

311. Great Cities, Arts, and Ideas: The Western Classical Age (A)
(HUM 311.) Fall. 4(4-0) Sophomores.

The humanities in an urban culture during the Western classical age. Major ideas and works of art and literature, their significance in the city's life, and their continuing influence. Cities will be Athens or Rome.

312. Great Cities, Arts, and Ideas: The Renaissance (A)
(HUM 312.) Winter. 4(4-0) Sophomores.

The humanities in an urban culture during the Renaissance. Major ideas and works of art and literature, their significance in the city's life, and their continuing influence. Cities will be Florence, Rome, or Paris.

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.

335. Film and Drama, a Comparison
(J M 335A.) Winter, Spring. 3(3-2) Juniors.

A comparison of dramatic and cinematic forms with primary emphasis on the unique attributes of each medium that create differing impacts and responses on the reader/viewer.

339. Interdisciplinary Studies in the Arts and Humanities
(J M 339A.) Fall, Winter, Spring. 3(3-0) or 4(3-0) May reenroll for a maximum of 8 credits. Juniors or approval of department.

Study of a theme or topic from the perspectives of at least two disciplines.

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.

380. The Role of Women in America: Arts and Self
(ATL 380.) Winter of even-numbered years. 4(4-0) Juniors.

Various art forms by women and the exploration of a feminine sensibility; sex, race, and class interactions, sexual stereotypes; male views of women and themselves; the impact of the media.

381. The Role of Women in America: Movements and Ideology
(ATL 381.) Spring of odd-numbered years. 4(4-0) Juniors.

Key personalities and philosophical currents in the women's movement; biological and cultural myths and realities; the historical role of the family, "The Culture of Romance."

390H. Perspectives in Literature
Fall. 4(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. 4(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. 4(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.

434. Critical Issues in Dance
(J M 434.) Winter. 3(3-0) Seniors in Dance Field of Concentration or approval of department.

Development of aesthetic values and opinions through analysis of critical issues in dance. Solidification of individual dance philosophies.

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
(U C 492.) 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
Winter, Summer. 3(2-0)

Emergence and development of receptive and expressive aspects of oral language of the child.

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

227. Physics for Audiology and Speech Sciences

Fall, Spring. 4(4-0) MTH 108. Not open to students with credit in PHY 237. Inter-departmental 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. Scientific Bases of Voice Communication Process

Fall, Spring. 3(3-0) ASC 276 and PHY 237 or approval of department.

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(2-2) 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(4-1) ASC 276, ASC 277.

Fundamental aspects of normal hearing; hearing disorders, hearing tests.

460. Aural Rehabilitation

Winter, Summer. 5(4-1) 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. Therapeutic experience in speech and language pathology.

476. Speech Pathology II: Diagnostics

Fall, Winter, Spring, Summer. 5(3-2) 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, Spring. 4(3-4) 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. Advanced Study of Articulatory Behavior

Summer. 4(3-2) Approval of department.

Theoretical and pragmatic implications of the interrelationships of articulatory behavior and language production, especially as related to investigating procedures and results.

810. Audiologic Calibration Standards

Summer. 4(3-2) ASC 854 or ASC 833A and ASC 833B; ASC 880A; approval of department.

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(2-2)

Evaluation of the role of the audiologist in industry emphasizing identification procedures, damage-risk criteria, measurement and control of noise, conservation procedures, and medicolegal 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

Winter. 4(2-2)

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 electronystagmography.

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

Winter. 3(2-2) ASC 833I or approval of department.

Anatomy, physiology, evaluation, interpretation and management of tinnitus.

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 stutterers.

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.) Winter. 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
Spring. 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
Winter. 4(4-0)

Various clinical procedures; assisting others in transferring and maintaining these behaviors outside the clinical environment.

853. Speech Perception: Theory and Measurement
Spring. 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.

874. Speech and Hearing Problems in Public Schools
Summer. 4(3-0) May reenroll for a maximum of 16 credits.

Graduate seminar in speech and hearing involving problems that arise in relation to speech and hearing therapy in the public schools.

875A. Clinical Practicum in Speech and Language Pathology
Fall, Winter, Spring, Summer. 1 credit.
ASC 474. May reenroll for a maximum of 8 credits.

Directed diagnostic, therapeutic, and prognostic experience in speech and language pathology.

875B. Clinical Practicum in Audiology
Fall, Winter, Spring, Summer. 1 credit.
ASC 454. May reenroll for a maximum of 8 credits.

Directed diagnostic, therapeutic and prognostic experience in audiology in various clinical settings.

876. Communication Disorders: Neuroanatomy-Neurophysiology
Fall. 4(3-1) Approval of department.

Neuroanatomical and neurophysiological correlates of speech, language, and hearing.

880A. Algorithms for Speech and Hearing Sciences
Fall. 4(4-0)

A discussion of useful algorithms applicable to quantification of phenomena related to audiology and speech sciences.

880B. Acoustic Phonetics
Winter. 4(2-2) ASC 880A or approval of department.

An analytic study of the acoustics of speech.

880C. Instruments and Electronics for Audiology and Speech Sciences
Spring. 4(3-3) ASC 880B or approval of department.

A discussion of the electronic principles and instruments necessary to measure parameters related to hearing and speech processes.

880D. Experimental Phonetics
Summer. 4(4-0) ASC 880C or approval of department.

Critical review of the literature in experimental phonetics. Selected papers on acoustic and physiological phonetics and related fields are presented in seminar fashion.

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.

BIOCHEMISTRY BCH

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

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. Variable credit. 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
(363.) Winter, Summer. 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
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 the properties and functions of biomolecules, energy-yielding and energy-requiring processes, and the transfer of genetic information.

452. Biochemistry
Winter. 3(3-0) BCH 451.
Continuation of BCH 451.

453. Biochemistry
Spring. 3(3-0) BCH 452.
Continuation of BCH 452.

499. Research
Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 12 credits. Approval of department.
A course designed to give qualified undergraduate students an opportunity to gain experience in biochemical research.

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
Fall. 3(3-0) BCH 501 or approval of department.
A continuation of BCH 501.

503. Cell Biology
Fall. 5(5-0) Admission to the College of Human Medicine. Interdepartmental with the departments of Microbiology and Public Health, Physiology, and Pharmacology and Toxicology. Administered by the Department of Microbiology and Public Health.
Principles of cell biology for medical students.