSTIC EMISSIONS
ASLP 617 (1.0 cedits) - **Fall 2000**
Monday - 10:00am - 11:50am - 125 TLRB
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Course Description: This course is required of all graduate students in Audiology and is part of the advanced diagnostic courses. The knowledge and skills presented in this course are necessary in order to be competitive in the job market and are basic to the practice of audiology and represent the standard of practice in the community. The material presented in this course is required for passing the national examination and certification by the American Speech-Language-Hearing Association (ASHA).

This course presents both basic and applied neurophysiology and electrophysiology of the auditory and related systems. The student will be required to gain a theoretical knowledge of the normal and pathophysiology of the auditory system and how the nervous system responds to acoustic stimuli, including its ontogeny. The student will develop applied skills in the use of biophysical measurements for hearing assessment and otoacoustic emission assessment across all age ranges.

Prerequisites: The following courses are required prerequisites: An undergraduate degree in Audiology or consent of the instructor. Students that have not completed these prerequisites are required to discontinue this course until such time the prerequisite courses have been completed.

Honor Code: The student is expected to be familiar with the Honor Code. The Honor Code is enforced in this class and student's 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.

Course Objectives

A. To develop a theoretical and practical knowledge of the neurophysiology of the auditory system, and its response to acoustic stimuli.

B. To become proficient in the administration of electrophysiological measures of hearing.

C. To understand the normal and pathophysiology of the auditory system and its relation to auditory function and medical management.

D. To understand the importance of continued reading of professional journals and develop critical thinking in the area of auditory electrophysiology.

Textbooks

Robinette, M.S. and Glattke, T.J. (1997) Otoacoustic Emissions: Clinical Applications. New York: Thieme. (ISBN 0-86577-579-6)

Supplies

1. Each student will be required to purchase a HIGH DENSITY 3.5" floppy disk. These are available at the BYU bookstore and should be available by the first laboratory demonstration.

COURSE REQUIREMENTS

Examinations: There will be two major examinations. Additional points on each question may be awarded for exceptional answers without penalizing other students. Students are encouraged to meet with the instructor following the midterm examination to discuss each question/answer.

Laboratory Demonstrations: The student will be required to keep notes during the laboratory demonstrations (see attached sample) and turn these into the instructor at the beginning of the next class period. This will account for 10% of the final grade.

Laboratory Assignments: Laboratory assignments will be made throughout the course and will account for 20% of the final grade.

Special Seminars and Lectures: As these opportunities students will be required to attend and submit an abstract of the activity. This will account for 10% of your final grade.

Grading Standard: Each of the above areas will be weighted for a total of 100 points. Assignments are due at the end of the class period. A late penalty of 50% of the earned points will be assessed for any assignments received after 4:00 p.m. of the due date, unless otherwise specified. The distribution is accordingly:

Final examination	30%
Midterm examination	30%
Laboratory assignments	20%
Demonstrations	10%
Special Seminars and Lectures	10%
TOTAL	100 %

Grade Point Distribution

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

COURSE SCHEDULE AND OUTLINE

Auditory Evoked Potentials – ASLP 617

Class Number	Date of Class	Lecture topic	Assignments[1]	Comments
1	**28 Aug**	Instrumentation		Chpts 14,14.
2	**11 Sep**	Neurophysiology and SOAEs	1. Lab 1: Three recordings of SOAEs.	Chapts 1,2,3.
3	**18 Sep**	TOAEs	1. Lab 1 due. 2. Lab 2: Three recordings of TOAEs 3. Take home midterm exam distributed.	Chpts 4,7,8.
4	**25 Sep**	DPOAEs	1. Lab 2 due. 2. Lab 3: Three recordings of DPOAEs. 3. Midterm due.	Chpts 5,11.
5	**2 Oct**	Contralateral Suppression	1. Lab 3 due. 2. Lab 4: Three recordings using TOAE and DPOA and contralateral suppression. 3. Take home final exam distributed.	Chpts 6,10.
6	**9 Oct**	**Impedance Course Begins**	1. Lab 4 due 2. Final exam due.	
7	**16 Oct**			
8	**23 Oct**			
9	**20 Nov**			
10	**27 Nov**			
11	**4 Dec**			

[1]Reading assignments are to be completed <u>prior</u> to the beginning of the class period.

SAMPLE LABORATORY DEMONSTRATION
DEMONSTRATION #1

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

Laboratory Assignment: Auditory brainstem evoked potentials

Auditory brainstem evoked potentials were recorded in a 23 year old female with normal hearing. A Cadwell Quantum 84 evoked potential machine was used to collect the data. Electrodes were placed across the scalp: Cz-M1, Cz-M2, M1-M2 and Cz to Cvii. A ground electrode was placed at Fpz. Acoustic clicks were presented at 11.1/sec and the intensity varied from 80 dBnHL to 0 dBnHL in 10 dB steps. The patient was placed in the supine position. The recordings....

Note: The student must also answer the questions accompanying each demonstration.

SAMPLE ESSAY EXAM QUESTION

Blue books, using double spacing, are to be used in all examinations <u>except</u> for 'take home' examinations that are to be typewritten, double spaced.

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

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 increase, 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.