BS MATHEMATICS

Program Learning Objectives

1. Understand the nature of mathematical proof and be able to write clear and concise proofs.
2. Develop the ability to read, understand, and use basic definitions in linear and abstract algebra and real analysis, and be able to prove simple consequences of these definitions.
3. Be able to use standard mathematical techniques to solve elementary problems.
4. Be able to communicate effectively in oral and written form.
5. Be able to write simple computer programs to perform mathematical computations.
6. Gain experience exploring open-ended problems, learn to make conjectures, and gather evidence to support or refute these conjectures.
7. Develop the ability to read and to learn mathematics independently.
8. Learn about applications of mathematics in other fields and gain experience in mathematical modeling.

Degree Requirements and Curriculum

In addition to the program requirements listed on this page, students must also satisfy requirements outlined in more detail in the Minimum Requirements for Graduation (http://catalog.calpoly.edu/ generalrequirementsbachelorsdegree/#generaleducationtext) section of this catalog, including:

- 60 units of upper division courses
- Graduation Writing Requirement (GWR)
- 2.0 GPA
- U.S. Cultural Pluralism (USCP)

Note: No major, support or concentration courses may be selected as credit/no credit.

MAJOR COURSES

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 141</td>
<td>Calculus I (B1)</td>
<td>4</td>
</tr>
<tr>
<td>MATH 142</td>
<td>Calculus II (B1)</td>
<td>4</td>
</tr>
<tr>
<td>MATH 143</td>
<td>Calculus III</td>
<td>4</td>
</tr>
<tr>
<td>MATH 202</td>
<td>Orientation to Mathematics Major</td>
<td>1</td>
</tr>
<tr>
<td>MATH 206</td>
<td>Linear Algebra I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 241</td>
<td>Calculus IV</td>
<td>4</td>
</tr>
<tr>
<td>MATH 242</td>
<td>Differential Equations I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 248</td>
<td>Methods of Proof in Mathematics</td>
<td>4</td>
</tr>
<tr>
<td>MATH 306</td>
<td>Linear Algebra II</td>
<td>4</td>
</tr>
<tr>
<td>MATH 336</td>
<td>Combinatorial Math</td>
<td>4</td>
</tr>
<tr>
<td>MATH 412</td>
<td>Introduction to Analysis I</td>
<td>4</td>
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</table>

Select from the following: 3

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 459</td>
<td>Senior Project Seminar</td>
<td>4</td>
</tr>
<tr>
<td>MATH 460</td>
<td>Senior Project Applied Seminar</td>
<td></td>
</tr>
<tr>
<td>MATH 461</td>
<td>Senior Project I &amp; MATH 462</td>
<td></td>
</tr>
<tr>
<td></td>
<td>and Senior Project II</td>
<td></td>
</tr>
<tr>
<td>MATH 481</td>
<td>Abstract Algebra I</td>
<td>4</td>
</tr>
<tr>
<td>CSC/CPE 101</td>
<td>Fundamentals of Computer Science</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 141</td>
<td>General Physics IA</td>
<td>4</td>
</tr>
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</table>

Select from the following: 1

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 132</td>
<td>General Physics II (B3 &amp; B4)</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 133</td>
<td>General Physics III (B3 &amp; B4)</td>
<td></td>
</tr>
</tbody>
</table>

General Curriculum in BS Mathematics or Concentration 2 44/56/48/48

GENERAL EDUCATION (GE)

(See GE program requirements below.) 60

FREE ELECTIVES

Free Electives 2 15/3/11/11

Total units 180

1 Required in Major; also satisfies GE.
2 General Curriculum/Applied Concentration/Pure Concentration/ Mathematics Teaching Concentration.
3 MATH 460 is recommended for students in the Applied Concentration.

General Curriculum in BS Mathematics or Concentrations (select one)

- General Curriculum (http://catalog.calpoly.edu/ collegesandprograms/collegeofsciencescience/mathematics/mathematics/ bsmathematics/generalcurriculum)
- Applied Mathematics (http://catalog.calpoly.edu/ collegesandprograms/collegeofsciencescience/mathematics/mathematics/ bsmathematics/appliedmathematicsconcentration)
- Mathematics Teaching (http://catalog.calpoly.edu/ collegesandprograms/collegeofsciencescience/mathematics/mathematics/ bsmathematics/mathematics/teachingconcentration)
- Pure Mathematics (http://catalog.calpoly.edu/ collegesandprograms/collegeofsciencescience/mathematics/mathematics/ bsmathematics/puremathematicsconcentration)

General Education (GE) Requirements

- 72 units required, 12 of which are specified in Major and/or Support.
- See the complete GE course listing (http://catalog.calpoly.edu/ generalrequirementsbachelorsdegree/#generaleducationtext).
- Minimum of 12 units required at the 300 level.

Area A Communication

<table>
<thead>
<tr>
<th>Area</th>
<th>Communication</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>Expository Writing</td>
<td>4</td>
</tr>
<tr>
<td>A2</td>
<td>Oral Communication</td>
<td>4</td>
</tr>
<tr>
<td>A3</td>
<td>Reasoning, Argumentation and Writing</td>
<td>4</td>
</tr>
</tbody>
</table>

Area B Math, Science, and Quantitative Reasoning

<table>
<thead>
<tr>
<th>Area</th>
<th>Math, Science, and Quantitative Reasoning</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>B1</td>
<td>Mathematics/Statistics (8 units in Major/Support)</td>
<td>0</td>
</tr>
<tr>
<td>B2</td>
<td>Life Science</td>
<td>4</td>
</tr>
<tr>
<td>B3</td>
<td>Physical Science (4 units in Support)</td>
<td>0</td>
</tr>
<tr>
<td>B4</td>
<td>One lab taken with either a B2 or B3 course</td>
<td></td>
</tr>
<tr>
<td>B7</td>
<td>Upper-division elective</td>
<td>4</td>
</tr>
</tbody>
</table>

Area C Arts and Humanities

<table>
<thead>
<tr>
<th>Area</th>
<th>Arts and Humanities</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td>C1</td>
<td>Literature</td>
<td>4</td>
</tr>
<tr>
<td>C2</td>
<td>Philosophy</td>
<td>4</td>
</tr>
</tbody>
</table>

Note: No major, support or concentration courses may be selected as credit/no credit.
<table>
<thead>
<tr>
<th>Area</th>
<th>Course Description</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>C3</td>
<td>Fine/Performing Arts</td>
<td>4</td>
</tr>
<tr>
<td>C4</td>
<td>Upper-division elective</td>
<td>4</td>
</tr>
<tr>
<td>Area C elective</td>
<td>(Choose one course from C1-C5)</td>
<td>4</td>
</tr>
<tr>
<td>Area D</td>
<td>Society and the Individual</td>
<td></td>
</tr>
<tr>
<td>D1</td>
<td>The American Experience (Title 5, Section 40404 requirement)</td>
<td>4</td>
</tr>
<tr>
<td>D2</td>
<td>Political Economy</td>
<td>4</td>
</tr>
<tr>
<td>D3</td>
<td>Comparative Social Institutions</td>
<td>4</td>
</tr>
<tr>
<td>D5</td>
<td>Upper-division elective</td>
<td>4</td>
</tr>
<tr>
<td>Area E</td>
<td>Lifelong Learning and Self-Development</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>Lower-division elective</td>
<td>4</td>
</tr>
</tbody>
</table>

Total units 60

1 Required in Major; also satisfies GE.