

- 313. Great Cities, Arts, and Ideas: The Modern World (A)**
(HUM 313.) Spring. 4(4-0) Sophomores.

The humanities in an urban culture during the modern era. Major ideas, works of art and literature; their significance in the life of an important world capital during the 18th, 19th, or 20th century.

- 332. Development of American Indians as an Ethnic Minority**
(RES 313.) Spring. 4(4-0) Approval of college.

The history of the contact between Euro-Americans and American Indians is examined from the perspective of Native Americans.

- 333. Contemporary Problems of American Indians**
(RES 333.) Spring. 4(4-0) A L 332.

An overview of contemporary American Indian problems including their background in federal policies, protests engendered, and possible solutions.

- 345. Jewish Humanities in the Twentieth Century (A)**
(HUM 345.) Fall, Winter, Spring. 4(4-0) Sophomores. Previous studies in the humanities recommended.

An interdisciplinary study of the novel, short story, drama, music, film, and arts of the Twentieth Century as they have reflected the experiences, preoccupations, and contributions of the Jews.

- 390H. Perspectives in Literature**
Fall. 3(3-0) Juniors, approval of Honors College.

Attention will be focused on several major literary works. Students will employ various types of literary analysis, considering theme, idea, structure, etc., and examining some major trends in contemporary literary criticism.

- 391H. Perspectives in Philosophy**
Winter. 3(3-0) Juniors, approval of Honors College.

The two primary areas of concern will be ethics and aesthetics, the emphasis on one or the other to be determined by the professor. The course will include reading of major works, discussion of major figures in the fields, and the preparation of a substantial paper.

- 392H. Perspectives in History**
Spring. 3(3-0) Juniors, approval of Honors College.

The focus will be on the nature of international diplomacy in the 20th century, the development of nationalism, the balance of power system, the influence of new ideologies, and the developments of the power structure since 1945.

- 393H. Perspectives in 20th Century Arts: 1900-1920**

Fall. 3(3-0) Juniors, approval of Honors College.

Reaction to Naturalism across the arts traced in Symbolism and Expressionism as interrelated phenomena in response to the crisis of confidence in European institutions.

- 394H. Perspectives in 20th Century Arts: 1920-1945**

Winter. 3(3-0) Juniors, approval of Honors College.

Formalist analysis of art elements examined across the arts in Cubism, Surrealism and new musical structures as positive response to war, depression and dictatorship.

- 395H. Perspectives in Contemporary Arts: Postwar Period**
Spring. 3(3-0) Juniors, approval of Honors College.

The function of avant-garde arts after World War II to the present studied in the new dimensions of an environment created by new technology and the mass media explosion.

- IDC. Women's Studies Senior Level Seminar**
For course description, see Interdisciplinary Courses.

- 450. Arts Management**
Fall, Winter, Spring. 3 to 5 credits. May reenroll for a maximum of 9 credits. Seniors or Graduate Students or approval of department.

Administration of arts organizations, management of facilities, understanding operational methods and procedures of performing companies, financial structure and funding of arts centers, study of audience development, contemporary trends in arts management field.

- 461. Aging and Human Values**
Spring. 3(3-0) Juniors.

Development of personal and professional responses to value-laden questions concerning aging and the elderly through historical, literary, philosophical and related perspectives.

- 491H. Perspectives in the Social Sciences and Humanities**

Fall, Winter, Spring. 2 to 6 credits. May reenroll for a maximum of 12 credits if different topic is taken. Juniors, approval of Honors College, or approval of instructor. Interdepartmental with the College of Social Science.

An integration of subject matter and methodologies of several disciplines as they are relevant to particular topic areas.

- 492. Integrative Topics in the Arts and Humanities**
Fall, Winter, Spring. 4(4-0) May reenroll for a maximum of 8 credits. Juniors or approval of department.

In-depth study of topics in the arts and humanities. Integrative and interdisciplinary approach.

- 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**
(372.) 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.

**Descriptions — Audiology and Speech Sciences
of
Courses**

- 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 Pathology II: 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. Electrophysiological Methods of Auditory and Vestibular 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 electrostagnography.
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
(831A.) Fall. 4(4-0)
Neuropathology, symptomatology, and speech and language habilitation and rehabilitation of individuals with aphasia.
B. Apraxia and Dysarthria
(832B.) 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
(831B.) Winter. 4(4-0)
Etiology, symptomatology, diagnosis, and treatment of voice disorders including the specific communication problems of the laryngectomized.
D. Stuttering
(832E.) Fall. 4(4-0)
History, symptomatology, development, evaluation, and theories of stuttering. Focus is to facilitate clinical involvement with stutters.
E. Orofacial Anomalies
(832F.) 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
(832C.) 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.

400II. 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.

412. Clinical Biochemistry

Winter. 3(2-3) BCH 401; CEM 162. Medical Technology majors. Not acceptable for a B.S. degree in biochemistry. Others: approval of department.

Quantitative clinical laboratory methods.

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.

460. Principles of Biochemical Methods

Spring. 3(3-0) One year physical chemistry or CEM 384 concurrently; BCH 453 or concurrently, or BCH 401.

Principles of biochemical methods with emphasis on electrophoresis, chromatography, immunological techniques, sedimentation, diffusion, viscosity, radiochemistry, and absorption and emission spectroscopy.

470. Biological Membranes

(IDC 470.) Spring. 3(3-0) BCH 401. Interdepartmental with the departments of Microbiology and Public Health, and Physiology. Administered by the Department of Physiology.

The chemistry, physics and mathematics of the permeability, energy transductions and surface functions of differentiated cell membranes and membranous organelles are compared. A brief discussion of theoretical and experimental models is included.

499. Research

Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 12 credits. Undergraduates: approval of department. Participation in research projects.

501. Medical Biochemistry

Fall. 3(3-0) Open only to students in the professional programs in the College of Human Medicine and the College of Osteopathic Medicine.

Basic biochemical principles and terminology of importance in medical biology.

502. Medical Biochemistry

Winter. 3(3-0) BCH 501 or approval of department.

A continuation of BCH 501.

503. Introduction to Medical Biology

Fall. 5(5-0) Admission to the College of Human Medicine. Interdepartmental with the departments of Microbiology and Public Health, Pharmacology and Toxicology, and Physiology. Administered by the Department of Microbiology and Public Health.

Principles of medical biology for medical students.

511. Medical Biochemistry I

Winter. 3(3-0) One year of organic chemistry. Open only to students in the professional programs in the College of Human Medicine and the College of Osteopathic Medicine.

Basic biochemical principles and terminology with emphasis on metabolism and function of biomolecules of importance in medical biology.

512. Medical Biochemistry II

Spring. 4(4-0) BCH 511.

Basic biochemical principles and processes pertinent to specific areas of human pathophysiology.

811. Nucleic Acid Structure and Function

Fall. 4(4-0) One year of organic chemistry, one year of physical chemistry, one term of introductory biochemistry, or approval of department. Limited to graduate students in biochemistry or other students needing a similar professional preparation.

Organization and expression of eucaryotic genes including gene structure, regulation of gene expression, replication, and recombination. Molecular cloning, DNA sequencing and gene transfer techniques.

812. Protein Structure and Function

Winter. 4(4-0) BCH 811.

Protein structure and function relationships, macromolecule-ligand interactions, enzyme kinetics and principles of methods used in enzymology.

813. Metabolism and Its Regulation

Spring. 4(4-0) BCH 812.

Molecular basis of metabolic regulation, compartmentation and interrelationships of metabolic cycles involving carbohydrates, proteins and lipids.

821. Biochemical Mechanisms and Structure

Fall. 4(4-0) One year of organic chemistry; introductory biochemistry; and physical chemistry or concurrently.

Structures, methods of structural analysis, synthesis, and reaction mechanisms of biological substances including proteins, carbohydrates, lipids, porphyrins, phosphate esters, enzymes and coenzymes.

BIOCHEMISTRY BCH

College of Agriculture and Natural Resources

College of Human Medicine

College of Natural Science

College of Osteopathic Medicine

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.