ASTRONOMY MAJOR

Program Director: Melissa Hayes-Gehrke, Ph.D.

The Astronomy Department offers courses leading to a Bachelor of Science in Astronomy as well as a series of courses of general interest to non-majors. Astronomy majors are given a strong undergraduate preparation in Astronomy, Mathematics, and Physics. The degree program is designed to prepare students for positions in government and industry laboratories or for graduate work in Astronomy or related fields. Courses offered by this department may be found under the following acronym: ASTR.

Program Objectives

The Department of Astronomy B.S. program educates majors toward achieving an understanding of modern astronomical concepts, applying physics and mathematics to astrophysical situations, and gaining experience in gathering and reducing data using astronomical instrumentation and computational tools. Completion of this program provides the opportunity for majors to acquire the knowledge and skills necessary for graduate school or employment after graduation.

Program Learning Outcomes

1. Identify basic concepts from the many areas of astronomy, including motions in the sky, gravity, electromagnetic radiation, solar system, stars, and galaxies.
2. Develop mathematical skills, acquire physics knowledge, and practice applying these skills and knowledge in astrophysical situations.
3. Use astronomical telescopes/instruments and reduce astronomical data using modern computational methods.
4. Demonstrate advanced level knowledge in several different areas of astronomy.
5. Describe the current demographic composition of people working in the field of astronomy and how this affects its practice and presents barriers to broader inclusion.

REQUIREMENTS

Course	Title	Credits
Required Basic Astronomy Courses		
ASTR120	Introductory Astrophysics - Solar System	3
ASTR121	Introductory Astrophysics II - Stars and Beyond	4
ASTR310	Observational Astronomy	4
ASTR320	Theoretical Astrophysics	3
Advanced Astronomy Courses		
Select any two 400 level Astronomy courses of the following:		6
ASTR406	Stellar Structure and Evolution	
ASTR410	Radio Astronomy	
ASTR415	Computational Astrophysics	
ASTR421	Galaxies	
ASTR422	Cosmology	
ASTR430	The Solar System	
ASTR435	Astrophysics of Exoplanets	
ASTR450	Orbital Dynamics	
ASTR480	High Energy Astrophysics	
Optional Astronomy Seminars:		
ASTR288	Special Projects in Astronomy (ASTR288C-Astronomy Research Techniques)	
ASTR288	Special Projects in Astronomy (ASTR288M-Current Events in Astronomy Research)	
ASTR288	Special Projects in Astronomy (ASTR288I Introduction to the Astronomy Major)	
ASTR288	Special Projects in Astronomy (ASTR288P-Introduction to Astronomical Programming)	
Required Introductory Physics Courses [1]		
PHYS171	Introductory Physics: Mechanics	3
PHYS265	Introduction to Scientific Programming	3
PHYS272	Introductory Physics: Fields	3
PHYS273	Intermediate Oscillations and Waves	3
PHYS275	Experimental Physics I: Mechanics and Waves	2
PHYS276	Experimental Physics II: Electricity and Magnetism	2
Advanced Physics Courses		
PHYS313	Electricity and Magnetism I	4
PHYS371	Modern Physics	3
PHYS401	Quantum Physics I	4
PHYS404	Introduction to Statistical Thermodynamics	3
Supporting Mathematics/Mathematical Methods Courses		
MATH140	Calculus I	4
MATH141	Calculus II	4
MATH241	Calculus III	4
MATH243	Introduction to Linear Algebra and Differential Equations	4
Total Credits		**66**

1. Also accepted with consent of advisor: PHYS161, PHYS165, PHYS260, PHYS261, PHYS270, PHYS271 (14 credits)
2. For students with experience with computer programming this course can be replaced by PHYS474 Computational Physics or ASTR415 Computational Astrophysics. If students complete ASTR415 for this requirement, it cannot be counted as an advanced astronomy course (400-level course) requirement.
3. Completion of both MATH246 and either MATH240 or MATH461 will be accepted in place of PHYS274.

Grades in all of the above required courses must be "C-" or better.

GRADUATION PLANS

Click here (https://cmns.umd.edu/undergraduate/advising-academic-planning/academic-planning/four-year-plans/four-year-plans-gened/) for roadmaps for graduation plans in the College of Computer, Mathematical, and Natural Sciences.

Additional information on developing a graduation plan can be found on the following pages:

- http://4yearplans.umd.edu
- the Student Academic Success-Degree Completion Policy (https://academiccatalog.umd.edu/undergraduate/registration-academic-requirements-regulations/academic-advising/#success) section of this catalog