Department of Physics

(The College of Humanities, Arts and Sciences)
www.physics.uni.edu

The Department of Physics offers the following undergraduate and graduate programs. Specific requirements for these programs are listed within this Department of Physics section in the following order:

- **Undergraduate Major (B.S.)**
  - Physics

- **Undergraduate Major (B.A.)**
  - Physics-Teaching

- **Minors**
  - Nanoscience and Nanotechnology
  - Physics

The Department of Physics offers major programs in two baccalaureate areas: the Bachelor of Science and the Bachelor of Arts. The B.S. Physics major is recommended for students who wish to prepare for graduate study in physics, engineering, or other sciences such as geophysics, astronomy, biophysics, or medical physics. The B.A. Physics-Teaching program provides students with the best qualification to teach physics in high school.

**Bachelor of Science Degree Program**

**Emphasis-B.S. Physics Major Honors Research**

Students who complete a sustained research project in physics may be invited to do Honors Research. Students must first complete 4 credit hours of PHYSICS 3000 (880:180) Undergraduate Research in Physics and then 1 credit hour of PHYSICS 4990 Senior Thesis.

**Physics Major**

The B.S. Physics major requires a minimum of 126 total hours to graduate. This total includes Liberal Arts Core requirements and the following specified major requirements, plus electives to complete the minimum of 126 hours.

**Note:** To graduate with a B.S. degree in Physics, a student must earn an overall grade point average of at least 2.50 in all courses applied toward the major.

**Required**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>MATH 1420</td>
<td>Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 1421</td>
<td>Calculus II</td>
<td>4</td>
</tr>
<tr>
<td>MATH 2422</td>
<td>Calculus III</td>
<td>4</td>
</tr>
<tr>
<td>PHYSICS 1100</td>
<td>First-Year Projects in Physics</td>
<td>1</td>
</tr>
<tr>
<td>PHYSICS 1701</td>
<td>Physics I for Science and Engineering</td>
<td>4</td>
</tr>
<tr>
<td>PHYSICS 1702</td>
<td>Physics II for Science and Engineering</td>
<td>4</td>
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<tr>
<td>PHYSICS 2300</td>
<td>Physics III: Theory and Simulation</td>
<td>3</td>
</tr>
<tr>
<td>PHYSICS 2700</td>
<td>Mathematical Methods of Physics</td>
<td>3</td>
</tr>
<tr>
<td>PHYSICS 3000</td>
<td>Undergraduate Research in Physics</td>
<td>2</td>
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<tr>
<td>PHYSICS 3500</td>
<td>Internship in Applied Physics</td>
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<tr>
<td>PHYSICS 3700</td>
<td>Physics Seminar</td>
<td>1</td>
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<tr>
<td>PHYSICS 4100/5100</td>
<td>Modern Physics</td>
<td>4</td>
</tr>
<tr>
<td>PHYSICS 4110/5110</td>
<td>Modern Physics Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>PHYSICS 4300/5300</td>
<td>Introduction to Electronics</td>
<td>4</td>
</tr>
<tr>
<td>PHYSICS 4600/5600</td>
<td>Classical Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>PHYSICS 4860/5860</td>
<td>Computational Physics</td>
<td>3</td>
</tr>
<tr>
<td>PHYSICS 4900/5900</td>
<td>Thermodynamics and Statistical Mechanics</td>
<td>4</td>
</tr>
</tbody>
</table>

**Electives**

- Physics, Natural Science, or Math Electives * 8

**Total Hours** 59

* Students have the option to design an area of professional concentration by the appropriate choice of elective courses in Physics (or another Natural Science), or Mathematics. Electives must be mathematics or science courses that count toward a major of the department offering the course. Electives should be selected with the advice of an academic adviser in Physics.

**Bachelor of Arts Degree Program**

**Emphasis-B.A. Physics Major-Teaching Honors Research**

Students who complete a sustained research project in physics education may be invited to do Honors Research. Students must first complete 4 credit hours of PHYSICS 3000 (880:180) Undergraduate Research in Physics and then 1 credit hour of PHYSICS 4990 Senior Thesis.

**Physics Major-Teaching**

The B.A. Physics major in teaching requires a minimum of 120 total hours to graduate. This total includes Liberal Arts Core requirements, the Professional Education Requirements, and the following specified major requirements, plus electives to complete the minimum of 120 hours.
### Required

**Mathematics:**
- MATH 1420 (800:060) Calculus I 4
- MATH 1421 (800:061) Calculus II 4

**Science and Science Education:**
- SCI ED 3300/5300 (820:190g) Orientation to Science Teaching 3
- SCI ED 4700/5700 (820:193g) Methods for Teaching Physical Science 3
- SCI ED 3200 (820:196) Current Technologies in Science Teaching 2

**Physics:**
- PHYSICS 1100 First-Year Projects in Physics 1
- PHYSICS 1701 (880:130) Physics I for Science and Engineering 4
- PHYSICS 1702 (880:131) Physics II for Science and Engineering 4
- PHYSICS 2300 (880:132) Physics III: Theory and Simulation 3
- PHYSICS 4080/5080 Resources for Teaching Physics 2

**Electives:**
- Physics: all 3000+ level courses 6
- Mathematics or non-physics science courses from the College of Humanities, Arts and Sciences 4

**Total Hours** 46

* Excluding all 820:xxx and mathematics below MATH 1420 (800:060).

It is recommended that sufficient work including current curricula should be taken for licensure approval in a second area. Common teaching combinations are physics-chemistry or physics-mathematics.

Completion of this major will satisfy the requirements of the Iowa Department of Education for licensure.

### Minors

#### Nanoscience and Nanotechnology Minor

**Required**

**Chemistry and Biochemistry:**
- Select one of the following:
  - CHEM 1110 (860:044) & CHEM 1120 (860:048) General Chemistry I and General Chemistry II 5-8
  - CHEM 1130 (860:070) General Chemistry I-II

**Physics:**
- PHYSICS 1511 (880:054) General Physics I 4

**Electives:**
- 100/3000-level electives in Physics, with no more than 3 hours earned in the following:
  - PHYSICS 3000 (880:180) Undergraduate Research in Physics (and/or)
  - PHYSICS 4450/5450 Laboratory Projects (880:185g)

**Total Hours** 20

* See course descriptions to reference 4-digit numbers associated with these 100/3000-level courses.