# Bachelor of Science in Physics - Quantitative Reasoning Category III/IV and Stretch English

120 Total Units Required  
Minimum Number of Units in the Major: 71

This roadmap is a suggested plan of study and does not replace meeting with an advisor. Please note that students may need to adjust the actual sequence of courses based on course availability. Please consult an advisor in your major program for further guidance.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Semester</strong></td>
<td></td>
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</tr>
<tr>
<td>ENG 104</td>
<td>Writing the First Year: Finding Your Voice Stretch I</td>
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<tr>
<td>MATH 197</td>
<td>Prelude to Calculus I (Prerequisite for MATH 226)</td>
<td>3</td>
</tr>
<tr>
<td>GE Area A</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>GE Area C</td>
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</tr>
<tr>
<td>GE Area D</td>
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<tr>
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<tr>
<td><strong>Second Semester</strong></td>
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<tr>
<td>ENG 105</td>
<td>Writing the First Year: Finding Your Voice Stretch II (A2)</td>
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<tr>
<td>MATH 198</td>
<td>Prelude to Calculus II (Prerequisite for MATH 226, B4)</td>
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<tr>
<td>GE Area A</td>
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<tr>
<td>GE Area C</td>
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<tr>
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<td><strong>Third Semester</strong></td>
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<tr>
<td>MATH 226</td>
<td>Calculus I (Major Lower-Division Prerequisite, B4)</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 E</td>
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<td><strong>Units</strong></td>
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<tr>
<td><strong>Fourth Semester</strong></td>
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<tr>
<td>CSC 309</td>
<td>Computer Programming for Scientists and Engineers (Major Lower-Division Prerequisite)</td>
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<tr>
<td>MATH 227</td>
<td>Calculus II (Major Lower-Division Prerequisite)</td>
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<tr>
<td><strong>Units</strong></td>
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**Fifth Semester**

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<tbody>
<tr>
<td>MATH 228</td>
<td>Calculus III (Major Lower-Division Prerequisite)</td>
<td>4</td>
</tr>
<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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<tr>
<td>GE Area UD-B: Upper-Division Physical and/or Life Sciences (Consider SF State Studies Course)</td>
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<tr>
<td>SF State Studies or University Elective (if selecting MATH 245) or MATH 325</td>
<td>Linear Algebra (if selecting MATH 376)</td>
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<td><strong>Units</strong></td>
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**Sixth Semester**

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<th>Course</th>
<th>Title</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td>MATH 245 or MATH 376</td>
<td>Elementary Differential Equations and Linear Algebra (Major Lower-Division Prerequisite) or Ordinary Differential Equations I</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 UD-C: Upper-Division Physical and/or Life Sciences (Consider SF State Studies Course)</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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<tr>
<td><strong>Units</strong></td>
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**Seventh Semester**

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<tr>
<td>PHYS 320 &amp; PHYS 321</td>
<td>Modern Physics I and Modern Physics Laboratory (Major Upper-Division Core)</td>
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<tr>
<td>PHYS 330</td>
<td>Analytical Mechanics I (Major Upper-Division Core)</td>
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</table>

1. Stretch I
2. Stretch II (A2)
3. Stretch III (B1, B3)
4. Stretch IV (B4)
5. Stretch V (B2, B4)
<table>
<thead>
<tr>
<th>Course</th>
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</thead>
<tbody>
<tr>
<td>PHYS 385</td>
<td>Introduction to Theoretical Physics I (Major Upper-Division Core)</td>
<td>3</td>
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<tr>
<td>PHYS 360</td>
<td>Electricity and Magnetism I (Major Upper-Division Core)</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 370</td>
<td>Thermodynamics and Statistical Mechanics (Major Upper-Division Core)</td>
<td>3</td>
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<tr>
<td>PHYS 457</td>
<td>Introduction to Analog Electronics (Major Upper-Division Core)</td>
<td>4</td>
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<tr>
<td>PHYS 430</td>
<td>Quantum Mechanics I (Major Upper-Division Core)</td>
<td>3</td>
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<tr>
<td>PHYS 460</td>
<td>Electricity and Magnetism II (Major Upper-Division Core)</td>
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<tr>
<td>PHYS 490</td>
<td>Physics Project Laboratory (Major Upper-Division Core)</td>
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<td>Major Elective (10 units total) - Take One</td>
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<tr>
<td>PHYS 491GW</td>
<td>Advanced Laboratory II - GWAR (Major Upper-Division Core)</td>
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<tr>
<td>PHYS 695</td>
<td>Culminating Experience in Physics (Major Upper-Division Core)</td>
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<tr>
<td>Major Elective (10 units total) - Take Two</td>
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</tbody>
</table>

Total Units: 124

1. 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.
2. 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.
3. QR Category III students with a grade of B or higher in high school pre-calculus in the past year may be able to enroll in MATH 226. Please see a department advisor.
4. To avoid taking additional units, it is recommended that you meet SF State Studies requirements (AERM, GP, ES, SJ) within your GE or major.
5. Major Electives (10 units)
Upper-division astronomy, physics, mathematics, or related sciences courses.