

SHS 626: Audiological Assessment and Management of Infants and Young Children

Catalog Description: This course is designed for graduate students pursuing a degree in Early Oral Intervention of Children Who are Deaf and Hard of Hearing. Students will learn the nature of sound; causes, types, and degrees of hearing loss; audiogram interpretation; audiological assessments used with the pediatric population and in newborn hearing screenings; the impact of early identification and intervention; and recent developments in hearing technology including. Students will also learn strategies relevant to the management of children with varying degrees of hearing problems used to assess the benefits infants and young children receive from their hearing devices.

Course Credit: 3 semester hours

Prerequisites

Normal language and speech development
Infant Development or Child Development
Anatomy and Physiology of the Speech Mechanism
Anatomy and Physiology of the Hearing Mechanism
Introduction to Audiology
Phonetics
Or permission of the instructor

I. Course Objectives

Students will achieve growth toward becoming informed, dynamic professionals by demonstrating proficiencies in knowledge of hearing loss, interpreting audiograms, and audiological assessment procedures used with infants and young children. The student will:

- A. Identify the major causes of hearing loss and its prevalence.
- B. Describe the nature of sound and how hearing is measured.
- C. Categorize the types and degrees of hearing loss.
- D. Identify the major anatomical structures involved in hearing and balance and describe concepts in anatomy and physiology of hearing.
- E. Interpret unaided audiograms and compare air and bone-conduction audiograms to determine type and degree of hearing loss.
- F. Identify and interpret audiological assessments used with the pediatric population.
- G. Discuss the need for differential diagnosis of auditory function
- H. Describe neonatal indicators that would place an infant at high-risk for hearing loss, screening procedures, and advantages of early identification.
- I. Define the arguments for early identification and auditory management.

- J. Discuss the impact of mild and moderate hearing losses on educational achievement and compare the impact of severe and profound losses
- K. Interpret aided and unaided audiograms and determine suitability of hearing technology, based on speech acoustics.
- L. Describe the various hearing technologies available to infants and children with hearing loss.
- M. Specify the candidacy for pediatric cochlear implants and discuss possible family concerns.
- N. Identify the major components typical of cochlear implants, describe the surgical procedure and processing strategies.
- O. Discuss the suitability and ethical issues of cochlear implants for children with a variety of histories and audiological backgrounds, based on current candidacy requirements.
- P. Discuss the advantages of FM and Soundfield systems and classroom acoustics necessary for optimal signal to noise ratios.
- Q. Perform listening checks of hearing aids to determine functioning.
- R. Troubleshoot amplification and sensory technology.
- S. Explain the roles of the audiologist and teacher of the deaf/hard of hearing on IEP teams with respect to audiological management

II. Course Content

- A. The causes and prevalence of hearing loss
 - 1. Etiologies
 - 1. pre-lingual vs post-lingual causes of hearing loss
 - 2. syndromic vs non-syndromic genetic causes
 - 3. trauma, diseases, birth weight and ototoxic drugs
 - 2. Prevalence of hearing loss
 - a. US and worldwide
 - b. impact of migration trends
- B. The nature of Sound
 - 1. Duration, intensity and frequency
 - 2. Sound measurement
 - a. hertz (Hz)
 - b. decibels (dB)
- C. Types and degrees of hearing loss
 - 1. Types of hearing loss
 - a. conductive
 - b. sensorineural
 - c. mixed
 - d. central

2. Degrees of hearing loss
 - a. mild
 - b. moderate
 - c. severe
 - d. profound

- D. Anatomy and physiology of the hearing mechanism
 1. Embryological development
 2. The outer ear
 3. The middle ear
 4. The inner ear
 5. The auditory nerve and central auditory pathways

- E. Audiograms and pure-tone audiometry
 1. Air-conduction audiometry
 2. Bone-conduction audiometry
 3. Audiogram interpretation
 4. Comparing aided and unaided thresholds

- F. Audiological Assessments
 1. Otoscope Examination
 - a. reasons for conducting test
 - b. interpreting results
 2. Tympanometry
 - a. reasons for conducting test
 - b. interpreting results
 3. Objective and Electrophysiological tests
 - a. auditory brainstem response (ABR)
 - b. auditory steady state evoked potentials (ASSR)
 - c. otoacoustic emissions (OAE)
 4. Behavioral tests
 - a. conditioned play audiometry
 - b. visual reinforcement audiometry (VRA)
 5. Speech awareness and speech reception
 - a. word tests
 - b. sentence tests
 6. Hearing Screenings
 - a. Pure-tone testing
 - b. Practice
 - c. Interpreting results

- G. Differential diagnosis of auditory function
 1. Sensorineural hearing loss
 2. Auditory neuropathy (AN)
 3. Central auditory processing disorders (CAPD)
 4. Effects of attention deficits (ADD/ADHD)
 5. Multiple challenges and difficult to test children

- H. Newborn screening and assessment
 - 1. High risk register and neonatal indicators
 - 2. Universal newborn hearing screening
 - 3. Limitations of OAE, ABR, ASSR
 - 4. Follow-up to screening
 - 5. Advantages of early identification

- I. Early identification and auditory management
 - 1. Aggressive audiological management
 - 2. Assessment protocols and timeframes

- J. Impact of hearing loss on educational achievement
 - 1. Overview of audiogram interpretation
 - 2. Mild and moderate hearing losses
 - 3. Severe and profound hearing losses
 - 4. Unilateral hearing losses
 - 5. Effects of chronic otitis media
 - 6. Fluctuating vs. stable hearing losses

- K. Suitability of hearing technologies, based on speech acoustics
 - 1. Aided and unaided audiograms and access to the speech signal
 - 2. Hearing aids, expected gain and aided thresholds
 - 3. Cochlear implants and expected soundfield audiograms

- L. Hearing technologies for infants and young children
 - 1. Analog hearing aids
 - 2. Digital hearing aids
 - 3. Transposition aids
 - 4. Bone conduction aids
 - 5. Tactile devices
 - 6. Cochlear implants
 - 7. FM (frequency modulation) systems for home and preschool environments
 - 8. Wearability issues for young children

- M. Cochlear implant candidacy for infants and young children
 - 1. FDA approvals and restrictions
 - 2. Current candidacy criteria
 - 3. Ethical issues and family concerns
 - 4. Pre- and post- counseling with families

- N. Cochlear implant systems
 - 1. Components
 - 2. Considerations when selecting a cochlear implant
 - 3. Commitments and precautions
 - 4. Surgical procedures
 - 5. Processing strategies
 - 6. Special tests (e.g., Electrical Stapedial Reflex Thresholds, ESRT; Neural Response Imaging, NRI; Neural Response Telemetry, NRT)
 - 7. Factors affecting auditory performance with the implant

8. Cochlear implants and FM systems
- O. Cochlear implants - suitability
 1. Changes in candidacy criteria
 2. Children of various ages with varying degrees of hearing loss
 3. Children with early onset hearing loss implanted after age 5
 4. Bi-lateral cochlear implants and localization
 5. Special populations and considerations
 6. Children transitioning from visual/manual programs
 7. Expectations and counseling
 8. Factors related to performance
 9. Ethical issues
 - P. Classroom acoustics and advantages of FM technology
 1. Noise
 2. Reverberation
 3. Signal/noise ratios
 4. Effects of noise on listening function and learning
 - Q. Listening checks of hearing aids
 1. Using attenuated and regular stethoscopes
 2. Ling Sound Checks
 - R. Troubleshooting technology
 1. Hearing aids and FM systems
 2. Cochlear implants
 - S. Individualized education plans (IEPs)
 1. Roles of members of the team
 2. Audiological management considerations
 3. Working with families

III. Methods of Instruction

- A. Lectures and group discussion
- B. Demonstration lessons (live/video)
- C. Case studies
- D. Laboratory demonstration and practice
- E. Reading assignments and handouts
- F. On-line research

IV. Methods of Evaluation

- A. Attendance 5%
- B. Quality and quantity of class participation (K,S,D) 10%
- C. Written examinations and quizzes (K,S,D) 30%
- D. Laboratory participation (K,S,D) 15%
- E. Observation and case study presentation (K,S,D) 20%
- F. Hands-on practicum (K,S,D) 20%
- G. Anonymous course evaluations (D)

V. Suggested Text

Kramer, S. (2007). *Audiology: Principles and procedures*. San Diego, CA: Plural.

Various reading assignments will also be given.

VII. Course Format

This course will be taught as a seminar with class discussion, research, student presentations, invited presentations and demonstrations.

Academic Honesty

When cheating is discovered, the faculty member may give the student an F on the work involved or in the course. If further disciplinary action is deemed appropriate, the student should be reported to the dean of students. In addition to being in violation of academic honesty, cheating violates the Code of Student Conduct and may be grounds for probation, suspension, and/or expulsion. (Taken from *Student Handbook*)

Plagiarism

Plagiarism is scholarly theft, and it is defined as the unacknowledged use of secondary sources. More specifically, any written or oral presentation in which the writer or speaker does not distinguish clearly between original and borrowed material constitutes plagiarism.

Because students, as scholars, must make frequent use of the concepts and facts developed by other scholars, plagiarism is not the mere use of another's facts and ideas. However, it is plagiarism when students present the work of other scholars as if it were their own work.

Plagiarism is committed in a number ways:

1. Reproducing another author's writing as if it were one's own.
2. Paraphrasing another author's work without citing the original.
3. Borrowing from another author's ideas, even though those ideas are reworded, without giving credit.
4. Copying another author's organization without giving credit.

(Taken from *Student Handbook*)

Administrative Requirements

1. Students are expected to attend and be prepared to participate in each class session.
2. Students are expected to participate in all related field experiences.
3. Students are expected to take examinations and quizzes when they are scheduled and to submit assignments on the date these assignments are due during the class period.
4. Late submission of assignments should be rare. Late assignments will be accepted only on or before the next regularly scheduled class period and penalized by 50%. Late assignments will not be accepted beyond the next class period and will earn "0" credit.
5. If one quiz is missed, the next quiz will count twice. If additional quizzes are missed a grade of "0" will be given.
6. Make-up examinations will be given only in the most merited

circumstances. Make-up examinations may be oral, written, or oral and written.

7. Requests for Incomplete (I) grades are discouraged, and will not be approved except in the most merited circumstances.

ADA STATEMENT

If a student has a disability that qualifies under the American with Disabilities Act (ADA) and requires accommodations, he/she should contact the Office for Disability Accommodations (ODA) for information on appropriate policies and procedures. Disabilities covered by ADA may include learning, psychiatric, physical disabilities, or chronic health disorders. Students can contact ODA if they are not certain whether a medical condition/disability qualifies.

Address: The University of Southern Mississippi
Office for Disability Accommodations
118 College Drive # 8586
Hattiesburg, MS 39406-0001

Voice Telephone: (601) 266-5024 or (228) 214-3232

Fax: (601) 266-6035

Individuals with hearing impairments can contact ODA using the *Mississippi Relay* Service at 1-800-582-2233 (TTY) or email Suzy Hebert at Suzanne.Hebert@usm.edu