Physics, B.A.

Learning Outcomes

Physics majors will be able to:

- demonstrate competency in applying the basic laws of physics in classical and quantum mechanics, electromagnetism, thermodynamics, and statistical physics;
- solve complex, real-world problems using the principles of physics; and
- demonstrate competency in using basic instrumentation and in analyzing the data obtained.

Requirements

The Bachelor of Arts with a major in physics requires a minimum of 120 s.h., including at least 44 s.h. of work for the major (minimum of 24 s.h. in physics plus 20 s.h. in supporting course work). Students must maintain a g.p.a. of at least 2.00 in all courses for the major and in all UI courses for the major. They also must complete the College of Liberal Arts and Sciences GE CLAS Core.

The major is designed for students who wish to build a foundation of knowledge in physics but do not plan a research-oriented career in the discipline. It also is good preparation for students interested in secondary school science teaching; see “Teacher Licensure” below.

The B.A. program requires fewer physics courses than the B.S. program does, giving students a wider choice of electives. Bachelor of Arts students take calculus in addition to physics courses, which include a laboratory. They also take science courses in a thematic area or the physics course work required for teacher licensure, and the department encourages them to do additional work.

Students who want to earn a double major in physics and astronomy must choose their course work carefully; see "Double Major in Physics and Astronomy" below. Bachelor of Arts students majoring in physics who are interested in science teaching and in earning a graduate degree may enroll in a combined degree program offered by the College of Liberal Arts and Sciences and the College of Education; see "B.A./M.A.T. (Science Education Subprogram)" under Combined Programs [p. 2] in this section of the Catalog.

The B.A. with a major in physics requires the following courses or their equivalents. Many upper-level physics courses have prerequisites; students should consult their advisors when choosing courses numbered 3000 or above.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS:2704</td>
<td>Physics IV</td>
<td>4</td>
</tr>
<tr>
<td>PHYS:3756</td>
<td>Intermediate Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>Three additional physics courses numbered 3000-4999 approved by the advisor, excluding PHYS:4761, PHYS:4762, PHYS:4905, and PHYS:4990</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Supporting Course Work

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>This sequence:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH:1850 &amp;</td>
<td>Calculus I-II</td>
<td>8</td>
</tr>
<tr>
<td>MATH:1860</td>
<td></td>
<td></td>
</tr>
<tr>
<td>One of these:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Additional science courses in a thematic area, approved by the advisor</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Course work required for teacher licensure</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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 B.A. 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 course work is accepted toward 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.

Teacher Licensure

Students interested in teaching in elementary and/or secondary schools should seek admission to the Teacher Education Program (TEP) in the College of Education.

To qualify for licensure in secondary teaching, students in the TEP complete a degree in education as well as a related College of Liberal Arts and Sciences degree. See Teacher Education Program Application and Admission on the College of Education website for details on requirements and deadlines for applying to the College of Education and about TEP choices of majors leading to licensure.

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.
Combined Programs

B.A./M.A.T. (Science Education Subprogram)

Bachelor of Arts students in physics who are interested in pursuing a graduate degree in teaching may apply to the combined Bachelor of Arts/Master of Arts in Teaching with a science education subprogram offered by the College of Liberal Arts and Sciences and the College of Education. Designed for undergraduates majoring in biology, chemistry, environmental sciences, or physics, the combined program enables students to earn a B.A. and M.A.T. in five years by beginning to earn graduate credit during their fourth year of undergraduate study and by counting up to 18 s.h. of qualifying credit toward both degrees. For more information, see "Combined B.A./M.A.T." under Science Education in the Master of Arts in Teaching, M.A.T. (College of Education) section of the Catalog. Interested students should consult an advisor.

B.A./M.S. in Business Analytics (Career Subprogram)

Students majoring in physics who are interested in earning a master's degree in business analytics with a career subprogram may apply to the combined B.A./M.S. program offered by the College of Liberal Arts and Sciences and the Tippie College of Business. The program enables students to begin the study of business analytics before they complete their bachelor's degree. Students are able to complete both degrees in five years rather than six.

Separate application to each degree program is required. Applicants must be admitted to both programs before they may be admitted to the combined degree program. For information about the business analytics program, see the M.S. in business analytics (career) in the Tippie College of Business section of the Catalog.

B.A./M.S. in Finance

Students majoring in physics who are interested in earning a master's degree in finance may apply to the combined B.A./M.S. program offered by the College of Liberal Arts and Sciences and the Tippie College of Business. The program enables students to begin the study of finance before they complete their bachelor's degree. Students are able to complete both degrees in five years rather than six.

Separate application to each degree program is required. Applicants must be admitted to both programs before they may be admitted to the combined degree program. For information about the finance program, see the M.S. in finance (Tippie College of Business) in the Catalog.

Honors

Honors in the Major

Students majoring in physics have the opportunity to graduate with honors in their major. They must maintain a University of Iowa g.p.a. of at least 3.33. Students must earn 6-8 s.h. in PHYS:4999 Undergraduate Research during their junior and senior years and 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 physics major.

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: calculus II and physics II
Before the fifth semester begins: physics III-IV and up to four more courses in the major
Before the seventh semester begins: two to four more courses in the major and at least 90 s.h. earned toward the degree
Before the eighth semester begins: two or three more courses in the major
During the eighth semester: enrollment in all remaining course work 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.

Physics, B.A.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Academic Career</td>
<td></td>
</tr>
<tr>
<td>Any Semester</td>
<td>Research: students are strongly encouraged to be active participants in research within the department.</td>
<td>0</td>
</tr>
<tr>
<td>First Year</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fall</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PHYS:1701</td>
<td>Physics I a</td>
<td>4</td>
</tr>
<tr>
<td>MATH:1850</td>
<td>Calculus I a, b</td>
<td>4</td>
</tr>
<tr>
<td>RHET:1030</td>
<td>Rhetoric or ENGL:1200</td>
<td>3 - 4</td>
</tr>
<tr>
<td></td>
<td>or The Interpretation of</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Literature</td>
<td></td>
</tr>
<tr>
<td>GE CLAS Core: Social Sciences</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>CSI:1600</td>
<td>Success at Iowa</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Hours</td>
<td>16-17</td>
</tr>
<tr>
<td>Spring</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PHYS:1702</td>
<td>Physics II a</td>
<td>4</td>
</tr>
</tbody>
</table>
**RHET:1030**  
Rhetoric or **ENGL:1200**  
The Interpretation of Literature  
3 - 4

**MATH:1860**  
Calculus II  
4

**GE CLAS Core: Diversity and Inclusion**  
c  
3

**MATH:2700**  
Introduction to Linear Algebra  
d  
4

**GE CLAS Core: World Languages First Level**  
Proficiency or elective course  
e  
4 - 5

**GE CLAS Core: Values and Culture**  
c  
3

**Hours**  
14-15

**Second Year**  
**Fall**

**PHYS:2703**  
Physics III  
4

**MATH:2850**  
Calculus III  
d  
4

**GE CLAS Core: World Languages Second Level**  
Proficiency or elective course  
e  
4 - 5

**GE CLAS Core: Values and Culture**  
c  
3

**Hours**  
15-16

**Spring**

**PHYS:2704**  
Physics IV  
3 - 4

**MATH:3756**  
Intermediate Laboratory  
3

**GE CLAS Core: Historical Perspectives**  
c  
3

**GE CLAS Core: World Languages Second Level**  
Proficiency or elective course  
e  
4 - 5

**Elective course**  
g  
1 - 3

**Hours**  
14-17

**Third Year**  
**Fall**

**PHYS:3756**  
Intermediate Laboratory  
3

Major: physics elective course numbered 3000 or above  
3

**GE CLAS Core: World Languages Fourth Level**  
Proficiency or elective course  
e  
4 - 5

**Elective course**  
g  
3

**Hours**  
13-14

**Spring**

Major: additional science course in chosen thematic area  
3

Major: physics elective course numbered 3000 or above  
3

**GE CLAS Core: Literary, Visual, and Performing Arts**  
c  
3

**Elective course**  
g  
3

**Elective course**  
g  
3

**Hours**  
15

**Fourth Year**  
**Fall**

Major: additional science course in chosen thematic area  
3

Major: physics elective course numbered 3000 or above  
3

**GE CLAS Core: Literary, Visual, and Performing Arts**  
c  
3

**Elective course**  
g  
3

**Elective course**  
g  
3

**Elective course**  
g  
3

**Spring**

Major: additional science course in chosen thematic area  
3

Major: additional science course in chosen thematic area  
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)

<table>
<thead>
<tr>
<th>Hours</th>
<th>Total Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>116-125</td>
</tr>
</tbody>
</table>

- a Fulfills a major requirement and may fulfill a GE requirement.
- b Enrollment in math courses requires completion of a placement exam.
- c 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.
- d While this course is not a major requirement, it is strongly recommended and a prerequisite for many physics and astronomy courses in the department.
- 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 Students must complete at least 9-10 s.h. in physics courses numbered 3000-4999 and approved by the advisor, excluding PHYS:4761, PHYS:4762, PHYS:4905, and PHYS:4990.
- 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. For more information visit [http://commencement.uiowa.edu/](http://commencement.uiowa.edu/). If applicable search for “Early and Late Participation” to find this page (e.g. walk in graduation ceremony in May, degree conferred in August).

**Career Advancement**

Physics 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.

The degree leads to careers in medicine, law, science-related administration, business, or technical writing. It also is good preparation for students interested in secondary school science teaching.

About 70 percent 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](http://pomerantzcareercenter.uiowa.edu/) offers multiple resources to help students find internships and jobs.