

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

Major Required Core	62-63 units	Biological Sciences Electives	3-4 units	General Education Requirements	48 Units														
<p>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)</p> <p>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) or</p> <p>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)</p> <p>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)</p> <p>CHM3210 - Elements of Biochemistry (3) or                      CHM3270 - Biochemistry I (3)</p> <p>ENG1101 - Stretch Composition II (3) (A2) or                      ENG1103 - First Year Composition (3) (A2)</p> <p>ENG2105 - Written Reasoning (3) (A3)</p> <p>NTR2030 - Health, Nutrition and the Integrated Being (3) (E)                      OR                      PSY2201 - Introduction to Psychology (3) (E)                      OR                      SCI1010 - Science and Mathematics: Freshman Experience I (1) (E) and                      SCI1010A - Science and Mathematics: Freshman Experience I Activity (1) (E) and                      SCI1020A - Science and Mathematics: Freshman Experience II Activity (1) (E)</p> <p>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)</p>	<p><b>Major Electives</b> <b>30-31 units</b></p> <p>Any combination of courses from the SIX emphases of electives would satisfy this requirement. In consultation with an advisor, select and follow an emphasis that best fits your career goals. In addition, up to 2 units of BIO 4410 and/or BIO 4610 and one unit of BIO 4620 may count toward core electives.</p> <p>Courses not listed may be acceptable following consultation with advisor.</p> <p>*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 most updated and specific professional degree and school requirements, consult individual professional schools or the Pre-Professional advisor.</p> <p>**Courses with double asterisks are required for the admission to the Clinical Laboratory Scientist (CLS) programs. In addition, CHM 2210 / 2210L is required for CLS and can be taken as an elective.</p>	<p>Approved electives include any 2000, 3000, or 4000-level courses in the Biological Sciences Department not specifically designed for non-majors. Only 1-unit of BIO 2000 or BIO 4000 allowed. Also included are any Chemistry or Math courses. See advisor for approval of courses offered by other departments.</p> <p><b>Emphasis Electives</b> <b>27 units</b></p> <p><b>Emphasis 1 - Integrative Biology</b></p> <p>Select from each of the three areas (A, B, and C) listed below, with at least one course from each area.</p> <p><b>Area A (Cellular and Molecular)</b></p> <p>BIO3620 - Applied Microbiology (2)                      BIO3620L - Applied Microbiology Laboratory (1)                      BIO3640 - Food Microbiology (2)                      BIO3640L - Food 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)                      BIO4100 - Biophysics (3)                      BIO4190 - Neuroscience I: Cell and Molecular Processes (3)                      BIO4190L - Neuroscience I: Cell and Molecular Processes Laboratory (1)                      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)                      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)</p> <p><b>Area B (Physiology/Organismal)</b></p> <p>BIO2340 - Human Anatomy (2)                      BIO2340L - Human Anatomy Laboratory (2)                      BIO2350 - Human Physiology (3)                      BIO2350L - Human Physiology Laboratory (1)                      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)                      BIO3090 - Biology of the Brain (3)                      BIO3600 - General Epidemiology (3)                      BIO4220 - Neural Circuits of Behavior (3)                      BIO4220L - Neural Circuits of Behavior Laboratory (1)                      BIO4240 - Neuromuscular Physiology (3)                      BIO4250 - Neuroscience II: Neural Systems (3)                      BIO4450 - Physiology I: Cells (3)                      BIO4450L - Physiology I: Cells Laboratory (1)                      BIO4460 - Physiology II: Systems (3)                      BIO4460L - Physiology II: Systems Laboratory (1)                      BIO4480 - Plant Physiology (3)                      BIO4480L - Plant Physiology Laboratory (1)                      BIO4530 - Plant Anatomy (2)                      BIO4530L - Plant Anatomy Laboratory (2)</p>	<p>Students should consult the Academic Programs website  <a href="https://www.cpp.edu/~academic-programs/general-education-course-listings.shtml">https://www.cpp.edu/~academic-programs/general-education-course-listings.shtml</a>                      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.</p> <p><b>Area A. English Language Communication and Critical Thinking (9 units)</b></p> <ol style="list-style-type: none"> <li>1. Oral Communication</li> <li>2. Written Communication</li> <li>3. Critical Thinking</li> </ol> <p><b>Area B. Scientific Inquiry and Quantitative Reasoning (12 units)</b></p> <ol style="list-style-type: none"> <li>1. Physical Sciences</li> <li>2. Life Sciences</li> <li>3. Laboratory Activity</li> <li>4. Mathematics/Quantitative Reasoning</li> <li>5. Science and Technology Synthesis</li> </ol> <p><b>Area C. Arts and Humanities (12 units)</b></p> <ol style="list-style-type: none"> <li>1. Visual and Performing Arts</li> <li>2a. Philosophy and Civilization</li> <li>2b. Literature and Language Other than English</li> <li>3. Arts and Humanities Synthesis</li> </ol> <p><b>Area D. Social Sciences (12 units)</b></p> <ol style="list-style-type: none"> <li>1. U.S. History and American Ideals</li> <li>2. U.S. Constitution and California Government</li> <li>3. Social Sciences: Principles, Methodologies, Value Systems, and Ethics</li> <li>4. Social Science Synthesis</li> </ol> <p><b>Area E. Lifelong Learning and Self-Development (3 units)</b></p>	<p><b>Interdisciplinary General Education</b> <b>21 Units</b></p> <p>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.</p> <p><b>How IGE fulfills General Education Requirements:</b></p> <table border="1"> <thead> <tr> <th>Year</th> <th>Completion of IGE Courses</th> <th>Satisfies GE Requirements</th> </tr> </thead> <tbody> <tr> <td>Freshman</td> <td>IGE 1100, IGE 1200</td> <td>A2 and C2b</td> </tr> <tr> <td>Sophomore</td> <td>IGE 2100, IGE 2200</td> <td>C1 and C2a</td> </tr> <tr> <td>Junior</td> <td>IGE 2300, IGE 2400</td> <td>D1 and D3</td> </tr> <tr> <td>Senior</td> <td>IGE 3100</td> <td>C3 or D4</td> </tr> </tbody> </table>	Year	Completion of IGE Courses	Satisfies GE Requirements	Freshman	IGE 1100, IGE 1200	A2 and C2b	Sophomore	IGE 2100, IGE 2200	C1 and C2a	Junior	IGE 2300, IGE 2400	D1 and D3	Senior	IGE 3100	C3 or D4
Year	Completion of IGE Courses	Satisfies GE Requirements																	
Freshman	IGE 1100, IGE 1200	A2 and C2b																	
Sophomore	IGE 2100, IGE 2200	C1 and C2a																	
Junior	IGE 2300, IGE 2400	D1 and D3																	
Senior	IGE 3100	C3 or D4																	
				<p><b>American Institutions</b> <b>6 Units</b></p> <p>Courses that satisfy this requirement may also satisfy GE Area D1 and D2.</p>															
				<p><b>American Cultural Perspectives Requirement</b> <b>3 Units</b></p> <p>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.</p>															
				<p><b>Graduation Writing Test</b></p> <p>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.</p>															

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

BIO4800 - Entomology (2)  
 BIO4800L - Entomology Laboratory (2)  
 BIO4810 - Histology (2)  
 BIO4810L - Histology Laboratory (1)  
 BIO4820 - Biology of Fishes (2)  
 BIO4820L - Biology of Fishes Laboratory (2)  
 BIO4840 - Herpetology (2)  
 BIO4840L - Herpetology Laboratory (2)

**Area C (Ecology/Environmental)**

BIO3130 - Marine Biology (3)  
 BIO3250L - Ecology Laboratory (1)  
 BIO3500 - California Flora (1)  
 BIO3500L - California Flora Laboratory (1)  
 BIO4080 - Water Pollution Biology (3)  
 BIO4140 - Biology of Species Invasions (2)  
 BIO4180 - Marine Ecology (3)  
 BIO4180L - Marine Ecology Laboratory (1)  
 BIO4490 - Marine Botany (2)  
 BIO4490L - Marine Botany Laboratory (2)  
 BIO4520 - Evolution of Plants (3)  
 BIO4520L - Evolution of Plants Laboratory (1)  
 BIO4550 - Field Biology (1-3)  
 BIO4550A - Field Biology Activity (1-3)  
 BIO4550L - Field Biology Laboratory (1-3)  
 BIO4570 - Plants and the Environment (2)  
 BIO4570L - Plants and the Environment Laboratory (2)  
 BIO4580 - Ecology and Conservation of Hawaiian Ecosystems (3)  
 BIO4590S - Ethnobotany - Service Learning (1)  
 BIO4590AS - Ethnobotany Service Learning Activity (2)  
 BIO4680 - Microbial Ecology (2)  
 BIO4680L - Microbial Ecology Laboratory (1)  
 BIO4690 - Plant-microbe Interactions (2)  
 BIO4690L - Plant-microbe Interactions Laboratory (1)  
 BIO4910S - Interpretation of Science Service Learning (1)  
 BIO4910AS - Interpretation of Science Service Learning Activity (2)

**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)  
 BIO4560 - Plant Development and Differentiation (3)  
 BIO4570 - Plants and the Environment (2)  
 BIO4570L - Plants and the Environment Laboratory (2)  
 BIO4800 - Entomology (2)  
 BIO4800L - Entomology Laboratory (2)

**\*Emphasis 3 - Genetics and Molecular Cell Biology**

BIO2060 - Basic Microbiology (3)  
 BIO2060L - Basic Microbiology Laboratory (1)  
 BIO4040 - Advanced Genetics (3)  
 BIO4300 - Concepts of Molecular Biology (3)  
 BIO4320 - Molecular Biology Techniques (3)  
 BIO4320L - Molecular Biology Techniques Laboratory (1)  
 BIO4390 - Cancer Cell Biology (3)

BIO4450 - Physiology I: Cells (3) and  
 BIO4450L - Physiology I: Cells Laboratory (1)  
 OR  
 BIO4480 - Plant Physiology (3) and  
 BIO4480L - Plant Physiology Laboratory (1)  
 OR  
 BIO4660 - Microbial Physiology (3) and  
 BIO4660L - Microbial Physiology Laboratory (1)

BIO4540 - Plant Genetics (3)

**\*Emphasis 4 - Microbiology**

\*\*Required course for the admission to the Clinical Laboratory Scientist (CLS) programs. In addition, CHM 2210 / 2210L is required and can be taken as an elective.

**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)  
 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)  
 BIO4259 - Neuroscience II: Neural Systems (3)  
 BIO4259L - 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**

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**

BIO3130 - Marine Biology (3) (B5)  
 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)  
 BIO4490 - Marine Botany (2)  
 BIO4490L - Marine Botany Laboratory (2)  
 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**

**0-1 units**

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