CAL POLY

# BS BIOLOGICAL SCIENCES
## 2022-2026

This document displays only your course requirements at the time of publication of the catalog. You must use your Degree Progress Report to track all graduation requirements.

***Note: No Major, Support or Concentration courses may be selected as credit/no credit.***

| MAJOR COURSES | | |
|---|---|---|
| BIO 150 | Diversity and History of Life | 4 |
| BIO 161 | Intro to Cell and Molecular Biology (B2 & B3) [1] | 4 |
| BIO 162 | Introduction to Organismal Form & Function | 4 |
| BIO 263 | Introductory Ecology and Evolution | 4 |
| BIO 351 | Principles of Genetics | 5 |
| BIO 413 | Evolutionary Medicine | 4 |
| or BIO 414 | Evolution | |
| BIO 461 | Senior Project - Research Proposal | 2 |
| or BIO 462 | Senior Project Research Experience | |
| **Ecology** [3] | | |
| Select from the following: | | 4 |
| BIO 327 | Wildlife Ecology | |
| BIO 363 | Principles of Conservation Biology | |
| BIO 442 | Behavioral Ecology | |
| BOT 326 | Plant Ecology | |
| MCRO 436 | Microbial Ecology | |
| MSCI 300 | Marine Ecology | |
| **Physiology** [2,3] | | |
| Select from the following: | | 4 |
| BIO 361 | Principles of Animal Physiology | |
| BIO 434 | Environmental Physiology | |
| BIO 435 | Plant Physiology | |
| **Concentration or General Curriculum in Biology** [3] (See list of Concentrations and General Curriculum below) | | 43 |
| **Total Major Units** | | **78** |

| SUPPORT COURSES | | |
|---|---|---|
| CHEM 127 | Gen CHEM for Ag & Life Science I (B1 & B3) [1] | 4 |
| CHEM 128 | Gen CHEM for Agriculture & Life Science II | 4 |
| CHEM 129 | Gen CHEM for Agriculture & Life Science III | 4 |
| CHEM 216 | Organic Chemistry I [4] | 5 |
| or CHEM 312 | Organic Chem: Fund. & Applications | |
| MATH 161 | Calculus for the Life Sciences I (B4) [1] | 4 |
| MATH 162 | Calculus for the Life Sciences II (GE Electives) [1] | 4 |
| PHYS 121 | College Physics I | 4 |
| PHYS 122 | College Physics II | 4 |
| PHYS 123 | College Physics III | 4 |
| STAT 218 | Applied Statistics for the Life Sciences | 4 |
| **Total Support Units** | | **41** |

| GENERAL EDUCATION | | |
|---|---|---|
| **Area A** | **English Language Communication & Critical Thinking** | |
| A1 | Oral Communication | 4 |
| A2 | Written Communication | 4 |
| A3 | Critical Thinking | 4 |
| **Area B** | **Scientific Inquiry and Quantitative Reasoning** | |
| B1 | Physical Science (4 units in Support) [1] | 0 |
| B2 | Life Science (4 units in Major) [1] | 0 |
| B3 | One lab in either a B1 or B2 course (in Major) | |
| B4 | Math/Quantitative Reasoning (4 units in Support) [1] | 0 |
| Upper-Division B | | 4 |
| **Area C** | **Arts and Humanities** | |
| ***Select lower-division courses from 3 different prefixes.*** | | |
| C1 | Arts | 4 |
| C2 | Humanities | 4 |
| Lower-Division C Elective - Select from either C1 or C2 | | 4 |
| Upper-Division C | | 4 |
| **Area D** | **Social Sciences** | |
| ***Select courses from at least 2 different prefixes*** | | |
| D1 | American Institutions (Title 5/Section 40404) | 4 |
| D2 | Lower-Division D | 4 |
| Upper-Division D | | 4 |
| **Area E** | **Lifelong Learning and Self-Development** | |
| Lower-Division E | | 4 |
| **Area F** | **Ethnic Studies** | |
| Lower-Division F | | 4 |
| **GE Electives in Areas C and D** | | |
| ***Select lower- or upper-division courses from 2 different areas.*** | | |
| GE Electives (4 units B in Support) [1] | | 0 |
| GE Electives (Area C or D) | | 4 |
| **Total GE Units** | | **56** |
| **FREE ELECTIVES** [5] | | **5** |
| **TOTAL DEGREE UNITS** | | **180** |

**FOOTNOTES**

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

2 Students who are planning to take Anatomy and Physiology courses should take BIO 361 to fulfill this requirement.

3 Courses taken to meet a Major or Support requirement cannot be double-counted in a concentration or in the General Curriculum.

4 Students in the Molecular and Cellular Biology concentration should take CHEM 216 to fulfill this requirement.

5 If a General Education (GE) course 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.

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## General Curriculum in Biology

The General Curriculum in Biology is followed by default if no concentration is declared.

**Biodiversity Courses** [1,2]

Select from the following: 4

| | | | |
|---|---|---|---|
| BIO 321 | BIO 324 | BIO 336 | MCRO 224[3] |
| BIO 322 | BIO 329 | BIO 429 | MCRO 402 |
| BIO 323 | BIO 335 | BOT 313 | MSCI 324 |

**400-level Electives** [1,4]

Select from any 400 level BIO/BOT/MCRO/MSCI course, except BIO 400, 450, 461, 462, 463. 12

**300-400 level Electives** [1,2]

Select from any 300-400 level BIO/BOT/MCRO/MSCI course, except BIO 300, 330, 400, 450, 461, 462, 463, and courses "not open for major credit in Biological Sciences." 8

**Approved Electives** [1,5,6,7]

At least 12 units must be upper-division. 19
At least 4 units must be BIO/BOT/MCRO/MSCI course(s)
Select from the following:
Any BIO/BOT/MCRO/MSCI course except those "not open for major credit in Biological Sciences." [7,8,9]

| | | |
|---|---|---|
| AG/EDES/ENGR/ISLA/ SCM/UNIV 350 | CHEM 418 | NR 418 |
| ANT 401 | CHEM 428 | NR 425 |
| ASCI 239 | CHEM 474 | PHIL 323 |
| ASCI 351 | COMS 418 | or PHIL 339 |
| ASCI 403 | CSC 101 | or PHIL 341 |
| ASCI 405 | DATA 301 | PSC 201 |
| or BIO 407 | ENGR 322/SCM 302[10] | PSY 320 |
| ASCI 406 | ERSC/GEOG 250 | PSY 340 |
| ASCI 438 | ES/WGQS 350 | SS 120 |
| CHEM 217 | FSN 310 | SS 321 |
| CHEM 218 | GEOG 441 | SS 322 |
| CHEM 220 | KINE 406 | SS 422 |
| CHEM 223 | KINE 445 | STAT 313 |
| CHEM 314 | KINE 446 | STAT 324 |
| or CHEM 369 | LA/NR 218 | or STAT 334 |
| CHEM 331 | or GEOG 218 | STAT 330 |
| CHEM 341 | NR 141 | STAT 416 |
| CHEM 372 | NR 142 | STAT 419 |
| CHEM 377 | NR 404 | STAT 421 |
| | NR 416 | |

**Total Units 43**

1 Consultation with advisor is recommended prior to selecting electives; bear in mind your selections may impact pursuit of post-baccalaureate studies and/or goals.
2 Excess units will be applied to Approved Electives.
3 Recommended for students interested in health science careers.
4 Excess units will be applied to 300-400 level Electives.
5 If a course is taken to meet a Major or Support requirement, it cannot be double-counted in the concentration.
6 Taking a General Education (GE) course that double-counts as an elective may cause an upper-division unit shortage. **Use care to ensure that you have taken enough 300-400 level courses to meet the required 60 units of upper-division courses.**
7 If BIO 461 or BIO 462 is used to meet the senior project requirement, it cannot be double-counted as an elective.
8 Maximum of 6 units may be applied toward Approved Electives: BIO 200, 300, 400, 450, 485, 495; MSCI 401.
9 Only one of the following courses may count toward Approved Electives: BIO 231, 232.
10 Maximum of 2 units may be applied toward Approved Electives from ENGR 322/SCM 302

## Anatomy and Physiology Concentration

| | | |
|---|---|---|
| BIO 452 | Cell Biology | 4 |
| CHEM 369 or CHEM 314 | Biochemical Principles (Upper-Division B)[1] / Biochemistry: Fund. & Apps (Upper-Div B)[1] | 5 |

**Biodiversity Courses** [1,2]

Select from the following: 4

| | | | |
|---|---|---|---|
| BIO 321 | BIO 324 | BIO 336 | MCRO 224[3] |
| BIO 322 | BIO 329 | BIO 415 | MSCI 324 |
| BIO 323 | BIO 335 | BOT 313 | MSCI 437 |

**Core Anatomy and Physiology Courses** [1,2]

Select from the following: 16

| | | |
|---|---|---|
| BIO 406 | BIO 408 | BIO 426 |
| BIO 407 | BIO 409 | |
| or ASCI 405 | BIO 410 | |

**Department Electives** [1,2]

Select from the following: 3

| | | | |
|---|---|---|---|
| BIO 321 | BIO 406 | BIO 426 | MCRO 225 |
| BIO 322 | BIO 407 | BIO 428 | MCRO 320 |
| BIO 323 | or ASCI 405 | BIO 429 | MCRO 342 |
| BIO 324 | BIO 408 | BIO 434 | MCRO 402 |
| BIO 329 | BIO 409 | BIO 435 | MCRO 423 |
| BIO 335 | BIO 410 | BIO 470 | MCRO 424 |
| BIO 336 | BIO 411 | BIO/CHEM 475 | |
| BIO 405 | BIO 415 | MCRO 224[3] | |

**Approved Electives** [1]

At least 4 units must be upper-division 11
Select from the following:

| | | |
|---|---|---|
| ANT 401 | BIO 411 | DATA 301 |
| ASCI 351 | BIO 415 | ENGR 322/SCM 302[7] |
| ASCI 406 | BIO 426 | FSN 310 |
| ASCI 407 | BIO 428 | KINE 406 |
| ASCI 438 | BIO 429 | KINE 445 |
| BIO 231[4] or 232[4] | BIO 434 | KINE 446 |
| BIO 300[5] | BIO 435 | MCRO 225 |
| BIO 321 | BIO 461[6] | MCRO 320 |
| BIO 322 | BIO 462[6] | MCRO 342 |
| BIO 323 | BIO 463 | MCRO 402 |
| BIO 324 | BIO 470 | MCRO 423 |
| BIO 329 | BIO/CHEM 475 | MCRO 424 |
| BIO 335 | BOT 313 | MSCI 324 |
| BIO 336 | CHEM 217 | MSCI 437 |
| BIO 400[5] | CHEM 218 | PHIL 323 |
| BIO 405 | CHEM 220 | or PHIL 339 |
| BIO 406 | CHEM 223 | or PHIL 341 |
| BIO 407 | CHEM 372 | PLSC/BOT 323 |
| or ASCI 405 | CHEM 418 | PSY 320 |
| BIO 408 | CHEM 428 | PSY 340 |
| BIO 409 | COMS 418 | STAT 313 |
| BIO 410 | CSC 101 | WGQS/ES 350 |

**Total Units 43**

1 Consultation with advisor is recommended prior to selecting electives; they may impact pursuit of post-baccalaureate studies and/or goals. Choose electives carefully to **ensure that you meet the required 60 units of 300-400 level courses**.
2 Excess units will be applied to Approved Electives.
3 Recommended for students interested in health sciences careers.
4 Only one of the following may count toward Approved Electives: BIO 231 or 232.
5 Maximum of 6 units may be applied toward Approved Electives: BIO 200, 300, 400, 450, 485, 495; MSCI 401.
6 If BIO 461 or BIO 462 is used to meet the senior project requirement, it cannot be double-counted as an Approved Elective.
7 Max. of 2 units may be applied to Approved Electives from ENGR 322 /SCM 302.

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| Ecology, Evolution, Biodiversity, & Conservation Concentration | | |
|---|---|---|
| BIO 363 | Principles of Conservation Biology | 4 |
| LA/NR 218 or GEOG 218 | Intro to Geographic Information Systems (GIS) Applications in GIS [1] | 3 |
| **Biodiversity Courses [1, 2]** | | |
| Select three from the following: BIO 321, BIO 322, BIO 323, BIO 324, BIO 335, BIO 336, BOT 313, BOT 433, MCRO 224, MSCI 437 | | 12 |
| **Ecology and Evolution Courses [1]** | | |
| Select one from the following: BIO 415, BIO 442, BIO 444, BIO 445, BIO 446, BIO 447, BOT 326, MCRO 436, MSCI 300 | | 4 |
| **Conservation Courses [1, 2]** | | |
| Select one from the following: BIO 427, MSCI 428, MSCI 439, NR 416 | | 4 |
| **Approved Electives: [3, 4]** | | |
| Select from the following: At least 8 units must be upper-division. ASCI 239, BIO 300[5], BIO 321, BIO 322, BIO 323, BIO 324, BIO 327, BIO 329, BIO 330, BIO 335, BIO 336, BIO 400[5], BIO 415, BIO 427, BIO 429, BIO 434, BIO 435, BIO 442, BIO 444, BIO 445, BIO 446, BIO 450[5], BIO 461[6], BIO 462[6], BIO 463, BOT 311, BOT 323, BOT 326, GEOG 441, MCRO 224, MCRO 436, MSCI 300, MSCI 324, MSCI 428, MSCI 437, MSCI 439, NR 141, NR 142, NR 314, NR 404, NR 416, NR 418, NR 425, NR 445, SCM 302/ENGR 322[7], STAT 313, STAT 324, or STAT 334, STAT 330, STAT 331, STAT 416, STAT 419, STAT 421 | | 16 |
| **Total Units** | | **43** |

1 Excess units will be applied to subsequent concentration electives.

2 Students seeking certification (e.g. as an Associate Wildlife Biologist from the Wildlife Society) should see their faculty advisor for guidance.

3 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.

4 If a course is taken to meet a Major or Support requirement, it cannot be double-counted in the concentration.

5 Maximum of 6 units may be applied toward Approved Electives: BIO 200, BIO 300, BIO 400, BIO 450, BIO 485, BIO 495, MSCI 401.

6 If BIO 461 or BIO 462 is used to meet the senior project requirement, it cannot be double-counted as an Approved Elective.

7 Maximum of 2 units may be applied toward Approved Electives from SCM 302/ENGR 322.

| Molecular and Cellular Biology Concentration | | |
|---|---|---|
| BIO 452 | Cell Biology | 4 |
| BIO/CHEM 475 | Molecular Biology Laboratory | 3 |
| CHEM 217 | Organic Chemistry II | 3 |
| CHEM 220 | Organic Chemistry Laboratory For Life Sciences II | 1 |
| CHEM 369 | Biochemical Principles (Upper-Division B)[1] | 5 |
| MCRO 224 | General Microbiology I | 5 |
| **Advanced Cell and Molecular Applications [1, 2]** | | |
| Select from the following: ASCI 403, BIO 405, BIO 426, BIO 428, BIO/CHEM 441, BIO/CHEM 476, CHEM 372, CHEM 418, CHEM 474, MCRO 402, MCRO 433 | | 10 |
| **Approved Electives [1,3,4,5]** | | |
| Select from any 300-400 level BIO/BOT/MCRO/MSCI courses (including Advanced Cell and Molecular Applications from the list above) or select from the following: At least 5 units must be upper-division. ASCI 403, ASCI 406, ASCI 407, BIO/CHEM 202, CHEM 218, CHEM 223, CHEM 331, CHEM 372, CHEM 377, CHEM 418, CHEM 428, CHEM 474, CSC 101, DATA 301, ENGR 322/SCM 302[6], ES/WGQS 350, PHIL 323 or PHIL 339 or PHIL 341, STAT 313 | | 12 |
| **Total Units** | | **43** |

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

2 Excess units will be applied to Approved Electives.

3 Consult with your faculty advisor for approval to use other relevant upper-division coursework in other departments.

4 If a course is taken to meet a Major or Support requirement, it cannot be double-counted in the concentration.

5 Maximum of 6 units may be applied toward Approved Electives: BIO 200, BIO 300, BIO 400, BIO 450, BIO 485, BIO 495, MSCI 401.

6 Maximum of 2 units may be applied toward Approved Electives from ENGR 322/SCM 302.