

**Descriptions—Astronomy and Astrophysics
of
Courses**

**ASTRONOMY AND
ASTROPHYSICS** **AST**

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

201. Astrophysics and Astronomy I
Fall, 3(4-0)
P: PHY 183 or PHY 183B or PHY 193H; MTH 132
or MTH 152H.
Overview of the universe: the celestial sphere, orbits,
spectra, the solar system, stars, and stellar evolution.
QP: PHY 28,7 PHY 291H, MTH 113 QA: AST 229,
AST 217

202. Astrophysics and Astronomy II
Spring, 4(3-12)
P: AST 201; PHY 184 or PHY 184B or PHY 294H;
MTH 234 or MTH 254H, or concurrently.
Interstellar medium, the milky way, galaxies, and the
large-scale structure of the universe. Coordinate
systems, instruments, and data analysis.
QP: AST 229 QA: AST 230, AST 327

301. Junior Research Seminar
Spring, 1(1-0) A student may earn a maxi-
mum of 4 credits in all enrollments for this course.
P: AST 202.
Preparation and presentation of a review paper on
a current topic in astronomy or astrophysics.
QP: AST 230, AST 327 QA: AST 399

310. Directed Studies
Fall, Spring, Summer, 1 to 3 credits. A
student may earn a maximum of 6 credits in all
enrollments for this course.
P: AST 202. R: Approval of department.
Individual study or project in astronomy or astrophys-
ics under the direction of a faculty member.
QP: AST 230 QA: AST 490

401. Stars
Fall, 3(3-0)
P: AST 202, PHY 321 or concurrently.
Physical processes that determine the structure and
evolution of stars. Results of stellar evolution theory.
Stellar atmospheres. Observations of stars.
QP: AST 327, PHY 396 QA: AST 442

402. Galaxies
Spring, 3(3-0)
P: AST 401, PHY 481.
Contents and dynamics of the milky way. Mass and
luminosity distributions of galaxies. Stellar popula-
tions. The interstellar medium. Evolution of galaxies.
Active galactic nuclei.
QP: PHY 427, PHY 447 QA: AST 462, AST 463

410. Senior Thesis
Fall, Spring, 1 to 4 credits. A student may
earn a maximum of 4 credits in all enrollments for
this course.
R: Open only to seniors in Astrophysics.
Design and execute an original experiment or compu-
tation. A written and oral report of the research is
required.
QA: AST 406

800. Research Methods
Fall, Spring, Summer, 3(3-0) A student
may earn a maximum of 6 credits in all enroll-
ments for this course.
P: AST 801.
Apprenticeship in astrophysical research; student will
work closely with individual faculty member learning
research techniques.
QA: PHY 800

801. Introduction to Astrophysics
Fall, 3(3-0)
Survey of contemporary astrophysics. Stellar evolu-
tion, the structure of the Milky Way, the properties
of external galaxies, and cosmology.

810. Radiation Astrophysics
Spring of even-numbered years. 3(3-0)
P: AST 801.
Transfer of radiation through plasmas and processes
for emission and absorption of photons. Interpretation
of the spectra of stars, interstellar medium, and
galaxies.
QA: AST 442

**820. Advanced Topics in Astrophysics
(MTC)**
Fall, Spring, 3(3-0) A student may earn a
maximum of 9 credits in all enrollments for this
course.
P: AST 801.
Advanced work in a specialized astrophysical topic.
QA: AST 820

830. Galactic and Extragalactic Dynamics
Fall of even-numbered years. 3(3-0)
P: AST 801, PHY 820.
Implications of gravitational dynamics and stellar
evolution on galactic and extragalactic systems.

840. Stellar Astrophysics
Spring of odd-numbered years. 3(3-0)
P: AST 801.
Physics of stellar interiors. Methods for calculating
stellar models. Principles of stellar evolution.
QA: AST 820

**860. Gravitational Astrophysics and
Cosmology (MTC)**
Fall, Spring, 3(3-0) A student may earn a
maximum of 6 credits in all enrollments for this
course.
Topics in general relativity, gravitational astrophys-
ics, and cosmology.
QA: PHY 860, PHY 861

**870. Astronomical Instrumentation and
Data Analysis**
Fall of odd-numbered years. 3(3-0)
P: AST 801.
Theory and techniques of astronomical data acqui-
sition and analysis.

**AUDIOLOGY AND SPEECH
SCIENCES** **ASC**

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

**113. Oral Communication Principles and
Skills**
Fall, Spring, Summer, 3(2-2)
Study, development and enhancement of oral commu-
nication skills including speech, voice, language and
listening.
QP: COM 115 QA: ASC 108

**203. Introduction to Communication
Sciences and Disorders**
Fall, Spring, 3(3-0)
R: Not open to students with credit in ASC 403.
Survey of research and practice regarding speech,
hearing and language disorders in children and
adults.
QA: ASC 201, ASC 470

**214. Anatomy and Physiology of the
Speech and Hearing Mechanism**
Fall, 4(3-2)
P: ASC 203 or concurrently.
Structural and functional analyses of the central and
peripheral auditory mechanisms, and of the respira-
tory, phonatory, and articulatory mechanisms for
speech.
QP: ASC 108 QA: ASC 274

232. Descriptive Phonetics
Fall, 2(1-2)
Principles of speech production. Transcription of
speech using the International Phonetic Alphabet.
QP: ASC 274 QA: ASC 276

255. Speech and Hearing Sciences
Spring, 5(4-2)
P: ASC 214, ASC 232 or concurrently, MTH 110 or
MTH 116, one ISP course. R: Not open to freshmen.
Application of the scientific method to the studies of
audition, speech perception and speech production.
QP: ASC 274, ASC 276 QA: ASC 277

333. Oral Language Development
Fall, Spring, 3(3-0)
P: ASC 203 or one LIN course or one PSY course. R:
Not open to freshmen.
Development of receptive and expressive aspects of
child language.
QA: ASC 222

344. Evaluation Procedures in Audiology
Fall, 4(3-2)
P: ASC 255.
Classification of hearing disorders. Behavioral and
electrophysiological measurement of hearing, includ-
ing subjective and objective testing procedures.
QP: ASC 276, ASC 277 QA: ASC 454

**364. Evaluation Procedures in
Speech-Language Pathology**
Fall, 4(3-2)
P: ASC 333. R: Open only to Audiology and Speech
Sciences majors.
Evaluation procedures in speech-language pathology,
test procedures, evaluation of results, and report
writing.
QP: ASC 201, ASC 277 QA: ASC 373

**403. Communication Sciences and
Disorders**
Fall, 3(3-0)
R: Not open to freshmen and sophomores. Not open
to Audiology and Speech Sciences majors. Not open
to students with credit in ASC 203.
Research and practice regarding communication
disorders and the professions of speech-language
pathology and audiology.
QP: ASC 201 QA: ASC 470, ASC 201

**433. Language Dialect Differences in
Applied Contexts**
Spring, 3(3-0)
R: Not open to freshmen and sophomores.
Regional, ethnic, and cultural characteristics of Amer-
ican English. Comparison of speech-language differ-
ences and disorders.
QA: ASC 444

443. Aural Rehabilitation
Spring, 3(3-0)
P: ASC 344.
Fundamental aspects of auditory rehabilitation, in-
cluding individual and group amplification systems,
auditory training, speechreading, and counseling with
children and adults.
QP: ASC 454 QA: ASC 460

**463. Intervention Procedures in
Speech-Language Pathology**
Spring, 3(3-0)
P: ASC 364. R: Open only to Audiology and Speech
Sciences majors.
Intervention procedures for individuals with develop-
mental and acquired communication disorders.
QP: ASC 373 QA: ASC 476

**483. School-Based Communication
Disorders Programs**
Spring, 3(3-0)
P: ASC 463, ASC 494 or concurrently. R: Open only
to Audiology and Speech Sciences majors.
Administrative and regulatory aspects of school-based
programs for persons with communication disorders.
QP: ASC 201, ASC 373 QA: ASC 477

490. Independent Study
Fall, Spring, Summer, 1 to 4 credits. A
student may earn a maximum of 8 credits in all
enrollments for this course.
R: Approval of department, application required.
Individualized student activities in human communi-
cation sciences and disorders.
QA: ASC 499

- 494. Clinical Practicum in Communication Disorders**
Fall, Spring, Summer. 1 credit. A student may earn a maximum of 2 credits in all enrollments for this course.
P: ASC 463. R: Open only to Audiology and Speech Sciences majors. Approval of department. Supervised provision of clinical services to individuals with speech, language and/or hearing disorders.
QP: ASC 201, ASC 373 QA: ASC 474
- 803. Research Methods in Communication Sciences and Disorders**
Fall. 3(3-0)
R: Open only to graduate students in Audiology and Speech Sciences.
Hypothesis generation, experimental design, data collection, data analysis and presentation.
- 813. Neuroanatomy and Neurophysiology of Speech, Language, and Hearing**
Fall. 3(3-0)
R: Open only to graduate students in Audiology and Speech Sciences.
Structural and functional descriptions of the nervous system as it relates to communication sciences and disorders.
QA: ASC 876
- 823A. Acquired Language Disorders**
Spring. 3(3-0)
P: ASC 813 or concurrently. R: Open only to graduate students in Audiology and Speech Sciences.
Neuropathology, symptomatology, and speech-language rehabilitation of individuals with aphasia and related disorders.
QP: ASC 876 QA: ASC 841A
- 823B. Motor Speech Disorders**
Fall. 3(3-0)
P: ASC 813 or concurrently. R: Open only to graduate students in Audiology and Speech Sciences.
Neuropathology, symptomatology, and speech-language habilitation and rehabilitation of individuals with motor speech disorders.
QP: ASC 876 QA: ASC 841B
- 823C. Voice Disorders**
Summer. 3(3-0)
R: Open only to graduate students in Audiology and Speech Sciences.
Etiology, symptomatology, diagnosis, and treatment of voice disorders in children and adults.
QA: ASC 841C
- 823D. Fluency Disorders**
Fall. 3(3-0)
R: Open only to graduate students in Audiology and Speech Sciences.
History, theories, symptomatology, diagnosis, and treatment of fluency disorders in children and adults.
QA: ASC 841D
- 823E. Assessment of Childhood Language Disorders**
Fall. 3(3-0)
R: Open only to graduate students in Audiology and Speech Sciences.
Evaluation of language disorders of preschool, school-aged, and adolescent populations.
QA: ASC 841F
- 823F. Language Intervention: Early Stages**
Spring. 3(3-0)
P: ASC 823E or approval of department. R: Open only to graduate students in Audiology and Speech Sciences.
Principles of intervention in language disorders for children functioning at or below preschool levels, regardless of chronological age.
QP: ASC 841F QA: ASC 841G
- 823G. Language Intervention: Later Stages**
Summer. 3(3-0)
P: ASC 823E or approval of department. R: Open only to graduate students in Audiology and Speech Sciences.
Principles of intervention in language disorders for school-age children and adolescents functioning above preschool levels.
QP: ASC 841F QA: ASC 841H
- 823X. Augmentative Communication**
Fall. 3(3-0)
R: Open only to graduate students in Audiology and Speech Sciences.
History and philosophy of augmentative communication. Assessment, system selection, and intervention considerations for aided and unaided systems. Topics include synthesized voice output and micro-processor-based systems.
QA: ASC 842
- 833. Auditory Psychophysics**
Spring. 3(3-0)
P: ASC 803 or concurrently. R: Open only to graduate students in Audiology and Speech Sciences.
Psychophysical theory and methods as applied to the study of hearing phenomena.
QP: COM 405 QA: ASC 854
- 843A. Hearing Assessment**
Fall. 3(3-0)
R: Open only to graduate students in Audiology and Speech Sciences.
Clinical evaluation of hearing. Pure tone and speech audiometry. Immittance testing.
QA: ASC 833A, ASC 833B
- 843B. Differential Diagnostic Audiology**
Spring. 3(3-0)
P: ASC 843A. R: Open only to graduate students in Audiology and Speech Sciences.
Tests of peripheral and central auditory function for differential diagnosis of hearing impairment.
QP: ASC 833A QA: ASC 833B
- 843C. Hearing Amplification and Rehabilitation**
Spring. 3(3-0)
P: ASC 843A. R: Open only to graduate students in Audiology and Speech Sciences.
Clinical management of the hearing impaired. Amplification and other forms of aural rehabilitation.
QP: ASC 833A QA: ASC 833I, ASC 833G
- 843D. Electrophysiologic Assessment**
Fall. 3(3-0)
P: ASC 813 or concurrently. R: Open only to graduate students in Audiology and Speech Sciences.
Theory and methods of electrophysiologic testing of the auditory and vestibular systems.
QP: ASC 876 QA: ASC 833H, ASC 833J
- 843E. Special Populations in Audiology**
Summer. 3(3-0)
P: ASC 843C. R: Open only to graduate students in Audiology and Speech Sciences.
Audiologic considerations and evaluative procedures for infant, pediatric, mentally-impaired, multiply-handicapped, and geriatric populations.
QP: ASC 833A, ASC 833G, ASC 833I QA: ASC 833E, ASC 833F
- 843F. Hearing Conservation**
Fall. 3(3-0)
P: ASC 833, ASC 843A, or approval of department. R: Open only to graduate students in Audiology and Speech Sciences.
Hearing conservation programs in occupational, educational, and community settings. The role of the audiologist.
QP: ASC 854, ASC 833A QA: ASC 833C
- 890. Independent Study**
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 8 credits in all enrollments for this course.
R: Open only to M.A. students in Audiology and Speech Sciences. Approval of department.
Individualized study under faculty direction.
QA: ASC 990
- 894A. Clinical Practicum in Speech-Language Pathology**
Fall, Spring, Summer. 1 credit. A student may earn a maximum of 6 credits in all enrollments for this course.
R: Open only to graduate students in Audiology and Speech Sciences. Approval of department.
Supervised clinical experience in the management of clients with speech-language disorders.
QA: ASC 875A
- 894B. Clinical Practicum in Audiology**
Fall, Spring, Summer. 1 credit. A student may earn a maximum of 6 credits in all enrollments for this course.
R: Open only to graduate students in Audiology and Speech Sciences. Approval of department.
Supervised clinical experience in the management of clients with hearing disorders.
QA: ASC 875B
- 899. Master's Thesis Research**
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 6 credits in all enrollments for this course.
R: Open only to graduate students in Audiology and Speech Sciences. Approval of department.
QA: ASC 899
- 914A. Speech Production and Perception I**
Fall of even-numbered years. 4(3-2)
P: ASC 803 or concurrently. R: Open only to graduate students in Audiology and Speech Sciences.
Classroom and laboratory study of issues regarding speech production and perception.
QP: COM 405
- 914B. Speech Production and Perception II**
Spring of even-numbered years. 4(3-2)
P: ASC 914A. R: Open only to graduate students in Audiology and Speech Sciences.
Further classroom and laboratory study of issues regarding speech production and perception.
- 990. Independent Study**
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 16 credits in all enrollments for this course.
R: Open only to Ph.D. students. Approval of department.
Individualized study under faculty direction.
QA: ASC 990
- 991. Special Topics in Communication Sciences and Disorders**
Fall, Spring, Summer. 3(3-0) A student may earn a maximum of 12 credits in all enrollments for this course.
R: Open only to graduate students in Audiology and Speech Sciences.
Topics vary.
- 992. Seminar in Communication Sciences and Disorders**
Fall, Spring, Summer. 3(3-0) A student may earn a maximum of 12 credits in all enrollments for this course.
R: Open only to graduate students in Audiology and Speech Sciences.
Topics vary.
QA: ASC 940
- 994. Research Practicum in Communication Sciences and Disorders**
Fall, Spring, Summer. 1 credit. A student may earn a maximum of 12 credits in all enrollments for this course.
P: ASC 803 or concurrently. R: Approval of department.
Individual research under faculty supervision.
QP: COM 405
- 999. Doctoral Dissertation Research**
Fall, Spring, Summer. 1 to 24 credits. A student may earn a maximum of 99 credits in all enrollments for this course.
R: Open only to Ph.D. students in Audiology and Speech Sciences. Approval of department.
QA: ASC 999