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:1701 &amp; PHYS:1702 &amp; PHYS:2703</td>
<td>Introductory Physics I-II</td>
<td>8</td>
</tr>
<tr>
<td>PHYS:3756</td>
<td>Intermediate Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>PHYS:4761, PHYS:4762, PHYS:4905, and PHYS:4990</td>
<td>9-10</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>MATH:1850 &amp; MATH:1860</td>
<td>Calculus I-II</td>
<td>8</td>
</tr>
<tr>
<td>One of these:</td>
<td>Additional science courses in a thematic area, approved by the advisor</td>
<td>12</td>
</tr>
</tbody>
</table>

Course work required for teacher licensure

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

Majors interested in earning licensure to teach in elementary and/or secondary schools must complete the College of Education’s Teacher Education Program (TEP) in addition to the requirements for the major and all requirements for graduation. The TEP requires several College of Education courses and student teaching. Contact the Office of Student Services in the College of Education for details.

Students must satisfy all degree requirements and complete TEP licensure before degree conferred.

Students with a strong interest in science teaching may complete a science education major. Students choose one of five emphases — biology, chemistry, earth science, physics, or all-science — and earn a Bachelor of Science degree. They may apply for admission to the TEP. See the B.S. in science education in the Teaching and Learning section of the Catalog.

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</td>
<td>4</td>
</tr>
<tr>
<td>MATH:1850</td>
<td>Calculus I</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 Literature</td>
<td></td>
</tr>
<tr>
<td>GE CLAS Core: Social Sciences</td>
<td></td>
<td>3</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</td>
<td>4</td>
</tr>
</tbody>
</table>

a, b, c

a = Required
b = Recommended
c = Suggested
RHET:1030 or ENGL:1200  
Rhetoric or The Interpretation of Literature  
3 - 4  
MATH:1860  
Calculus II  
4  
GE CLAS Core: Diversity and Inclusion  
3  
Second Year  
Fall  
PHYS:2703  
Physics III  
4  
MATH:2700  
Introduction to Linear Algebra  
4  
GE CLAS Core: World Languages First Level  
4 - 5  
Proficiency or elective course  
GE CLAS Core: Values and Culture  
3  
Hours  
14-15  
Spring  
PHYS:2704  
Physics IV  
3 - 4  
MATH:2850  
Calculus III  
4  
GE CLAS Core: International and Global Issues  
3  
GE CLAS Core: World Languages Second Level  
4 - 5  
Proficiency or elective course  
Hours  
15-16  
Third Year  
Fall  
PHYS:3756  
Intermediate Laboratory  
3  
Major: physics elective course numbered 3000 or above  
3  
GE CLAS Core: Historical Perspectives  
3  
GE CLAS Core: World Languages Second Level  
4 - 5  
Proficiency or elective course  
Elective course  
1 - 3  
Hours  
14-17  
Spring  
Major: additional science course in chosen thematic area  
3  
Major: physics elective course numbered 3000 or above  
3  
GE CLAS Core: World Languages Fourth Level  
4 - 5  
Proficiency or elective course  
Elective course  
3  
Elective course  
3  
Elective course  
3  
Elective course  
3  
Hours  
13-14  
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  
3  
Elective course  
3  
Elective course  
3  
Elective course  
3  
Elective course  
3  
Spring  
Major: additional science course in chosen thematic area  
3  
Major: additional science course in chosen thematic area  
3  
Elective course  
3  
Elective course  
3  
Elective course  
3  
Elective course  
3  
Elective course  
3  
Elective course  
3  
Hours  
15  
Degree Application: apply on MyUI before deadline  
(typically in February for spring, September for fall)  
Hours  
15  
Total Hours  
116-125  
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 offers multiple resources to help 
students find internships and jobs.