

PEDIATRIC AUDIOLOGY

ASLP 434

EVALUATION OF THE PEDIATRIC PATIENT

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PEDIATRIC AUDIOLOGY
Educational Psychology 434
Winter 1998

Monday & Wednesday
11:00 a.m. - 11:50 a.m.
125 TLRB

David L. McPherson, Ph.D.¹
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375-9166 (home)

Course Description: This course is a two credit course required for undergraduate students majoring in Audiology and is recommended for students majoring in 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 in infants and children including pure tone air- and bone conduction threshold testing, speech audiometry, fundamentals of middle ear tympanometry, and school and industrial hearing screening. Developmental anatomy and physiology of the normal and pathological auditory system in infants and children are introduced.

Course Objectives

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

Textbooks

1. Martin, F. and Clark, J. Hearing Care for Children. Boston: Allyn and Bacon, 1996. [Required text. It is highly recommended that this text be purchased and kept for future reference]
2. Northern, J. and Downs, M. Hearing in Children (Fourth edition). Baltimore: Williams & Wilkins, 1991. [Secondary text, not required but recommended.]
3. Katz, J. (ed). Handbook of Clinical Audiology (Third edition). Baltimore: William & Wilkins, 1985. [Secondary text, not required but recommended.]

Special Needs

Students that are registered with the Services for Students with Disabilities or the Counseling and Development Center may receive special considerations in the timing and execution of assigned class work or examinations, but may not receive special consideration in completing class assignments or grading. That is, competency will be expected at the level this course is taught, but special considerations may be given as to the implementation and timing of the coursework. Any considerations must be discussed with the professor by the end of the fourth class period.

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. The instructor reserves the right to fully review all contested material and adjust scores accordingly.

Honor Code

The Honor Code is part of the course requirements and is also a matter of personal commitment 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, 1996-97]

¹Office hours by appointment only.

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.

COURSE REQUIREMENTS²

Examinations: There will be two examinations weighted to 55% of your total grade. The midterm examination will contribute to 25% of your final grade and the final will contribute to 30% of your final grade. They will be essay type. 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. Examinations are given ONLY on the scheduled day and times. Make-up examinations are not given. The student has four class periods to contest scores or grades from the date the examination is first returned to the class. The instructor reserves the right to fully review all contested material and adjust scores accordingly.

Quizzes: There will be five quizzes throughout the term. Each quiz will count for 4% of your grade. Quizzes are given ONLY on the scheduled day and times. Make-up quizzes are not given. The instructor reserves the right to fully review all contested material and adjust scores accordingly. The student has four class periods to contest scores or grades from the date the quiz is first returned to the class. The instructor reserves the right to fully review all contested material and adjust scores accordingly.

Laboratory Assignments: There will be five laboratory assignments each weighted to 1% of your grade. These will be practical experiences in audiometric assessment and will be assigned by the instructor. Each laboratory assignment is to be completed on a different subject. The student is responsible for obtaining their own subjects and scheduling equipment. A cover sheet is included in the back of the syllabus for each laboratory assignment. Laboratory assignments are to be stapled. Do not submit in folders etc.

Lab Assignment no.	Topic	Due
1	Hearing screening on <u>two</u> youths (6-8 year old). Pure tones only using ASHA criteria for screening.	Class # 15
2	Puretone air conduction thresholds on <u>two</u> (3-4 year old). Subjects may NOT be shared by other class members.	Class # 18
3	Immittance audiometry (tympanometry, acoustic reflex) and pure tone thresholds (air conduction and bone conduction) on <u>two</u> 4-6 year olds. Subjects may NOT be shared by other class members.	Class # 21
4	Audiological evaluation (pure tone, speech, immittance, case history) on <u>one</u> 4 to 5 year old. Besides a formal report a separate write-up on the techniques used and results must be included.	Class # 24
5	Evaluation on <u>one</u> 3-9 months of age infant. Besides a formal report a separate write-up on the techniques used and results must be included. Immittance audiometry is to be completed.	On the day of the Final Examination

²All 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.

Term Paper: Each student will be required to submit a fifteen to twenty page term paper which will be weighted to 10% of the final grade. It will be typed according to the American Psychological Association's style manual (available at the bookstore/library). Include references and double space. The topic must be submitted in writing and approved by the instructor. A 3 pt. penalty is assessed for not meeting the deadline (see Class Schedule). Each student is responsible to meet with the instructor to review progress on the term paper. A regularly scheduled appointment may be made by the student prior to the end of the first week of class. Each student will make a 20 minute presentation of their term paper which will contribute to 5% of your total grade. The presentation is to be well organized using appropriate media.

Topics for term papers: The topic for term papers must be approved by the instructor.³ A form is attached to the back of the syllabus that is to be used and included with the term paper. The following are some suggestions for appropriate topics. Demonstration projects are also acceptable alternatives to a term paper. Students may collaborate, with the instructor's prior approval. Term papers from other courses, either in the past or courses currently enrolled, will not be acceptable. It must be an original term paper. The exception to this requirement is waived for concurrent writing projects within the English department, with prior instructor approval.

1. Auditory brainstem evoked potentials in infants and young children.
2. Auditory event related potentials (not brainstem) infants and young children.
3. Development of auditory behavior and psychoacoustic responses in infants and young children.
4. Psycho-social aspects of hearing loss in infants and children including demographics.
5. Amplification of the hearing impaired infant (including tactile aids).
6. Central auditory disorders in infants and young children.
7. Aural rehabilitation in Pediatrics (0-12 years of age).
8. Speech processing in children.
9. Educational and legislative programs for the deaf and hearing impaired.
10. Immittance and acoustic reflex testing infants and young children (including neurophysiological development of the acoustic reflex arc).
11. Neurophysiological development of the sensory system in infants and young children.
12. Behavioral conditioning for the evaluation of the infant and child.
13. Vestibular evaluation in infants and young children.
14. Genetic hearing loss.
15. Effects of middle ear dysfunction on communicative disorders in infants and young children.
16. Physiological techniques of hearing assessment in infants and young children (not evoked potentials or otoacoustic emissions).
17. Special problems of the child with both visual and auditory disorders (i.e., blind and deaf).
18. Cochlear implants in children.
19. Psychophysical techniques in pediatric audiology.
20. Otoacoustic Emissions as a screening tool in infants and young children.

Class Preparation: Although a class role is not usually obtained on a routine basis, students will be called upon from time-to-time to participate. Those students that are absent or unprepared will be penalized 1 point for each occurrence.

Style: Student name, date, course identification and assignment (including assignment number) must be included on all materials (see appendices for examples and preferred style). Assignments not correctly identified will not be accepted.

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.

³It is your responsibility to make an appointment with the instructor to discuss the topic and get approval for the term paper topic. The topics must be approved by the end of class number 10, per the class schedule.

Study Questions: The study questions consist of student initiated questions from the assigned reading. They are to be organized by reading chapter. There are to be 15 questions per assigned chapter. The questions should be clearly separated from the answer. The following format is to be used:

1. Define and discuss SRT: The speech reception threshold (SRT) is used to describe the intensity of a spondee word, in dBHL, that an individual is able to repeat 50% of the time. It is.....

2. Discuss classical conditioning and its use in pediatric audiology: Classical conditioning may be divided into two main areas.....

The study questions are to be typewritten and you are to keep a copy. **THESE WILL NOT BE RETURNED.**

Late Assignments: All assignments are due by 11:15 am on the day of the class. Late assignments will be accepted up to and including five days from time of assignment and not later than 5:00 pm of the fifth day. A 50% penalty will be assessed on all late assignments.

Grading Standard: Each of the areas will be weighted for a total of 100 points. The distribution is accordingly:

Final examination	30
Midterm examination	25
Five quizzes (4 pts each)	20
Five laboratory assignments (1 pt each)	5
Study Questions	5
Presentation of term paper	5
Term paper	10
Topic approval 1pt	
Outline 1pt	
Draft 1pt	
Final 7pts	
TOTAL	100

A	100-95 pts	C+	78-80 pts
A-	90-94 pts	C	75-77 pts
B+	87-89 pts	C-	70-74 pts
B	84-86 pts	D	65-69 pts
B-	81-83 pts	E	64 & below

⁴CHEATING AND/OR PLAGERISM RESULTS IN CLASS FAILURE, at instructor's option.

COURSE SCHEDULE AND OUTLINE

ASLP 434

Class Number	Date of Class	Lecture topic	Assignments ⁵	Comments
1	Jan 5	Introduction and Review of course		
2	Jan 7	Effects of Hearing Loss	Martin&Clark Chpt 1	
3	Jan 12	Genetic Aspects of Hearing Loss I	Martin&Clark Chpt 2	
4	Jan 14	Genetic Aspects of Hearing Loss II		Term paper topic .
5	Jan 21	Conductive Hearing Loss in Children	Martin&Clark Chpt 3	Quiz 1 (Class nos. 2,3,4)
6	Jan 26	Sensorineural Hearing Loss in Children	Martin&Clark Chpt 4	
7	Jan 28	Psychophysical Techniques in Assessment of Pediatric Hearing I		
8	Feb 2	Psychophysical Techniques in Assessment of Pediatric Hearing II & Demonstration of Conditioning		Outline of term paper due.
9	Feb 4	Behavioral Hearing Tests	Martin&Clark Chpt 6	
10	Feb 9	Pediatric Hearing Screening I	Martin&Clark Chpt 5	Quiz 2 (class nos. 5,6,7,8).
11	Feb 11	Pediatric Hearing Screening II	Martin&Clark Chpt 7	
12	Feb 17 (Tuesday)	<u>MID TERM EXAMINATION</u>		Mid term Examination (in class).
13	Feb 18	Central Auditory Processing Disorders I	Martin&Clark Chpt 8	
14	Feb 23	Central Auditory Processing Disorders II		
15	Feb 25	Introduction to Amplification	Martin&Clark Chpts 11 & 12	Lab no. 1 due
16	Mar 2	Pediatric Amplification		Quiz 3 (class nos. 13,14) Draft of term paper due (with references).
17	Mar 4	Cochlear Implants I	Martin&Clark Chpt 13 & 14	
18	Mar 9	Cochlear Implants II & Assistive Listening Devices		Lab no. 2 due.
19	Mar 11	Needs Assessment in Hearing Impairment	Martin&Clark Chpt 10	Quiz 4 (class nos. 15,16,17,18).
20	Mar 16	Parent and Family Counseling	Martin&Clark Chpt 9	
21	Mar 18	Intervention in Pediatric Hearing Loss	Martin&Clark Chpts 15-17	Lab no. 3 due.
22	Mar 23	Educational Audiology	Martin&Clark Chpts 15-17	
23	Mar 25	Term Paper Presentations		Quiz 5 (class nos. 19,20,21,22) Final term papers due.
24	Mar 30	Term Paper Presentations		Lab no. 4 due.
25	Apr 1	Term Paper Presentations		Study Questions due.
26	Apr 6	Term Paper Presentations		
27	Apr 8	Term Paper Presentations		
28	Apr 13	Term Paper Presentations		
FINAL EXAM	Apr 18	FINAL EXAMINATION 125 TLRB 3:00pm – 6:00pm	THE FINAL EXAMINATION WILL NOT BE GIVEN PRIOR TO THIS DATE	Lab no. 5 due. <u>No papers accepted after 6:00 pm.</u>

⁵Reading assignments are to be completed prior to the beginning of the class period.

SAMPLE LABORATORY ASSIGNMENT

LABORATORY ASSIGNMENT #1

(Student name)

(Course)

(Date)

Laboratory Assignment: Pure tone audiogram

Pure tone audiograms (three) were completed on other students that were reported to have normal hearing. A portable audiometer (Belltone 10C) was used. The testing was done in a quiet room. Both air and bone conduction audiograms were constructed from the results.

Note: The student must attach copies of each audiogram and/or other forms (stapled) to the cover sheet.

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 when he was in a noisy situation and his wife complained the television was too loud. Also it was stated that he had a 'hissing' in his ears at times that sounded like 'a steam valve was broken.' He noted that although he can 'hear' people it is difficult to understand what they are saying.

Background

The patient has a negative history for familial hearing loss, acute illnesses resulting in fevers or the use of antibiotics, and 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 level. The patient reported no significant history of high blood pressure, cardiac disease and is a non-smoker. The patient uses alcohol on social occasions. The patient enjoys SCUBA diving and reports frequent 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.

Clinical Observation

Speech and language appear normal for age and social conditions. No phonemic regression was noted. The patient understood all of my questions when facing him, but on a couple of occasions had difficulty understanding me if my face was turned in a different direction. It is my impression he relies on speech reading to supplement his auditory cues.

Evaluation

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

Pure tone air and bone conduction threshold under appropriate masking procedures suggest a 50 dB loss in the low-to-mid- frequencies sloping to a severe loss in the mid-to-high frequencies (70-90 dB), with an air-bone gap in the 250-2000 Hz range.

Speech reception thresholds were consistent with the pure tone audiogram. Speech discrimination, in quiet, showed 66% on the right and 48% on the left.

Tympanometry showed reduced compliance, bilaterally. The acoustic reflex could not be elicited except in the right ear at 4000 Hz using maximum intensity (110 dB SPL).

Impression

A true estimate of residual hearing abilities in this patient could not be established because of possible middle ear involvement as noted by the abnormal tympanograms, bilaterally. However, it is my guess that there is probably a moderate-to-severe hearing loss present. The history would indicate the presence of tinnitus. Although the actual etiology cannot be established this patient's profile is typical of noise induced permanent hearing loss and/or barotrauma.

Recommendations

1. Medical referral for both possible intervention and hearing aid clearance.
2. Repeat threshold testing following medical intervention.
3. Tinnitus evaluation.
4. Speech testing in noise to establish functional hearing abilities.
5. Counseling as to ear defenders and the use of such.
6. Hearing aid evaluation.
7. Communicative strategy counseling with the spouse.

The patient was counseled as to the above recommendations and has agreed to follow-up. I would very much like receiving copies of any reports and will be responsible for the audiological management of this patient.

(Signature)

David L. McPherson, Ph.D.

attachments: Audiogram, tympanograms

cc: Chart files

SAMPLE ESSAY EXAM QUESTION

Blue books, using double spacing, are to be used in all examinations and quizzes except for 'take home' examinations which 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 discussion 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.

STUDY QUESTIONS
(example)
Pediatric Audiology
Educational Psychology 434

These primary study questions were taken from:
Martin, F. and Clark, J. Hearing Care for Children. Botson: Allyn and Bacon, 1995.

Chapter 1

1. Discuss the concept of homogenous versus heterogeneous in the classifying of the hearing impaired child.
2. What factors prolong the identification of hearing loss ?
3. What is the general effect of site of lesion on auditory perception?
4. Why is it important to identify other handicapping conditions early?
5. What is the most critical factor in the home environment for the hearing impaired child?
6. Compare and contrast hearing loss as a disability versus hearing loss as a culture.
7. What conflicts may arise in a hearing child born to deaf parents?
8. Compare and contrast the terms "deaf" versus "hearing impaired".
9. According to Clark (1981) what are the various classifications of hearing impairment?
10. Knauf's (1978) argument about classifying hearing impairment.
11. Compare and contrast the communicative experience between the mother of an infant with normal hearing and a mother with a deaf infant.
12. What type of activity appears to be "pre-language" in the normal hearing child, and what type of adaptation must be done in the deaf infant?
13. What is the general relationship between the severity of the hearing loss, the onset of the hearing and the development of the child?
14. How does hearing loss at birth affect the development of speech perception?
15. How are consonants classified into subphonemic features?
16. What does the feature of manner refer to?
17. What does the feature of voicing refer to?
18. What does the feature of place refer to?
19. What does the effect of hearing loss at birth have on the feature of manner?
20. What does the effect of hearing loss at birth have on the feature of voicing?
21. What does the effect of hearing loss at birth have on the feature of place?
22. What is the effect of hearing loss on the phonemic perception (give at least one example)?
23. Discuss the effects of hearing loss on speech production.
24. What are the effects of hearing loss on both primary and secondary language development?
25. What is meant by 'form' and how does hearing impairment effect form?
26. What is meant by 'content' and how does hearing impairment effect content?
27. What is meant by 'function' and how does hearing impairment effect function?
28. What are the effects of hearing impairment on reading?

Chapter 2

29. What are the two major categories of childhood hearing loss and what encompasses each category ?

30. What percentage of hereditary hearing loss may be described as 'isolated hearing loss' versus a 'genetic syndroms hearing loss'?
31. What are the eight classifications of Konigsmark and Gorlin for genetic hearing loss?
32. Discuss the use of the audiogram in identifying the etiology of hearing loss in children.
33. Compare and contrast 'Chromosomal Inheritance versus Mendelian Inheritance.
34. Discuss Dominant Inheritance, Recessive Inheritance, and X-linked Recessive Inheritance.
35. Discuss Complex, or Multifactorial, Inheritance.
36. What is the goal of genetic counseling?
37. In obtaining a medical history, list five MAJOR pieces of information that must be obtained is it relates to familial and medical history of a chldr/infant.
38. What history would indicate the necessity of genetic counseling?
39. What physical examination would indicate the necessity of genetic counseling?
40. What social history would indicate the necessity of geneteic counseling?

Chapter 3

41. At about what age does the tympanic membrane complete its development?
42. What major factor would effect accurate hearing assesment within the first 24 houres of life?
43. What is the normal relationship of the external ear to the predominate facial features?
44. In congenital disorders of the external ear, what two factors are of greatest significance for hearing loss?
45. Discuss the extracranial and intracranial complications of otitis media.
46. Compare and contrast the use of chronic antibiotic treatment of otitis median versus ventilation tubes.

Chapter 4

Student Name: _____

TERM PAPER APPROVAL
(after approval attach to the
backof the term paper)

This is an original term paper of my own choosing and writing. I have not previously submitted a term paper on this topic. I understand that this topic and term paper may not be used for any other current course.

Topic	TOTAL /1.0
Student's signature	Date
Instructor's signature	Approval Date

Student Name: _____

Pediatric Audiology
ASLP 434

TERM PAPER DRAFT SHEET
(after approval attach to the
backof the term paper)

This is an original term paper of my own choosing and writing. I have not previously submitted a term paper on this topic. I understand that this topic and term paper may not be used for any other current course.

Student's signature	Date
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INSTRUCTOR'S COMMENTS

Relevancy
Content
Depth
Clarity & Accuracy
Professionally written
References
APA style

TOTAL /1

Student Name: _____

Pediatric Audiology
Educational Psychology 434

TERM PAPER GRADING SHEET
(attach as first page)

This is an original term paper of my own choosing and writing. I have not previously submitted a term paper on this topic. I understand that this topic and term paper may not be used for any other current course.

Student's signature	Date
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INSTRUCTOR'S COMMENTS AND GRADE

0.5	Relevancy
1.5	Content
1.0	Depth
1.5	Clarity & Accuracy
1.0	Professionally written
1.0	References
0.5	APA style
/7	

ORAL PRESENTATION

1.5	Media
2.5	Organization
2.0	Professionally presented
/5	

TOTAL /12

Student Name: _____

Laboratory Assignment 1

Hearing screening on TWO youths (6-8 year old). Pure tones only using ASHA criteria for screening.

INSTRUCTOR'S COMMENTS:

Quality of Recording	

Quality of Quantitative Analysis	

Quality of Interpretation	

Quality of Discussion	

Pts Awarded: /1

Student Name: _____

Laboratory Assignment 2

Puretone air conduction thresholds on TWO (3-4 year old). Subjects may NOT be shared by other class members.

INSTRUCTOR'S COMMENTS:

Quality of Recording	

Quality of Quantitative Analysis	

Quality of Interpretation	

Quality of Discussion	

Pts Awarded: /1

Student Name: _____

Laboratory Assignment 3

Immittance audiometry (tympanometry, acoustic reflex) and pure tone thresholds (air conduction and bone conduction) on TWO 4-6 year olds. Subjects may NOT be shared by other class members.

INSTRUCTOR'S COMMENTS:

Quality of Recording	

Quality of Quantitative Analysis	

Quality of Interpretation	

Quality of Discussion	

Pts Awarded: /1

Student Name: _____

Laboratory Assignment 4

Audiological evaluation (pure tone, speech, immittance, case history) on ONE 4 to 5 year old. Besides a formal report a separate write-up on the techniques used and results must be included.

INSTRUCTOR'S COMMENTS:

Quality of Recording	

Quality of Quantitative Analysis	

Quality of Interpretation	

Quality of Discussion	

Pts Awarded: /1

Student Name: _____

Laboratory Assignment 5

Evaluation on one 3-9 months of age infant. Besides a formal report a separate write-up on the techniques used and results must be included. Immittance audiometry is to be completed.

INSTRUCTOR'S COMMENTS:

Quality of Recording	

Quality of Quantitative Analysis	

Quality of Interpretation	

Quality of Discussion	

Pts Awarded: /1