CALIFORNIA STATE POLYTECHNIC UNIVERSITY, POMONA

ACADEMIC SENATE

ACADEMIC PROGRAMS COMMITTEE

REPORT TO

THE ACADEMIC SENATE

AP-019-167

Bachelor of Science in Biology for Semesters

| | |
|---|---|
| Academic Programs Committee | Date: 11/20/2016 |
| Executive Committee<br>Received and Forwarded | Date: 11/16/2016 |
| Academic Senate | Date: 11/30/2016<br>First Reading<br>01/11/17<br>Second Reading |

BACKGROUND: The Department of Biological Sciences has put forward a revised semester program that combines their previous degree options into a single program in which students can pursue specialized interests via elective courses. This revised and consolidated program will allow students the same academic flexibility that they enjoyed with multiple options under semesters, but will not require the same administrative overhead as maintaining multiple formal options. While there may be some loss of courses that would be of interest to students in other programs, the discontinuation of or consolidation of courses is being handled through the usual curricular process, with appropriate opportunities for input from and consultation with other departments.

RESOURCES CONSULTED:
Deans
Associate Deans
Department Chairs
All Faculty

DISCUSSION:
Before reaching the Academic Programs Committee, this program was reviewed by the College Curriculum Committee in the College of Science as well as the Dean of Science and the Office of Academic Programs. All concerns raised at those levels were addressed. The Academic Programs Committee then conducted campus-wide consultation, as well as its own review of the program. No concerns were raised.

RECOMMENDATION:

The Academic Programs Committee recommends approval of the revised Bachelor of Science in Biology for Semesters.

AP-019-167, Bachelor of Science in Biology for Semesters

| **Biology, B.S.: 120 units** | | | |
|---|---|---|---|
| **Status** | active | | |
| **Hierarchy Entities** | Biological Sciences | | |
| **Approval Process Name** | I. Program - Q2S Existing Program/Option/Minor | | |
| **Current Step** | Office of Academic Programs | | |
| **Originator** | Nancy Buckley | | |
| **Created** | 12/17/2015 11:50AM | | |
| **Launched** | 12/17/2015 12:16PM | | |
| **Form** | | | |
| **General Catalog Information** | | | |
| Department | Biological Sciences | | |
| Conversion Category: | Revisioned | | |
| Proposal Type: | Program | | |
| Describe or list changes | Eliminated options of General Biology, Botany, Microbiology and Zoology. Instead now just have the Biology major with emphasis. Proposal to discontinue options submitted on Curriculog Form K. | | |
| Semester Program Name (e.g. Biology, B.S., Art History, B.A.) | Biology, B.S.: 120 units | | |
| Program Description | Biology Major<br>The Biology major with emphasis in Botany, Genetics and Molecular Cell Biology, Integrative Biology, Microbiology, Neuroscience and Physiology, and Zoology stresses a balance between the theoretical aspects of biology and actual experience in the field and laboratory. The variety of courses offered in a flexible curriculum provides an opportunity for a wide range of experience in biological sciences. | | |
| Curriculum Sheet | See Biology, B.S._ALY.xlsx | | |
| Roadmap | See attached. | | |
| Two-Year Course Offering | See attached. | | |
| Assessment Plan | See attached. | | |
| Select Program | | | |
| Prospective Curriculum | | | |
| **Steps** | | | |
| **Files** | Author | Date | File |
| | Nancy Buckley | 12/17/2015 12:15PM | BIOLOGY Curriculum Sheet.xlsx |
| | Nancy Buckley | 12/17/2015 12:15PM | BIOLOGY Roadmaps.xlsx |
| | Nancy Buckley | 12/17/2015 12:15PM | BiologyBS-Assessment.docx |
| | Nancy Buckley | 12/17/2015 12:16PM | 2 Year Course Schedule.docx |
| | Ashley Ly | 09/14/2016 09:42AM | Biology, B.S._ALY.xlsx |

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

Plan (Major) Biology
Subplan/Option
Catalog Year 2018-2019
Minimum Units Required 120
Name
Student ID
TGA
GWT Satisfied __Yes __No

## Required Major Core Courses

| Course | | Units |
|---|---|---|
| Foundations of Biology: Evolution, Ecology, and Biodiversity | BIO 1220/1220L | 3/1 |
| Genetics | BIO 2400 | 3 |
| Biostatistics Lab | BIO 2110L | 1 |
| Cell and Molecular Biology | BIO 3220 | 3 |
| Principles of Ecology | BIO 3250 | 3 |
| Principles of Evolution | BIO 3240 | 3 |
| Foundations of Biology: Energy, Matter, and Information (B2, B3) | BIO 1210/1210L | 3/1 |
| Genetics and Human Issues (B5) | BIO 3000 | 3 |
| or Human Sexuality (B5) | BIO 3010 | (3) |
| or Biology of the Brain (B5) | BIO 3090 | (3) |
| or Environment and Society (B5) | BIO 3040 | (3) |
| or Biology of Human Pregnancy (B5) | BIO 3070 | (3) |
| or Sexually Transmitted Diseases (B5) | BIO 3030 | (3) |
| or Marine Biology (B5) | BIO 3130 | (3) |
| or Biodiversity Conservation (B5) | BIO 3120 | (3) |
| General Chemistry I (B1, B3) | CHM 1210/1210L | 3/1 |
| General Chemistry II | CHM 1220/1220L | 3/1 |
| Elements of Organic Chemistry | CHM 2010/2010L | 3/1 |
| or Organic Chemistry I | CHM 3140/3140L | (4/1) |
| Elements of Biochemistry | CHM 3210 | 3 |
| or Biochemistry I | CHM 3270 | (3) |
| Stretch Composition II (A2) | ENG 1101 | 3 |
| or First Year Composition (A2) | ENG 1103 | (3) |
| Written Reasoning (A3) | ENG 2105 | 3 |
| Health, Nutrition and the Integrated Being (E) | NTR 2030 | 3 |
| or Introduction to Psychology (E) | PSY 2201 | (3) |
| or Mind, Brain & Behavior: Integrated View (E) | PSY 2210 | (3) |
| or Sci. and Mathematics: Freshmen Exp. (E) | SCI 1010/1010A | (3) |
| Calculus for Life Sciences (B4) | MAT 1200 | 3 |
| Physics of Motion, Fluids, and Heat | PHY 1210/1210L | 3/1 |
| Physics of Electromagnetism, Circuits, and Light | PHY 1220/1220L | 3/1 |
| Biostatistics (B4) | STA 1300 | 3 |
| | **Total Units** | **62-63** |

## Elective Core Courses

| Course | Units |
|---|---|
| Any combination of courses from the six emphases of electives would satisfy this requirement. See the next page for emphases and courses. 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 4810 and one unit of BIO 4820 may count towards core electives. | 27 |
| 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. | 3-4 |

## Unrestricted Electives

| Course | Units |
|---|---|
| Select a sufficient number of courses so that the total from "Major Core", "Elective Core", "GE", and "Unrestricted Electives" is at least 120 units. | 0-2 |
| **Total Units** | **0-2** |

## General Education Requirements

| Area | Units |
|---|---|
| **Area A Communication & Critical Thinking** | **9** |
| 1 Oral Communication | |
| 2 Written Communication | |
| 3 Critical Thinking | |
| **Area B Scientific Inquiry and Quantitative Reasoning** | **12** |
| *Select at least one lab course from sub-area 1 or 2.* | |
| 1 Physical Sciences | |
| 2 Life Sciences | |
| 3 Laboratory Activity | |
| 4 Quantitative Reasoning | |
| 5 Science and Technology Synthesis | |
| **Area C Arts and Humanities** | **12** |
| 1 Visual and Performing Arts | |
| 2 Philosophy and Civilization | |
| 3 Literature and Foreign Languages | |
| 4 Arts and Humanities Synthesis | |
| **Area D Social Sciences** | **12** |
| 1 U.S. History and American Ideals | |
| 2 US Constitution and California Government | |
| 3 The Social Sciences: Principles, Methodologies, Value Systems, and Ethics | |
| 4 Social Science Synthesis | |
| **Area E Lifelong Understanding and Self Development** | **3** |
| **Total Units** | **48** |

| **American Institutions** | |
|---|---|
| Courses that satisfy this requirement may also satisfy G.E. Area D1 | 6 |

| **American Cultural Perspectives Requirement** | |
|---|---|
| Refer to catalog for list of courses that satisfy this requirement. Course may also satisfy major, minor, GE, or unrestricted elective requirements. | 3 |

All persons who receive undergraduate degrees from Cal Poly Pomon must pass the Graduation Writing Test (GWT). The test must be taken by the semester following completion of 90 units for undergraduates.

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**Emphasis 1 - Integrative Biology***

*Recommended elective courses:*
*Select from each of the three areas (A, B, and C) listed below, with at least one course from each area.*

*Area A (Cellular and Molecular)*
BIO 3620/3620L Applied Microbiology (3/1)
BIO 3640/3640L Food Microbiology (3/1)
BIO 4020/4020L Developmental Biology (3/1)
BIO 4030 Human Genetics (3)
BIO 4040 Advanced Genetics (3)
BIO 4060 Regulatory Affairs and Safety Assessment (3)
BIO 4100 Biophysics (3)
BIO 4190/4190L Neuroscience I: Cell and Molecular (3/1)
BIO 4300 Concepts of Molecular Biology (3)
BIO 4320/4320L Molecular Biology Techniques (3/1)
BIO 4360/4360L Recomb DNA & Protein Tech (3/1)
BIO 4380/4380L Bioinformatics (3/1)
BIO 4400/4400L Stem Cell Biology (3/1)
BIO 4540 Plant Genetics (3)
BIO 4560 Plant Development and Differentiation (3)
BIO 4605/4605L Medical Microbiology (3/1)
BIO 4640 Medical Virology (2)
BIO 4650/4650L Immunology (3/1)
BIO 4660/4660L Microbial Physiology (3/1)
BIO 4670/4670L General Virology (2/2)
BIO 4700/4700L Hematology (2/1)
BIO 4710 Immunohematology (2)

*Area B (Physiology/Organismal)*
BIO 2340/2340L Human Anatomy (2/2)
BIO 2350/2350L Human Physiology (3/1)
BIO 2370/2370L Introduction to Invertebrate Zoology (3/1)
BIO 2380/2380L Introduction to Vertebrate Zoology (3/1)
BIO 3090 Biology of the Brain (3) (BB)
BIO 3600 General Epidemiology (3)
BIO 4200 Neuroscience II: Systems Neuroscience (3)
BIO 4220/4220L Neural circuits of behavior
BIO 4240 Neuromuscular Physiology (3)
BIO 4450/4450L Physiology I (3/1)
BIO 4460/4460L Physiology II (3/1)
BIO 4480/4480L Plant Physiology (3/1)
BIO 4530/4530L Plant Anatomy (2/2)
BIO 4600/4600L Entomology (2/2)
BIO 4610/4610L Histology (2/2)
BIO 4620/4620L Ichthyology (2/2)
BIO 4640/4640L Herpetology (2/2)

*Area C (Ecology/Environmental)*
BIO 3130 Marine Biology (3)
BIO 3250L Ecology Lab (1)
BIO 3500/3500L California Flora (1/1)
BIO 4060 Water Pollution Biology (3)
BIO 4140 Biology of Species Invasions (2)
BIO 4160/4160L Marine Ecology (3/1)
BIO 4490/4490L Marine Botany (2/2)
BIO 4520/4520L Evolution of Plants (3/1)
BIO 4550/4550A/4550L Field Biology (1-9 each)
BIO 4570/4570L Plants and the Environment (2/2)
BIO 4580 Ecology and Conservation of Hawaiian Ecosystems (3)
BIO 4590/4590AS Ethnobotany (1/2)
BIO 4660/4660L Microbial Ecology z (2/1)
BIO 4690/4690L Plant-Microbe Interactions (2/1)
BIO 49105/4910AS Interpretation of Science Service Learning (1/2)

**Emphasis 2 - Botany**

*Recommended elective courses:*
BIO 2050/2050L Plant Form and Function (3/1)
BIO 3250L Ecology Lab (1)
BIO 4480/4480L Plant Physiology (3/1)
PLT 2310/2310L - Basic Soil Science (2/1)

*Additional elective courses:*
BIO 2060/2060L Basic Microbiology (3/1)
BIO 3500/3500L California Flora (1/1)
BIO 4490/4490L Marine Botany (2/2)
BIO 4520/4520L Evolution of Plants (3/1)
BIO 4530/4530L Plant Anatomy (2/2)
BIO 4540 Plant Genetics (3)
BIO 4560 Plant Development and Differentiation (3)
BIO 4570/4570L Plants and the Environment (2/2)
BIO 4600/4600L Entomology (2/2)

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

*Recommended elective courses:*
BIO 2060/2060L Basic Microbiology (3/1)
BIO 4040 Advanced Genetics (3)
BIO 4300 Concepts of Molecular Biology (3)
BIO 4320/4320L Molecular Biology Techniques (3/1)
BIO 4450/4450L Physiology I (3/1)
or BIO 4480/4480L Plant Physiology (3/1)
or BIO 4660/4660L Microbial Physiology (3/1)
BIO 4540 Plant Genetics (3)

**Emphasis 4 - Microbiology***

*Recommended elective courses:*
BIO 2060/2060L Basic Microbiology (3/1)
BIO 4605/4605L Medical Microbiology (3/1) †
BIO 4660/4660L Microbial Physiology (3/1)
BIO 4680/4680L Microbial Ecology (2/1)

*Additional elective courses:*
BIO 3600 General Epidemiology (3)
BIO 3620/3620L Applied Microbiology (2/1)
BIO 3640/3640L Food Microbiology (3/1)
BIO 4640 Medical Virology (2)
BIO 4650/4650L Immunology (3/1) †
BIO 4670/4670L General Virology (2/2)
BIO 4690/4690L Plant-Microbe Interactions (2/1)
BIO 4700/4700L Hematology (2/1) †
BIO 4710 Immunohematology (2)

**Emphasis 5 - Neuroscience and Physiology***

*Recommended elective courses:*
BIO 4190/4190L Neuroscience I: Cell and Molecular (3/1)
BIO 4200/BIO 4200L Neuroscience II: Systems Neuroscience
BIO 4450/4450L Physiology I (3/1)
BIO 4460/4460L Physiology II (3/1)

*Additional elective courses:*
BIO 4100 Biophysics (3)
BIO 4220/4220L Neural Circuits of Behavior (3/1)
BIO 4240 Neuromuscular Physiology (3)
BIO 4360/4360L Protein Biotechnology (2/2)
BIO 4380/4380L Bioinformatics (3/1)
BIO 4400/4400L Stem Cell Biology (3/1)
BIO 4610/4610L Histology (2/2)

**Emphasis 6 - Zoology**

*Recommended elective courses:*
BIO 2370/2370L Introduction to Invertebrate Zoology (3/1)
BIO 2380/2380L Introduction to Vertebrate Zoology (3/1)
BIO 3250L Ecology Lab (1)
BIO 4450/4450L Physiology I (3/1)
BIO 4460/4460L Physiology II (3/1)

*Additional elective courses:*
BIO 3130 Marine Biology (3) (BB)
BIO 3500/3500L California Flora (1/1)
BIO 4020/4020L Developmental Biology (3/1)
BIO 4100 Biophysics (3)
BIO 4140 Biology of Species Invasions (2)
BIO 4160/4160L Marine Ecology (3/1)
BIO 4190/4190L Neuroscience I: Cell and Molecular (3/1)
BIO 4490/4490L Marine Botany (2/2)
BIO 4600/4600L Entomology (2/2)
BIO 4610/4610L Histology (2/2)
BIO 4620/4620L Ichthyology (2/2)
BIO 4640/4640L Herpetology (2/2)

Note:
* Emphasis 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.
† Required course for the admission to the Clinical Laboratory Scientist (CLS) programs. In addition, CHM 2210/2210L Quantitative Analysis (2/2) is required and can be taken as a support elective.

Courses not listed may be acceptable following consultation with advisor.