ASTRONOMY* AST

College of Natural Science

119. *General Astronomy*

(PHY 119.) Winter, Spring, Summer. 4(4-0) Not open to engineering or physical science majors. Students may not receive credit in both 119 and 217.

Physical nature of solar system, star clusters, and galaxies as seen by modern astronomers. Limited opportunity for astronomical observations.

217. *General Astronomy*

(PHY 217.) Fall, Winter. 4(4-0) MTH 102. Students may not receive credit in both 217 and 119.

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.

327. *Practical Astronomy*

Fall. 3(3-0) 217, 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.

437. *Observatory Practice*

Fall. 3(1-4) 217 and MTH 113.

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

458. *Astrophysics*

Winter. 3(3-0) PHY 289 or approval of department.

Properties of a gas under conditions of astrophysical interest. Atomic spectroscopy. Emission and absorption of radiation. Physical properties of stellar atmospheres and other astronomical objects as inferred from the spectra.

459. *Solar System Physics*

Spring. 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.

490. *Special Problems*

Fall, Winter, Spring, Summer. 1 to 5 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.

819. *Stellar Structure*

Spring. 3(3-0) 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.

828. *Galactic Structure*

Winter of even-numbered years. 3(3-0) PHY 427 or approval of department.

Distribution and dynamics of stars and interstellar material in our galaxy. Spiral structure. Galactic evolution.

839. *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. Potential of solid objects. Orbital motion and perturbations for planets, rockets, and satellites.

* Effective Fall 1966. Formerly part of Department of Physics and Astronomy.

850. *Ionized Gases*

Spring. 3(3-0) E E 835 or PHY 448. Interdepartmental with and administered by the Electrical Engineering Department.

Elastic collision processes; Boltzmann equation; moment equations; basic plasma phenomena; motion of a charged particle in electrical and magnetic field; individual and collective charged particle behavior.

989. *Waves and Radiations in Plasmas*

Fall of even-numbered years. 3(3-0) E E 850. Interdepartmental with and administered by the Electrical Engineering Department.

Plasma oscillation; interaction, electromagnetic fields with plasmas, wave propagation in magnetionic media; plasma sheath; rediation of electric source in incompressive and compressive plasmas; electroacoustic waves; magnetohydrodynamics; research topics in plasmas.

AUDIOLOGY AND SPEECH SCIENCES* ASC

College of Communication Arts

093. *Remedial Speech*

Fall, Winter, Spring, Summer. 0(2-0) [2(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, Summer. 3(2-0)

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

276. *Descriptive Phonetics*

(275.) Fall, Spring. 3(2-2)

Detailed description of the principles that underlie the production of speech sounds.

277. *Scientific Bases of Voice Communication Process*

(275.) Winter, Spring. 3(3-0)

Scientific bases of voice communication with special reference to the acoustic aspect of production.

372. *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, Summer. 4(2-2)

Principles underlying the clinical interview and client relationships essential to diagnosis and therapy. Procedures in obtaining, recording, and evaluating test results and therapeutic methods.

454. *Audiology I*

Fall, Winter, Spring, Summer. 5(3-0) 276, 277.

Fundamental aspects of hearing; nature, testing and rehabilitation.

460. *Audiology II*

Winter. 5(3-0) 454 or approval of department.

Theory and methodology in the teaching of lipreading and auditory training to the acoustically handicapped.

*Effective July 1, 1967. Courses formerly in Speech Department.

† See page A-2 item 3

470. *Speech Correction for Teachers*

Fall, Winter, Spring, Summer. 3(3-0) Juniors. Not open to speech pathology and audiology majors.

Meeting needs of the speech handicapped child in classroom.

473. *Speech Pathology II*

Spring. 5(3-0) 372 or approval of department.

Etiology and symptomatology of disorders of the nervous system and maxillo-facial anomalies resulting in speech and/or language problems of children.

474. *Clinical Practice in Speech Correction*

Fall, Winter, Spring, Summer. 1 to 3 credits. May re-enroll for credit. Six credits required for certification. 372.

475. *Structures and Functions of Speech and Hearing Mechanisms*

(854A.) Winter. 3(3-0) Approval of department.

Peripheral and central auditory mechanisms and the respiratory, phonatory and articulatory mechanisms for speech.

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.

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 Loss

Summer. 4(2-0)

Review, evaluation, and development of techniques employed in lipreading training, auditory training, hearing aid orientation, and counseling for the acoustically handicapped.

B. Cerebral Palsy

Spring. 4(2-1)

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

Winter. 4(3-0)

Language behavior and speech development of the mentally retarded as related to all facets of personal-social development and adjustment.