ASTRONOMY/PLANETARY SCIENCES (AST) - COURSES

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, the Keck and Gemini telescopes, or supercomputers 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: 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. Optional evening observing sessions with be held during the semester.

Prerequisite: PHY 125/133 or PHY 131/133 or PHY 141/133

DEC: E
SBC: STEM+
4 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 or GEO 106.

Prerequisite: PHY 125/133 or PHY 131/133 or PHY 141/133

SBC: STEM+
3 credits

AST 248: 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. E or SNW course

DEC: H
SBC: STAS
3 credits

AST 345: Undergraduate 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

SBC: EXP+
0-3 credits

AST 341: Stars and Radiation

An introduction to, and development of, a firm physical understanding of the observed properties of stars. Topics include the structure of the interior and atmosphere of stars, the transfer of energy by radiation in plasmas, the evolution of stars, and the end stages of stellar evolution, including white dwarfs, neutron stars, black holes and supernovae, with careful attention to the comparison of the predictions with observations.

Prerequisites: AST 203; PHY 251/252; MAT 203 or 211 or 307 or AMS 261

3 credits

AST 346: Galaxies

An introduction to the properties of galaxies, including 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.
AST 347: Cosmology
An introduction to physical cosmology. Examination of the physical universe and the Friedmann equations, microwave background variation, thermal history of the universe, and nucleosynthesis. Prerequisites: AST 203; PHY 251/252; MAT 203 or 211 or 307 or AMS 261
3 credits

AST 389: Science Fiction
The literary genre called Science Fiction enables us to explore our nature, and that of the universe we inhabit, by postulating worlds, cultures and technologies that do not (yet) exist, but could, and the consequences thereof. This course focuses on the sub-genre called hard science fiction, in which the science/technology is more or less plausible. Students should be prepared to address the genre from both its scientific and literary sides. This course is offered as both AST 389 and EGL 389.
Prerequisite: WRT 102; one D.E.C. B or HUM course; one D.E.C. E or SNW course
DEC: H
SBC: CER, STAS
3 credits

AST 390: Special Topics in Astrophysics and Cosmology
Covers selected topics in astrophysics and cosmology, such as black holes, neutron stars, and gravitational waves; computational astrophysics; astrobiology and exoplanets; high-energy astrophysics; etc. Topics may be repeated every few years. May be repeated to a maximum of 6 credits under different course topics.
Prerequisite: permission of the department and the following: AST 203, PHY 277, MAT 203 or 211 or 307 or AMS 261
3 credits

AST 443: Observational Techniques in Astronomy
An introduction to modern astronomical instrumentation 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 203
SBC: ESI, SPK
4 credits

AST 444: Experiential Learning
This course is designed for students who engage in a substantial, structured experiential learning activity in conjunction with another class. Experiential learning occurs when knowledge acquired through formal learning and past experience are applied to a "real-world" setting or problem to create new knowledge through a process of reflection, critical analysis, feedback and synthesis. Beyond-the-classroom experiences that support experiential learning may include: service learning, mentored research, field work, or an internship.
Prerequisite: WRT 102 or equivalent; permission of the instructor and approval of the EXP+ contract (http://sb.cc.stonybrook.edu/bulletin/current/policiesandregulations/degree_requirements/EXPplus.php)
SBC: EXP+
0 credit, S/U grading

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 458: Speak Effectively Before an Audience
A zero credit course that may be taken in conjunction with any AST course that provides opportunities to achieve the learning outcomes of the Stony Brook Curriculum's SPK learning objective.
Pre- or corequisite: WRT 102 or equivalent; permission of the instructor
SBC: SPK
0 credit, S/U grading

AST 459: Write Effectively in Astronomy/Planetary Sciences
A zero credit course that may be taken in conjunction with any 300- or 400-level AST course, with permission of the instructor. The course provides opportunities to practice the skills and techniques of effective academic writing and satisfies the learning outcomes of the Stony Brook Curriculum's WRTD learning objective.
Prerequisite: WRT 102; permission of the instructor
SBC: WRTD
0 credit, S/U grading

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 individual or innovative instruction, and reinforce previously acquired knowledge.
Prerequisites: U4 standing; permission of instructor
SBC: EXP+
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
SBC: EXP+
0-6 credits, S/U grading