Cal Poly Pomona

Name:
Plan: **Biology, B.S.**
SubPlan/Option:
Min. Units Required: **120 units**

2019-2020 University Catalog
Degree Curriculum Sheet

Major Required — 56-58 units

BIO1210 - Foundations of Biology: Energy, Matter, and Information (3) (B2)
BIO1210L - Foundations of Biology: Energy, Matter, and Information Laboratory (1) (B3)
BIO1220 - Foundations of Biology: Evolution, Ecology, and Biodiversity (3)
BIO1220L - Foundations of Biology: Evolution, Ecology, and Biodiversity Laboratory (1)
BIO2110L - Biostatistics Laboratory (1)
BIO2400 - Genetics (3)
BIO3220 - Cell and Molecular Biology (3)
BIO3240 - Principles of Evolution (3)
BIO3250 - Principles of Ecology (3)
CHM1210 - General Chemistry I (3) (B1)
CHM1210L - General Chemistry Laboratory I (1) (B3)
CHM1220 - General Chemistry II (3) (B1)
CHM1220L - General Chemistry Laboratory II (1) (B3)

CHM2010 - Elements of Organic Chemistry (3) and
CHM2010L - Elements of Organic Chemistry Laboratory (1)
OR
CHM3140 - Organic Chemistry I (4) and
CHM3140L - Organic Chemistry Laboratory I (1)

CHM3210 - Elements of Biochemistry (3) or
CHM3270 - Biochemistry I (3)

ENG1101 - Stretch Composition II (3) (A2) or
ENG1103 - First Year Composition (3) (A2)

ENG2105 - Written Reasoning (3) (A3) or
PHL2020 - Critical Thinking (3) (A3)

MAT1140 - Calculus I (4) (B4) or
MAT1200 - Calculus for Life Sciences (3) (B4)

PHY1210 - Physics of Motion, Fluids, and Heat (3) (B1)
PHY1210L - Physics of Motion, Fluids, and Heat Laboratory (1) (B3)
PHY1220 - Physics of Electromagnetism, Circuits, and Light (3)
PHY1220L - Electromagnetism, Circuits, and Light Laboratory (1)
STA1300 - Biostatistics (3) (B4)

Major Electives — 29-31 units

Students who take Elements of Organic Chemistry (CHM 2010 / CHM 2010L) and Calculus for Life Science (MAT 1200) will need 31 units of Major Electives. Students who take both Organic Chemistry I (CHM 3140 / CHM 3140L) and Calculus I (MAT 1140) will only need 29 units of Major Electives, whereas students who take only one of these courses will need 30 units of Major Electives.

Non-Emphasis Electives — 0-8 units

Up to 8 units of any 2000, 3000, or 4000-level courses from any department in College of Science or College of Engineering that are not listed under Major Required, as well as 3000-level GE courses offered by the Biological Sciences Department are allowed. A list of qualifying GE B5 area courses are listed below.

BIO3000 - Genetics and Human Issues (3) (B5)
BIO3010 - Human Sexuality (3) (B5)
BIO3030 - Sexually Transmitted Diseases and Safer Sex (3) (B5)
BIO3040 - Environment and Society (3) (B5)
BIO3070 - Biology of Human Pregnancy (3) (B5)
BIO3090 - Biology of the Brain (3) (B5)
BIO3120 - Biodiversity Conservation (3) (B5)
BIO3130 - Marine Biology (3)

Note(s):

* If you plan to take Organic Chemistry I and Organic Chemistry Laboratory I (CHM 3140 / CHM 3140L), you must also take Organic Chemistry II (CHM 3150 - (3)) lecture in order to take any Biochemistry course. Both CHM 3150 and CHM 3150L (if taken) will count toward your Non-Emphasis Electives.

* If you take Biochemistry I (CHM 3270), you will also be taking its co-requisite CHM 3270L - (1) , which will count toward your Non-Emphasis Electives.

* CHM 2210 / CHM 2210L is required for the Clinical Laboratory Scientist (CLS) programs and can be taken as an elective under this category.

Emphasis Electives — 21-31 units

Any combination of courses listed below will satisfy the required 21-31 units, except that at least 12 units must be at 4000-level or above. Emphases are listed to provide guidance for helping students to choose courses of interest that best fit your career goals, but there is no requirement for choosing a specific emphasis for fulfilling these units.

* Please note that up to 4 units combined from research supervisory, service learning, and internship courses can also count as electives under this category. These courses include BIO 2000 or BIO 4000 , BIO 4410 , BIO 4590S / BIO 4590AS , BIO 4610 , BIO 4620 , and BIO 4910S / BIO 4910AS .

* Please also note that all special topics courses listed as BIO 2990 / BIO 2990A / BIO 2990L or BIO 4990 / BIO 4990A / BIO 4990L are not included in any emphasis below but they can also count as electives under this category.

*Emphases with asterisks are recommended for pre-professional students in medicine, dentistry, and pharmacy. In addition, one year of organic chemistry with laboratories are required. One year of biochemistry with laboratories are also required for pharmacy and highly recommended for medicine and dentistry programs. For updated and specific professional degree and school requirements, consult individual professional schools or the Pre-Professional advisor.

**Courses with double asterisks are required for the admission to the Clinical Laboratory Scientist (CLS) programs.

Emphasis 1 - Integrative Biology

Recommended Electives

Consider selecting 2 of the 3 courses listed below. Labs are corequisites.

BIO2050 - Form and Function in Plants (3)
BIO2050L - Form and Function in Plants Laboratory (1)
BIO2060 - Basic Microbiology (3)
BIO2060L - Basic Microbiology Laboratory (1)
BIO2070 - Animal Biology (3)
BIO2070L - Animal Biology Laboratory (1)

Other Electives

Consider selecting a variety of courses from emphases 2 to 6 listed below.

Emphasis 2 - Botany

Recommended Electives

BIO2050 - Form and Function in Plants (3)
BIO2050L - Form and Function in Plants Laboratory (1)
BIO3250L - Ecology Laboratory (1)
BIO4480 - Plant Physiology (3)
BIO4480L - Plant Physiology Laboratory (1)
PLT2310 - Basic Soil Science (2)
PLT2310L - Basic Soil Science Laboratory (1)

Other Electives

BIO2060 - Basic Microbiology (3)
BIO2060L - Basic Microbiology Laboratory (1)
BIO3500 - California Flora (1)
BIO3500L - California Flora Laboratory (1)
BIO4490 - Marine Botany (2)
BIO4490L - Marine Botany Laboratory (2)
BIO4520 - Evolution of Plants (3)
BIO4520L - Evolution of Plants Laboratory (1)
BIO4530 - Plant Anatomy (2)
BIO4530L - Plant Anatomy Laboratory (2)
BIO4540 - Plant Genetics (3)
BIO4550 - Field Biology (1-3)
BIO4550A - Field Biology Activity (1-3)
BIO4550L - Field Biology Laboratory (1-3)
BIO4560 - Plant Development and Differentiation (3)
BIO4570 - Plants and the Environment (2)
BIO4570L - Plants and the Environment Laboratory (2)
BIO4580 - Ecology and Conservation of Hawaiian Ecosystems (3)
BIO4800 - Entomology (2)
BIO4800L - Entomology Laboratory (2)

General Education Requirements — 48 Units

Students should consult the Academic Programs website

https://www.cpp.edu/~academic-programs/general-education-course-listings.shtml

for current information regarding this requirement. Unless specific courses are required, please refer to the list of approved courses under General Education Requirements, Areas A through E.

Area A. English Language Communication and Critical Thinking (9 units)

At least 3 units from each sub-area

1. Oral Communication
2. Written Communication
3. Critical Thinking

Area B. Scientific Inquiry and Quantitative Reasoning (12 units)

At least 3 units from B1, B2, B4, and B5 including 1 unit of lab from B1 or B2 to fulfill B3

1. Physical Sciences
2. Life Sciences
3. Laboratory Activity
4. Mathematics/Quantitative Reasoning
5. Science and Technology Synthesis

Area C. Arts and Humanities (12 units)

At least 3 units from each sub-area and 3 additional units from sub-areas 1 and/or 2

1. Visual and Performing Arts
2. Literature, Modern Languages, Philosophy and Civilization
3. Arts and Humanities Synthesis

Area D. Social Sciences (12 units)

At least 3 units from each sub-area

1. U.S. History and American Ideals
2. U.S. Constitution and California Government
3. Social Sciences: Principles, Methodologies, Value Systems, and Ethics
4. Social Science Synthesis

Area E. Lifelong Learning and Self-Development (3 units)

Interdisciplinary General Education — 21 Units

An alternate pattern for partial fulfillment of GE Areas A, C, and D available for students is the Interdisciplinary General Education (IGE) program. Students should see an advisor for specific GE coursework required by their major. Please refer to the University Catalog General Education Program section for additional information.

How IGE fulfills General Education Requirements:

Year	*Completion of IGE Courses*	*Satisfies GE Requirements*
First	*IGE 1100, IGE 1200*	*A2 and C2*
Second/Third	*IGE 2100, IGE 2200*	*C1 and C2*
	IGE 2300, IGE 2400	*D1 and D3*
Third/Fourth	*IGE 3100*	*C3 or D4*

American Institutions — 6 Units

Courses that satisfy this requirement may also satisfy GE Area D1 and D2.

American Cultural Perspectives Requirement — 3 Units

Refer to the University Catalog General Education Program section for a list of courses that satisfy this requirement. Course may also satisfy major, minor, GE, or unrestricted elective requirements.

Graduation Writing Test

All persons who receive undergraduate degrees from Cal Poly Pomona must pass the Graduation Writing Test (GWT). The test must be taken by the semester following completion of 60 units for undergraduates.

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Emphasis 3 - Genetics and Molecular Cell Biology

BIO2060 - Basic Microbiology (3)
BIO2060L - Basic Microbiology Laboratory (1)
BIO4020 - Developmental Biology (3)
BIO4020L - Developmental Biology Laboratory (1)
BIO4030 - Human Genetics (3)
BIO4040 - Advanced Genetics (3)
BIO4060 - Regulatory Affairs and Safety Assessment (3)
BIO4300 - Concepts of Molecular Biology (3)
BIO4320 - Molecular Biology Techniques (3)
BIO4320L - Molecular Biology Techniques Laboratory (1)
BIO4360 - Recombinant DNA and Protein Technology (3)
BIO4360L - Recombinant DNA and Protein Technology Laboratory (1)
BIO4380 - Bioinformatics (2)
BIO4380L - Bioinformatics Laboratory (2)
BIO4390 - Cancer Cell Biology (3)
BIO4400 - Stem Cell Biology (3)
BIO4400L - Stem Cell Biology Laboratory (1)
BIO4450 - Physiology I: Cells (3)
BIO4450L - Physiology I: Cells Laboratory (1)
BIO4480 - Plant Physiology (3)
BIO4480L - Plant Physiology Laboratory (1)
BIO4540 - Plant Genetics (3)
BIO4660 - Microbial Physiology (3)
BIO4660L - Microbial Physiology Laboratory (1)

Emphasis 4 - Microbiology

Recommended Electives

BIO2060 - Basic Microbiology (3)
BIO2060L - Basic Microbiology Laboratory (1)
** BIO4635 - Medical Microbiology (3)
** BIO4635L - Medical Microbiology Laboratory (1)
BIO4660 - Microbial Physiology (3)
BIO4660L - Microbial Physiology Laboratory (1)
BIO4680 - Microbial Ecology (2)
BIO4680L - Microbial Ecology Laboratory (1)

Other Electives

BIO3600 - General Epidemiology (3)
BIO3620 - Applied Microbiology (2)
BIO3620L - Applied Microbiology Laboratory (1)
BIO3640 - Food Microbiology (2)
BIO3640L - Food Microbiology Laboratory (1)
BIO4060 - Regulatory Affairs and Safety Assessment (3)
BIO4080 - Water Pollution Biology (3)
BIO4640 - Medical Virology (1)
** BIO4650 - Immunology (3)
** BIO4650L - Immunology Laboratory (1)
BIO4670 - General Virology (3)
BIO4670L - General Virology Laboratory (1)
BIO4690 - Plant-microbe Interactions (2)
BIO4690L - Plant-microbe Interactions Laboratory (1)
** BIO4700 - Hematology (3)
** BIO4700L - Hematology Laboratory (1)

Emphasis 5 - Neuroscience and Physiology

Recommended Electives

BIO4190 - Neuroscience I: Cell and Molecular Processes (3)
BIO4190L - Neuroscience I: Cell and Molecular Processes Laboratory (1)
BIO4200 - Neuroscience II: Neural Systems (3)
BIO4200L - Neuroscience II: Systems Neuroscience Laboratory (1)
BIO4450 - Physiology I: Cells (3)
BIO4450L - Physiology I: Cells Laboratory (1)
BIO4460 - Physiology II: Systems (3)
BIO4460L - Physiology II: Systems Laboratory (1)

Other Electives

BIO2340 - Human Anatomy (2)
BIO2340L - Human Anatomy Laboratory (2)
BIO2350 - Human Physiology (3)
BIO2350L - Human Physiology Laboratory (1)
BIO4020 - Developmental Biology (3)
BIO4020L - Developmental Biology Laboratory (1)
BIO4100 - Biophysics (3)
BIO4220 - Neural Circuits of Behavior (3)
BIO4220L - Neural Circuits of Behavior Laboratory (1)
BIO4240 - Neuromuscular Physiology (3)
BIO4360 - Recombinant DNA and Protein Technology (3)
BIO4360L - Recombinant DNA and Protein Technology Laboratory (1)
BIO4380 - Bioinformatics (2)
BIO4380L - Bioinformatics Laboratory (2)
BIO4400 - Stem Cell Biology (3)
BIO4400L - Stem Cell Biology Laboratory (1)
BIO4810 - Histology (2)
BIO4810L - Histology Laboratory (2)

Emphasis 6 - Zoology

Recommended Electives

BIO2370 - Introduction to Invertebrate Zoology (3)
BIO2370L - Introduction to Invertebrate Zoology Laboratory (1)
BIO2380 - Introduction to Vertebrate Zoology (3)
BIO2380L - Introduction to Vertebrate Zoology Laboratory (1)
BIO3250L - Ecology Laboratory (1)
BIO4450 - Physiology I: Cells (3)
BIO4450L - Physiology I: Cells Laboratory (1)
BIO4460 - Physiology II: Systems (3)
BIO4460L - Physiology II: Systems Laboratory (1)

Other Electives

BIO3500 - California Flora (1)
BIO3500L - California Flora Laboratory (1)
BIO4020 - Developmental Biology (3)
BIO4020L - Developmental Biology Laboratory (1)
BIO4100 - Biophysics (3)
BIO4140 - Biology of Species Invasions (2)
BIO4180 - Marine Ecology (3)
BIO4180L - Marine Ecology Laboratory (1)
BIO4190 - Neuroscience I: Cell and Molecular Processes (3)
BIO4190L - Neuroscience I: Cell and Molecular Processes Laboratory (1)
BIO4200 - Neuroscience II: Neural Systems (3)
BIO4200L - Neuroscience II: Systems Neuroscience Laboratory (1)
BIO4450 - Physiology I: Cells (3)
BIO4450L - Physiology I: Cells Laboratory (1)
BIO4460 - Physiology II: Systems (3)
BIO4460L - Physiology II: Systems Laboratory (1)
BIO4490 - Marine Botany (2)
BIO4490L - Marine Botany Laboratory (2)
BIO4550 - Field Biology (1-3)
BIO4550A - Field Biology Activity (1-3)
BIO4550L - Field Biology Laboratory (1-3)
BIO4580 - Ecology and Conservation of Hawaiian Ecosystems (3)
BIO4800 - Entomology (2)
BIO4800L - Entomology Laboratory (2)
BIO4810 - Histology (2)
BIO4810L - Histology Laboratory (2)
BIO4820 - Biology of Fishes (2)
BIO4820L - Biology of Fishes Laboratory (2)
BIO4840 - Herpetology (2)
BIO4840L - Herpetology Laboratory (2)

Unrestricted Electives — 0-3 units

Select a sufficient number of courses so that the total from "Major Required", "Major Electives", "GE", and "Unrestricted Electives" is at least 120 units.