ASTRONOMY, BA

Contact

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Faculty

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Program Description

Astronomy and astrophysics is the study of the cosmos – from the scale of the solar system to the Universe as a whole – and uses physics to analyze planets, stars, and black holes. By pursuing an astronomy B.A., the student will gain an understanding of these objects and their gravitational interaction to produce larger celestial structures, including planetary systems, galaxies, and black hole binaries. By fulfilling the course requirements for the B.A., the student will learn and apply the fundamentals of nuclear fusion, thermodynamics, radiation and radiative transport, quantum mechanics, and Newtonian gravitation. The student will also have the opportunity to explore more specialized topics, such general relativity, astrobiology, and high-energy astrophysics, where the latter includes gamma-ray bursts, supernovae, and compact objects (white dwarfs, neutron stars, and black holes). The emphasis of the coursework is on the qualitative understanding of these and other astronomical systems and the physics governing their evolution. Higher-level courses that delve deeper into the mathematical nature of these systems of equations and their solutions can also replace (in credit) lower-level courses. Students will also learn practical skills that are used heavily in other fields and industry, such as data analysis, statistical inference, and low-level programming and computation.

1. A student will be able to explain phenomena occurring from sub-atomic to cosmological distance scales using qualitative physical principles.
2. A student will be able to apply mathematics and logic to solve problems associated with natural phenomena.
3. A student will be able to assess and explain arguments for physical laws based on experimental, observational, and theoretical evidence.
4. A student will be able to employ basic laboratory and technical skills to solve physics problems as a result of formal laboratory course work and research opportunities with faculty.

Code	Title	Credits
Program Requirements		
The Bachelor of Arts in Astronomy consists of 11 to 14 credits of lower-division courses and 18 credits of upper-division courses.		
Required Lower-Diision Courses		
PHY 215	General Physics I for Scientists	3
PHY 216	General Physics II for Scientists	3
PHY 225	Experiencing Physics I	2
PHY 226	Experiencing Physics II	2
AND		
One course from the following		
AST 101	Our Corner of the Universe	4
AST 104	Stars, Galaxies, & the Universe	4
NOTE: Students declaring an Astronomy B.A. after having successfully completed PHY 211, PHY 221, PHY 212, and PHY 222 are not required to take PHY 215, PHY 225, PHY 216, and PHY 226. A student may substitute another AST course numbered 300 or higher for the (AST 101 or AST 104) requirement.		
18 credits of upper-division physics and astronomy courses are required:		
PHY 306	Nuclear Physics in our Lives	3
AND Either		
AST 317	Modern Astrophysics	3
or PHY 317	Modern Astrophysics	
AND		
4 credtis of laboratory courses from the following list:		
PHY 365	Experiencing Physics III	2
PHY 366	Experiencing Physics IV	2
PHY 443	Experimental Physics	4
PHY 467	Optics and Photonics	4
AST 465	Methods in Astronomy and Astrophysics	4
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AND		
One course from the following:		
AST 312	Relativity, Black Holes, and the Big Bang	3
or PHY 312	Relativity, Black Holes, and the Big Bang	
AST 319	Introduction to Astrobiology	3
or PHY 319	Introduction to Astrobiology	
PHY 517	Fluid Dynamics	3
PHY 585	Principles of General Relativity	3

The remaining 5 credits must be completed with AST or PHY courses numbered 300 or above. By petition, courses from other colleges or departments covering similar topics to either a required or elective AST/PHY course may also be counted toward the major.