# Bachelor of Science in Applied Physics - Astronomy Option

(120 credits minimum)

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
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<tbody>
<tr>
<td><strong>1st Semester</strong></td>
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</tr>
<tr>
<td>HUM 101</td>
<td>English Composition: Writing, Speaking, Thinking I</td>
</tr>
<tr>
<td>PHYS 111</td>
<td>Physics I</td>
</tr>
<tr>
<td>PHYS 111A</td>
<td>Physics I Lab</td>
</tr>
<tr>
<td>MATH 111</td>
<td>Calculus I</td>
</tr>
<tr>
<td>CS 113</td>
<td>Introduction to Computer Science</td>
</tr>
<tr>
<td>or CS 115</td>
<td>or Introduction to Computer Science in C++</td>
</tr>
<tr>
<td>CHEM 125</td>
<td>General Chemistry I</td>
</tr>
<tr>
<td>or CHEM 121</td>
<td>or Fundamentals of Chemical Principles I</td>
</tr>
<tr>
<td>FRSH SEM</td>
<td>First-Year Seminar</td>
</tr>
<tr>
<td><strong>Term Credits</strong></td>
<td><strong>17</strong></td>
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| 2nd Semester | |
| PHYS 144 | Introduction to Data Reduction with Applications | 3 |
| PHYS 121 | Physics II | 3 |
| PHYS 121A | Physics II Lab | 1 |
| MATH 112 | Calculus II | 4 |
| CHEM 122 | Fundamentals of Chemical Principles II | 3 |
| or CHEM 126 | or General Chemistry II | |
| CHEM 124 | General Chemistry Laboratory | 1 |
| **Term Credits** | **15** |

| Second Year | |
| **1st Semester** | |
| MATH 213 | Calculus III B | 4 |
| MATH 225 | Survey of Probability and Statistics | 1 |
| PHYS 234 | Physics III | 3 |
| PHYS 231A | Physics III Lab | 1 |
| History and Humanities GER 200 level | 3 |
| HUM 102 | English Composition: Writing, Speaking, Thinking II | 3 |
| **Term Credits** | **15** |

| 2nd Semester | |
| MATH 222 | Differential Equations | 4 |
| MATH 228 | Mathematical Methods for Scientists and Engineers | 3 |
| PHYS 335 | Introductory Thermodynamics | 3 |
| or R750 315 | or Intro Thermodynamics | |
| History and Humanities GER 300+ level | 3 |
| **Term Credits** | **13** |

| Third Year | |
| **1st Semester** | |
| PHYS 432 | Electromagnetism I | 3 |
| PHYS 320 | Astronomy and Astrophysics I | 3 |
| History and Humanities GER 300+ level | 3 |
| PHYS 430 | Classical Mechanics I | 3 |
**B.S. in Applied Physics**

<table>
<thead>
<tr>
<th>Term Credits</th>
<th>15</th>
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**2nd Semester**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>PHYS 433</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 321</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 418</td>
<td>3</td>
</tr>
<tr>
<td>Math/Phys/CS Elective</td>
<td>3</td>
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<tr>
<td>Humanities and Social Science Senior Seminar GER</td>
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**Fourth Year**

**1st Semester**

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>PHYS 420</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 442</td>
<td>3</td>
</tr>
<tr>
<td>Math/Physics/CS Elective</td>
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<tr>
<td>Technical Elective</td>
<td>3</td>
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<tr>
<td>Social Science GER</td>
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**2nd Semester**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>PHYS 322</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 421</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 450</td>
<td>3</td>
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<tr>
<td>Technical Elective</td>
<td>3</td>
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<tr>
<td>Technical Elective</td>
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<th>Term Credits</th>
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**Total Credits**

<table>
<thead>
<tr>
<th>Credits</th>
<th>120</th>
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</table>

* Students can take MATH 333 (Probability and Statistics) instead of MATH 225

**Electives**

**Math/Phys/CS**

Consult the physics department for information about qualifying courses.

**Technical**

Consult the physics department for information about qualifying courses.

Refer to the **General Education Requirements** for further information on GER electives.

**Co-op Courses**

Co-op courses bearing degree credit replace a technical elective or another course approved by the faculty advisor in the students major department. In applied physics, both PHYS 311 Co-op Work Experience I and PHYS 411 Co-op Work Experience II are taken for degree Credit with permission.

**Bachelor of Science in Applied Physics - Optical Science and Engineering Option**

(120 credits minimum)

**First Year**

**1st Semester**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>HUM 101</td>
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<tr>
<td>PHYS 111</td>
<td>3</td>
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<tr>
<td>PHYS 111A</td>
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<tr>
<td>MATH 111</td>
<td>4</td>
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<td>Course Code</td>
<td>Course Title</td>
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<td>-------------</td>
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</tr>
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<td>CS 113</td>
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<td>First-Year Seminar</td>
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**2nd Semester**

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>PHYS 114</td>
<td>Introduction to Data Reduction with Applications</td>
<td>3</td>
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<tr>
<td>PHYS 121</td>
<td>Physics II</td>
<td>3</td>
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<tr>
<td>PHYS 121A</td>
<td>Physics II Lab</td>
<td>1</td>
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<tr>
<td>MATH 112</td>
<td>Calculus II</td>
<td>4</td>
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<tr>
<td>CHEM 122</td>
<td>Fundamentals of Chemical Principles II</td>
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<tr>
<td>or CHEM 126</td>
<td>or General Chemistry II</td>
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<tr>
<td>CHEM 124</td>
<td>General Chemistry Laboratory</td>
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**Second Year**

**1st Semester**

<table>
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<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>MATH 213</td>
<td>Calculus III B</td>
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<tr>
<td>MATH 225</td>
<td>Survey of Probability and Statistics</td>
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<tr>
<td>PHYS 234</td>
<td>Physics III</td>
<td>3</td>
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<td>PHYS 231A</td>
<td>Physics III Lab</td>
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<td>History and Humanities GER 200 level <a href="http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/ger-200-level/">1</a></td>
<td>3</td>
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<tr>
<td>HUM 102</td>
<td>English Composition: Writing, Speaking, Thinking II</td>
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**2nd Semester**

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>MATH 222</td>
<td>Differential Equations</td>
<td>4</td>
</tr>
<tr>
<td>MATH 328</td>
<td>Mathematical Methods for Scientists and Engineers</td>
<td>3</td>
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<tr>
<td>MATH 335</td>
<td>Vector Analysis</td>
<td>3</td>
</tr>
<tr>
<td>or R750 315</td>
<td>or Intro Thermodynamics</td>
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<tr>
<td>History and Humanities GER 300+ level <a href="http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/ger-300-level/">2</a></td>
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**Third Year**

**1st Semester**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>OPSE 301</td>
<td>Introduction to Optical Science and Engineering</td>
<td>3</td>
</tr>
<tr>
<td>OPSE 310</td>
<td>Virtual Instrumentation</td>
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<tr>
<td>History and Humanities GER 300+ level <a href="http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/ger-300-level/">3</a></td>
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<tr>
<td>PHYS 430</td>
<td>Classical Mechanics I</td>
<td>3</td>
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<tr>
<td>PHYS 432</td>
<td>Electromagnetism I</td>
<td>3</td>
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**2nd Semester**

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<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>OPSE 402</td>
<td>High Power Laser and Photonics Applications</td>
<td>3</td>
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<tr>
<td>PHYS 433</td>
<td>Electromagnetism II</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 418</td>
<td>Fundamentals of Optical Imaging</td>
<td>3</td>
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<td>PHYS 446</td>
<td>Solid State Physics</td>
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<tr>
<td>Phys/OPSE Elective</td>
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**Fourth Year**

**1st Semester**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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</thead>
<tbody>
<tr>
<td>PHYS 442</td>
<td>Introduction to Quantum Mechanics</td>
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</tr>
<tr>
<td>or R750 404</td>
<td>or Quantum Mechanics</td>
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</table>
Phys/OPSE/EE Elective
Technical Elective
Technical Elective
Social Science GER (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/social-science-ger/)

<table>
<thead>
<tr>
<th>Term</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Phys/OPSE/EE Elective</td>
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<tr>
<td>Technical Elective</td>
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<tr>
<td>Technical Elective</td>
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</tr>
<tr>
<td>Social Science GER</td>
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</tr>
<tr>
<td>Term Credits</td>
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2nd Semester

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>PHYS 450 Advanced Physics Lab</td>
<td>3</td>
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<tr>
<td>Free Elective</td>
<td>3</td>
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<tr>
<td>Technical Elective</td>
<td>3</td>
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<tr>
<td>Phys/EE Elective</td>
<td>3</td>
</tr>
<tr>
<td>Humanities and Social Science Senior Seminar GER (<a href="http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/hss-capstone/">http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/hss-capstone/</a>)</td>
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<td>Term Credits</td>
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</table>

Total Credits 120

* Students can take MATH 333 (Probability and Statistics) instead of MATH 225

Electives

Phys/OPSE
Consult the physics department for information about qualifying courses.

Math/Phys/CS
Consult the physics department for information about qualifying courses.

Math/Phys/EE/CS
Consult the physics department for information about qualifying courses.

Technical
Consult the physics department for information about qualifying courses.

See the General Education Requirements “Refer to the General Education Requirements for specific information for GER courses”

Co-op Courses

Co-op courses bearing degree credit replace a technical elective or another course approved by the faculty advisor in the students major department. In applied physics, both PHYS 311 Co-op Work Experience I and PHYS 411 Co-op Work Experience II are taken for degree Credit with permission.

This curriculum represents the maximum number of credits per semester for which a student is advised to register. A full-time credit load is 12 credits. First-year students are placed in a curriculum that positions them for success which may result in additional time needed to complete curriculum requirements. Continuing students should consult with their academic advisor to determine the appropriate credit load.