Physics B.S.

The plan in Physics leads to the bachelor of science (B.S.) degree at the undergraduate level. Our location and the connections our faculty have with National Aeronautics and Space Administration (NASA) and allied aerospace industry allow UHCL to offer students unique research opportunities. In addition to our Physics B.S., we also offer specializations in Engineering Physics and Computational Physics, specifically designed for students interested in pursuing a career in engineering or computational sciences. The Houston–Galveston area is a thriving center for many science-intensive industries, from aerospace to petrochemical; thus, the demand for professionals with knowledge of physics is high. Local industries in Houston provide a huge potential to employ individuals with a B.S. in Physics, in addition to the increasing demand for physics teachers in high schools. This demand is also expected to grow dramatically over the next decade. An undergraduate degree in Physics enables students to progress into graduate programs in Physics, Astronomy or Engineering. Students may select electives in areas of particular interest. Physics is a very broad discipline, which can lead to a variety of career options. The UHCL Physics program provides several areas where students can develop a degree plan to support their specific career goals. Some of these focus areas include: Geophysics, Biophysics, Space Physics, Computational Physics, Mathematical Physics, Materials Science, Physics Education, Premedical and Prelaw. Courses needed to support these focus areas are chosen in consultation with a physics adviser and faculty member from the other program.

Degree Requirements

This degree requires 120 hours and includes 42 hours of University Core. However; some of the Major Requirements courses listed below also satisfy University Core. If other courses are taken to satisfy University Core, the Major Requirements below are still necessary for graduation and substitutions are not accepted.

University Core Requirements (42 Hours)

<table>
<thead>
<tr>
<th>Communication (6 hours)</th>
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</thead>
<tbody>
<tr>
<td>WRIT 1301 Composition I</td>
</tr>
<tr>
<td>Credit Hours: 3</td>
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<tr>
<td>WRIT 1302 Composition II</td>
</tr>
<tr>
<td>Credit Hours: 3</td>
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<table>
<thead>
<tr>
<th>Mathematics (4 hours)</th>
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<tbody>
<tr>
<td>MATH 2413 Calculus I</td>
</tr>
<tr>
<td>Credit Hours: 4</td>
</tr>
</tbody>
</table>

Additional Information

Three (3) hours of Calculus will count toward the University Core and one (1) hour will count toward the Major.

<table>
<thead>
<tr>
<th>Life and Physical Sciences (6 hours)</th>
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</thead>
<tbody>
<tr>
<td>CHEM 1311 General Chemistry I</td>
</tr>
<tr>
<td>Credit Hours: 3</td>
</tr>
<tr>
<td>CHEM 1312 General Chemistry II</td>
</tr>
<tr>
<td>Credit Hours: 3</td>
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</tbody>
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<table>
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<tr>
<th>Language, Philosophy and Culture (3 hours)</th>
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</thead>
<tbody>
<tr>
<td>HUMN 1301 Humanities</td>
</tr>
<tr>
<td>Credit Hours: 3</td>
</tr>
<tr>
<td>LITR 2341 Literature and Experience</td>
</tr>
<tr>
<td>Credit Hours: 3</td>
</tr>
<tr>
<td>PHIL 1301 Introduction to Philosophy</td>
</tr>
<tr>
<td>Credit Hours: 3</td>
</tr>
<tr>
<td>WGST 1301 Gender Matters: Introduction to Women’s and Gender Studies</td>
</tr>
<tr>
<td>Credit Hours: 3</td>
</tr>
</tbody>
</table>
Creative Arts (3 Hours)

- ARTS 1303
  World Art Survey I
  Credit Hours: 3
- ARTS 1304
  World Art Survey II
  Credit Hours: 3
- ARTS 2379
  Arts and the Child
  Credit Hours: 3

American History (6 hours)

- HIST 1301
  United States History I
  Credit Hours: 3
- HIST 1302
  United States History II
  Credit Hours: 3

Government/ Political Science (6 hours)

- POLS 2305
  Federal Government
  Credit Hours: 3
- POLS 2306
  Texas Government
  Credit Hours: 3

Social and Behavioral Sciences (3 hours)

- ANTH 2346
  General Anthropology
  Credit Hours: 3
- CRIM 1301
  Introduction to Criminal Justice
  Credit Hours: 3
- ECON 2301
  Principles of Macroeconomics
  Credit Hours: 3
- ECON 2302
  Principles of Microeconomics
  Credit Hours: 3
- GEOG 1303
  World Regional Geography
  Credit Hours: 3
- PSYC 2301
  Introduction to Psychology
  Credit Hours: 3
- SOCI 1301
  Introduction to Sociology
  Credit Hours: 3

Component Area Option (6 hours)

- CHEM 1111
  Laboratory for General Chemistry I
  Credit Hours: 1
- CHEM 1112
  Laboratory for General Chemistry II
  Credit Hours: 1
- MATH 2413
  Calculus I
  Credit Hours: 4
- MATH 2414
  Calculus II
  Credit Hours: 4
- PHYS 2125
  Laboratory for University Physics I
  Credit Hours: 1
- PHYS 2126
  Laboratory for University Physics II
  Credit Hours: 1
- PHYS 3103
  Laboratory for Modern Physics
  Credit Hours: 1
- PHYS 3303
  Modern Physics
  Credit Hours: 3
- PHYS 3311
  Mathematical Methods for Physics and Engineering I
  Credit Hours: 3
- PHYS 3312
  Mathematical Methods for Physics and Engineering II
  Credit Hours: 3
- PHYS 3321
  Intermediate Mechanics
  Credit Hours: 3
- PHYS 3331
  Intermediate Electromagnetism
  Credit Hours: 3
- PHYS 3342
  Quantum Theory I
  Credit Hours: 3

Major Requirements (52 Hours)

Students seeking a B.S. degree in Physics should complete the following requirements:

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<tr>
<td>CHEM 1112</td>
<td>Laboratory for General Chemistry II</td>
</tr>
<tr>
<td>CHEM 1311</td>
<td>General Chemistry I</td>
</tr>
<tr>
<td>CHEM 1312</td>
<td>General Chemistry II</td>
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<tr>
<td>MATH 2315</td>
<td>Calculus III</td>
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<tr>
<td>MATH 2413</td>
<td>Calculus I</td>
</tr>
<tr>
<td>MATH 2414</td>
<td>Calculus II</td>
</tr>
<tr>
<td>PHYS 2125</td>
<td>Laboratory for University Physics I</td>
</tr>
<tr>
<td>PHYS 2126</td>
<td>Laboratory for University Physics II</td>
</tr>
<tr>
<td>PHYS 2325</td>
<td>University Physics I</td>
</tr>
<tr>
<td>PHYS 2326</td>
<td>University Physics II</td>
</tr>
<tr>
<td>PHYS 3103</td>
<td>Laboratory for Modern Physics</td>
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<tr>
<td>PHYS 3342</td>
<td>Quantum Theory I</td>
</tr>
</tbody>
</table>
Physics Courses:

- PHYS 3343: Quantum Theory II (3 credits)
- PHYS 3351: Thermodynamics & Statistical Mechanics (3 credits)
- PHYS 4371: Undergraduate Physics Research (3 credits)
- PHYS 4372: Research Seminar (3 credits)
- WRIT 3315: Advanced Technical Writing (3 credits)

Additional Major Requirements

Select one of the following:

- CSCI 1320: C Programming (3 credits)
- CSCI 1370: Software Development with Java (3 credits)
- CSCI 1470: Computer Science I (4 credits)
- CSCI 1471: Computer Science II (4 credits)
- CSCI 3321: Numerical Methods (3 credits)
- CSCI 3323: Object-Oriented Design and Programming (3 credits)

Elective Requirements (25 hours)

(6 hours) Upper-level (3000-4000) PHYS/ASTR courses. (19 hours) of electives, a minimum of 11 must be upper level (3000-4000).

Computational Physics Specialization (25 hours)

(3 hours) Upper-level PHYS/ASTR electives.

- CSCI 1470: Computer Science I (4 credits)
- CSCI 1471: Computer Science II (4 credits)
- CSCI 2315: Data Structures (3 credits)
- CSCI 3321: Numerical Methods (3 credits)
- CSCI 3352: Advanced Data Structures and Algorithms (3 credits)
- MATH 2305: Discrete Mathematics (3 credits)
- PHYS 4202: Computational Physics (2 credits)
- SWEN 4342: Software Engineering (3 credits)

Additional Information

In addition to the above listed requirements, students must complete 3 credit hours of 3000 or 4000 level elective Physics courses chosen in collaboration with the student's faculty adviser.