

# BIORESOURCE AND AGRICULTURAL ENGINEERING (BS)

## 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 (<https://catalog.calpoly.edu/academic-standards-policies/general-requirements-bachelors-degree/>) section of this catalog, including:

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

Note: No Major or Support courses may be selected as credit/no credit. In addition, no more than 12 units of cooperative or internship courses can count towards your degree requirements.

| Code                                    | Title                                                        | Units |
|-----------------------------------------|--------------------------------------------------------------|-------|
| <b>MAJOR COURSES</b>                    |                                                              |       |
| BRAE 1128                               | Careers in BioResource and Agricultural Engineering          | 2     |
| BRAE 1150                               | Design Graphics and CAD for Agricultural Engineering         | 2     |
| BRAE 1239                               | Engineering Surveying                                        | 3     |
| BRAE 2216                               | Fundamentals of Electricity                                  | 4     |
| BRAE 2220                               | Introduction to Biological Systems (5B & 5C) <sup>1</sup>    | 4     |
| BRAE 2221                               | Engineering Mechanics with Agricultural Applications I       | 4     |
| BRAE 2222                               | Engineering Mechanics with Agricultural Applications II      | 4     |
| BRAE 2236                               | Principles of Irrigation                                     | 4     |
| BRAE 3234                               | Equipment Engineering I                                      | 4     |
| BRAE 3312                               | Hydraulics                                                   | 3     |
| BRAE 3320                               | Bioresource Engineering                                      | 3     |
| BRAE 3332                               | Environmental Controls for Agricultural Structures           | 3     |
| BRAE 4403                               | Agricultural Engineering Ethics, Economics, and Optimization | 3     |
| BRAE 4414                               | Irrigation Engineering                                       | 3     |
| BRAE 4422                               | Equipment Engineering II                                     | 3     |
| BRAE 4428                               | Agricultural Robotics and Automation                         | 4     |
| BRAE 4433                               | Agricultural Structures Design                               | 4     |
| BRAE 4460                               | Senior Project I                                             | 1     |
| BRAE 4461                               | Senior Project II                                            | 2     |
| BRAE Focus Area                         |                                                              |       |
| Select from the following:              |                                                              | 6     |
| BRAE 3335                               | Internal Combustion Engines                                  |       |
| BRAE 4302                               | Servo Hydraulics                                             |       |
| BRAE 4447                               | Advanced Surveying with GIS Applications                     |       |
| BRAE 4448                               | Bioconversion                                                |       |
| BRAE 5435                               | Hydrology and Drainage                                       |       |
| BRAE 5436                               | Food and Agriculture Process Water Engineering               |       |
| BRAE 5532                               | Water Pumps and Wells                                        |       |
| BRAE 5533                               | Irrigation Project Design                                    |       |
| <b>Approved Elective</b>                |                                                              |       |
| Select from the following: <sup>2</sup> |                                                              | 3     |
| BRAE 3335                               | Internal Combustion Engines                                  |       |
| BRAE 3345                               | Photogrammetry and Remote Sensing with GIS Applications      |       |
| BRAE 3348                               | Energy for a Sustainable Society                             |       |
| BRAE 3349                               | Water for a Sustainable Society                              |       |
| BRAE 4302                               | Servo Hydraulics                                             |       |
| BRAE 4447                               | Advanced Surveying with GIS Applications                     |       |

|                                            |                                                          |            |
|--------------------------------------------|----------------------------------------------------------|------------|
| BRAE 4448                                  | Bioconversion                                            |            |
| BRAE 5405                                  | Chemigation                                              |            |
| BRAE 5435                                  | Hydrology and Drainage                                   |            |
| BRAE 5436                                  | Food and Agriculture Process Water Engineering           |            |
| BRAE 5532                                  | Water Pumps and Wells                                    |            |
| BRAE 5533                                  | Irrigation Project Design                                |            |
| MSCI 4438                                  | Aquaculture                                              |            |
| <b>SUPPORT COURSES</b>                     |                                                          |            |
| CHEM 1122                                  | Fundamentals of Chemical Reactivity (5A) <sup>1</sup>    | 4          |
| CSC 1032                                   | Programming for Scientists and Engineers                 | 3          |
| Select from the following: 4B <sup>1</sup> |                                                          | 3          |
| ECON 2001                                  | Survey of Economics                                      |            |
| ECON 2040                                  | Macroeconomics                                           |            |
| MATH 1261                                  | Calculus I (2) <sup>1</sup>                              | 4          |
| MATH 1262                                  | Calculus II                                              | 4          |
| MATH 2263                                  | Calculus III                                             | 3          |
| PHYS 1141                                  | General Physics I                                        | 4          |
| PHYS 1143                                  | General Physics II                                       | 4          |
| STAT 3210                                  | Engineering Statistics (Upper-Division 2/5) <sup>1</sup> | 3          |
| <b>GENERAL EDUCATION (GE)</b>              |                                                          |            |
| (See GE program requirements below)        |                                                          | 27         |
| <b>FREE ELECTIVES</b>                      |                                                          |            |
| Free Electives                             |                                                          | 0          |
| <b>Total Units</b>                         |                                                          | <b>128</b> |

<sup>1</sup> Required in Major or Support; also satisfies General Education (GE) requirement.

<sup>2</sup> If a course is taken to meet a Major requirement, it cannot be double-counted as an Approved Elective.

## General Education (GE) Requirements

- 43 units required, 16 of which are specified in Major and/or Support.
- If any of the remaining 27 Units is used to satisfy a Major or Support requirement, additional units of Free Electives may be needed to complete the total units required for the degree.
- See the complete GE course listing (<https://catalog.calpoly.edu/academic-standards-policies/general-requirements-bachelors-degree/#generaleducationtext>).
- A grade of C- or better is required in one course in each of the following GE Areas: 1A (English Composition), 1B (Critical Thinking), 1C (Oral Communication), and 2 (Mathematics and Quantitative Reasoning).

### Lower-Division General Education

|               |                                                                                                               |   |
|---------------|---------------------------------------------------------------------------------------------------------------|---|
| <b>Area 1</b> | <b>English Communication and Critical Thinking</b>                                                            |   |
| 1A            | Written Communication                                                                                         | 3 |
| 1B            | Critical Thinking                                                                                             | 3 |
| 1C            | Oral Communication                                                                                            | 3 |
| <b>Area 2</b> | <b>Mathematics and Quantitative Reasoning</b>                                                                 |   |
| 2             | Mathematics and Quantitative Reasoning (3 units in Support) <sup>1</sup>                                      | 0 |
| <b>Area 3</b> | <b>Arts and Humanities</b>                                                                                    |   |
| 3A            | Arts                                                                                                          | 3 |
| 3B            | Humanities: Literature, Philosophy, Languages other than English                                              | 3 |
| <b>Area 4</b> | <b>Social and Behavioral Sciences (Area 4 courses must come from at least two different course prefixes.)</b> |   |
| 4A            | American Institutions (Title 5, Section 40404 Requirement)                                                    | 3 |
| 4B            | Social and Behavioral Sciences (3 units in Support) <sup>1</sup>                                              | 0 |
| <b>Area 5</b> | <b>Physical and Life Sciences</b>                                                                             |   |



|                                         |                                                                                                        |           |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------|-----------|
| 5A                                      | Physical Sciences (3 units in Support) <sup>1</sup>                                                    | 0         |
| 5B                                      | Life Sciences (3 units in Major) <sup>1</sup>                                                          | 0         |
| 5C                                      | Laboratory (may be embedded in a 5A or 5B course) (1 units in Major) <sup>1</sup>                      | 0         |
| <b>Area 6</b>                           | <b>Ethnic Studies</b>                                                                                  |           |
| 6                                       | Ethnic Studies                                                                                         | 3         |
| <b>Upper-Division General Education</b> |                                                                                                        |           |
| Upper-Division 2/5                      | Mathematics and Quantitative Reasoning or Physical and Life Sciences (3 units in Support) <sup>1</sup> | 0         |
| Upper-Division 3                        | Arts and Humanities                                                                                    | 3         |
| Upper-Division 4                        | Social and Behavioral Sciences (Area 4 courses must come from at least two different course prefixes.) | 3         |
| <b>Total Units</b>                      |                                                                                                        | <b>27</b> |

<sup>1</sup> Required in Major or Support; also satisfies General Education (GE) requirement.