

**Descriptions — Arts and Letters  
of  
Courses**

**499. Arts and Letters Internship**  
Fall, Winter, Spring, Summer. 1 to 10 credits. May reenroll for a maximum of 10 credits. Juniors, 3.00 GPA, approval of instructor. Supervised pre-professional field experience for juniors, seniors, or graduate students.

**999. Doctoral Dissertation Research**  
Fall, Winter, Spring, Summer. Variable credit. May reenroll for a maximum of 36 credits. Approval of college.

**ASTRONOMY AND  
ASTROPHYSICS**

See Physics and Astronomy.

**AUDIOLOGY AND SPEECH  
SCIENCES ASC**

**College of Communication Arts and  
Sciences**

**108. Voice and Articulation**  
Fall, Winter, Spring, Summer. 3(4-0)  
The study and development of the skills of voice and articulation.

**201. Introduction to Communication  
Disorders**  
Fall, Winter. 3(3-0)  
Speech, hearing and language disorders in adults and children.

**222. Oral Language Development**  
Fall, Winter, Spring, Summer. 3(3-0)  
Emergence and development of receptive and expressive aspects of oral language of the child.

**227. Physics for Audiology and Speech  
Sciences**  
Fall, Spring. 4(4-0) MTH 108. Not open to students with credit in PHY 237. Interdepartmental with and administered by Physics. Introductory physics for Audiology and Speech Sciences majors; kinematics, Newtons' Law, conservation of energy and momentum, waves and vibrations, sound propagation, resonance, speech production.

**274. Structures and Functions of Speech  
and Hearing Mechanisms**  
Fall, Winter. 5(4-2) ASC 108 or approval of department.  
Peripheral and central auditory mechanisms and the respiratory, phonatory and articulatory mechanisms for speech.

**276. Descriptive Phonetics**  
Winter, Spring. 3(3-0) ASC 274 or approval of department.  
Detailed description of the principles that underlie the production of speech sounds.

**277. Speech Science**  
Fall, Spring. 3(3-0) ASC 274, ASC 276.  
Scientific bases of voice communication with special reference to the acoustic aspect of production.

**373. Clinical Procedures in Speech  
Pathology and Audiology**  
Winter, Spring. 4(4-0) 2.00 grade-point average in ASC 201 and ASC 277 or approval of department.  
Principles underlying the clinical interview and client relationships essential to diagnosis and therapy. Procedures in obtaining, recording, and evaluating test results and therapeutic methods.

**444. Oral Language of Urban Areas**  
Winter, Summer. 3(3-0)  
Concentration in the characteristics of language and human communication as these relate to studies and practices of those involved in urban affairs.

**445. Communication Disorders: Social  
and Emotional Components**  
Spring. 3(3-0) Juniors.  
Analysis and management of the social and emotional components of speech, language, and hearing problems.

**454. Introduction to Audiology**  
Fall, Spring. 5(4-2) ASC 276, ASC 277.  
Fundamental aspects of normal hearing; hearing disorders, hearing tests.

**460. Aural Rehabilitation**  
Winter, Summer. 5(5-0) ASC 454 or approval of instructor.  
Fundamental aspects of hearing aids, auditory training, and speechreading for the hearing-impaired person.

**470. Communication Disorders**  
Spring, Summer. 3(3-0) Juniors. Not open to Audiology and Speech Sciences majors.  
An overview of communication disorders; the professions of speech and language pathology and audiology and their relationships to allied professions.

**474. Clinical Practicum in Speech and  
Language Pathology**  
Fall, Winter, Spring, Summer. 1 credit. May reenroll for a maximum of 2 credits. Grade of 2.0 or better in both ASC 201 and ASC 373; satisfactory completion of a speech, language, and hearing screening/evaluation at the MSU Speech and Hearing Clinic.  
Therapeutic experience in speech and language pathology.

**476. Speech-Language Pathology:  
Diagnostics**  
Fall, Winter, Spring, Summer. 5(4-2) ASC 474 or approval of department.  
Test procedures and analysis; supervised clinical experience in language and speech evaluations and report writing.

**477. Methods in Public School Speech  
and Hearing Therapy**  
Fall, Winter. 4(3-2) ASC 201, ASC 373. Must be taken prior to term of student teaching.  
Administration and organization, procedures and materials in public school speech and hearing therapy.

**480. Basic Laboratory in Experimental  
Audiology**  
Fall, Spring. 3(1-4) MTH 108, PHY 227, ASC 454; Juniors.  
Contemporary experimental procedures in basic audiological research. Projects include systematic exercises in equipment use, calibration, psychophysical methods, and data analysis.

**499. Independent Study**  
Fall, Winter, Spring, Summer. 1 to 6 credits. May reenroll for a maximum of 12 credits. Approval of department.

**801. Phonological Disorders**  
Winter. 4(4-0) Approval of department.  
Advanced study of normal aspects and correlates of phonological development; traditional and contemporary intervention issues, and issues related to research in phonological disorders.

**810. Audiologic Calibration Standards**  
Winter. 4(3-2) ASC 854 or ASC 833A, ASC 833B.  
Contemporary electro-acoustic and other measurement standards for audiometers, sound level meters, earphones, hearing aids, and related devices; current issues in standards development; laboratory in applied measurement.

**833. Specialized Clinical Audiology.**  
**A. Differential Audiometry**  
Fall. 4(3-2)  
Pure tone audiometric tests as an aid to the otologist in evaluating the pathology of hearing loss; including the development of norms. Consideration of nonorganic loss.

**B. Speech Audiometry**  
Fall. 4(3-2)  
Evaluation of speech and speech-like signals; detection, discrimination and recognition.

**C. Industrial Audiology**  
Spring. 4(4-0)  
Evaluation of the role of the audiologist in industry emphasizing identification procedures, damage-risk criteria, measurement and control of noise, conservation procedures, and medico-legal problems.

**D. Advanced Audiological  
Evaluation**  
Winter. 4(3-2)  
Theory, administration and evaluation of selected tests of the peripheral and central auditory system.

**E. Pediatric Audiology**  
Fall. 4(4-0)  
Evaluative procedures including play audiometry, language assessment, and case studies as aids to the differential diagnosis of auditory disorders in children; rehabilitative procedures for the acoustically handicapped child.

**F. Geriatric Audiology**  
Summer. 4(4-0) ASC 460 or approval of department.  
Causes and descriptions of hearing loss associated with aging; audiologic evaluation and rehabilitation of older people with emphasis on amplification needs.

**G. Auditory Habilitation of the  
Hearing Impaired**  
Spring. 4(4-0) ASC 460; ASC 833B or approval of department.  
Communication skills development, early identification, differential diagnosis, personal and classroom amplification systems, methodological controversies and public laws affecting education of the hearing impaired.

**H. Electrophysiologic Methods of  
Auditory Assessment**  
Spring. 4(3-2) ASC 854 or approval of department.  
Electroencephalic and brain stem audiometry, electrocochleography, electrocardiac audiometry, respiration audiometry, electrodermal audiometry, impedance audiometry and electronystagmography.

**BIOCHEMISTRY BCH**

**College of Agriculture and Natural Resources  
College of Human Medicine  
College of Natural Science  
College of Osteopathic Medicine**

**I. Amplification Systems for the Hearing Impaired**  
*Winter. 4(3-2) ASC 833B.*  
Form, function and clinical application of group and personal amplification systems for the hearing impaired.

**J. Tinnitus and Vestibular Disorders**  
*Spring. 3(2-2) ASC 833I or approval of department.*  
Anatomy, physiology, evaluation, interpretation and management of tinnitus.

**840. Language Theories and Disorders**  
*Spring. 4(4-0) Previous course work in language development.*  
Advanced study of child language research emphasizing an applied psycholinguistic approach to child language disorders.

**841. Evaluation and Treatment of Speech and Language Disorders**

**A. Aphasia**  
*Fall. 4(4-0)*  
Neuropathology, symptomatology, and speech and language habilitation and rehabilitation of individuals with aphasia.

**B. Apraxia and Dysarthria**  
*Spring. 4(4-0)*  
Neuropathology, symptomatology, and speech and language habilitation and rehabilitation of individuals with apraxia and dysarthria, including those with cerebral palsy.

**C. Voice Disorders**  
*Winter. 4(4-0)*  
Etiology, symptomatology, diagnosis, and treatment of voice disorders including the specific communication problems of the laryngectomized.

**D. Stuttering**  
*Fall. 4(4-0)*  
History, symptomatology, development, evaluation, and theories of stuttering. Focus is to facilitate clinical involvement with stutterers.

**E. Orofacial Anomalies**  
*Spring. 4(4-0)*  
Etiology, symptomatology, diagnosis, and treatment of various orofacial anomalies including lip and/or palatal cleft, glossectomy, jaw resection, dental anomalies, and tongue thrust.

**F. Delayed Language Assessment**  
*Fall. 4(4-0)*  
Evaluative techniques including audiometry, psychometry, and case history as aids to the differential evaluation of delayed language development.

**G. Language Intervention: Early Stages**  
*Winter. 4(4-0) Approval of department.*  
Language intervention for those children functioning at or below a four-year-old level in their language behavior; mental retardation, autism, and other developmental delays associated with severe language impairments.

**H. Language Intervention: Later Stages**  
*Summer. 4(4-0) Approval of department.*  
Treatment of developmental language delays and disorders with emphasis upon children functioning at or above the four-year-old level in language behavior; preadolescent and adolescent language disorders are included.

**842. Augmentative and Alternative Communication Systems**  
*Summer. 4(4-0) Approval of department.*  
Historical perspective and philosophy of augmentative/alternative communication systems. Aided and unaided nonspeech communication systems. Assessment, selection, and intervention procedures.

**843. Transfer and Maintenance of Speech Behaviors**  
*Spring. 4(4-0)*  
Various clinical procedures; assisting others in transferring and maintaining these behaviors outside the clinical environment.

**853. Speech Perception: Theory and Measurement**  
*Summer. 4(4-0) Approval of department.*  
Evaluation and analysis of various theories of speech perception and their implications for speech and language pathologists, audiologists, and speech and hearing scientists.

**854. Psychophysics and Theories of Audition**  
*Fall. 4(4-0) Approval of instructor.*  
Nature of auditory stimuli and the results of psychophysical experimentation in audition.

**875A. Clinical Practicum in Speech and Language Pathology**  
*Fall, Winter, Spring, Summer. 1 credit. May reenroll for a maximum of 8 credits. ASC 474 and satisfactory completion of a speech, language, and hearing screening/evaluation at the MSU Speech and Hearing Clinic.*  
Directed diagnostic, therapeutic, and prognostic experience in speech and language pathology.

**875B. Clinical Practicum in Audiology**  
*Fall, Winter, Spring, Summer. 1 credit. May reenroll for a maximum of 8 credits. ASC 454 and satisfactory completion of a speech, language, and hearing screening/evaluation at the MSU Speech and Hearing Clinic.*  
Directed diagnostic, therapeutic and prognostic experience in audiology in various clinical settings.

**876. Communication Disorders: Neuroanatomy-Neurophysiology**  
*Fall. 4(3-2) Approval of department.*  
Neuroanatomical and neurophysiological correlates of speech, language, and hearing.

**899. Master's Thesis Research**  
*Fall, Winter, Spring, Summer. Variable credit. Approval of department.*

**940. Seminar in Audiology and Speech Sciences**  
*Fall, Winter, Spring, Summer. 4(4-0) May reenroll for a maximum of 16 credits.*

**990. Special Problems in Audiology and Speech Sciences**  
*Fall, Winter, Spring, Summer. 1 to 6 credits.*  
Special projects in audiology and speech sciences.

**999. Doctoral Dissertation Research**  
*Fall, Winter, Spring, Summer. Variable credit. Approval of department.*

**100. Lectures in Biochemistry**  
*Spring. 1(1-0) Biochemistry majors; others by approval of department.*  
An introduction to modern biochemistry using an historical approach.

**200. Introduction to Biochemistry**  
*Winter, Summer. 5(5-0) Credit may not be earned in both BCH 200 and BCH 401. General chemistry; one term organic chemistry. Not acceptable for a B.S. degree in biochemistry.*  
Survey of biochemistry emphasizing the major metabolic activities of living organisms.

**400H. Honors Work**  
*Fall, Winter, Spring. 1 to 4 credits. May reenroll for a maximum of 12 credits. Approval of department.*  
Assigned reading and experimentation.

**401. Basic Biochemistry**  
*Fall, Spring. 5(5-0) Credit may not be earned in both BCH 200 and BCH 401. One year organic chemistry or CEM 242; not open to biochemistry majors.*  
A one-term presentation of biochemistry emphasizing structure and function of major biomolecules, metabolism and regulation. Examples used for illustrative purposes will emphasize the mammalian organism.

**404. General Biochemistry Laboratory**  
*Winter. 3(1-6) Analytical chemistry; BCH 401 or BCH 451.*  
Experimental aspects of biochemistry.

**405. Biochemistry Laboratory**  
*Fall, Spring. 3(0-9) BCH 453 or concurrently; BCH 404; undergraduate biochemistry majors or approval of department.*  
Advanced undergraduate laboratory to illustrate modern biochemical methods and techniques.

**451. Biochemistry I**  
*Fall. 3(3-0) Credit may not be earned in both BCH 401 and BCH 451. One year organic chemistry or CEM 242.*  
A comprehensive survey of biochemistry, with emphasis on protein structure and function, enzymology, and bioenergetics.

**452. Biochemistry II**  
*Winter. 3(3-0) BCH 451.*  
Continuation of BCH 451, with emphasis on intermediary metabolism.

**453. Biochemistry III**  
*Spring. 3(3-0) BCH 452.*  
Continuation of BCH 452, with emphasis on the replication and expression of genetic information.