BA/BS MAJOR IN PHYSICS

Requirements for a Bachelor of Arts or Bachelor of Science Degree with a Major in Physics

Additional Graduation Requirements (https://catalog.una.edu/undergraduate/academic-procedures-requirements/graduation-requirements/)

Code  Title                  Hours
General Education Component (https://catalog.una.edu/undergraduate/academic-procedures-requirements/general-education-component/)
Area I (Written Composition)  6
Area II (Humanities and Fine Arts)  12
Area III (Natural Sciences and Mathematics)  11
Area IV (History, Social and Behavioral Sciences)  12
Area V (https://www.una.edu/areav/)

Major Core Requirements in Physics
PH 251  Technical Physics I  2
& PH 252  and Technical Physics II  2
PH 343  Modern Physics  4

Major Concentration Requirements
Select one of the following Options:

Option I: Professional Physics
PH 356W  Intermediate Laboratory  1  4
PH 444  Quantum Mechanics  3
PH 447  Electricity and Magnetism  3
PH 448  Electromagnetic Fields  3
PH 456  Thermodynamics and Statistical Mechanics  3
PH 471  Classical Dynamics  3
PH 495  Directed Research  1-3
PH 498  Senior Assessment Seminar  1
Select 9 hours from the following courses:  9
PH 480  Topics in Physics  2
PH 481  Topics in Physics
PH 482  Topics in Physics
PH 483  Topics in Physics
PH 484  Topics in Physics
PH 485  Topics in Physics
PH 486  Topics in Physics
PH 487  Topics in Physics
PH 488  Topics in Physics
PH 489  Topics in Physics

Prescribed Supporting Courses
MA 125  Calculus I  2  4
MA 126  Calculus II  2  4
MA 227  Calculus III  2  4
MA 355  Differential Equations  3
CS 155  Computer Science I  4
CS 255  Computer Science II  3
Total Hours  39-51

Option II: General Physics
PH 356W  Intermediate Laboratory  1  4
PH 447  Electricity and Magnetism  3
PH 471  Classical Dynamics  3
PH 495  Directed Research  1-3
PH 498  Senior Assessment Seminar  1
Select twelve credits of Physics Electives at the 300-400 level  12

Prescribed Supporting Courses
MA 125  Calculus I  2  4
MA 126  Calculus II  2  4
MA 227  Calculus III  2  4
MA 355  Differential Equations  3
CS 155  Computer Science I  4

For BA degree, select 6 hours of a required foreign language at the introductory level.
BA/BS Major in Physics

CS 255  Computer Science II  3

Total Hours  4

35-47

1  Fulfills computer literacy requirement for Option III
2  These courses are required in the major field if not completed as a part of the General Education component.

Option III: Geophysics

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td>ES 131</td>
<td>Earth Science/Physical Geology</td>
<td>4</td>
</tr>
<tr>
<td>ES 350</td>
<td>Introduction to Geophysics</td>
<td>4</td>
</tr>
<tr>
<td>ES 365</td>
<td>Data Analysis in Geophysics</td>
<td>3</td>
</tr>
<tr>
<td>ES 410</td>
<td>Tectonics</td>
<td>3</td>
</tr>
<tr>
<td>ES 420</td>
<td>Seismology</td>
<td>4</td>
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<tr>
<td>ES 495</td>
<td>Directed Research</td>
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</tr>
<tr>
<td>PH 356W</td>
<td>Intermediate Laboratory ¹</td>
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</tr>
<tr>
<td>PH 447</td>
<td>Electricity and Magnetism</td>
<td>3</td>
</tr>
<tr>
<td>PH 471</td>
<td>Classical Dynamics</td>
<td>3</td>
</tr>
<tr>
<td>PH 498</td>
<td>Senior Assessment Seminar</td>
<td>1</td>
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</table>

Select three hours of Physics Electives (300-400 level)  3

Prescribed Supporting Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA 125</td>
<td>Calculus I ²</td>
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</tr>
<tr>
<td>MA 126</td>
<td>Calculus II ²</td>
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</tr>
<tr>
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</tr>
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<td>Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td>CS 155</td>
<td>Computer Science I</td>
<td>4</td>
</tr>
<tr>
<td>CS 255</td>
<td>Computer Science II</td>
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</tr>
</tbody>
</table>

Total Hours  4

43-55

1  Fulfills computer literacy requirement for student’s enrolled Option
2  This course is required in the major field if not completed as part of the General Education component

Option IV: General Science ¹

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td>BI 111</td>
<td>Principles of Biology</td>
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</tr>
<tr>
<td>BI 112</td>
<td>Principles of Biology</td>
<td>4</td>
</tr>
<tr>
<td>BI 305</td>
<td>Cell Biology</td>
<td>4</td>
</tr>
<tr>
<td>BI 306</td>
<td>Genetics</td>
<td>4</td>
</tr>
<tr>
<td>CH 111</td>
<td>General Chemistry</td>
<td>4</td>
</tr>
<tr>
<td>&amp; 111L</td>
<td>and General Chemistry Laboratory</td>
<td></td>
</tr>
<tr>
<td>CH 112</td>
<td>General Chemistry</td>
<td>4</td>
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<tr>
<td>&amp; 112L</td>
<td>and General Chemistry Laboratory</td>
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<tr>
<td>CH 311</td>
<td>Organic Chemistry</td>
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<tr>
<td>&amp; 311L</td>
<td>and Organic Chemistry Laboratory</td>
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<tr>
<td>CS 135</td>
<td>Computer Skills for Problem-Solving (or higher) ²</td>
<td>3</td>
</tr>
<tr>
<td>ES 131</td>
<td>Earth Science/Physical Geology</td>
<td>4</td>
</tr>
<tr>
<td>ES 132</td>
<td>Historical Geology</td>
<td>4</td>
</tr>
<tr>
<td>MA 125</td>
<td>Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>MA 126</td>
<td>Calculus II</td>
<td>4</td>
</tr>
<tr>
<td>PH 251</td>
<td>Technical Physics I</td>
<td>5</td>
</tr>
<tr>
<td>PH 252</td>
<td>Technical Physics II</td>
<td>5</td>
</tr>
<tr>
<td>PH 343</td>
<td>Modern Physics</td>
<td>4</td>
</tr>
</tbody>
</table>

Select one course from the following:  3-4

BI 307  Microbiology
BI 312  Evolution
BI 421  Ecology
CH 312  Organic Chemistry
& 312L  and Organic Chemistry Laboratory
ES 445  Mineralogy
PH 125  Descriptive Astronomy
PH 356W  Intermediate Laboratory ³

Select one course with accompanying lab from the following:  4-5

CH 321  Quantitative Analysis
CH 322  Instrumental Analysis ³
CH 341  Applied Physical Chemistry

Select one course from the following:  3-4

ES 330  Meteorology
ES 375  Technology and the Environment
ES 431  Structural Geology
ES 455W  Paleobiology ³

Total Hours  4

72-75

1  Option IV requires a second major or a second degree in an approved area.
2  Fulfills computer literacy requirement for student’s enrolled option
3  These courses are required in the major if not completed as part of the General Education component
4  A laboratory is included in science courses that carry 4-5 credit hours (Physics and Earth Science Department).