BS BIOLOGICAL SCIENCES

- 60 units upper division
- GWR
- 2.0 GPA
- USCP

* = Required in Major/Support; also satisfies GE
Course sequencing: See flowcharts at csmadvising.calpoly.edu
Note: No major, support or concentration courses may be taken as credit/no credit.

MAJOR COURSES

- BIO 160 Diversity & the History of Life .................. 4
- BIO 161 Intro to Cell & Molecular Bio (B2&B4)* ...... 4
- BIO 162 Intro to Organismal Form & Function ......... 5
- BIO 263 Introductory Ecology and Evolution .......... 4
- BIO 351 Principles of Genetics ............................ 5
- BIO 414 Evolution ............................................ 4
- BIO 461 Senior Project – Research Proposal or
  BIO 462 Senior Project – Research ....................... 2

1 Biological Diversity: ........................................... 4
   BIO 328, 415; BOT 313, 323, 433, 437; MCRO 341, 425
   Ecology: BIO 325, BOT 326; MCRO 436 .............. 4
   Physiology: BIO 361, 434, 435 ........................... 4
   Concentration .................................................. 39

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SUPPORT COURSES

- CHEM 127 General Chemistry (B3&B4)* ............ 4
- CHEM 128, 129 General Chemistry ..................... 4
- CHEM 312 Survey of Organic Chemistry or
  CHEM 316 Organic Chemistry I .......................... 5
- MATH 161, 162 Calculus/Life Sciences I, II (B1)* .... 4
- PHYS 121, 122, 123 College Physics I, II, III ....... 4
- STAT 218 Appl Statistics-Life Sciences (B1)* ........ 4

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GENERAL EDUCATION (GE)

- 72 units required, 16 of which are specified in Major/Support.
  → See page 50 for complete GE course listing.
  → Minimum of 12 units required at the 300 level.

Area A Communication (12 units)

- A1 Expository Writing ....................................... 4
- A2 Oral Communication ..................................... 4
- A3 Reasoning, Argumentation, and Writing .......... 4

Area B Science and Mathematics (no add'l units req'd)

- B1 Mathematics/Statistics * 8 units in Support .... 0
- B2 Life Science * 4 units in Major ..................... 0
- B3 Physical Science * 4 units in Support .......... 0
- B4 One lab taken with either a B2 or B3 course in
  Major ......................................................... 0

4

Area C Arts and Humanities (20 units)

- C1 Literature .................................................. 4
- C2 Philosophy ................................................ 4
- C3 Fine/Performing Arts ................................. 4
- C4 Upper-division elective ............................... 4
- Area C elective (Choose one course from C1-C4) .... 4

Area D/E Society and the Individual (20 units)

- D1 The American Experience (40404) ................. 4
- D2 Political Economy ..................................... 4
- D3 Comparative Social Institutions .................... 4
- D4 Self Development (CSU Area E) .................... 4
- D5 Upper-division elective ................................ 4

Area F Technology Elective (upper division)(4 units)

180

FREE ELECTIVES ................................................. 4

4 Concentrations (select one)

Anatomy and Physiology Concentration

- BIO 432 Vertebrate/Human Anatomy & Phys I ...... 5
- BIO 433 Vertebrate/Human Anatomy & Phys II .... 5
- BIO 452 Cell Biology ....................................... 4
- CHEM 371 Biochemical Principles or CHEM 313
  Survey of Biochemistry and Biotechnology ......... 5

5 Approved electives ........................................... 20

Select 20 units from the following; at least 12
units must be from BIO, CHEM, MCRO, ZOO
courses:

- ASCI 351, 406;
- BIO/CHEM 375;
- BIO 400, 405, 426, 434, 435, 463;
- CHEM 317, 318, 372;
- FSN 310, 429;
- KINE 406, 445, 446;
- MCRO 225, 320, 342, 402, 423, 424;
- PHIL 339;
- PSY 340;
- SCM 451;
- ZOO 422, 425, 428

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1 Students in the Molecular and Cellular Biology concentration should
   take MCRO 224 to fulfill this requirement.
2 Students in the Anatomy and Physiology concentration and in the
   Biology Teaching concentration should take BIO 361 to fulfill this
   requirement.
3 Students in the Molecular and Cellular Biology concentration should
   take CHEM 316 to fulfill this requirement.
4 Guidelines are available for approved electives in most concentrations.
   See your faculty advisor for assistance.
5 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.
1 Biology Teaching Concentration

BIO 432 Vertebrate/Human Anatomy/Phys I ........ 5
BIO 433 Vertebrate/Human Anatomy/Phys II ....... 5
BIO 452 Cell Biology............................................. 4
BIO/PSC 424 Organizing/Teaching Science.......... 4
MCRO 320 Emerging Infectious Diseases............. 3
SCM 300 Early Field Experience, Science/Math... 4
SCM 451 Ethics in the Sciences ............................. 3
2 Approved electives.................................................... 11

Select 11 units from the following:
BIO 328, 330, 375, 400, 401, 415, 434, 435,
463, 472;
BOT 311, 313, 323, 326, 335, 433, 437;
MCRO 225, 421, 424, 433;
ZOO 321, 322, 323, 329, 335, 336, 341, 437

Ecology Concentration

Ecology of the Individual (select 1 course) .......... 4-5
BIO 434, BIO 435, ZOO 437
Population Ecology (select 1 course).................. 3-4
BIO 401, BIO 439, BIO 444
Community Ecology (select 1 course)................. 4-5
BIO 325, BIO 328, BOT 326, BOT 433,
MCRO 436
Global Ecology (select 1 course) ...................... 4
BIO 415, GEOG 250, GEOG 333, UNIV 350
Methodology (select 3 courses)......................... 10-12
BIO/CHEM 375, BIO 419, BIO 443, LA/NR
318, STAT 313, STAT 419
2 Approved electives............................................. 14-9

Select courses from the above five lists in this
concentration, or from the following:
BIO 400, 463, 472; BOT 311; CSC 448;
NR 307, 418; SS 321, 322;

Field and Wildlife Biology Concentration

BOT 313 Taxonomy of Vascular Plants ............... 4
BOT 433 Field Botany ......................................... 4
ZOO 321 Mammalogy.......................................... 4
ZOO 323 Ornithology......................................... 4
ZOO 341 Herpetology......................................... 4
Emphasis Area (select one)................................. 19

Field Biology Emphasis

ZOO 335 General Entomology (4)
ZOO 437 Animal Behavior (4)
BIO 439/ZOO 322 (4)
2 Approved electives (7) Select 7 units from:
BIO 325, 327, 328, 330, 400, 401, 415, 419,
427, 439, 434, 443, 444; BOT 326, 437;
NR 141, 142, 203, 307, 317, 318, 404, 416;
MCRO 402; SS 121, 321, 322; STAT 313,
324, 330, 416, 419, 421; ZOO 322, 329, 335,
336, 425, 437

3 Wildlife Biology Emphasis

BIO 327 Wildlife Biology Methods (5)
BIO 427 Wildlife Management (4)
BIO 444 Population Ecology (3) or
BIO 401 Conservation Biology (4)
2 Approved electives (6-7) Select 6-7 units from
the approved electives list above for the Field
Biology Emphasis

General Biology Concentration

BIO 452 Cell Biology ............................................. 4
CHEM 313 Survey of Biochem and Biotech or
CHEM 371 Biochemical Principles 12/21/09 ....... 5

Anatomy/Physiology............................................. 4
BIO 361, BIO 432, BIO 433, BIO 434, BIO
435, BOT 335, MCRO 424, ZOO 422
2/12/10

Botany ............................................................. 4
BOT 313, BOT 323, BOT 326, BOT 335,
BOT 433, BOT 437 2/12/10

Microbiology ..................................................... 3-5
BIO 426, MCRO 224, MCRO 225, MCRO
320, MCRO 342, MCRO 402, MCRO 421,
MCRO 433, MCRO 436, ZOO 428

Zoology ............................................................. 4
BIO 328, ZOO 321, ZOO 322,
ZOO 323, ZOO 329, ZOO 335, ZOO 336,
ZOO 341, ZOO 425

2 Approved electives ............................................. 15-13

Select from:
BIO 328, 400, 401, 405, 415, 426, 432, 433,
434, 435, 463, 472;
BOT 311, 313, 323, 326, 335, 433, 437;
CHEM 317;
MCRO 224, 225, 320, 342, 402, 421, 424,
433, 436;
SCM 451;
ZOO 321, 322, 323, 329, 335, 336, 341, 422,
425, 428

To meet credentialing requirements, it is recommended that students take
KINE 250 or KINE 255 to fulfill GE D4, and SCM 330 to fulfill GE
Area F. 6/23/09.

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.

Students seeking Wildlife Biologist Certification should see faculty
advisor for assistance.
### Marine Biology and Fisheries Concentration

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td>BIO 328</td>
<td>Marine Biology</td>
<td>5</td>
</tr>
<tr>
<td>BIO/CHEM 375</td>
<td>Molecular Biology Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>BOT 437</td>
<td>Phycology</td>
<td>4</td>
</tr>
<tr>
<td>STAT 313</td>
<td>Applied Experimental Design and Regression Models</td>
<td>4</td>
</tr>
<tr>
<td>ZOO 322</td>
<td>Ichthyology</td>
<td>4</td>
</tr>
<tr>
<td>ZOO 336</td>
<td>Invertebrate Zoology</td>
<td>4</td>
</tr>
</tbody>
</table>

1. **Approved electives**: 15 units

*Select at least 8 units from:*
- BIO 400, 401, 405, 419, 434, 435, 438, 439, 443, 444, 452, 462, 463;
- MCRO 436;
- ZOO 321, 323, 425, 437

*Select no more than 8 units from:*
- CHEM 317, 313 or 371; 341, 474;
- PSC 201

### Molecular and Cellular Biology Concentration

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIO/CHEM 375</td>
<td>Molecular Biology Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>BIO 452</td>
<td>Cell Biology</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 317</td>
<td>Organic Chemistry II</td>
<td>5</td>
</tr>
<tr>
<td>CHEM 371</td>
<td>Biochemistry</td>
<td>5</td>
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<tr>
<td>CHEM 372</td>
<td>Metabolism</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 474</td>
<td>Protein Techniques Laboratory or Biochemistry</td>
<td>4</td>
</tr>
<tr>
<td>BIO/CHEM 476</td>
<td>Gene Expression Laboratory</td>
<td>2</td>
</tr>
</tbody>
</table>

*Choose 8 units from the following:*
- BIO 405, BIO 426, BIO/CHEM 441,
- BIO/CHEM 476 or CHEM 474, BOT 450,
- MCRO 402, MCRO 433, SCM 201

1. **Approved electives**: 8 units

*Select 8 units from:*

**List A**
- BIO 400, 405, 426, 432, 433, 435, 463;
- BIO/CHEM 441;
- BIO/CHEM 476 or CHEM 474;
- BOT 323, 450;
- MCRO 320, 402, 423, 424, 433;
- ZOO 422, 425, 428

**List B** (Only one course from this list without special petition)
- ASCI 403, 406;
- CHEM 318, 331, 377, 472, 477, 478, 528;
- SCM 201, 451

### Systematics and Biodiversity Concentration

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIO 443</td>
<td>Molecular Ecology &amp; Systematics</td>
<td>4</td>
</tr>
<tr>
<td>BIO/CHEM 375</td>
<td>Molecular Biology Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>BIO 415</td>
<td>Biogeography</td>
<td>4</td>
</tr>
<tr>
<td>BIO/CHEM 441</td>
<td>Bioinformatics Applications</td>
<td>4</td>
</tr>
<tr>
<td>STAT 313</td>
<td>Applied Experimental Design and Regression Models</td>
<td>4</td>
</tr>
<tr>
<td>STAT 419</td>
<td>Applied Multivariate Statistics</td>
<td>4</td>
</tr>
</tbody>
</table>

1. **Approved biological diversity electives**: 16 units

*Select 16 units from:*
- BIO 325, 327, 328, 400, 401, 419, 427, 429, 463, 472;
- BIO/NR 317;
- BOT 311, 313, 323, 326, 433, 437;
- CSC 448;
- NR 307;
- STAT 324, 330, 416, 421;
- ZOO 321, 322, 323, 335, 336, 341, 425

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.