



**California State Polytechnic University, Pomona
Degree Curriculum Sheet**

Plan (Major) **BIOTECHNOLOGY**

Catalog Year **2016 - 2017**

Name _____

Subplan/Option _____

Minimum Units Required **180**

Student ID _____

Required Core Courses

BIO 122/122L - Foundations of Biology: Reproduction and Development (3/2)
 BIO 123/123L - Foundations of Biology: Biodiversity (3/2)
 BIO 211/211L - Biometrics (3/1)
 BIO 230 - Horizons in Biotechnology (1)
 BIO 303 - Genetics (4)
 BIO 310 - Cell and Molecular Biology (4)

BIO 441 - Internship in Biology (1-2) or
 SCI 470 - Cooperative Education (1-4)
 2 units must be taken of either BIO 441 or SCI 470.

BIO 450 - Concepts of Molecular Biology (4)

BIO 451 - Molecular Biology Techniques (3) and
 BIO 451L - Molecular Biology Techniques Laboratory (2)

BIO 490 - Scientific Communication (1)

CHM 122 - General Chemistry (3) and
 CHM 122L - General Chemistry Laboratory (1)

CHM 123 - General Chemistry (3) and
 CHM 123L - General Chemistry Laboratory (1)

CHM 221/221L - Quantitative Analysis (2/2)

CHM 314 - Organic Chemistry (3) and
 CHM 317L - Organic Chemistry Laboratory (1)

CHM 315 - Organic Chemistry (3) and
 CHM 318L - Organic Chemistry Laboratory (1)

CHM 316 - Organic Chemistry (3) and
 CHM 319L - Organic Chemistry Laboratory (1)

CHM 327 - Biochemistry (3) and
 CHM 327L - Biochemistry Laboratory (1)

CHM 328 - Biochemistry (3) and
 CHM 328L - Biochemistry Laboratory (1)

CHM 329 - Biochemistry (3) and
 CHM 329L - Biochemistry Laboratory (1)

MIC 201/201L - Basic Microbiology (3/1)

Total Units 75

Elective Core Courses

Upper Division Course Clusters

At least 18 units from one "Primary" cluster and 6 units from any of the other five clusters, to be selected in consultation with faculty advisor. See "Upper Division Course Clusters" listed on the back of the Curriculum Sheet.

Total Units 24

Required Support Courses

The following major support courses should be used to satisfy the indicated GE requirements. If these courses are not used to satisfy GE, the total units to degree may be more than 180 units.

BIO 121/121L - Foundations of Biology: Energy and Matter - Cycles and Flows (3/2) (B2, B3)

BIO 301 - Human Sexuality (4) (B5) or
 BIO 302 - Biology of Cancer (4) (B5) or
 BIO 309 - Biology of the Brain (4) (B5) or
 BIO 340 - Biodiversity Conservation (4) (B5)

CHM 121 - General Chemistry (3) (B1) and
 CHM 121L - General Chemistry Laboratory (1) (B3)

ENG 130 - Freshman English II (4) (A3)

ENG 107 - Stretch Composition III (4) (A2) or
 ENG 109 - Advanced Stretch Composition II (4) (A2) or
 ENG 110 - First-Year Composition (4) (A2)

MAT 120 - Calculus for the Life Sciences (4) (B4)

PHY 121 - College Physics (3) and
 PHY 121L - College Physics Laboratory (1)

PHY 122 - College Physics (3) and
 PHY 122L - College Physics Laboratory (1)

PHY 123 - College Physics (3) and
 PHY 123L - College Physics Laboratory (1)

FN 203 - Health, Nutrition and the Integrated Being (4) (E) or
 PSY 201 - General Psychology (4) (E) or
 PSY 210 - Mind, Brain, and Behavior: An Integrated View (4) (E) or
 SCI 101/101A - Science and Mathematics: Freshman Experience I (1/1) (E) and
 SCI 102/102A - Science and Mathematics: Freshman Experience II (1/1) (E)

Total Units 41

General Education Requirements

Area A Communication & Critical Thinking (12 units)

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

Area B Mathematics & Natural Sciences (16 units)

1. Physical Science
2. Biological Science
3. Laboratory Activity
4. Math/Quantitative Reasoning
5. Science & Technology Synthesis

Area C Humanities (16 units)

1. Visual and Performing Arts
2. Philosophy and Civilization
3. Literature and Foreign Language
4. Humanities Synthesis

Area D Social Sciences (20 units)

1. U.S. History, Constitution, American Ideals
 - a. United States History
 - b. Introduction to American Government
2. History, Economics and Political Science
3. Sociology, Anthropology, Ethnic & Gender Studies
4. Social Science Synthesis

Area E Lifelong Understanding & Self Development (4 units)

Total Units 68

American Institutions

Courses that satisfy this requirement may also satisfy GE Area D1

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American Cultural Perspectives Requirement

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.

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All persons who receive undergraduate degrees from Cal Poly Pomona must pass the Graduation Writing Test (GWT). The test must be taken by the quarter following completion of 120 units for undergraduates.

UPPER DIVISION COURSE CLUSTERS

Emphasis 1: Cellular, Molecular, and Microbial Biology

BIO 403 - Human Genetics (3)
BIO 421 - Advanced Genetics (4)
BIO 455/455L - Molecular Biology of Recombinant DNA (2/2)
BIO 459/459L - Bioinformatics (3/2)
BIO 465 - Stem Cell Biology (3)
BIO 465L - Stem Cell Biology Lab (1)
MIC 310/310L - Applied Microbiology (3/2)
MIC 320/320L - Food Microbiology (3/1)
MIC 330 - General Epidemiology (4)
MIC 410/410L - Medical Bacteriology (3/2)
MIC 415/415L - Immunology-Serology (3/2)
MIC 425/425L - Medical Mycology (3/2)
MIC 428/428L - Microbial Physiology (4/1)
MIC 430/430L - General Virology (3/2)
MIC 444 - Hematology (3)
MIC 444L - Hematology Lab (1)
MIC 445 - Immunohematology (3)
MIC 445L - Immunohematology Lab (1)
ZOO 425/425L - Medical Parasitology (3/2)

Emphasis 2: Physiology

BIO 320 - Developmental Biology (4) and
BIO 320L - Developmental Biology Laboratory (1)

BIO 410 - Biophysics (4) cross-listed as
PHY 410 - Biophysics (4)

BIO 413 - Principles of Evolution (4)
BIO 424 - Neuroscience (4)
BIO 426/426L - Neuroanatomy (4/1)
BIO 428/428L - Cellular Physiology (4/1)
BIO 431/431L - Radiation Biology (3/1)
ZOO 422/422L - Histology (2/3)
ZOO 428/428L - Animal Physiology (4/1)

Emphasis 3: Biochemistry and Molecular Separation Techniques

CHM 301/301A - Fundamentals of Physical Chemistry (3/1)
CHM 304/304A - Elements of Physical Chemistry (3/1)
CHM 305 - Elements of Physical Chemistry (3)
CHM 328L - Biochemistry Laboratory (1)
CHM 329L - Biochemistry Laboratory (1)
CHM 340 - The Chemist in Industry (4)
CHM 342/342L - Spectroscopic Methods (2/2)
CHM 343/343L - Separation Methods (2/2)
CHM 344/344L - Electroanalytical Methods (2/2)
CHM 352/352L - Physical Chemistry/Laboratory (1/2)
CHM 422/422L - Organic Synthesis (2/2)
CHM 424/424L - Organic Analysis (2/2)
CHM 451/451L - Enzymology (3/1)
CHM 453 - Recombinant DNA Biochemistry (3)

ECE 435 - Biomedical Instrumentation and Measurements (3) and
ECE 435L - Biomedical Instrumentation and Measurements Laboratory (1)

Emphasis 4: Food, Agriculture, and Environment

ABM 405 - Food and Agricultural Marketing Applications (4)
AHS 302/302L - Animal Parasitology (3/1)
AVS 405/405L - Immunological Procedures in Animal Production (3/1)
AVS 412 - Mammalian Endocrinology (4)
AVS 430/430L - Biotechnology Applications in Animal Science (3/1)
AVS 432/432A - Advanced Animal Breeding (3/1)
BOT 428/428L - Plant Physiology (4/1)
BOT 435/435L - Plant Anatomy (2/2)
BOT 456/456L - Plant Tissue Culture (3/1)
FN 433 - Advanced Nutrient Metabolism I (4)
FN 434 - Advanced Nutrient Metabolism II (4)
FN 437 - Nutritional Genomics (4)
FST 420/420L - Food Chemistry I (3/1)
FST 426/426L - Food Chemistry II (3/1)
FST 428/428L - Food Analysis (3/1)
MIC 435/435L - Microbial Ecology (2/2)
MIC 436/436L - Plant-Microbe Interactions (2/2)
PLT 404/404L - Plant Breeding (3/1)
PLT 411 - Environmental Toxicology (4)
PLT 421/421L - Crop Diseases (3/1)
PLT 422/422L - Advanced Plant Propagation (3/1)
PLT 427/427L - Diseases of Ornamentals (3/1)
PLT 431/431L - Soil Chemistry (3/1)
PLT 437/437L - Environmental Sustainable Agriculture (3/1)
ZOO 426/426L - Entomology (3/1)

Emphasis 5: Policy and Business

BIO 405 - Regulatory Affairs and Safety Assessment (4)
BIO 576 - Regulatory Affairs for the Biotechnology Industry (3)
FST 325 - Food Safety and Current Issues (4)
PLT 303 - Pesticide and Hazardous Material Laws (3)
CIS 310 - Management Information Systems (4)
IBM 301 - Principles of Marketing Management (4)
IBM 302 - Marketing Strategy (4)
MHR 318 - Organizational Behavior (4)
MHR 405 - Training and Development (4)
MHR 438 - Advanced Organizational Behavior (4)
TOM 301 - Operations Management (4)

Up to 4 units of BIO 441 and/or BIO 461 and 2 units of BIO 462 may count towards core electives.

** 500-level courses: No more than 13 units may be counted towards an undergraduate degree. Students must have senior standing and at least a 2.75 GPA. A special petition must be filed to receive undergraduate credit for graduate courses taken as a senior.