2011-13 Cal Poly Catalog

Biological Sciences Department

BS BIOLOGICAL SCIENCES

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

* = Required in Major/Support; also satisfies GE

Course sequencing: See flowcharts at csmdvising.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 ...... 4/5
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 415; BOT 313, 323, 433, 437; MCRO 224, 402;
   MSCI 324; ZOO 321, 322, 323, 329, 335,
   336, 341, 425 (6/9/15)
Ecology: BIO 325, 327, 328, 401, 445, 446; BOT
   326; MCRO 436 (9/26/13) ..................................... 4
2. Physiology: BIO 361, 434, 435 .................................. 4
3. Concentration or General Curriculum in Biology .... 38-39
   (9/24/12)

SUPPORT COURSES

CHEM 127 General Chemistry (B3&B4)* .......... 4
CHEM 128, 129 General Chemistry ....................... 4, 4
5. CHEM 312 Survey of Organic Chemistry or
   CHEM 216 Introduction to Organic Chemistry I
   or CHEM 316 Organic Chemistry I (7/13/12) ....... 5
MATH 161, 162 Calculus/Life Sciences I, II (B1)* 4, 4
PHYS 121, 122, 123 College Physics I, II, III .... 4, 4, 4
STAT 218 Appl Statistics-Life Sciences (B1)* ....... 4

GENERAL EDUCATION (GE)

72 units required, 16 of which are specified in Major/Support.
→See page 39 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

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

FREE ELECTIVES ......................................................... 4-6 5

General Curriculum in Biology

CHEM 313 Survey of Biochem and Biotech or
CHEM 371 Biochemical Principles ....................... 5

Anatomy/Physiology (Select at least 1 course) .... 4-5
   BIO 361, 432, 433, 434, 435;
   MCRO 424; ZOO 422

Botany (Select at least 1 course) ....................... 4
   BOT 311, 313, 323, 324, 335, 431, 433, 437

Ecology/Evolution/Conservation (Select at least 1 course) .............. 3-4
   BIO 325, 327, 328, 401, 415, 419, 427, 428,
   438, 439, 443, 444, 445, 446; (12/3/13)
   BOT 326; MCRO 436; MSCI 301, 303, 401,
   410; ZOO 437 or BIO 442 (10/29/13)(7/16/15)

Microbiology (Select at least 1 course) ............. 3-5
   MCRO 224, 225, 301, 320, 342, 421, 423,
   433; ZOO 425

Molecular/Cellular Biology (Select at least 1 course) ............. 3-4
   BIO 405, 426, 452;
   BIO/CHM 375, 441, 476;
   BOT/HCS 450;
   MCRO 402; ZOO 428

Zoology (Select at least 1 course) .................... 4
   ZOO 321, 322, 323, 329, 335, 336, 341

Research, Projects and Seminars ...................... 0-6
   BIO 200, 330, 400, 440, 450, 461, 462, 463,
   470, 471, 472; SCM 302 (12/3/13)(7/23/15)

1. 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. Note that courses in concentrations or the general curriculum may not
   double-count in the major core.

4. Maximum of 6 units may be applied toward the major from the
   following courses: BIO 400, BIO 450, BIO 462, BIO 463.

5. Students in the Molecular and Cellular Biology concentration should
   take CHEM 216 or 316 to fulfill this requirement. (7/9/12)

6. To meet credentialing requirements, it is recommended teaching
   students take KINE 250 to fulfill GE D4, and SCM 330 to fulfill GE
   Area F.

2011-2013 Cal Poly Catalog
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
1 Approved electives.................................. 20

Select 20 units from the following:

8 units minimum from:
BIO/CHM 375; BIO 405, BIO 407 or ASCI 405, BIO 406, 408, 409, 410, 426, 434, 435; MCRO 225, 320, 342, 402, 423, 424; ZOO 422, 425, 428

11 units maximum from:
CHEM 217, 218, 220, 223, 317, 318, 372

8 units maximum from:
ANT 401; ASCI 351, 406, 438; BIO 400, 461, 462, 463; COMS 418, FSN 310, 429; KINE 406, 445, 446; PHIL 339 or 341; PSY 320, 340; SCM 302, 451 or PHIL 341

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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) or PHIL 339 Biomedical Ethics (4), PHIL 340 Environmental Ethics (4) or SCM 325 Genetic Engineering Technology (4)...
1 Approved electives.................................. 10-11

Select 11 units from the following:


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Ecology Concentration

Ecology of the Individual (select 1 course) .......... 4-5
BIO 434, 435; MCRO 424; ZOO 437
Population Ecology (select 1 course).............. 3-4
BIO 327, 401, 439, 444
Community Ecology (select 1 course)............. 4
BIO 325, 328; BOT 326, 433; MCRO 436

Global Ecology (select 1 course) ................. 4
BIO 415, GEOG 250, 333; UNIV 350
Methodology (select 3 courses) ................... 10-12
BIO/CHM 375, BIO 419, BIO 443, LA/NR 318 or GEOG 318, STAT 313, STAT 419 (4/27/16)
1, 4 Approved electives............................. 10-14

Select courses from the above five lists in this concentration, or from the Biological Diversity list of courses in the major core, or from the following:

BIO 330, 361, 400, 427, 441, 462, 463, 472; BOT 311, 313, 323, 437; GEOG 440;
MCRO 224, 402;
NR 307, 311, 418, 421;
SCM 302; SS 121, 321, 322, 421, 422;
ZOO 321, 322, 323, 329, 335, 336, 341, 425

Field and Wildlife Biology Concentration

BIO 330 Taxonomy of Vascular Plants .............. 4
BIO 433 Field Botany ................................ 4
ZOO 321 Mammalogy .................................. 4
ZOO 323 Ornithology .................................. 4
ZOO 341 Herpetology .................................. 4
Emphasis Area (select Field or Wildlife) ......... 19

Field Biology Emphasis

ZOO 335 General Entomology (4)
ZOO 437 Animal Behavior (4)
BIO 439/ZOO 322 (4)
1 Approved electives (Select 7 units from):
BIO 325, 327, 330, 400, 401, 415, 419, 427, 439, 434, 443, 444, 445, 446, 461, 462, 463;
(4/24/14)(12/17/15)
BIO 326, 437; LA/NR 318;
NR 141, 142, 203, 307, 404, 416;
MCRO 402; SS 121, 321, 322; SCM 302 (3/13/13)
STAT 313, 324, 330, 416, 419, 421;
ZOO 322, 329, 335, 336, 425, 437

Wildlife Biology Emphasis

BIO 327 Wildlife Ecology (4)
BIO 427 Wildlife Management (4)
BIO 444 Population Ecology (3) or BIO 401 Conservation Biology (4)
1 Approved electives. Select 7-8 units from the approved electives list above in the Field Biology Emphasis

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Marine Biology and Fisheries Concentration

BIO 328 Marine Ecology ......... 4

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 To meet credentialing requirements, it is recommended teaching students take KINE 250 to fulfill GE D4, and SCM 330 to fulfill GE Area F.
3 Students seeking Wildlife Biologist Certification should see faculty advisor for assistance.
4 If any of these courses is taken to meet a major or support requirement in the degree, it cannot be double-counted as an approved elective.
<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>BOT 437</td>
<td>Psychology, Marine Plants</td>
<td>4</td>
</tr>
<tr>
<td>STAT 313</td>
<td>App Exp Design/Regression Models</td>
<td></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>

**Change effective Spring 2012**

Approved electives

Select at least 8 units from:

- BIO 325, 327, 400, 401, 405, 419, 434, 435, 438, 439, 440, 442, 445, 446, 443, 444, 452, 461, 462, 463; MSCI 301, 303, 401, 410
- MCRO 436;
- ZOO 321, 323, 324, 425, 437

Select no more than 8 units from:

- CHEM 217, 302, 317, 313 or 371, 341, 474;
- PSC 201; SCM 302 (3/13/13) (7/9/12) (6/24/14) (7/16/15) (7/23/15)

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**Molecular and Cellular Biology Concentration**

BIO/CHEM 375 Molecular Biology Laboratory......... 3

BIO 452 Cell Biology.................................. 4

CHEM 217 Organic Chemistry for Life Sciences

- II (4) or CHEM 317 Organic Chemistry II (5)

or

- CHEM 217 Organic Chemistry II (3) and CHEM 220 Organic Chemistry Laboratory for Life Sciences (1)

or

- CHEM 217 Organic Chemistry II (3) and CHEM 221 Organic Chemistry Laboratory II (2) (7/27/15) .... 4-5

CHEM 371 Biochemical Principles ....................... 5

CHEM 372 Metabolism .................................... 4

CHEM 474 Protein Techniques Laboratory or BIO/CHEM 476 Gene Expression Laboratory 2

Choose 8 units from the following..................... 8

- BIO 405, 426; BIO/CHEM 441, BIO/CHEM 476 or CHEM 474; BOT 450; MCRO 402, 433; SCM 201

Approved electives................................... 8

Select 8 units from:

List A

- BIO 400†, 405, 406, 407, 408, 409, 426, 432, 433, 435, 461, 462, 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 List B)

- ASCI 403, 406;
- CHEM 218, 318, 331, 377, 472, 477, 478, 528;
- SCM 201, 302, 451

(7/9/12) (3/13/13) (7/16/15) (7/23/15) 38-39

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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 The course selected to satisfy this requirement may not be used to satisfy electives in the concentration.

3 If CHEM 474 is taken for 3 units the extra unit will count towards Approved Electives. (7/16/15)

4 If any of these courses is taken to meet a major or support requirement in the degree, it cannot be double-counted as an approved elective. (7/23/15)

† Total credit limited to 4 units.