PHY 125 or 131/133 or 141
Permission of instructor and department
Advanced status in one of the studio courses. Students may have prerequisites for this course, which may include a higher-level physics course. Students must supply their own 35 mm camera equipment. Estimated cost varies and includes the purchase of necessary equipment and materials. Students must supply their own 35 mm camera equipment. Estimated cost of supplies is $300.

ARS 471 Advanced Theory and Practice of Printmaking: Intaglio Processes
Continued development of intaglio techniques, emphasizing a variety of multi-plate and single-plate color printing processes, and tailored to the individual requirements of advanced students. May be repeated once.
Prerequisite: ARS 374
3 credits

ARS 472 Advanced Theory and Practice of Printmaking: Lithography
Continued development of lithographic techniques, emphasizing methods of stone and plate lithography and leading to the production of printed single- and multi-colored editions. May be repeated once.
Prerequisite: ARS 375
3 credits

ARS 475 Undergraduate Teaching Practicum I
Work with a faculty member as an assistant in one of the faculty member’s regularly scheduled classes. The student is required to attend all the classes, do all the regularly assigned work, and meet with the faculty member at regularly scheduled times to discuss the intellectual and pedagogical matters relating to the course.
Prerequisites: Studio art major; preferably U4 standing; sponsorship of an instructor; permission of department 3 credits, S/U grading

ARS 476 Undergraduate Teaching Practicum II
Work with a faculty member as an assistant in one of the faculty member’s regularly scheduled classes. The student is required to attend all the classes, do all the regularly assigned work, and meet with the faculty member at regularly scheduled times to discuss the intellectual and pedagogical matters relating to the course. Students assume greater responsibility in such areas as assisting in demonstrations and critiques, only under direct supervision of the instructor. The course in which the student is permitted to work as a teaching assistant must be different from the course in which he or she previously served.
Prerequisite: ARS 475; permission of department 3 credits, S/U grading

ARS 481 Photography III
Black-and-white photography stressing the theory and practice of 35 mm and medium-format equipment as an artistic tool for individual expression and communication. Emphasis is on the production of prints of outstanding quality and presentation through varied assignments (landscapes, abstracts, portraits, etc.) and equipment. Students must supply their own 35 mm camera equipment. Estimated cost of supplies is $300.
Prerequisite: ARS 381; permission of instructor after interview and review of portfolio 3 credits

ARS 482 Photography IV
Black-and-white photography stressing the theory and practice of communicative skills and presentation aimed at enabling serious photographic students to follow and develop their personal photographic and subject interests. Students work on several photographic essays throughout the semester. Students must provide their own 35mm equipment. Estimated cost of supplies is $300.
Prerequisites: ARS 381; permission of instructor after interview and review of portfolio 3 credits

ARS 487 Advanced Directed Projects in Studio Theory and Practice
Advanced independent projects for outstanding students under the supervision of a faculty member. May be repeated once for a maximum of six credits.
Prerequisites: Advanced status in one of the studio areas; sponsorship of a faculty member; permission of department 6-9 credits

ARS 488 Internship
Prerequisites: U3 or U4 standing; 15 credits in art department courses; permission of department 6-9 credits, S/U grading

ARS 491, 492 Special Topics in Studio Theory and Practice
Semester supplements to this Bulletin contain specific description when course is offered. May be repeated for credit as the topic changes.
Prerequisite: Permission of department 3 credits

ARS 495 Senior Honors Project in Studio Art
A one-semester project for studio art majors who are candidates for the degree with departmental honors.
Prerequisites: Permission of instructor and department 3 credits

AST 100 Astronomy Today
Seminar designed to introduce students to the excitement of modern astronomy, focusing on the most recent discoveries, as reported in the media. The course provides sufficient scientific background to enable students to understand the impact of these discoveries.
1 credit

AST 101-E Introduction to Astronomy
Description of planets, stars, galaxies, black holes, pulsars, quasars, supernovae, and white dwarfs. Mat’s place in the cosmos. Cosmological and cosmogonical theories. Two hours of lecture and one hour of recitation per week. Students with better science preparation are encouraged to take AST 203. Not for major credit. Not for credit in addition to AST 205.
Prerequisite: Satisfaction of entry skill in mathematics requirement (Skill 1) or satisfactory completion of D.E.C. C 3 credits

AST 105-E Introduction to the Solar System
A general survey of present knowledge of the planets, satellites, interplanetary medium, comets, asteroids, and outer regions of the sun. Begins with a historical introduction and discussion of the methods of science. Emphasizes current NASA deep-space exploration missions and other modern astronomical methods. Not for major credit. Not for credit in addition to AST 205.
Prerequisite: Permission of department 3 credits

AST 112 Astronomy Laboratory
An introduction to observational activities in astronomy. Students make astronomical measurements using simple instruments such as a quadrant, cross-staff, spectrometer, and telescope; analyze measurements; examine how quantities of interest and their errors are derived from the measurements and how they are properly reported. Not for major credit.
Pre- or Corequisite: AST 101 or 105 or 248 1 credit

AST 200 Current Astronomical Research at Stony Brook
Seminar designed to introduce students to astronomical research currently underway at Stony Brook. Faculty actively engaged in cutting edge research using facilities such as the Hubble space telescope, the CHANDRA X-Ray Observatory, and the Keck and Gemini telescopes, give presentations on their own research. Appropriate for students considering undergraduate research in astronomy as well as students interested in current astronomy.
1 credit

AST 203-E Astronomy
A survey of the physical nature of the universe for the student with some background in physics and mathematics. May not be taken for credit in addition to AST 101. An optional observing session is held one evening per week.
Prerequisite: PHY 125 or 131/133 or 141 3 credits

AST 205 Introduction to Planetary Sciences
An introduction to the solar system for the student with a background in mathematics or physical sciences. A survey of the planets, comets, asteroids, and leading to the production of printed single- and multi-colored editions. May be repeated once.
Prerequisite: PHY 125 or 131/133 or 141 3 credits

AST 248-H The Search for Life in the Universe
A study of the role of science in modern society through investigation of the question: Does life exist elsewhere in the universe? Topics include a review of the astronomical and biological settings; the origin of life on the earth and possibly elsewhere; the evolution of life and the development of intelligence and technology. Also discussed are the ramifications of the development of life and intelligence for the atmosphere and the biosphere.
Prerequisite: One D.E.C. category E course 3 credits

AST 277 Computation for Physics and Astronomy
An introduction to computing on UNIX/Linux computers. Fundamentals of using UNIX/Linux to write computer programs for numerical algorithms to solve computational physics and astronomy problems. Assignments are carried out in a high-level compiler programming language such as Fortran 90 or C++ and require extensive use of SINC site computers outside the classroom. This course is offered as both AST 277 and PHY 277.
3 credits

AST 287 Introductory Research in Astronomy
Independent research under the supervision of a faculty member, at a level appropriate for lower-division students. May be repeated.
Prerequisites: Permission of instructor and departmental research coordinator
Advisory Prerequisites: U1 or U2 standing; one AST course 0-3 credits

AST 301-H Collisions in the Solar System
A discussion of the evidence that comet and asteroid impacts have played a significant part in the evolution of the Earth, and other planets of the solar system, as well as an assessment of the actual and perceived hazard posed by terrestrial impacts and discussion of what can be done about it. The course follows a interdisciplinary approach and is not for major credit.
Prerequisites: A lower-division 3-4 credit AST course; MAT 125 or 121 or 141 or AMS 151; PHY 121/123 or 125 or 131/133 or 141 3 credits

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COURSE DESCRIPTIONS
AST 304 The Universe
The origin, evolution, and ultimate fate of the uni-
verse. The course begins with a historical approach
with emphasis on the evolution of cosmological ideas
from pre-Copernican universes to the Big Bang.
Consideration of the evolution of the universe from
the earliest moments after the Big Bang to the distant
future, including the formation of the galaxies, stars,
and planets. Not for major credit.
Prerequisites: A lower-division 3-4 credit AST course;
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Permission of instructor
MEC 111; MAT 132
AST 203; PHY 121/125 or 125 or 131/133 or 141
3 credits

AST 341 Stars and Radiation
An introduction to, and development of, a firm phys-
ical understanding of the observed properties of
stars. Topics include the structure of the interior and
atmosphere of stars, the transfer of energy by radia-
tion in plasmas, the evolution of stars, and the end
stages of stellar evolution, including white dwarfs,
neutron stars, black holes and supernovae, with care-
ful attention to the comparison of the predictions with
observations.
Prerequisites: AST 203; PHY 251/252; MAT 203 or 205
or 211 or AMS 261
3 credits

AST 345 Undergraduate Research in Astronomy
Student participation in faculty-directed research
projects.
Prerequisite: Permission of instructor
0-1 credits

AST 346 Galaxies
An introduction to the properties of galaxies, includ-
ing the Milky Way and others. Examination of the physical processes that govern the stars, dust, and gas
in galaxies. Stellar constituents of galaxies, equilibria
of collisionless systems, gas dynamics, and radiative
processes.
Prerequisites: AST 203; PHY 251/252; MAT 203 or 205
or 211 or AMS 261
3 credits

AST 347 Cosmology
An introduction to physical cosmology. Examination
of the physical properties that govern the galaxies and
intergalactic matter in the universe. Expansion of the
universe and the Friedmann equations, microwave
background variation, thermal history of the universe,
and nucleosynthesis.
Prerequisites: AST 203; PHY 251/252; MAT 203 or 205
or 211 or AMS 261
3 credits

AST 389-H Science Fiction
The literary genre called Science Fiction enables us to
imagine worlds, cultures and technologies
that have not yet existed. This course is offered as
AST 389 and EGL 389.

AST 443 Observational Techniques in
Optical Astronomy
An introduction to modern astronomical instrumenta-
tion and data handling and to the use of telescopes.
Emphasis on techniques and equipment appropriate
for wavelengths shorter than one micron. Extensive
laboratory and observing exercises are required.
Prerequisite: AST 205
4 credits

AST 447 Senior Tutorial in Astronomy
Independent readings in advanced topics to be
arranged prior to the beginning of the semester.
Weekly conferences are held with a faculty member.
May be repeated once.
Prerequisites: U4 standing; permission of instructor
1-3 credits

AST 475 Teaching Practicum in Astronomy
Supervision of laboratory or recitation sections under
the close guidance of the course instructor. Includes
regular meetings with the instructor for purposes of
planning and evaluation; supplementary reading in
preparation for laboratory or recitation sessions; and
opportunities to make oral presentations, provide indi-
vidual or innovative instruction, and reinforce previ-
ously acquired knowledge.
Prerequisites: U4 standing; permission of instructor
3 credits, S/U grading

AST 487 Senior Research in Astronomy
Under the supervision of a faculty member, a major in
the department may conduct research for academic
credit. A research proposal must be prepared by the
student and submitted to the department chairperson
for approval before the beginning of the semester in
which credit is to be given. A written report must be
submitted before the end of the semester. May be
repeated.
Prerequisite: Permission of instructor
0-6 credits, S/U grading

ATM 102-E Weather and Climate
Introduces the nature and causes of common metro-
alogical phenomena, severe weather occurrences,
and climatic patterns. Topics include formation and
movement of air masses and large-scale storms; tech-
niques for weather prediction; weather satellites; hur-
ricanes, tornadoes, and thunderstorms; cloud and pre-
cipitation types; the climatic history of the earth; and
actual and potential effect of human activities on
weather and climate, and of weather and climate on
humans. This course is offered as both ATM 102 and
EST 102.
3 credits

ATM 205-E Introduction to Atmospheric Sciences
A study of the nature and causes of atmospheric phe-
nomena, along with basic physical and chemical
processes and energetics. Topics include composition
and structure of the atmosphere, atmospheric ther-
modynamics, hydrostatics, solar and terrestrial radia-
tion, cloud and precipitation processes, elementary
dynamics, atmospheric wind and pressure patterns,
and severe storms.
Prerequisites: ENS/PHY 119 or PHY 121/125 or 125 or 131/133 or 141; MAT 125 or 131 or 141 or AMS 151
3 credits

ATM 237-H Current Topics in World
Climate and Atmosphere
An exploration of current concerns about the green-
house effect, acid rain, and global ozone loss, in a for-
mat accessible to non-science majors. The social and
political steps being taken to limit global atmospheric
pollution and climate change are discussed. Not for
major credit. This course is offered as both ATM 237
and PHY 237.
Prerequisites: One D.E.C. category E course; satisfac-
tion of entry skill in mathematics requirement
3 credits

ATM 247 Senior Tutorial in Atmosphere
Independent readings in advanced topics to be
arranged prior to the beginning of the semester.
Weekly conferences are held with a faculty member.
May be repeated once.
Prerequisites: U4 standing; permission of instructor
1-3 credits

ATM 305-E Global Atmospheric Change
An application of chemical principles to the analysis
and prediction of climate changes on earth. The
course analyzes climates that have occurred in the
earth’s past and uses this information to infer climate
changes that are likely to occur in the near and distant
future. Topics covered include atmospheric chem-
istry, paleoclimates, greenhouse warming, ozone
changes, and urban pollution.
Prerequisites: MAT 125 or 131 or 141 or AMS 151;
CHE 131 or 141
Advisory Prerequisite: One of the following: ENS/PHY
119, 132/134, 142, or 127
3 credits

ATM 320 Spatial Data Analysis Using
Matlab
Provides a working knowledge of the multivariate
analysis methods used in the earth and atmospheric
sciences and the Matlab programming tool. Topics
include regression, eigenvalue, principal component
analysis, and objective mapping.
Prerequisites: MEC 111; MAT 132
3 credits

ATM 345 Atmospheric Thermodynamics
and Dynamics
A quantitative introduction to the thermodynamical
and dynamical processes of Earth's atmosphere.
Topics include moist and dry thermodynamical
processes, hydrostatic stability, external forces of
atmospheric motion, equations of atmospheric
motions on a rotating planet, coordinate transforma-
tions, and horizontal motions under balanced forces.
Prerequisites: MAT 203 or 205 or AMS 261; MEC 111;
PHY 126/127 or 132/134 or 142
3 credits

ATM 346 Advanced Atmospheric Dynamics
Advanced concepts of mid-latitude and tropical atmos-
pheric motions, wave dynamics, and numerical meth-
ods. Topics include circulation and vorticity, turbu-
ence and boundary-layer structure, quasi-geostrophic
theory, large-scale and buoyancy-driven waves, baro-
clinic instability and energetics, equatorial wave theo-
ry, and barotropic and primitive equation models.
Prerequisites: ATM 345; MAT 303 or AMS 361
3 credits

ATM 347 Advanced Synoptic Meteorology
and Weather Forecasting
The application of dynamical and physical meteoro-
logy to the analysis and prediction of the atmosphere.
Topics include application of numerical and statistical
methods, diagnosis of vertical motion, development of
midlatitude synoptic systems, mesoscale phenomena
associated with cyclones, convective systems, and
radar applications. Laboratories include extensive
practice in forecasting and diagnosis of synoptic and
convective systems.
Prerequisites: ATM 346 and 348
3 credits

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