ARTS AND LETTERS

College of Arts and Letters

390H. Perspectives in Literature
Fall. 4(3-0) Juniors, approval of the 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 the 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 field, and the preparation of a substantial paper.

392H. Perspectives in History
Spring. 4(3-0) Juniors, approval of the 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 development of new ideologies, and the developments of the power structure since 1945.

400. Arts Management
Fall, Winter, Spring. 3 to 5 credits.
May re-enroll 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.

ASTRONOMY

College of Natural Science

119. General Astronomy
Fall, Winter, Spring, Summer. 4(4-0)
Not open to engineering or physical science majors or minors.
Physical nature of solar system, star clusters, and galaxies as seen by modern astronomers. Limited opportunity for astronomical observations.

217. General Astronomy
Fall, Winter. 4(4-0) MTH 102.
Descriptive course intended primarily for physical science majors. A semi-quantitative discussion of time, telescopes, the solar system, stars, clusters of stars, galaxies, and cosmology. Limited opportunity for astronomical observations.

229. General Astronomy
Spring. 4(4-0) PHY 287 or 291 or concurrently. Students may not receive credit in more than one of the following: 119, 217, 229.
Fundamental observations in astronomy and their interpretation through physical laws. Intended for physical science majors and recommended for astrophysics majors. Quantitative discussion of orbital motion, time, telescopes, solar system, stars, galaxies, and cosmology. Limited opportunity for astronomical observations.

327. Practical Astronomy
Spring. 3(3-0) 217, MTH 113.

378. Contemporary Astronomy
Winter. 3(3-0) 119 or 217, MTH 113.
A continuation of 119 or 217 with particular emphasis on modern developments. Includes interstellar matter, star formation, stellar evolution through final stages, supernovae, pulsars, neutron stars, galaxies and cosmology.

437. Observatory Practice
Fall. 3(1-4) 327.

455. Astrophysics
Winter. 3(3-0) 217 or 229, PHY 289, or approval of department.
Application of physical principles to the atmospheres and interiors of stars to deduce their physical properties. Discussion of radiation spectra and gas properties.

459. Solar System Physics
Fall. 3(3-0) PHY 289 or approval of department.
Physical properties of the sun, interplanetary space, planets, and satellites as deduced from terrestrial observations and from space probes. Recent results of the NASA space program will be emphasized.

501. Seminar
Winter. 1(1-0) May re-enroll for a maximum of 3 credits. Graduate students or approval of department.
Seminars to be presented by both faculty and students to review papers in the current astronomical research literature.

519. Stellar Structure
Spring of even-numbered years. 3(3-0)
455 or PHY 395 or approval of department.
Physical properties of stars and interstellar material in our galaxy. Spiral structure. Galactic evolution.

539. Celestial Mechanics
Spring of even-numbered years. 3(3-0)
PHY 427 or approval of department.
Two-body, three-body, and N-body problems. Orbital elements, constancy of solid objects. Orbital motion and perturbations for planets, rockets, and satellites.

580. Ionized Gases
Spring. 3(3-0) E E 835 or PHY 445.
Graduate and administrative by Electrical Engineering.
Elastic collisions and scattering; Boltzmann equation; moment equations; basic plasma phenomena; motion of a charged particle in electrical and magnetic fields; individual and collective charged particle behavior.

859. Stellar Atmospheres
Spring of odd-numbered years. 3(3-0)
458 or PHY 395 or approval of department.
The physics of radiation and the equation of its transfer. Full ionization state, thermal and line absorption profiles. The gray atmosphere and calculation of model atmospheres.

860. General Relativity and Cosmology I
Fall of even-numbered years. 3(3-0)
PHY 559 or approval of department. Interdepartmental with and administered by the Physics Department.
Conceptual foundations of general relativity theory; elements of tensor calculus; Riemann-Christoffel curvature tensor; the field equations; experimental tests; special solutions; the extension to cosmology.

861. General Relativity and Cosmology II
Winter of odd-numbered years. 3(3-0)
860. Interdepartmental with and administered by the Physics Department.
Relativistic cosmology: the model universes; steady-state theory; observational evidence and possibilities for decision among models; current problems.

898. Waves and Radiations in Plasmas
Fall of even-numbered years. 3(3-0)
850. Interdepartmental with and administered by Electrical Engineering.
Plasma oscillation; interaction, electromagnetic fields with plasma, wave propagation in magnetosheath media; plasma sheath; radiation of electric source in incompressive and compressive plasmas; electroacoustic waves; magnetohydrodynamics; research topics in plasmas.

AUDIOLOGY AND SPEECH SCIENCES

College of Communication Arts

093. Remedial Speech
Fall, Winter, Spring, Summer. 0(2-0)
Special help in relieving or compensating for disorders of speech.

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

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

274. Structures and Functions of Speech and Hearing Mechanisms
(S54A., 475.) Fall, Winter. 3(3-0)
108 or approval of department.
Peripheral and central auditory mechanisms and the respiratory, phonatory, and articulatory mechanisms for speech.

276. Descriptive Phonetics
(375.) Winter. Spring. 3(3-0) 274 or approval of department.
Detailed description of the principles that underlie the production and perception of sounds.

277. Scientific Bases of Voice Communication Processes
(375.) Fall, Spring. 3(3-0) 276
and PHY 237 or approval of department.
Scientific bases of voice communication with special reference to the acoustic aspect of production.

A-18
772. Speech Pathology I
Fall, Winter. 5(3-0) 276, 277.
Etiology, symptomatology, and rationale of therapy for speech and language problems.

373. Clinical Procedures in Speech Pathology and Audiology
Winter, Spring. 4(2-2) 2.00 grade-point average in 277 and 372 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.

454. Audiology I
Fall, Spring. 5(4-1) 378, 277.
Fundamental aspects of hearing: nature, testing and rehabilitation.

460. Audiology II
Winter, Summer. 5(3-0) 454 or approval of department.
Theory and methodology in the teaching of lip-reading and auditory training to the acoustically handicapped.

470. Speech Correction for Teachers
Fall, Winter, Spring, Summer. 3(3-0)
Junior. Not open to speech pathology and audiology majors.
Meeting needs of the speech handicapped child in classroom.

474. Clinical Practice in Speech Correction
Fall, Winter, Spring, Summer. 1 to 3 credits. May re-enroll for credit. Six credits required for certification. No more than 2 credits may be taken during the preprofessional program. 572.

476. Speech Pathology II: Diagnostics
Fall, Winter, Spring, Summer. 5(3-2) 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) 372.
Must be taken prior to term of student teaching. Administration and organization, procedures and materials in public school speech and hearing therapy.

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

801. Advanced Study of Articulatory Behavior
Fall. 4(3-1) Approval of department.
Theoretical and pragmatic implications of the interrelationships of articulatory behavior and language production, especially as related to investigating procedures and results.

831. Speech and Hearing Problems of Adults
A. Neuropathologies of Speech
Winter. 4(3-0)
Neuropathology, symptomatology, and speech and language rehabilitation of adults.

B. Voice Disorders
Spring. 4(3-0)
Etiology, symptomatology, and therapeutic procedures for disorders of voice. Speech pathologist and audiologist in relation to other disciplines in the rehabilitation of adults with voice disorders.

832. Speech and Hearing Evaluation and Therapy
A. Hearing Handicap
Summer. 4(2-2)
A theoretical approach to the study of the aural rehabilitative process.

B. Cerebral Palsy
Spring. 4(3-0)
Etiology, symptomatology, structural and functional consideration of cerebral palsy. Therapeutic procedures for the speech of the cerebral palsied.

C. Delayed Language Development
Winter. 4(3-0)
Evaluative techniques including audiometry, psychometry, and case history as aids to the differential evaluation of delayed language development.

D. Mental Retardation
Summer. 4(3-0)
Language behavior and speech development of the mentally retarded as related to all facets of personal-social development and adjustment.

E. Stuttering
Summer. 4(3-0)
Longitudinal studies of stuttering theories and the therapies accompanying them.

F. Cleft Palate
Fall. 4(2-0)
Etiology, symptomatology, structural and functional consideration of cleft palate. Therapeutic procedures for the speech habilitation of cleft palate individuals.

833. Specialized Clinical Audiology
A. Differential Audiology
Fall. 4(3-0)
Pure tone audiometric tests as an aid to the oto­logist in evaluating the pathology of hearing loss; including the development of norms. Consideration of nongenetic loss.

B. Speech Audiology and Evaluation of Hearing Aids
Fall. 4(4-0)
Speech audiometry; principles and methods in the selection of hearing aids; physical characteristics of hearing aids.

C. Industrial Audiology
Spring.
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(3-1)
Theory, administration and evaluation of selected tests including Bekesy, EDR, EEG, and advanced speech-audiometric tests.

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; habilitative procedures for the acoustically handicapped child.

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
(854E.) Summer. 4(3-0)
Nature of auditory stimuli and the results of psychophysical experimentation in audition.

857. Speech and Hearing Problems in Public Schools
Summer. 4(3-0) May re-enroll 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.

856. Communication Disorders: Neuroanatomy-Neurophysiology
Fall. 4(3-1) Approval of department.
Neuroanatomical and neurophysiological correlates of speech, language, and hearing.

858A. 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.

858B. Acoustic Phonetics
(875C.) Winter. 4(2-2) 850 or approval of department.
An analytic study of the acoustics of speech.

858C. Instruments and Electronics for Audiology and Speech Sciences
(875A.) Spring. 4(3-3) 850B or approval of department.
A discussion of the electronic principles and instruments necessary to measure parameters related to hearing and speech processes.

858D. Experimental Phonetics
(875B.) Summer. 4(2-2) 850C or approval of department.
Critical review of the literature in experimental phonetics with special reference to the historical development of the field and subsequent experimentation in physiological and acoustical phonetics.

899. Research
Fall, Winter, Spring, Summer. Variable credit. Approval of department.

940. Seminar in Audiology and Speech Sciences
Spring. 4(3-0) May re-enroll for 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. 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

163. Biochemistry Laboratory
Spring. 2(0-0) Honors section of CRM 162, and approval of department.
Experimental aspects of biochemistry for biochemistry majors with an honors chemistry background.