ASTR - ASTRONOMY (ASTR)

ASTR 101 Basic Astronomy
Credits 3. 3 Lecture Hours.
(Requisites: ASTR 103 Basic Astronomy. A qualitative approach to basic stellar
astronomy; earth-moon-sun relationships then studies of distances to
stars, stellar temperatures, and other physical properties; birth, life on the
main sequence of the H-R diagram, and ultimate fates of stars; not open
to students who have taken ASTR 111 or ASTR 314.

ASTR 102 Observational Astronomy
Credit 1. 3 Lab Hours.
(Requisites: ASTR 1103 or PHYS 1103) Observational Astronomy. Observational and
laboratory course which may be taken in conjunction with ASTR 101 or
ASTR 314. Use of techniques and instruments of classical and modern
astronomy.
Prerequisite: ASTR 101 or ASTR 314, or registration therein.

ASTR 103 Introduction to Stars and Exoplanets
Credits 3. 3 Lecture Hours.
A qualitative study of stellar birth, stellar structure and evolution, stellar
nucleosynthesis, the Hertzsprung-Russell Diagram, white dwarfs, neutron
stars, supernovae, black holes, proto-planetary systems, origin of the
solar system and the search for exoplanets; utilizes active learning
methods that incorporate observations from the current generation of
ground and space-based telescopes. Open to all majors.

ASTR 104 Introduction to Galaxies and Cosmology
Credits 3. 3 Lecture Hours.
A qualitative study of properties of galaxies, galaxy evolution through
cosmic time, galactic archaeology, active galactic nuclei, super-massive
black holes, large-scale structure, the expansion history of the universe,
cosmological parameters and Big Bang nucleosynthesis; utilizes active
learning methods that incorporate observations from the current
generation of ground and space-based telescopes. Open to all majors.

ASTR 109/PHYS 109 Big Bang and Black Holes
Credits 3. 3 Lecture Hours.
Designed to give an intuitive understanding of the Big Bang and Black
Holes, without mathematics, and de-mystify them for the non-scientist.

ASTR 111 Overview of Modern Astronomy
Credits 4. 3 Lecture Hours. 2 Lab Hours.
(Requisites: ASTR 1303 and ASTR 1103, ASTR 1403, PHYS 1303 and PHYS 1103,
PHYS 1403) Overview of Modern Astronomy. Roots of modern astronomy;
the scientific method; fundamental physical laws; the formation of
planets, stars, and galaxies; introduction to cosmology; includes an
integrated laboratory that reinforces the lecture topics, including hands-
on experience with telescopes and imaging of celestial objects; not open
to students who have taken ASTR 101 or ASTR 314.

ASTR 119/PHYS 119 Big Bang and Black Holes: Laboratory Methods
Credit 1. 2 Lab Hours.
Hands-on understanding of the concepts surrounding the Big Bang and
Black Holes; emphasis on the evidence-based decision making process,
methods and presentation; for non-scientists. Companion course for
Prerequisite: ASTR/PHYS 109/ASTR 109 or registration therein.
Cross Listing: PHYS 119/ASTR 119.

ASTR 285 Directed Studies
Credits 1 to 4. 1 to 4 Other Hours.
Special work in laboratory or theory to meet individual requirements in
cases not covered by regular curriculum; intended for use as lower-level
credit.
Prerequisite: Approval of department head.

ASTR 289 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.
Selected topics in an identified area of astronomy. May be repeated for
credit.
Prerequisite: Approval of instructor.

ASTR 291 Research
Credits 0 to 4. 0 to 4 Other Hours.
Research conducted under the direction of faculty member in astronomy.
May be repeated 2 times for credit.
Prerequisites: Freshman or sophomore classification and approval of
instructor.

ASTR 314 Survey of Astronomy
Credits 3. 3 Lecture Hours.
Primarily for majors in science and engineering. Kepler's laws, law
of gravitation, solar system, stars, stellar evolution, nucleosynthesis,
cosmology, clusters, nebulae, pulsars, quasars, black holes.
Prerequisite: PHYS 207 or PHYS 208.

ASTR 320 Astrophysical Research Methods
Credits 3. 3 Lecture Hours.
Background and tools used in modern astrophysical research, including
reduction of photometric and spectroscopic data, signal-to-noise and
error calculations and order-of-magnitude estimates.
Prerequisite: Grade of C or better in ASTR 314 or approval of instructor.

ASTR 401 Stars and Extrasolar Planets
Credits 3. 3 Lecture Hours.
How stars are born, how internal structure changes, nuclear fuel burned
and ultimate fate; extrasolar planet detection, formation, properties and
habitability.
Prerequisite: ASTR 314.

ASTR 403 Extragalactic Astronomy and Cosmology
Credits 3. 3 Lecture Hours.
Physical makeup of individual galaxies and large scale structure in
the universe; origin and eventual fate of the universe; interpretation
of observational data as it relates to baryonic matter, Dark Matter and
cosmological models with Dark Energy.
Prerequisite: ASTR 314.

ASTR 404 Advanced Astrophysical Research Methods
Credits 3. 3 Lecture Hours.
Advanced research techniques used by modern-day astronomers
to obtain, process and analyze data from grounds and space-based
telescopes.
Prerequisites: Grade of C or better in ASTR 320 or approval of instructor.

ASTR 485 Directed Studies
Credits 1 to 12. 1 to 12 Other Hours.
Special work in laboratory or theory to meet individual requirements in
cases not covered by regular curriculum.
Prerequisite: Approval of department head.

ASTR 489 Special Topics in...
Credits 1 to 4. 0 to 4 Lecture Hours. 0 to 4 Lab Hours.
Selected topics in an identified topic of astronomy. May be repeated for
credit.
Prerequisite: Approval of instructor.
ASTR 491 Research
Credits 0 to 4. 0 to 4 Other Hours.
Research conducted under the direction of faculty member in astronomy.
May be repeated for credit. Registration in multiple sections of this
course is possible within a given semester provided that the per semester
credit hour limit is not exceeded.
Prerequisites: Junior or senior classification and approval of instructor.