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 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.: 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 topics 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
Department of Physics and Astronomy
College of Natural Science

101 The Celestial Clockworks
Spring. 1(1-0) Relationship between ancient skylines 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 PHY 2105 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.

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.


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). R.B.: (AST 207). Not open to students with credit in AST 303.

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. Intergalactic 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.
110 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, 10(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. Students 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(3-0) 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)

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 620 and PHY 641) 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.

881 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. 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.

999 Doctoral Dissertation Research
Fall, Spring. 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.

Department of Audiology and Speech Sciences

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 auditory and speech disorders.

214 Anatomy and Physiology of the Speech and Hearing Mechanism
Fall. 4(3-2) P.M.: (ASC 203 or concurrently) Structural and functional aspects of the central and peripheral auditory mechanisms, and of the respiratory, phonatory, and articular 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) R: 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) R: 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 electrophysiologiogical 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

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.