Program Learning Outcomes

1. An ability to apply knowledge of mathematics, science, and engineering,
2. An ability to design and conduct experiments, as well as to analyze and interpret data,
3. An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability,
4. An ability to function on multidisciplinary teams,
5. An ability to identify, formulate, and solve engineering problems,
6. An understanding of professional and ethical responsibility,
7. An ability to communicate effectively,
8. The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context,
9. A recognition of the need for, and an ability to engage in lifelong learning,
10. A knowledge of contemporary issues,
11. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

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 or support courses may be selected as credit/no credit.

**MAJOR COURSES**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>BRAE 128</td>
<td>Careers in Bioresource and Agricultural Engineering</td>
<td>2</td>
</tr>
<tr>
<td>BRAE 129</td>
<td>Laboratory Skills and Safety</td>
<td>1</td>
</tr>
<tr>
<td>BRAE 133</td>
<td>Introduction to Engineering Design Graphics</td>
<td>1</td>
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<tr>
<td>BRAE 151</td>
<td>CAD for Agricultural Engineering</td>
<td>1</td>
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<tr>
<td>BRAE 152</td>
<td>3-D Solid Modeling</td>
<td>1</td>
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<tr>
<td>BRAE 216</td>
<td>Fundamentals of Electricity</td>
<td>4</td>
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<tr>
<td>BRAE 232</td>
<td>Agricultural Structures Planning</td>
<td>4</td>
</tr>
<tr>
<td>BRAE 234</td>
<td>Introduction to Mechanical Systems in Agriculture</td>
<td>4</td>
</tr>
<tr>
<td>BRAE 236</td>
<td>Principles of Irrigation</td>
<td>4</td>
</tr>
<tr>
<td>BRAE 239</td>
<td>Engineering Surveying</td>
<td>4</td>
</tr>
<tr>
<td>BRAE 312</td>
<td>Hydraulics</td>
<td>4</td>
</tr>
<tr>
<td>BRAE 320</td>
<td>Principles of Bioresource Engineering</td>
<td>4</td>
</tr>
<tr>
<td>BRAE 328</td>
<td>Measurements and Computer Interfacing</td>
<td>4</td>
</tr>
<tr>
<td>BRAE 331</td>
<td>Irrigation Theory</td>
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<tr>
<td>BRAE 403</td>
<td>Agricultural Systems Engineering</td>
<td>4</td>
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<tr>
<td>BRAE 414</td>
<td>Irrigation Engineering</td>
<td>4</td>
</tr>
<tr>
<td>BRAE 421</td>
<td>Equipment Engineering</td>
<td>3</td>
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<tr>
<td>BRAE 422</td>
<td>Equipment Engineering</td>
<td>4</td>
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<tr>
<td>BRAE 428</td>
<td>Agricultural Engineering</td>
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<tr>
<td>BRAE 433</td>
<td>Agricultural Structures Design</td>
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<tr>
<td>BRAE 460</td>
<td>Senior Project Organization</td>
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<tr>
<td>BRAE 461</td>
<td>Senior Project I</td>
<td>2</td>
</tr>
<tr>
<td>BRAE 462</td>
<td>Senior Project II</td>
<td>2</td>
</tr>
</tbody>
</table>

**Approved Electives**

Select from the following:

- BRAE 302 Servo Hydraulics
- BRAE 335 Internal Combustion Engines
- BRAE 345 Aerial Photogrammetry and Remote Sensing
- BRAE 348 Energy for a Sustainable Society
- BRAE 400 Special Problems (4 units maximum)
- BRAE 405 Chemigation
- BRAE/EE 434 Automotive Engineering for a Sustainable Future
- BRAE 435 Drainage
- BRAE 447 Advanced Surveying with GIS Applications
- BRAE 448 Biocconversion
- BRAE 450 Solar Photovoltaic System Engineering
- BRAE 532 Water Wells and Pumps
- BRAE 533 Irrigation Project Design
- CHEM 312 Survey of Organic Chemistry
- IME 319 Human Factors Engineering
- MCRO 421 Food Microbiology
- any upper division CE course
- any upper division EE course
- any upper division ENVE course

**SUPPORT COURSES**

Select from the following:

- BIO 213 Life Science for Engineers
- & BRAE 213 and Bioengineering Fundamentals (also offered as BMED 213; B2)
- MCRO 221 Microbiology (B2)
- CE 204 Mechanics of Materials I
- CE 207 Mechanics of Materials II
- CHEM 124 General Chemistry for Physical Science and Engineering I (B3 & B4)
- CHEM 125 General Chemistry for Physical Science and Engineering II (Add'l Area B)

Select from the following:

- CSC 231 Programming for Engineering Students
- any upper division CE course
- any upper division EE course
- any upper division ENVE course

**Notes:**

- No major or support courses may be selected as credit/no credit.
- Courses offered as BMED 213 are labeled B2. Courses offered as CHEM 124 are labeled B3 & B4. Courses offered as CHEM 125 are labeled B2. Courses offered as CSC 231 are labeled B2-3.
or CSC 232  Computer Programming for Scientists and Engineers
or CSC 234  C and Unix
ECON 201  Survey of Economics (D2)  2
or ECON 222  Macroeconomics
EE 321  Electronics  4
& EE 361  and Electronics Laboratory
ENGL 149  Technical Writing for Engineers (A3)  2
MATH 141  Calculus I (B1)  2
MATH 142  Calculus II (B1)  2
MATH 143  Calculus III (Add'l Area B)  2
MATH 241  Calculus IV  4
MATH 244  Linear Analysis I  4
ME 211  Engineering Statics  3
ME 212  Engineering Dynamics  3
PHYS 141  General Physics IA  4
PHYS 132  General Physics II  4
PHYS 133  General Physics III  4
SS 121  Introductory Soil Science  4
STAT 312  Statistical Methods for Engineers (B6)  2

GENERAL EDUCATION (GE)
(See GE program requirements below.)  36
FREE ELECTIVES
Free Electives  0
Total units  187-190

1 Consultation with advisor is recommended prior to selecting approved electives; bear in mind your selections may impact pursuit of post-baccalaureate studies and/or goals.
2 Required in Support; also satisfies GE.

General Education (GE) Requirements
• 72 units required, 36 of which are specified in Major and/or Support.
• See the complete GE course listing (http://catalog.calpoly.edu/generalrequirementsbachelorsdegree/#generaleducationtext).
• Minimum of 8 units required at the 300 level.

Area A  Communication
A1  Expository Writing  4
A2  Oral Communication  4
A3  Reasoning, Argumentation and Writing (4 units in Support)  1

Area B  Science and Mathematics  no additional units are required
B1  Mathematics/Statistics (8 units in Support)  1
B2  Life Science (4 units in Support)  1
B3  Physical Science (4 units in Support)  1
B4  One lab taken with either a B2 or B3 course
B6  Upper-division Area B (4 units in Support)  1

Additional Area B units (8 units in Support)  1