825. Seminar in Art Education
Fall, Winter, Spring, Summer. 2 to 4 credits. May re-enroll for a maximum of 8 credits. Approval of department. Examination and discussion of contemporary thought in the field of art education. Current problems examined within an interdisciplinary framework.

826. Critical Theory and Aesthetic Experience in Art Education
Fall, Winter, Spring, Summer. 3(3-0) Approval of department. Theories of art criticism and aesthetic experience. Organization of these concepts for application to art education programs or related fields.

827. Curriculum Design for Art Education
Fall, Winter, Spring, Summer. 3(3-0) Approval of department. Factors affecting art curriculum; analysis, preparation and evaluation.

828. Research Methods for Art Education
Fall, Winter, Spring, Summer. 3(3-0) Approval of department. Orientation to research; designs and evaluation. 3 credits. May re-enroll for a maximum of 12 credits. Approval of department.

Supervised teaching of college classes in art practice.

999. Research
Fall, Winter, Spring, Summer. Variable credit. May re-enroll for a maximum of 36 credits. Approval of college.

ARTS AND LETTERS

ARTS AND LETTERS

College of Arts and Letters

390H. Perspectives in Literature
Fall. 4(3-0) Juniors, approval of the 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 the 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, discussions of major figures in the field, and the preparation of a substantial paper.

392H. Perspectives in History
Spring. 4(3-0) Juniors, approval of the 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.

450. Arts Management
Fall, Winter, Spring. 3 to 5 credits. May re-enroll 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.

999. Research
Fall, Winter, Spring, Summer. Variable credit. May re-enroll for a maximum of 36 credits. Approval of college.

ASTRONOMY AND ASTROPHYSICS*

Astronomy and Astrophysics — Descriptions of Courses

378. Contemporary Astronomy
Winter. 3(3-0) 119 or 217 or 229; MTH 113 recommended.

A continuation of General Astronomy with particular emphasis on modern developments. Includes interstellar matter, star formation, stellar evolution through final stages, supernovae, pulsars, neutron stars, galaxies and cosmology.

437. Observatory Practice
Fall. 3(1-4) 327.


458. Astrophysics
Winter. 3(3-0) 217 or 229, PHY 289, or approval of department.

Application of physical principles to the atmospheres and interiors of stars to deduce their physical properties. Discussion of radiation, spectra and gas properties.

459. Solar System Physics
Fall. 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.

460. Special Problems
Fall, Winter, Spring, Summer. 1 to 3 credits. May re-enroll 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.

800. Research Methods
Fall, Winter, Spring. 1 to 9 credits. May re-enroll for a maximum of 12 credits. Graduate students or approval of department.

801. Seminar
Winter. 1(0-2) 117, MTH 113. May re-enroll 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) or PHY 355 or approval of department.


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.

829. Extragalactic Astronomy and Observational Cosmology
Spring of even-numbered years. 3(3-0) Approval of department.

859. Stellar Atmospheres
Spring of odd-numbered years. 3(3-0)
305 or PHY 395 or approval of department.
The physics of radiation and the equation of its
transfer. The solar absorption coefficient and line
absorption profile. The gray atmosphere and calculation of model atmospheres.

860. General Relativity and Cosmology I
Fall of even-numbered years. 3(3-0)
PHY 305 or approval of department. Interdepart­
mental with and administered by the Physics
Department.
Conceptual foundations of general relativity
theory; elements of tensor calculus; Riemann:
Christoffel curvature tensor; the field equations;
experimental tests; special solutions; the exten­
tion to cosmology.

861. General Relativity and Cosmology II
Winter of odd-numbered years. 3(3-0)
860. Interdepartmental with and administered by the Physics Department.
Relativistic cosmology: the model universe;
stead-state theory; observational evidence and possibilities for decision among models; current
problems.

894. Advanced Readings in Physics or Astronomy
Fall, Winter, Spring, Summer. Variable
credit. Interdepartmental with and adminis­
tered by the Department of Physics.

859. Waves and Radiations in Plasmas
Fall of even-numbered years. 3(3-0)
850. Interdepartmental with the Physics De­
partment and Electrical Engineering, and ad­
imistered by Electrical Engineering.
Plasma oscillations; interaction, electromagnetic
fields with plasmas, wave propagation in mag­
netic, ionized media; plasma sheath; radiation of
electric source in incompressive and compres­
sive plasmas; electroacoustic waves; magneto­
hydrodynamics; research topics in plasmas.

274. Structures and Functions of Speech and Hearing Mechanisms
(854A, 475).
Fall, Winter. 3(3-0)
103 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) 274 or approval of
department.
Detailed description of the principles that un­
derlie the production of speech sounds.

277. Scientific Bases of Voice Communication Process
Fall, Spring. 3(3-0) 276 and PHY 337 or
approval of department.
Scientific bases of voice communication with
special reference to the acoustic aspect of pro­
duction.

278. Speech Pathology and Audiology
Winter, Summer. 3(3-0) 277, 276.
Etiology, symptomatology, and rationale of ther­
apy for speech and language problems.

279. Clinical Procedures in Speech Pathology and Audiology
Winter, Summer. 3(3-0) 276.
Fundamental aspects of normal hearing; hearing
problems, hearing tests.

444. Oral Language of Urban Areas
Winter, Summer. 3(3-0)
Concentration in the characteristics of language
and human communication as they relate to
studies and practices of those involved in urban
affairs.

454. Introduction to Audiology
Fall, Spring, 4(3-1) 277 and 276.
Etiology, symptomatology, and rationale of ther­
apy for speech and language problems.

460. Aural Rehabilitation
Winter Summer. 5(4-1) 454 or
approval of instructor.
Fundamental aspects of hearing aids, auditory
training, and speechreading for the hearing-
impaired person.

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.

474. Clinical Practicum in Speech and Language Pathology
Fall, Winter, Spring, Summer. 1
credit. May re-enroll for a maximum of 2
credits. Grade of 2.0 or better in both 378
and 373.
Therapeutic experience in speech and language
pathology.

476. Speech Pathology II: Diagnostics
Fall, Winter, Spring, Summer. 5(3-1) 274 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(3-1) 374.
Must be taken prior to and approved of 375.
Principles underlying the clinical interview and
client assessment in the selection of hearing
aids; physical characteristics of hearing aids.

499. Independent Study
Fall, Winter, Spring, Summer. 1 to 6
credits. May re-enroll for a maximum of 12
credits. Approval of department.

801. Advanced Study of Articulatory Behavior
Fall. 3(3-1) Approval of department.
Theoretical and pragmatic implications of the
interrelationships of articulatory behavior and
language production, especially as related to
investigating procedures and results.

831. Speech and Hearing Problems of Adults
A. NEUROPATHOLOGIES OF SPEECH
Winter. 4(3-0)
Neuropathology, symptomatology, and speech
and language rehabilitation of adults.

832. Speech and Hearing Evaluation and Therapy
A. HEARING HANDICAP
Spring. 4(3-1)
A theoretical approach to the study of the aural
rehabilitative process.

C. DELAYED LANGUAGE DEVELOPMENT
Winter. 4(3-0)
Evaluative techniques including audiology, psy­
chometry, and case history as aids to the differ­
ential evaluation of delayed language develop­
ment.

D. MENTAL RETARDATION
Summer. 4(3-0)
Language behavior and speech development of
the mentally retarded as related to all facets of
personal-social development and adjustment.

F. SPEECH DISORDERS
Fall. 4(3-0)
Etiology, symptomatology, structural and func­
tional consideration of cleft palate. Therapeu­
tic procedures for the speech of the cerebral
palsied.

833. Specialized Clinical Audiology
A. DIFFERENTIAL AUDIOMETRY
Fall. 4(3-0)
Pure tone audiometric tests as an aid to the
otologist in evaluating the pathology of hearing
loss; including the development of norms.
Consideration of nonorganic loss.

B. SPEECH AUDIOMETRY AND EVALU­
atIon of HEARING AIDS
Fall. 4(3-0)
Speech audiometry; principles and methods in the
selection of hearing aids; physical characteris­
tics of hearing aids.

C. INDUSTRIAL AUDIOMETRY
Spring. 4(3-0)
Evaluation of the role of the audiologist in indus­
try emphasizing identification procedures, dam­
gerisk criteria, measurement and control of
noise, conservation procedures, and medico-legal
problems.