# Bachelor of Arts in Physics: Concentration in Astronomy - Quantitative Reasoning Category I/II and ENG 114

120 Total Units Required  
Minimum Number of Units in the Major: 52

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Semester</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ASTR 115</td>
<td>Introduction to Astronomy (Major Lower-Division Prerequisite, B1)</td>
<td>3</td>
</tr>
<tr>
<td>ENG 114</td>
<td>Writing the First Year: Finding Your Voice (A2) ¹</td>
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</tr>
<tr>
<td>MATH 226</td>
<td>Calculus I (Major Lower-Division Prerequisite, B4) ²</td>
<td>4</td>
</tr>
<tr>
<td>GE Area A ³</td>
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<tr>
<td>GE Area C</td>
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</tr>
<tr>
<td><strong>Units</strong></td>
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<td>16</td>
</tr>
<tr>
<td><strong>Second Semester</strong></td>
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<tr>
<td>MATH 227</td>
<td>Calculus II (Major Lower-Division Prerequisite)</td>
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<tr>
<td>PHYS 220 &amp; PHYS 222</td>
<td>General Physics with Calculus I and General Physics with Calculus I Laboratory (Major Lower-Division Prerequisite, B1, B3)</td>
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<tr>
<td>GE Area A</td>
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<td>3</td>
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<tr>
<td>GE Area C</td>
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<td><strong>Units</strong></td>
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<td><strong>Third Semester</strong></td>
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<tr>
<td>ASTR 301</td>
<td>Observational Astronomy Laboratory (Major Upper-Division Core)</td>
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<tr>
<td>MATH 228</td>
<td>Calculus III (Major Lower-Division Prerequisite)</td>
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<tr>
<td>PHYS 230 &amp; PHYS 232</td>
<td>General Physics with Calculus II and General Physics with Calculus II Laboratory (Major Lower-Division Prerequisite)</td>
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<td><strong>Units</strong></td>
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<td><strong>Fourth Semester</strong></td>
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<td>ASTR 300</td>
<td>Stars, Planets, and the Milky Way (Major Upper-Division Core)</td>
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<tr>
<td>PHYS 240 &amp; PHYS 242</td>
<td>General Physics with Calculus III and General Physics with Calculus III Laboratory (Major Lower-Division Prerequisite)</td>
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<tr>
<td>GE Area B: Life Science (B2)</td>
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<tr>
<td>GE Area C</td>
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<tr>
<td>GE Area D</td>
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<td><strong>Units</strong></td>
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<tr>
<td><strong>Fifth Semester</strong></td>
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<td>PHYS 320 &amp; PHYS 321</td>
<td>Modern Physics I and Modern Physics Laboratory (Major Upper-Division Core)</td>
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<td>GE Area D</td>
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<td>SF State Studies or University Elective - Take Two ⁴</td>
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<td><strong>Units</strong></td>
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<td><strong>Sixth Semester</strong></td>
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<tr>
<td>ASTR/PHYS 340GW</td>
<td>The Big Bang - GWAR (Major Upper-Division Core)</td>
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<td>ASTR 470</td>
<td>Observational Techniques in Astronomy (Major Upper-Division Core)</td>
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<tr>
<td>GE Area UD-B: Upper-Division Physical and/or Life Sciences (Consider SF State Studies Course)</td>
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<td>GE Area UD-C: Upper-Division Arts and/or Humanities (Consider SF State Studies Course)</td>
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<td>SF State Studies or University Elective - Take Two ⁴</td>
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<td><strong>Seventh Semester</strong></td>
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<tr>
<td>Major Elective - Take Two ⁵</td>
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<tr>
<td>GE Area UD-D: Upper-Division Social Sciences (Consider SF State Studies Course)</td>
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<td>SF State Studies or University Elective ⁴</td>
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<td><strong>Units</strong></td>
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<td><strong>Eighth Semester</strong></td>
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<tr>
<td>PHYS 695</td>
<td>Culminating Experience in Physics (Major Upper-Division Core)</td>
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<td>Major Elective - Take One ⁵</td>
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<tr>
<td>SF State Studies or University Elective - Take Four ⁴</td>
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<td><strong>Units</strong></td>
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<tr>
<td><strong>Total Units</strong></td>
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<td>120</td>
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ENG 114 can only be taken if you complete Directed Self-Placement (DSP) and select ENG 114; if you choose ENG 104/ENG 105 through DSP you will satisfy A2 upon successful completion of ENG 105 in the second semester; multilingual students may be advised into alternative English courses.

Depending on courses completed through Early Start, students in Pathway/Category III or IV may be required to enroll in a support course to complement their Quantitative Reasoning/B4 requirement. There are multiple course options for this pathway. Before enrolling in a B4 course, students should verify their MATH Pathway/Category in their Student Center. Information regarding the courses that correspond with your MATH Pathway/Category can be found on the Developmental Studies Office Website.

To avoid taking additional units, it is recommended that you meet SF State Studies requirements (AERM, GP, ES, SJ) within your GE or major.

Complementary Studies
Upon completion of the B.A. in Physics program, students will have taken 12 units of Calculus courses that satisfy the Complementary Studies requirement for a B.A. degree. Students who have earned AA-T or AS-T degrees and are pursuing a similar B.A. degree at SF State are required to fulfill the Complementary Studies requirement as defined by the major department. Students should consult with a major advisor about how transfer units and/or SF State units can best be applied to this requirement in order to ensure degree completion within 60 units.

Major Elective (8 units)
At least 8 units of upper-division courses in astronomy, physics, geosciences, mathematics or related subjects, selected on advisement. No more than 3 units of 600 level courses may count toward this requirement.