plaster, polyester resin, and metal. May be repeated once. Prerequisites: ARS 366 and ARH 342

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

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

ARS 475, 476 Undergraduate Teaching Practica I, 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. In ARS 475, 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. Prerequisites to ARS 475: Studio art major; preferably U4 standing; sponsorship of an instructor; permission of department. Prerequisites to ARS 476: ARS 475; permission of department. 3 credits per course, 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. Prerequisites: 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. Prerequisites: Advanced status in one of the studio areas; sponsorship of a faculty member; permission of department. 0-6 credits

ARS 488 Internship
Prerequisites: U3 or U4 standing; 15 credits in art department courses; permission of department. 0-6 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 per course

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 Astronomy

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 I
Description of planets, stars, galaxies, black holes, pulsars, quasars, supernovae, and white dwarfs. Man’s place in the cosmos and cosmological 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 201. Prerequisite: Satisfaction of entry skill in mathematics requirement (Skill I) 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, their satellites, the interplanetary medium, comets, asteroids, and outer regions of the sun. Begins with an 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. 3 credits

AST 112 Astronomy Laboratory
An introduction to observational activities in astronomy. Students make astronomical measurements using simple instruments such as a quadrant, crossstaff, 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. Prereq or Coreqquisite: 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 5 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 interplanetary medium, based upon the latest scientific discoveries. Not for credit in addition to AST 105. Prerequisite: PHY 125 or 131/133 or 141 5 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 historical 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 Computing for Physics and Astronomy Majors
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 computer programming language such as Fortran 90 or C++ and require extensive use of SINCE site computers outside the classroom. This course is offered as both AST 277 and PHY 277. 1 credit

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 Prerequisite: 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 hazards posed by terrestrial impacts and discussion of what can be done about it. The course follows an interdisciplinary approach and is not for major credit. Prerequisite: A lower-division 3-4 credit AST course; MAT 125 or 131 or 141 or AMS 151; PHY 121/123 or 125 or 131/133 or 141 5 credits

AST 304 The Universe
The origin, evolution, and ultimate fate of the universe. The course begins with a historical approach with emphasis on the evolution of cosmological ideas from geocentric 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; MAT 125 or 131 or 141 or AMS 151; PHY 121/123 or 125 or 131/133 or 141
3 credits

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 meteorological phenomena, severe weather occurrences, and climatic patterns. Topics include formation and movement of air masses and large-scale storms; techniques for weather prediction; weather satellites; hurricanes, tornadoes, and thunderstorms; cloud and precipitation 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 phenomena, along with basic physical and chemical processes and energetics. Topics include composition and structure of the atmosphere; atmospheric thermodynamics, hydrostatics, solar and terrestrial radiation, cloud and precipitation processes, elementary dynamics, atmospheric wind and pressure patterns, and severe storms.
Prerequisites: ENS/PHY 119 or PHY 126 and 127; CHE 131 or 141 or 198; 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 greenhouse effect, acid rain, and global ozone loss, in a format 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; satisfaction of entry skill in mathematics requirement
3 credits

ATM 247 Atmospheric Structure and Analysis
Real-world applications of basic dynamical principles to develop a physical understanding of various weather phenomena. Topics include the hypsometric equation, structure and evolution of extratropical cyclones, fronts, hurricanes, and convective systems, surface and upper air analysis techniques, radar and satellite interpretation, and introduction to operational products and forecasting. Two hours of lecture and one two-and-one-half hour laboratory per week. Laboratories include extensive practice in forecasting and diagnosis of synoptic and convective systems.
Prerequisites: ATM 346 and 348
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 transformations, and horizontal motions under balanced forces.
Prerequisites: ATM 203 or 205 or AMS 261; MEC 111; PHY 126 and 127 or 132/134 or 142
3 credits

ATM 346 Advanced Atmospheric Dynamics
General concepts of mid-latitude and tropical atmospheric motions, wave dynamics, and numerical methods. Topics include circulation and vorticity, turbulence and boundary-layer structure, quasi-geostrophic theory, large-scale and buoyancy-driven waves, baroclinic instability and energetics, equatorial wave theory, and barotropic and primitive equation models.
Prerequisites: ATM 345; MAT 305 or AMS 361
3 credits

ATM 347 Advanced Synoptic Meteorology and Weather Forecasting
The application of dynamical and physical meteorology to the analysis and prediction of the atmosphere. Topics include application of numerical and statistical models, diagnosis of vertical motion, development of mid-latitude 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

ATM 348 Atmospheric Physics
The application of the laws of physics to a variety of atmospheric phenomena and processes. Topics include cloud and precipitation processes with emphases on the microphysics, atmospheric electricity, solar and terrestrial radiation, photochemical processes, and boundary layer heat and mass transfer.
Prerequisite: ATM 346
3 credits

ATM 379 Air Pollution and Its Control
A detailed introduction to the causes, effects, and control of air pollution. The pollutants discussed include carbon monoxide, sulfur oxides, nitrogen oxides, ozone, hydrocarbons, and particulate matter. The emissions of these gases from natural and industrial sources and the principles used for controlling the latter are described. The chemical and physical transformations of the pollutants in the atmosphere are investigated and the phenomena of urban smog and acid rain are discussed.
Prerequisites: ENS/PHY 119 or PHY 132/134 or 142, or PHY 126 and 127; CHE 131 or 141 or 198; MAT 125 or 131 or 141 or AMS 151; U3 or U4 standing
3 credits