

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

**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. In addition, up to 3 units combined from BIO 4000, BIO 4410, BIO 4610, and BIO 4620 may count towards major electives.

\*For courses that may require 1000- or 2000-level prerequisites, the 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)  
 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)  
 BIO4220 - Neural Circuits of Behavior (3)  
 BIO4220L - Neural Circuits of Behavior 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.

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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 Animal Diseases (3)  
 AHS3305L - Parasitology and Animal 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)  
 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)  
 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)