Astronomy, BA

Learning Outcomes

Astronomy majors will be able to:

- demonstrate understanding of the fundamental concepts in astrophysics such as gravity, the nature of light, the physical characteristics of matter, and the motions of astronomical objects in the night sky;
- demonstrate proficiency in each of the major areas of astronomy—cosmology, galaxies, accretion and compact objects, the life cycle, and properties of stars and solar system science;
- show a working knowledge of a broad array of astrophysical phenomena that are based upon fundamental concepts; and
- gain familiarity with astronomical observations, instrumentation, computational methods, and software.

Requirements

The Bachelor of Arts with a major in astronomy requires a minimum of 120 s.h., including at least 49 s.h. of work for the major. The BA program requires fewer physics and mathematics courses than the BS program does, giving students a wider choice of electives. Students take calculus in addition to physics and astronomy courses, which include laboratories. They also must complete the College of Liberal Arts and Sciences GE CLAS Core.

The program is designed for students who wish to build considerable knowledge in astronomy but do not plan a research-oriented career in the field. It is appropriate for students planning careers in secondary school science teaching or science-related administration.

The BA with a major in astronomy requires the following courses or their equivalents. Substitutions may be allowed by exception through the department.

Requirements	Hours
Mathematics Courses	8
Physics Courses	24-29
Astronomy Courses	17

Mathematics Courses

Course #	Title	Hours
Both of these:		
MATH:1850	Calculus I	4
MATH:1860	Calculus II	4
Or both of these:		
MATH:1550	Engineering Mathematics I: Single Variable Calculus	4
MATH:1560	Engineering Mathematics II: Multivariable Calculus	4

Physics Courses

If students select PHYS:3811 Electricity and Magnetism I, they must complete the prerequisite before they register for that course.

Course #	Title	Hours
These three courses:		
PHYS:1701	Physics I	4
PHYS:1702	Physics II	4
PHYS:2703	Physics III	4
Or these two courses:		
PHYS:1611	Introductory Physics I	4
PHYS:1612	Introductory Physics II	4
All of these:		
PHYS:2704	Physics IV	4
PHYS:3710	Intermediate Mechanics	3
PHYS:3756	Intermediate Laboratory	3
One of these:		
PHYS:3730	Statistical Physics	3
PHYS:4720	Introductory Optics	3
One of these:		
PHYS:3811	Electricity and Magnetism I	3
PHYS:3850	Electronics	4

Astronomy Courses

Course #	Title	Hours
All of these:		
ASTR:1771	Fundamental Astronomy I: The Solar System and Exoplanets	4
ASTR:1772	Fundamental Astronomy II: Evolution of Stars, Galaxies, and the Universe	4
ASTR:3771	Introduction to Astrophysics I	3
ASTR:3772	Introduction to Astrophysics II	3
ASTR:4850	Observational Techniques in Astronomy	3

Undergraduate majors who plan to pursue graduate study are advised to go as far as they can beyond the minimum requirements listed above, including further work in mathematics. In planning this work, they should be guided by the College of Liberal Arts and Sciences maximum hours rule: students earning a BA may apply a maximum of 56 s.h. earned in one department to the minimum 120 s.h. required for graduation, whether or not the coursework is accepted toward the requirements for the major. Students who earn more than 56 s.h. from one department may use the additional semester hours to satisfy requirements for the major (if the department accepts them), and the grades they earn become part of their grade-point average, but they cannot apply the additional semester hours to the minimum 120 s.h. required for graduation.

Double Major in Physics and Astronomy

Students working toward a Bachelor of Arts with a double major in physics and in astronomy must complete all requirements for both majors and must earn a minimum of 56 s.h. outside the Department of Physics and Astronomy in order to graduate. Students interested in earning a double major should consult with their advisors. See Requirements for a Bachelor's Degree on the College of Liberal Arts and Sciences website.

Honors

Honors in the Major

Students majoring in astronomy have the opportunity to graduate with honors in their major. They must maintain a University of Iowa grade-point average (GPA) of at least 3.33. During their junior and senior years, students must conduct an investigation under the guidance of a faculty member. They must present a written report of their research (honors thesis) and describe their research results at a departmental seminar.

University of Iowa Honors Program

In addition to honors in the major, students have opportunities for honors study and activities through membership in the University of Iowa Honors Program. Visit Honors at Iowa to learn about the university's honors program.

Membership in the UI Honors Program is not required to earn honors in the astronomy major.

Career Advancement

Astronomy graduates have mastered skills that are readily transferable to a number of fields. They might choose to work in research, engineering, software development, teaching, finance, biomedical research, or consulting. Some graduates plan for careers in secondary school science teaching or science-related administration or plan to earn professional degrees.

About 70% of physics and astronomy graduates go on to graduate school. With help from the department’s in-house recruiting office, they win acceptance to some of the best graduate programs in the country.

The Pomerantz Career Center offers multiple resources to help students find internships and jobs.

Academic Plans

Four-Year Graduation Plan

The following checkpoints list the minimum requirements students must complete by certain semesters in order to stay on the university's Four-Year Graduation Plan. Courses in the major are those required to complete the major; they may be offered by departments other than the major department.

Before the third semester begins: math through MATH:1850 Calculus I and MATH:1860 Calculus II; and PHYS:1701 Physics I and PHYS:1702 Physics II.

Before the fifth semester begins: PHYS:2703 Physics III, PHYS:2704 Physics IV, and at least one more course in the major.

Before the seventh semester begins: three more courses in the major and at least 90 s.h. earned toward the degree.

Before the eighth semester begins: five more courses in the major.

During the eighth semester: enrollment in all remaining coursework in the major, all remaining GE CLAS Core courses, and a sufficient number of semester hours to graduate.

Sample Plan of Study

Sample plans represent one way to complete a program of study. Actual course selection and sequence will vary and should be discussed with an academic advisor. For additional sample plans, see MyUI.

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Course	Title	Hours
Academic Career		
Any Semester		
Research: students are strongly encouraged to be active participants in research within the department.		
Students can pursue a double major in astronomy and physics and earn more than 56 s.h. from the department toward these degrees but must also complete at least 56 s.h. outside of the Department of Physics & Astronomy.		
GE CLAS Core: Sustainability [a]		
	Hours	**0**
First Year		
Fall		
ASTR:1771	Fundamental Astronomy I: The Solar System and Exoplanets	4
PHYS:1701	Physics I	4
MATH:1850	Calculus I [b]	4
RHET:1030 or ENGL:1200	Rhetoric or The Interpretation of Literature	3 - 4
CSI:1600	Success at Iowa	2
	Hours	**17-18**
Spring		
ASTR:1772	Fundamental Astronomy II: Evolution of Stars, Galaxies, and the Universe	4
PHYS:1702	Physics II	4
MATH:1860	Calculus II	4
ENGL:1200 or RHET:1030	The Interpretation of Literature or Rhetoric	3 - 4
	Hours	**15-16**
Second Year		
Fall		
PHYS:2703	Physics III	4
MATH:2700	Introduction to Linear Algebra [c]	4
GE CLAS Core: Diversity and Inclusion [d]		3
GE CLAS Core: World Languages First Level Proficiency or elective course [e]		4 - 5
	Hours	**15-16**
Spring		
PHYS:2704	Physics IV	3 - 4
MATH:2850	Calculus III [c]	4
GE CLAS Core: International and Global Issues [d]		3
GE CLAS Core: World Languages Second Level Proficiency or elective course [e]		4 - 5
	Hours	**14-16**
Third Year		
Fall		
ASTR:3771	Introduction to Astrophysics I [f]	3
PHYS:3756	Intermediate Laboratory	3

PHYS:3811	Electricity and Magnetism I	3
GE CLAS Core: World Languages Third Level Proficiency or elective course [e]		4 - 5
Elective course [g]		1 - 3
	Hours	**14-17**
Spring		
ASTR:3772	Introduction to Astrophysics II [f]	3
PHYS:3710	Intermediate Mechanics	3
GE CLAS Core: Literary, Visual, and Performing Arts [d]		3
GE CLAS Core: World Languages Fourth Level Proficiency or elective course [e]		4 - 5
	Hours	**13-14**
Fourth Year		
Fall		
PHYS:3730	Statistical Physics	3
GE CLAS Core: Historical Perspectives [d]		3
GE CLAS Core: Social Sciences [d]		3
Elective course [g]		3
Elective course [g]		3
	Hours	**15**
Spring		
ASTR:4850	Observational Techniques in Astronomy [f]	3
GE CLAS Core: Values and Culture [d]		3
Elective course [g]		3
Elective course [g]		3
Elective course [g]		3
Degree Application: apply on MyUI before deadline (typically in February for spring, September for fall) [h]		
	Hours	**15**
	Total Hours	**118-127**

a Sustainability must be completed by choosing a course that has been approved for Sustainability AND for one of these General Education areas: Natural Sciences; Quantitative and Formal Reasoning; Social Sciences; Historical Perspectives; International and Global Issues; Literary, Visual, and Performing Arts; or Values and Culture.

b Enrollment in math courses requires completion of a placement exam.

c While this course is not a major requirement, it is strongly recommended and a prerequisite for many physics and astronomy courses in the department.

d GE CLAS Core courses may be completed in any order unless used as a prerequisite for another course. Students should consult with an advisor about the best sequencing of courses.

e Students who have completed four years of a single language in high school have satisfied the GE CLAS Core World Languages requirement. Enrollment in world languages courses requires a placement exam, unless enrolling in a first-semester-level course.

f Typically this course is offered every other year. Check MyUI for course availability since offerings are subject to change.

g Students may use elective courses to earn credit towards the total s.h. required for graduation or to complete a double major, minors, or certificates.

h Please see Academic Calendar, Office of the Registrar website for current degree application deadlines. Students should apply for a degree for the session in which all requirements will be met. For any questions on appropriate timing, contact your academic advisor or Graduation Services.