

## Arts and Letters—AL

**893A Internship in African American and African Studies I**  
Fall, Spring, Summer. 1 to 2 credits. RB: Courses in African American and African Studies. R: Open to students in African American and African Studies.

Supervised field work in an African American organization or institution. Direct and practical involvement in the community.

**893B Internship in Professional Writing**  
Spring. 3 to 6 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Permission of instructor required.

Internship in a corporate, organizational, or publishing setting. Classroom discussion of workplace issues and documents.

**893C Internship in African American and African Studies II**  
Fall, Spring, Summer. 1 to 2 credits. RB: Courses in African American and African Studies. R: Open to students in African American and African Studies.

Supervised field work in a Black organization or institution outside of the United States. Direct and practical involvement in a community outside of the United States.

**893D Internship in Literacy and Pedagogy**  
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Open only to graduate students in the Critical Studies in Literacy and Pedagogy major. Approval of college.

Supervised graduate practicums, observations, or internships in secondary or college writing and literacy classrooms

**898 Master's Research**  
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 3 credits in all enrollments for this course.

Directed research in support of Plan B Master's program requirements

**899 Master's Thesis Research**  
Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 15 credits in all enrollments for this course.

Directed research leading to a master's thesis, used in partial fulfillment of plan A master's degree requirements.

**980 Studies in Rhetoric**  
Spring. 3(3-0) A student may earn a maximum of 6 credits in all enrollments for this course. R: Open only to doctoral students in the College of Arts and Letters, the College of Education or approval of college. SA: ENG 980

Theories of rhetoric in historical and cultural context. Seminar topics variable by term.

**992 Seminar in Language Literacy and Pedagogy**  
Fall. 3(3-0) A student may earn a maximum of 9 credits in all enrollments for this course. R: Open only to doctoral students in the College of Arts and Letters or College of Education or approval of college. SA: ENG 992A

Teaching English literature, language, and composition.

**999 Doctoral Dissertation Research**  
Fall, Spring, Summer. 1 to 12 credits. A student may earn a maximum of 50 credits in all enrollments for this course.

Doctoral dissertation research.

## ASIAN LANGUAGES ASN

### Department of Linguistics and Germanic, Slavic, Asian and African Languages College of Arts and Letters

**290 Independent Study**  
Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 9 credits in all enrollments for this course. R: Approval of department.

Special projects in an Asian Languages arranged by an individual student and a faculty member in areas supplementing regular course offerings.

**291 Special Topics in Asian Languages**  
Fall. 1 to 4 credits. A student may earn a maximum of 8 credits in all enrollments for this course. Not open to students with credit in ASN 491.

Special topics supplementing regular course offerings proposed by faculty on a group study basis.

**401 East Asian Cultures (W)**  
Fall. 3(3-0) A student may earn a maximum of 6 credits in all enrollments for this course. P:M: (IAH 211B) and completion of Tier I writing requirement. SA: AL 401

Selected topics in the history and culture of China, Japan, and Korea. Topics vary.

**464 Studies in the Literature of Asia and the Asian Diaspora (W)**  
Spring. 3(3-0) A student may earn a maximum of 9 credits in all enrollments for this course. Interdepartmental with English. P:M: Completion of Tier I writing requirement.

Selected writers, genres, themes, or regions in Asian and Asian diasporic literature.

**490 Independent Study**  
Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 9 credits in all enrollments for this course. R: Open only to juniors or seniors. Approval of department.

Special projects in Asian Languages arranged by an individual student and a faculty member in areas supplementing regular course offerings.

**491 Special Topics in Asian Languages**  
Fall, Spring. 1 to 6 credits. A student may earn a maximum of 9 credits in all enrollments for this course. R: Open only to juniors or seniors. Approval of department.

Special topics supplementing regular course offerings proposed by faculty on a group study basis.

## ASTRONOMY AND ASTROPHYSICS AST

### Department of Physics and Astronomy College of Natural Science

**101 The Celestial Clockworks**  
Spring. 1(1-0)

Relationship between ancient skylore and timekeeping. Establishment of a calendar and celestial navigation. Development of the Greek horoscope as a time recorder and coordinate system.

**207 The Science of Astronomy**  
Fall. 3(3-0) P:M: (PHY 231 or concurrently or PHY 231B or concurrently or ISP 205 or concurrently or PHY 181B or concurrently or PHY 183 or concurrently or PHY 183B or concurrently or LBS 271 or concurrently or PHY 231C or concurrently) and (MTH 116 or concurrently or MTH 114 or concurrently or LBS 117 or concurrently) Not open to students with credit in AST 201.

In-depth study of one topic in astronomy with emphasis on key discoveries. Topics may be cosmology, the solar system, and the life of stars. Observing with portable telescopes.

**208 Planets and Telescopes**  
Spring. 3(2-2) P:M: (PHY 183 or PHY 183B or PHY 193H) and (MTH 132 or MTH 152H or LBS 118) RB: (AST 207) Not open to students with credit in AST 303.

Origin and nature of the solar system. Planets of the solar system and other star systems. Determination of time and celestial coordinates. Astronomical instruments and observational methods.

**301 Junior Research Seminar**  
Fall, Spring. 1(1-0) P:M: Completion of Tier I writing requirement.

Preparation and presentation of a review paper on a current topic in astronomy or astrophysics.

**303 Planetary System Astronomy**  
Fall of even years. 3(3-0) P:M: (PHY 183 or PHY 193H or PHY 183B) and (MTH 132 or MTH 152H or LBS 118) SA: AST 201

Origin and nature of the solar system. Planets of the solar system and other star systems. Asteroids, meteorites, and comets. Determination of time and celestial coordinates.

**304 Stars**  
Fall of even years. 3(3-0) P:M: (AST 208) and (PHY 215) and (PHY 321 or concurrently) SA: AST 401

Physical processes that determine the structure and evolution of stars. Observations of stars and star clusters. Spectra of stars.

**307 The Milky Way**  
Fall of odd years. 3(3-0) P:M: (PHY 183 or PHY 193H or PHY 183B) and (MTH 132 or MTH 152H or LBS 118) SA: AST 202

Structure and history of the Milky Way Galaxy. Stellar populations. Interstellar medium.

**308 Galaxies and Cosmology**  
Spring of odd years. 3(3-0) P:M: (AST 208) and (PHY 215) and (PHY 321 or concurrently) SA: AST 402

The Milky Way. Structure and content of galaxies. Active galaxies and quasars. The expanding universe. Modern cosmological models.

- 310 Directed Studies**  
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 4 credits in all enrollments for this course. R: Approval of department.  
Individual study or project in astronomy or astrophysics under the direction of a faculty member.
- 312 Observational Astronomy**  
Spring. 1(0-2) P:M: (AST 303 or AST 307)  
Basic observational techniques in astronomy. Stellar photometry and spectroscopy.
- 410 Senior Thesis**  
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 5 credits in all enrollments for this course. P:M: (AST 301) and completion of Tier I writing requirement.  
Design and execute an original experiment or computation. A written and oral report of the research is required.
- 800 Research Methods**  
Fall, Spring, Summer. 3(3-0) A student may earn a maximum of 12 credits in all enrollments for this course. RB: (AST 801)  
Apprenticeship in astrophysical research. Student will work closely with faculty member to learn research techniques.
- 801 Introduction to Astrophysics**  
Fall. 3(3-0)  
Survey of contemporary astrophysics. Stellar evolution, the structure of the Milky Way, the properties of external galaxies, and cosmology.
- 802 Techniques of Modern Astrophysics**  
Fall, Spring. 3 credits. RB: (AST 801)  
Students are introduced to modern astrophysics through participation in short projects involving literature surveys, professional planning, and research in observational, theoretical, and computational astrophysics.
- 805 Research Project**  
Fall, Spring. 3(0-3) A student may earn a maximum of 6 credits in all enrollments for this course.  
Research project to be completed under the guidance of an astronomy faculty member.
- 810 Radiation Astrophysics**  
Fall of odd years. 3(3-0)  
Transfer of radiation through plasmas and processes for emission and absorption of photons. Interpretation of the spectra of stars, the interstellar medium, and galaxies.
- 820 Advanced Topics in Astrophysics**  
Fall, Spring. 3(3-0) A student may earn a maximum of 9 credits in all enrollments for this course. RB: (AST 801)  
Advanced work in a specialized astrophysical topic.
- 825 Galactic Astronomy**  
Spring of odd years. 3(3-0)  
The Milky Way as a galaxy. Observations and techniques of theoretical analysis that are used to discover the features of our galaxy.
- 835 Extragalactic Astronomy**  
Fall of even years. 3(3-0)  
Galaxies beyond the Milky Way. Large-scale structure of the universe. Cosmology.
- 840 Stellar Astrophysics**  
Spring of even years. 3(3-0)  
Physics of stellar interiors. Methods for calculating stellar models. Principles of stellar evolution.

- 850 Electrodynamics of Plasmas**  
Spring of odd years. 3(3-0) Interdepartmental with Electrical and Computer Engineering; Physics. Administered by Department of Electrical and Computer Engineering. RB: (ECE 835 or PHY 488) SA: EE 850  
Plasma kinetic and macroscopic plasma transport theory. Electromagnetic wave propagation and charged particle diffusion processes in plasma. Electromagnetic energy absorption via elastic and inelastic collisions. Dc, rf, and microwave discharges.
- 860 Gravitational Astrophysics**  
Fall. 3(3-0) A student may earn a maximum of 6 credits in all enrollments for this course. RB: (PHY 820 and PHY 841)  
Experimental foundations, theory, and applications of gravitational physics and general relativity. Tests of the equivalence principle, modern solar system tests of general relativity, Schwarzschild metric, Hawking effect, Einstein's field equations.
- 861 Cosmology**  
Spring. 3(3-0) R: Open only to graduate students in the Department of Physics and Astronomy. SA: AST 860A  
Current research in cosmology: observational basis for the Big Bang, the cosmic background radiation, primordial nucleosynthesis, content and distribution of matter, cosmic geometry, growth of perturbations.
- 899 Master's Thesis Research**  
Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 36 credits in all enrollments for this course. R: Open only to graduate students in Astronomy and Astrophysics.  
MS Thesis Research
- 999 Doctoral Dissertation Research**  
Fall, Spring, Summer. 1 to 24 credits. A student may earn a maximum of 120 credits in all enrollments for this course. R: Open only to doctoral students in Astronomy and Astrophysics.  
Doctoral dissertation research.

## AUDIOLOGY AND SPEECH SCIENCES

### Department of Audiology and Speech Sciences College of Communication Arts and Sciences

- 203 Introduction to Communication Sciences and Disorders**  
Fall, Spring. 3(3-0) Not open to students with credit in ASC 403.  
Survey of research and practice regarding speech, hearing and language disorders in children and adults.
- 214 Anatomy and Physiology of the Speech and Hearing Mechanism**  
Fall. 4(3-2) P:M: (ASC 203 or concurrently)  
Structural and functional analyses of the central and peripheral auditory mechanisms, and of the respiratory, phonatory, and articulatory mechanisms for speech.

- 232 Descriptive Phonetics**  
Fall, Spring. 2(1-2)  
Principles of speech production. Transcription of speech using the International Phonetic Alphabet.
- 303 Hearing Science**  
Fall. 3(2-2) P:M: (MTH 106 or MTH 152H or MTH 110 or MTH 201 or MTH 116 or STT 200 or MTH 124 or STT 201 or MTH 132) RB: Completion of one ISP course. SA: ASC 255  
Physical and psychological aspects of sound and their measurement. Emphasis on the understanding of human communication and its disorders.
- 313 Speech Science**  
Spring. 3(2-2) P:M: (ASC 214 and ASC 232 or concurrently) RB: Completion of one ISP course SA: ASC 255  
Processes underlying the production and perception of speech. Understanding human communication and its disorders.
- 333 Oral Language Development**  
Fall, Spring. 3(3-0) P:M: (PSY 101 or LIN 200 or LIN 401 or ENG 302) R: Not open to freshmen.  
Development of receptive and expressive aspects of child language.
- 344 Evaluation Procedures in Audiology**  
Spring. 4(3-2) P:M: (ASC 303) and completion of Tier I writing requirement.  
Classification of hearing disorders. Behavioral and electrophysiological measurement of hearing, including subjective and objective testing procedures.
- 364 Evaluation Procedures in Speech-Language Pathology**  
Fall. 4(3-2) P:M: (ASC 313) and completion of Tier I writing requirement.  
Evaluation procedures in speech-language pathology. Test procedures. Analysis of results. Report writing.
- 394 Observation and Analysis of Clinical Practice**  
Fall, Spring, Summer. 1(0-2) P:M: (ASC 344 and ASC 364)  
Case presentations. Interviewing techniques. Behavioral observation and data collection. Behavior management. Counseling. Session plan and report writing.
- 403 Communication Sciences and Disorders**  
Fall. 3(3-0) R: Not open to freshmen or sophomores. Not open to students in the Department of Audiology and Speech Sciences. Not open to students with credit in ASC 203.  
Research and practice regarding communication disorders and the professions of speech-language pathology and audiology.
- 419 International Aspects of Communication Disorders**  
Spring, Summer. 1 to 6 credits. A student may earn a maximum of 9 credits in all enrollments for this course. P:M: (ASC 214 and ASC 303 and ASC 313 and ASC 333) R: Approval of department.  
Human communication disorders in international settings.