CalPolyPomona

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

2020-2021 University Catalog
Degree Curriculum Sheet

Major Required — 74-75 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)
BIO2060 - Basic Microbiology (3)
BIO2060L - Basic Microbiology Laboratory (1)
BIO2300 - Horizons in Biotechnology (1)
BIO2400 - Genetics (3)

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

BIO3220 - Cell and Molecular Biology (3)
BIO4300 - Concepts of Molecular Biology (3)

BIO4320 - Molecular Biology Techniques (3) ***and***
BIO4320L - Molecular Biology Techniques Laboratory (1)
OR
BIO4360 - Recombinant DNA and Protein Technology (3) ***and***
BIO4360L - Recombinant DNA and Protein Technology Laboratory (1)

BIO4410 - Internship in Biology (1-2) (1-unit required) ***or***
BIO4610 - Undergraduate Research (1)

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)
CHM2210 - Quantitative Analysis (2)
CHM2210L - Quantitative Analysis Laboratory (2)
CHM3140 - Organic Chemistry I (4)
CHM3140L - Organic Chemistry Laboratory I (1)
CHM3150 - Organic Chemistry II (3)

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

CHM3270L - Biochemistry Laboratory I (1)

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 — 15-16 units

Any combination of courses from the FIVE emphases of electives would satisfy this requirement. Emphases are listed to provide guidance for selecting courses that best fit to your career goals. There is no requirement to declare a specific emphasis. In addition, up to 3 units combined from BIO 4000 , BIO 4410 , BIO 4610 , and BIO 4620 may count towards major electives. Students who take MAT 1200 will need 16 units of Major Electives. Students who take MAT 1140 will need 15 units of Major Electives.

*Some courses may require 1000- or 2000-level prerequisites. These prerequisites cannot count towards degree.

Upper Division Course Emphases

Emphasis 1: Cellular, Molecular, and Microbial Biology

BIO3600 - General Epidemiology (3)
BIO3620 - Applied Microbiology (2)
BIO3620L - Applied Microbiology Laboratory (1)
BIO3640 - Food Microbiology (2)
BIO3640L - Food Microbiology Laboratory (1)
BIO4030 - Human Genetics (3)
BIO4040 - Advanced Genetics (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)
BIO4430 - Tissue Culture and Its Application (2)
BIO4430L - Tissue Culture and Its Application Laboratory (1)
BIO4540 - Plant Genetics (3)
BIO4560 - Plant Development and Differentiation (3)
BIO4635 - Medical Microbiology (3)
BIO4635L - Medical Microbiology Laboratory (1)
BIO4640 - Medical Virology (1)
BIO4650 - Immunology (3)
BIO4650L - Immunology Laboratory (1)
BIO4660 - Microbial Physiology (3)
BIO4660L - Microbial Physiology Laboratory (1)
BIO4670 - General Virology (3)
BIO4670L - General Virology Laboratory (1)
BIO4700 - Hematology (3)
BIO4700L - Hematology Laboratory (1)

Emphasis 2: Physiology

BIO3240 - Principles of Evolution (3)
BIO4020 - Developmental Biology (3)
BIO4020L - Developmental Biology Laboratory (1)
BIO4100 - Biophysics (3)
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)
BIO4240 - Neuromuscular Physiology (3)
BIO4450 - Physiology I: Cells (3)
BIO4450L - Physiology I: Cells Laboratory (1)
BIO4460 - Physiology II: Systems (3)
BIO4460L - Physiology II: Systems Laboratory (1)
BIO4810 - Histology (2)
BIO4810L - Histology 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.

CalPolyPomona

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Emphasis 3: Biochemistry and Molecular Separation Techniques

CHM3010 - Modeling the Fundamentals of Physical Chemistry (3) (B5)
CHM3040 - Elements of Physical Chemistry I (3)
CHM3050 - Elements of Physical Chemistry II (3)
CHM3150L - Organic Chemistry Laboratory II (1)
CHM3280 - Biochemistry II (3)
CHM3280L - Biochemistry Laboratory II (1)
CHM3310 - Clinical Chemistry (2)
CHM3310L - Clinical Chemistry Laboratory (1)
CHM3400 - The Chemist in Industry (3)
CHM3420 - Spectroscopic Methods (1)
CHM3420L - Spectroscopic Methods Laboratory (1)
CHM3430 - Separation Methods (1)
CHM3430L - Separation Methods Laboratory (1)
CHM3440 - Electroanalytical Methods (1)
CHM3440L - Electroanalytical Methods Laboratory (1)
CHM3520L - Physical Chemistry Laboratory (2)
CHM4090 - Polymer Chemistry (2)
CHM4160 - Macromolecular Modeling (3)
CHM4220 - Organic Synthesis (2)
CHM4220L - Organic Synthesis Laboratory (2)
CHM4240 - Organic Analysis (2)
CHM4240L - Organic Analysis Laboratory (2)
CHM4480 - Modern Mass Spectrometry and FT-NMR (3)
CHM4500 - Bioanalytical Chemistry (3)
CHM4500L - Bioanalytical Chemistry Laboratory (1)
CHM4510 - Enzymology (3)
CHM4510L - Enzymology Laboratory (1)
CHM4520 - Advanced Biomolecular Structure (3)
CHM4540 - Advanced Metabolism (3)
CHM4590 - Green Chemistry (3)
ECE4735 - Biomedical Signals, Instrumentation and Measurements (3)

Emphasis 4: Food, Agriculture, and Environment

AHS3305 - Parasitology and Infectious Diseases (3)
AHS3305L - Parasitology and Infectious Diseases Laboratory (1)
AVS4430 - Biotechnology Applications in Animal Science (3)
AVS4430L - Biotechnology Applications in Animal Science Laboratory (1)
BIO4480 - Plant Physiology (3)
BIO4480L - Plant Physiology Laboratory (1)
BIO4530 - Plant Anatomy (2)
BIO4530L - Plant Anatomy Laboratory (2)
BIO4680 - Microbial Ecology (2)
BIO4680L - Microbial Ecology Laboratory (1)
BIO4690 - Plant-microbe Interactions (2)
BIO4690L - Plant-microbe Interactions Laboratory (1)
BIO4800 - Entomology (2)
BIO4800L - Entomology Laboratory (2)
CHM4490 - Environmental Analysis (2)
CHM4490L - Environmental Analysis Laboratory (1)
FST3321 - Food Process Engineering (3)
FST3321L - Food Process Engineering Laboratory (1)
FST4261 - Food Chemistry (3)
FST4261L - Food Chemistry Laboratory (1)
FST4280 - Food Analysis (3)
FST4280L - Food Analysis Laboratory (1)
NTR3930 - Advanced Nutrient Metabolism I (3) *
NTR3940 - Advanced Nutrient Metabolism II (3) *
NTR4370 - Nutritional Genomics (3)
PLT4040 - Plant Breeding (2)
PLT4040L - Plant Breeding Laboratory (1)
PLT4110 - Environmental Toxicology (3)
PLT4190 - Plant Pathology (2)
PLT4190L - Plant Pathology Laboratory (1)
PLT4210 - Production Mycology (2)
PLT4210L - Production Mycology Laboratory (1)
PLT4220 - Specialized Plant Propagation (2)
PLT4220L - Specialized Plant Propagation Laboratory (1)
PLT4310 - Soil Chemistry (2)
PLT4310L - Soil Chemistry Laboratory (1)

Emphasis 5: Policy and Business

BIO4060 - Regulatory Affairs and Safety Assessment (3)
BIO5760 - Regulatory Affairs for the Biotechnology Industry (2)
CIS3100 - Management Information Systems (3)
FST3220 - Food Laws and Regulations (3)
FST3250 - Food Safety and Current Issues (3)
GEO4130 - Environmental Law (3)
IBM3012 - Principles of Marketing Management (3)
MHR3020 - Organizational Behavior (3)
MHR4220 - Training and Development (3)
PLT3030 - Pesticide Laws and Regulations (2)
TOM3010 - Operations Management (3)