

**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.

**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 and Justin Morrill Inter-College Programs.*

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**

**AST**

**College of Natural Science**

**115. Exploring Cosmology**

*Spring. 2(2-0) Not open to engineering or physical science majors.*

Nonmathematical view of the origin, history, and overall structure of the universe, based on the Big Bang model of cosmology.

**117. Introductory Observing**

*Fall, Spring. 2(1-2) AST 119, or AST 217, or AST 229 or concurrently and approval of department.*

Observations of celestial objects, constellation identification, and occasional planetarium exercises.

**119. General Astronomy (N)**

*Fall, Winter, Spring, Summer. 4(4-0) Not open to engineering or physical science majors. Students may not receive credit in more than one of the following: AST 119, AST 217, AST 229.*

A qualitative presentation of man's current view of the universe including birth and death of stars, cosmology, comparisons of planets, and life in the universe.

**120. Topics in Astronomy**

*Winter, Spring. 4(4-0) AST 119.*

Detailed qualitative discussion of currently interesting topics in astronomy. May include such topics as quasars, pulsars, black holes, planetary exploration, cosmology, concepts of relativity.

**217. General Astronomy (N)**

*Fall, Winter, Spring. 4(4-0) MTH 109 or MTH 111. Students may not receive credit in more than one of the following: AST 119, AST 217, AST 229.*

Intended primarily for physical science majors. A semiquantitative presentation of current views of the universe including birth and death of stars, cosmology, comparisons of planets, and life in the universe.

**229. General Astronomy**

*Fall. 4(4-0) PHY 287 or PHY 291H or concurrently; MTH 113. Students may not receive credit in more than one of the following: AST 119, AST 217, AST 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.

**237. Introductory Observatory Laboratory**

*Fall. 1(0-3) AST 217 or AST 229 or concurrently.*

Photographic and spectroscopic telescopic observations. Darkroom processing.

**327. Practical Astronomy**

*Winter. 3(3-0) AST 217 or AST 229, MTH 113.*

Celestial coordinate systems. Time conversion and sidereal time. Atmospheric refraction, parallax, proper motion, aberration, and precession. Star catalogs and ephemerides. Finding charts and setting of equatorial telescopes.

**378. Contemporary Astronomy**

*Winter. 3(3-0) AST 217 or AST 229.*

A continuation of General Astronomy with particular emphasis on modern developments. May include such topics as planetary exploration, interstellar matter, star formation, stellar evolution through final stages, supernovae, pulsars, neutron stars, black holes, galaxies, and cosmology.

**437. Observatory Practice**

*Spring. 3(1-4) AST 327 and approval of department.*

Stellar photography. Photographic photometry. Photoelectric photometry and corrections for atmospheric extinction. Multicolor photometric systems. Astronomical spectroscopy and radial velocity determinations.

**451. Solar System Astrophysics**

*Fall. 3(3-0) PHY 427 or concurrently or approval of department.*

Application of physical principles to the study of the planets, satellites, asteroids, comets, and interplanetary dust and gas. Mechanics of solar system objects.

**452. Stellar and Interstellar Astrophysics**

*Winter. 3(3-0) PHY 364 or PHY 294 and PHY 395 or approval of department.*

Emission, absorption and transfer of radiation in stars and the interstellar medium. Application of physical principles to the study of the interstellar medium and stellar interiors. Evolution of stars.

**453. High-Energy Astrophysics**

*Spring. 3(3-0) PHY 364 or PHY 294 and PHY 395 or approval of department.*

Application of fundamental physical laws of mechanics, gravitation, and electromagnetism to the dynamics of star systems, X-ray and radio sources such as galaxies and close binary stars, and to cosmology.

**490. Special Problems**

*Fall, Winter, Spring, Summer. 1 to 5 credits. May reenroll for a maximum of 10 credits. Approval of department.*

Individual study or project under the direction of a faculty member. An oral report on the work may be required in department seminar.

**Descriptions – Astronomy and Astrophysics  
of  
Courses**

**800. Research Methods**

Fall, Winter, Spring, Summer. 2(0-6)  
May reenroll for a maximum of 6 credits. Beginning graduate students. Interdepartmental with and administered by the Department of Physics.

Problems and techniques of current research by taking part in the design and setup of experiments, data taking and reduction; study and practice of theoretical methods. Areas of study: solid state and molecular structure, nuclear, elementary particles, astronomy, astrophysics.

**801. Seminar**

Winter. 1(1-0) May reenroll for a maximum of 2 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.

**819. Stellar Structure**

Spring of even-numbered years. 3(3-0)  
AST 458 or PHY 395 or approval of department.

Physical properties of the stellar interior. Methods of calculating models. Stellar evolution. Comparison of theory with current observations.

Approved through Winter 1982.

**820. Advanced Topics in Astrophysics**

Winter. 3(3-0) May reenroll for a maximum of 15 credits. AST 452 or PHY 395 or PHY 429 or approval of department.

Possible topics include dynamics of stars in galaxies, astrophysical fluid dynamics, quasar theory, stellar atmospheres, stellar interiors, stellar spectroscopy, and stellar photometry.

**850. Electrodynamics of Plasmas I**

Fall. 3(3-0) E E 835 or PHY 448; E E 874. Interdepartmental with Electrical Engineering and the Department of Physics and administered by Electrical Engineering.

Boltzmann equation; moment equations; two-fluid theory of plasma, waves in cold, warm and anisotropic infinite plasma; waves in bounded plasma structures, energy flow in anisotropic plasmas.

**860. General Relativity and Cosmology I**

Fall of even-numbered years. 3(3-0)  
PHY 858 or approval of department. Interdepartmental with and administered by the Department of Physics.

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)  
PHY 860. Interdepartmental with and administered by the Department of Physics.

Relativistic cosmology: the model universes; steady-state theory; observational evidence and possibilities for decision among models; current problems.

**984. Advanced Readings in Physics or Astronomy**

Fall, Winter, Spring, Summer. Variable credit. Interdepartmental with and administered by the Department of Physics.

**989. Electrodynamics of Plasmas II**

Winter of odd-numbered years. 3(3-0)  
E E 850. Interdepartmental with the Department of Physics, and Electrical Engineering. Administered by Electrical Engineering.

One fluid plasma model, magnetohydrodynamics, Maxwell's stress tensor, low frequency waves, transport phenomena, Landau damping, collision and rate coefficients. Diffusions in a magnetic field; investigation of dc, rf and microwave discharges.

**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.

**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 the Department of 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 277 and ASC 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.

**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 372 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 372.  
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.