Proposing New CSU Degree Programs
Bachelor's and Master's Levels

Offered through Self-Support and State-Support Modes

This document presents the format, criteria, and submission procedures for CSU bachelor's and master's degree program proposals. Please see the Academic Program Planning Web site for doctoral degree proposal formats. (http://www.calstate.edu/APP/)

Templates for Doctoral Proposals

- CSU Ed.D. Programs
- UC-CSU Joint Doctoral Programs
- Joint Doctorates with Independent Institutions

Criteria

Proposals are subjected to system-level internal and external evaluation, through which reviewers seek evidence indicating that current campus budgetary support levels provide sufficient resources to establish and maintain the program. Review criteria include: curriculum, financial support, number and qualifications of faculty, physical facilities, library holdings, responsiveness to societal need and regional and workforce needs, academic assessment plans, and compliance with all applicable CSU policies, state laws, and accreditation standards.

Procedures

Before a proposal is submitted to the Chancellor's Office, the campus adds the projected degree program to the campus academic plan. Subsequent to the CSU Board of Trustees approval of the projection, a detailed, campus-approved program implementation proposal is submitted to Chancellor's Office for review and approval. Proposals are to be submitted in the academic year preceding projected implementation. Only programs whose implementation proposals have been approved by the CSU Chancellor may enroll students. Campus Academic Plans appear in the Educational Policy Committee Agenda Item of the annual March meeting of the Board of Trustees.

Submission

1. The degree program proposal should follow the format and include information requested in this template. If the proposed program is subject to WASC Substantive Change, the Chancellor's Office will accept the WASC Substantive Change Proposal format in place of the CSU format. For undergraduate degrees, the total number of units required for graduation must still be made explicit.
2. Submit **four** complete hard copies of the campus-approved degree implementation proposal, including documentation of campus approval, to:

Academic Program Planning
CSU Office of the Chancellor
401 Golden Shore
Long Beach, California 90802-4210

3. Submit one electronic copy to APP@calstate.edu. A Word version is preferred.

CSU DEGREE PROPOSAL
Faculty Check List

Please confirm (√) that the following are included in the degree proposal:

__X___The total number of units required for graduation is specified (not just the total for the major):

_____X__ a proposed bachelor's program requires no fewer than 120 units

____X___ any proposed bachelor's degree program with requirements exceeding 120 units must provide a justification for the excess units

___X__Please specify the total number of prerequisite units required for the major.
Note: The prerequisites must be included in the total program unit count.

List all courses and unit counts that are prerequisite to the major:
_See attached.______**
_____
_____
_____

__X___Title 5 minimum requirements for bachelor's degree have been met, including:

___80-86_minimum number of units in major (BA 24 semester units), (BS 36 semester units)

___41-45minimum number of units in upper-division (BA 12 semester units), (BS 18 semester units)

__N/A___Title 5 requirements for proposed master's degree have been met, including:

_____ minimum of 30 semester units of approved graduate work are required

_____ no more than 50% of required units are organized primarily for undergraduate students

_____ maximum of 6 semester units are allowed for thesis or project

_____ Title 5 requirements for master's degree culminating experience are clearly explained.

_____ for graduate programs, at least five-full time faculty with terminal degrees in appropriate disciplines are on staff.

__N/A___For self-support programs:

_____ all EO 1047 requirements are met

_____ the proposed program does not replace existing state-support courses or programs

_____ a program budget is included

_____ costs to students are specified, by term

_____ total cost of program is specified

CSU Degree Program Proposal Template

Please Note:

- Campuses may mention proposed degree programs in recruitment material if it is specified that enrollment in the proposed program is contingent on final program authorization from the CSU Chancellor's Office.

- Approved degree programs will be subject to campus program review within five years after implementation. Program review should follow system and Board of Trustee guidelines (including engaging outside evaluators) and should not rely solely on accreditation review.

- ***Please refer to the document "Tips for Completing a Successful Program Proposal" (which follows this document) before completing the Program Proposal Template.***

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1. **Program Type (Please specify any from the list below that apply—delete the others)**

   a. State-Support

   b. New Program

2. **Program Identification**

   a. Campus: CSULB

   b. Full and exact degree designation and title (e.g. Master of Science in Genetic Counseling, Bachelor of Arts with a Major in History).

      Bachelor of Science in Biological Sciences, Option in Organismal Biology;

      Bachelor of Science in Biological Sciences, Option in Molecular Cell Biology and Physiology.

   c. Date the Board of Trustees approved adding this program projection to the campus Academic Plan.
      N/A

   d. Term and academic year of intended implementation (e.g. Fall 2013).
      Fall 2013.

e. Total number of units required for graduation. This will include all requirements, not just major requirements.
120 units

f. Name of the department(s), division, or other unit of the campus that would offer the proposed degree major program. Please identify the unit that will have primary responsibility.

Biological Sciences

g. Name, title, and rank of the individual(s) primarily responsible for drafting the proposed degree major program.

Brian T. Livingston, Professor and Chair
Biological Sciences Executive Council
Biological Sciences Curriculum Committee

h. Statement from the appropriate campus administrative authority that the addition of this program supports the campus mission and will not impede the successful operation and growth of existing academic programs.

See letter from Laura Kingsford, Dean of the College of Natural Sciences and Mathematics.

i. Any other campus approval documents that may apply (e.g. curriculum committee approvals).

See Letter from Henry Fung, Associate Dean of the College of Natural Sciences and Mathematics re: Approval of the college curriculum committee.

j. Please specify whether this proposed program is subject to WASC Substantive Change review. The campus is required to either attach a copy of the WASC Sub-Change proposal or submit that document in lieu of the CSU proposal format.

N/A

k. Optional: Proposed Classification of Instructional Programs and CSU Degree Program Code

Campuses are invited to suggest one CSU degree program code and one corresponding CIP code. If an appropriate CSU code does not appear on the system-wide list at: http://www.calstate.edu/app/resources.shtml, you can search CIP 2010 at http://nces.ed.gov/ipeds/cipcode/Default.aspx?y=55 to identify the code that best matches the proposed degree program. The Classification of Instructional Programs (CIP) is a National Center for

Education Statistics (NCES) publication that provides a numerical classification and standard terminology for secondary and postsecondary instructional programs. The CSU degree program code (based on old HEGIS codes) and CIP code will be assigned when the program is approved by the Chancellor.

CSU Code 04011
CIP Code 26.0101

3. Program Overview and Rationale

a. Rationale, including a brief description of the program, its purpose and strengths, fit with institutional mission, and a justification for offering the program at this time. The rationale may explain the relationship among the program philosophy, design, target population, and any distinctive pedagogical methods.

The existing Botany, Ecology and Zoology Options are being combined into an Option in Organismal Biology. The existing Cell and Molecular Biology and Physiology Options are being combined into an Option in Molecular Cell Biology and Physiology.

There are three main objectives in making these changes.

1. To simplify a confusing array of options, each with their own set of requirements.
2. To remove bottlenecks in the curriculum to decrease student time to graduation.
3. To provide more flexibility in elective requirements. This will also improve student time to graduation. It will also improve our ability to offer and staff required courses.

External reviews over the last two decades have suggested a simplification of our curriculum would be an improvement for students. This is also the trend both nationally and within the CSU system. Creating an Option in Organismal Biology brings us in line with many institutions, such as Harvard, and is a natural combination of botany, ecology and zoology. The botany and ecology options have consistently had low numbers, so this consolidation will also promote efficiency in operations and advising. At the same time, students with interests in those fields will still be able to follow that path within the new Option. Similarly, consolidation of the Cell, Molecular and Physiology Options in to a single option follows national trends. The two existing options overlap substantially in terms of requirements and electives, so this is also a natural integration.

When designing the new options and modifying the Biology Option, we took care to make changes that will reduce existing bottlenecks. In particular, we changed the diversity requirement in the Organismal and Biology Options so that there are more options to satisfy this requirement. We also increased the choices in physiology requirements in those two options and expanded the electives. In the Molecular Cell Biology and Physiology Option, we increased the choices for laboratory requirements and also expanded the electives.

By combining options we increase the flexibility and student choices throughout the curriculum while maintaining rigor and a comprehensive education. Students may still follow their interests and achieve the same pathways found in the previous options, but when faced with a course not being offered that formerly would be a roadblock to progressing toward a degree, students will now always have another choice. This will be particularly beneficial when faculty members are on sabbatical or on buyout from grants. The changes we propose will greatly facilitate our ability to foster student's progression towards a degree with existing faculty numbers.

b. Proposed catalog description, including program description, degree requirements, and admission requirements. For master's degrees, please also include catalog copy describing the culminating experience requirement(s).

Bachelor of Science in Biology, Option in Organismal Biology
(120 units)
This option is designed primarily for those interested in careers that involve the biology of animals, plants and the study of organisms in relation to their environment. It is particularly appropriate for those seeking employment in private industry or government service as well as those students contemplating graduate work in these fields. This option requires approximately 81-84 units in the major, of which 39-41 units are in lower division and 42-43 are in upper division.
All students must achieve at least a 2.0 grade-point average in each of the following: 1. the entire college record, 2. all units attempted at CSULB, 3. all courses in the major, and 4. all upper division courses in the major completed at CSULB.

Lower Division:
Take all of the following courses:
BIOL 211 Introduction to Evolution and Diversity (4)
Prerequisite/Corequisite: CHEM 111A with a grade of "C" or better.
BIOL 212 Intro to Cell and Molecular Biology (4)
Prerequisites: Completion of BIOL 211 and CHEM 111A with grades of "C" or better.
Pre/Corequisite: CHEM 111B with grade of "C" or better.
BIOL 213 Intro to Ecology and Physiology (4)
Prerequisites: BIOL 211, 212, CHEM 111B all with a grade of "C" or better.
BIOL 260 Biostatistics (3)
Prerequisites: BIOL 211 or BIOL 207 or MICR 200; MATH 111 or 113 or 119A or 122 all with a grade of "C" or better.
CHEM 111A General Chemistry (5)
Prerequisites: A passing score on the Chemistry Placement Examination . (Credit in Chem 101 does not substitute for a passing score on the Chemistry Placement Examination) and a "C" or better in MATH 113 or

117 or 119A or 122. One year of high school chemistry is strongly recommended. (Recommended for students who intend to pursue careers in science or engineering).
CHEM 111B General Chemistry (5)
Prerequisite: CHEM 111A with a grade of "C" or better.

NOTE: BIOL 111, 111L, 212, 212L, 213, 213L are required if courses were taken prior to catalog year 2010-11.

Take one of the following courses:
MATH 119A Survey of Calculus I (3)
Prerequisite: Appropriate MDPT placement or a grade of "C" or better in MATH 113.
MATH 122 Calculus I (4)
Prerequisite: Appropriate MDPT placement or a grade of "C" or better in MATH 111 and 113, or a grade of "C" or better in MATH 117.

Take one of the following courses:
MATH 119B Survey of Calculus II (3)
Prerequisite: MATH 119A or 122.
MATH 123 Calculus II (4)
Prerequisite: A grade of "C" or better in MATH 122.

Take one of the following courses:
PHYS 100A General Physics (4)
Prerequisite: MATH 109 or 113 or 117 or 119A or 120 or 122.
PHYS 151 Mechanics and Heat (4)
Prerequisite/Corequisite: MATH 122.

Take one of the following courses:
PHYS 100B General Physics (4)
Prerequisites: PHYS 100A.
PHYS 152 Electricity and Magnetism (4)
Prerequisite: PHYS 151; Prerequisite/Corequisite: MATH 123.

The following courses do not meet any specific or elective requirements for this major: BIOL 100, 153, 153L, 200, 200L, 205, 205L, 207, 208; MICR 101 and 200.

Upper Division:
Take a minimum of 42 upper division units to include the following:
Take one of the following course combinations in Organic Chemistry or Biochemistry (groups a or b):

a) CHEM 322A Organic Chemistry (3)
Prerequisite: CHEM 111B with a grade of "C" or better. Concurrent enrollment in CHEM 323A required except for students who have previously earned a "C" or better in CHEM 323A.
CHEM 322B Organic Chemistry (3)
Prerequisites: CHEM 322A and CHEM 323A, both with a grade of "C" or better. Concurrent enrollment in CHEM 323B required except for students who have previously earned a "C" or better in CHEM 323B.
CHEM 323A Organic Chemistry Laboratory (1)
Prerequisite: CHEM 111B with a grade of "C" or better. Concurrent enrollment in CHEM 322A required except for students who have previously earned a "C" or better in CHEM 322A.
CHEM 323B Organic Chemistry Laboratory (1)
Prerequisites: CHEM 322A and CHEM 323A, both with a grade of "C" or better. Concurrent enrollment in CHEM 322B required except for students who have previously earned a "C" or better in CHEM 322B.

b) CHEM 327 Organic Chemistry (3)

Prerequisite: CHEM 111A with a grade of "C" or better; CHEM 111B is recommended.
CHEM 448 Fundamentals of Biological Chemistry (3)
Prerequisites: CHEM 327 or 322B either with a grade of "C" or better.

Few, if any, health-related professional schools (e.g. veterinary medicine) will accept CHEM 327. Some graduate programs with masters or doctorates in biology and/or ecology may also not accept CHEM 327. Students interested in these programs might consider taking CHEM 322A,B and 323A,B. CHEM 327 is not acceptable as a prerequisite for CHEM 441A. CHEM 327 is acceptable toward the Minor in Chemistry.

Take all of the following courses: (11 units)
BIOL 312 Evolutionary Biology (3)
Prerequisites: BIOL 211, 212, 213, 260 all with a grade of "C" or better.
BIOL 350 General Ecology (3)
Prerequisites: BIOL 211, 212, 213, 260; MATH 119A or 122 all with a grade of "C" or better. Chemistry and physics recommended.
BIOL 370 General Genetics (4)
Prerequisites: BIOL 211, 212 and either BIOL 260 or CHEM 251 all with a grade of "C" or better.
BIOL 480 Seminars (1)
Prerequisites: Consent of undergraduate [graduate] advisor. Undergraduates must have filed for graduation and be in their last semester. Classified post-baccalaureates must have been admitted to a second baccalaureate or a certificate.

Although Biol 340 is not required for this option, it is a prerequisite for many 400-level courses and may be used as an elective.

Take at least one of the following courses/course pairs: 3-4 units
BIOL 345 Comparative Animal Physiology (3)
Prerequisites: BIOL 211, 212, 213 all with grade of "C" or better, and
BIOL 345L Lab in Comp Animal Physiology (1)
Prerequisite/Corequisite: BIOL 345 with a grade of "C" or better.
Or
BIOL 447 Molecular Plant Physiology (3)
Prerequisites: BIOL 340, 370, both with grade of "C" or better.

Take at least two of the following courses in organismal diversity, one of which must be BIOL 313, 316, 324, 427, or 439:
BIOL 313 Invertebrate Zoology (4)
Prerequisites: BIOL 211, 212, 213 all with a grade of "C" or better.
BIOL 316 General Entomology (4)
Prerequisites: BIOL 211, 212, 213 all with grade of "C" or better.
BIOL 324 Vertebrate Zoology (4)
Prerequisites: BIOL 211, 212, 213 all with grade of "C" or better.
BIOL 419, Ichthyology (3)
Prerequisites: BIOL 211, 212, 213, 260 and at least 6 additional units of upper division biological science, all with a grade of " C" or better. Recommended: BIOL 350, 353, and 370.
BIOL 421 Herpetology (3)
Prerequisites: BIOL 260, 350, and one additional upper division biology course, all with a grade of "C" or better. Recommended: BIOL 312, 324, or 370.
BIOL 423 Mammalogy (3)
Prerequisite: At least one of BIOL 312, 324, or 350, with a grade of "C" or better.
BIOL 424 Ornithology (3)
Prerequisites: BIOL 211, 212, 213, 260 and three units of upper division BIOL, all with a grade of "C" or better. Recommended: BIOL 350.
BIOL 427 Vascular Plant Systematics (4)

Prerequisite: BIOL 312 or 370 with a grade of "C" or better.
BIOL 439 Plant Morphology (4)
Prerequisite: BIOL 312 or 370 with a grade of "C" or better.

Select a minimum of two courses from the following (any combination of courses from the two groups is acceptable):

Ecology and evolution courses

BIOL/MICR 355 Microbial Ecology (3)
Prerequisites: MICR 211 or BIOL 211, 212, 213 all with a grade of "C" or better.
BIOL 412 Advanced Evolutionary Biology (3)
Prerequisite: BIOL 312 with a grade of "C" or better.
BIOL 450 Plant Ecology (3)
Prerequisites: BIOL 260, 350 with a grade of "C" or better. Recommended: BIOL 427, 447.
BIOL 451 Wetlands and Mangrove Ecology (3)
Prerequisites: BIOL 260, 350 both with a grade of "C" or better.
BIOL 452 Behavioral Ecology (3)
Prerequisites: BIOL 211, 212, 213, 260 all with a grade of "C" or better. Prerequisite/Corequisite: BIOL 312 or 350.
BIOL 453 Insect Ecology (3)
Prerequisite: BIOL 350 with a grade of "C" or better.
BIOL 454B Research in Tropical Terrestrial Ecology (3)
Prerequisites: BIOL 350; one of BIOL 316, 324, 421, 424, 427, or 439 all with a grade of "C" or better; and consent of instructor.
BIOL 456 Population Ecology (3)
Prerequisites: BIOL 350, MATH 119B or 123 all with a grade of "C" or better.
BIOL 457 Field Methods in Ecology (3)
Prerequisites: BIOL 260, 350 both all with a grade of "C" or better.
BIOL 459 Conservation Biology (3)
Prerequisites: BIOL 260, 350 both with a grade of "C" or better. Recommended: BIOL 370.
BIOL 472 Molecular Evolution (3)
Prerequisite: BIOL 370 with a grade of "C" or better. Recommended: BIOL 312.

Physiology courses

BIOL 442 Physiology at the Limit (3)
Prerequisites: BIOL 342 or 345 with a grade of "C" or better.
BIOL 443 Endocrinology (3)
Prerequisites: BIOL 340 or CHEM 441B; CHEM 320A or 322A or 327; and one of BIOL 341, 342, 345, 445, 448; CHEM 441A or 448, all with a grade of "C" or better.
BIOL 444 Reproductive Biology (3)
Prerequisite: BIOL 342 or 345 with a grade of "C" or better.
BIOL 449 Fish Physio and Endocrinology (3)
Prerequisite: BIOL 345 with grade of "C" or better.
BIOL 464 Aquatic Toxicology (3)
Prerequisites: BIOL 211, 212, 213, 340; CHEM 320A or 322A or 327, all with a grade of "C" or better. Recommended: BIOL 353 and CHEM 448 or 441A,B.

Take 2-3 additional upper division courses totaling 6-9 units in the Department of Biological Sciences so that a minimum number of 42 upper division units are completed. At least three of these units must be at the 400 level. Note that many 400 numbered courses require BIOL 340, which can also count as one of these elective courses.

Courses outside of BIOL that can also count toward these units include GEOG 481, CHEM 441A, and CHEM 448.

Courses that will not count towards these units are BIOL 301, 304, 305, 308, and MICR300I.

Students contemplating graduate or professional school should consider taking 1-3 units of BIOL 496 in addition to the requirements listed above. With prior permission of the advisor for this option, students may use 3 units of BIOL 496 as an elective.

Bachelor of Science in Biology, Option in Molecular Cell Biology and Physiology
(120 units)

This option is designed primarily for those interested in careers that involve biology at the cell, molecular and organ system levels and is particularly appropriate for those contemplating graduate work in these fields or entering one of the health professions, such as medicine and physical therapy. Students in this option might also want to pursue the Certificate in Biotechnology described elsewhere in this Catalog. This option requires approximately 82-86 units in the major, of which 39-41 are in lower division and 43-45 are in upper division.
All students must achieve at least a 2.0 grade-point average in each of the following: 1. the entire college record, 2. all units attempted at CSULB, 3. all courses in the major, and 4. all upper division courses in the major completed at CSULB.

Lower Division:
Take all of the following courses:
BIOL 211 Intro to Evolution and Ecology (4)
BIOL 212 Intro to Cell and Molecular Biology (4)
BIOL 213 Intro to Ecology and Physiology (4)
BIOL 260 Biostatistics (3)
CHEM 111A General Chemistry (5)
CHEM 111B General Chemistry (5)

Take one course from the following:
MATH 119A Survey of Calculus I (3) OR
MATH 122 Calculus I (4)

Take one course from the following:
MATH 119B Survey of Calculus II (3) OR
MATH 123 Calculus II (4)

Take one course from the following:
PHYS 100A General Physics (4) or
PHYS 151 Mechanics and Heat (4)

Take one course from the following:
PHYS 100B General Physics (4) or
PHYS 152 Electricity and Magnetism (4)

Upper Division:
Take all of the following courses:
CHEM 322A Organic Chemistry (3)
Prerequisite: CHEM 111B with a grade of "C" or better. Concurrent enrollment in CHEM 323A required except for students who have previously earned a "C" or better in CHEM 323A.

CHEM 322B Organic Chemistry (3)
Prerequisites: CHEM 322A and CHEM 323A, both with a grade of "C" or better. Concurrent enrollment in CHEM 323B required except for students who have previously earned a "C" or better in CHEM 323B.
CHEM 323A Organic Chemistry Laboratory (1)
Prerequisite: CHEM 111B with a grade of "C" or better. Concurrent enrollment in CHEM 322A required except for students who have previously earned a "C" or better in CHEM 322A.
CHEM 323B Organic Chemistry Laboratory (1)
Prerequisites: CHEM 322A and CHEM 323A, both with a grade of "C" or better. Concurrent enrollment in CHEM 322B required except for students who have previously earned a "C" or better in CHEM 322B.
CHEM 441A Biological Chemistry (3)
Prerequisite: Either CHEM 320B or both CHEM 322B and 323B with a grade of "C" or better; a biology or microbiology course is recommended.
CHEM 441B Biological Chemistry (3)
Prerequisite: CHEM 441A with a grade of "C" or better.

Take all of the following courses:
BIOL 340 Molecular Cell Biology (3)
Prerequisites: BIOL 211, 212; CHEM 320A or 322A or 327 all with a grade of "C" or better.
BIOL 370 General Genetics (4)
Prerequisites: BIOL 211, 212 and either BIOL 260 or CHEM 251 all with a grade of "C" or better.
BIOL 480 Seminars (1)
Prerequisites: Consent of undergraduate [graduate] advisor. Undergraduates must have filed for graduation and be in their last semester. Classified post-baccalaureates must have been admitted to a second baccalaureate or a certificate.

Take one of the following:
BIOL 312 Evolutionary Biology (3)
Prerequisites: BIOL 211, 212, 213, 260 all with a grade of "C" or better.
BIOL 350 General Ecology (3)
Prerequisites: BIOL 211, 212, 213, 260; MATH 119A or 122 all with a grade of "C" or better. Chemistry and physics recommended.

Take at least one of the following courses/course pairs:
BIOL 342 Human/Mammalian Phys (3)
Prerequisites: BIOL 211, 212, 213 all with grade of "C" or better. Recommended: PHYS 100A,B., and
BIOL 342L Lab in Human/Mammalian Phys (1)
Prerequisite/Corequisite: BIOL 342 with a grade of "C" or better.
Or
BIOL 345 Comparative Animal Physio (3)
Prerequisites: BIOL 211, 212, 213 all with grade of "C" or better, and
BIOL 345L Lab in Comp Animal Phys (1)
Prerequisite/Corequisite: BIOL 345 with a grade of "C" or better.
Or
BIOL 440L Molecular Cell Biology Lab (3)
Prerequisites: BIOL 340, 370, both with a grade of "C" or better, and consent of instructor.

If more than one is taken, the second course may count towards the electives below.

Take five courses totaling at least 15 units selected from the following:
BIOL 431 Biology of Cancer (3)
Prerequisites: BIOL 340, 370 with a grade of "C" or better.
BIOL 432 Stem Cell Biology (3)
Prerequisites: BIOL 433 with a grade of "C" or better.
BIOL 433 Developmental Biology (3)

Prerequisites: BIOL 340, and either BIOL 370 or MICR 371, both with a grade of "C" or better.
BIOL 440L Molecular Cell Biology Lab (3)
Prerequisites: BIOL 340, 370, both with a grade of "C" or better, and consent of instructor.
BIOL 442 Physiology at the Limit (3)
Prerequisites: BIOL 342 or 345 with a grade of "C" or better.
BIOL 443 Endocrinology (3)
Prerequisites: BIOL 340 or CHEM 441B; CHEM 320A or 322A or 327; and one of BIOL 341, 342, 345, 445, 448; CHEM 441A or 448, all with a grade of "C" or better.
BIOL 444 Reproductive Biology (3)
Prerequisite: BIOL 342 or 345 with a grade of "C" or better.
BIOL 445 Metabolic Regulation (3)
Prerequisites: BIOL 340, 342 or 345; CHEM 441A with grade of "C" or better.
BIOL 447 Molecular Plant Physiology (3)
Prerequisites: BIOL 340, 370, both with grade of "C" or better.
BIOL 448 Principles of Neurobiology (3)
Prerequisites: BIOL 340 or CHEM 441B and one of BIOL 341, 342, or 345 all with a grade of "C" or better.
BIOL 449 Fish Physio and Endocrinology (3)
Prerequisite: BIOL 345 with grade of "C" or better.
BIOL 472 Molecular Evolution (3)
Prerequisite: BIOL 370 with a grade of "C" or better.
BIOL 473 Molecular Genetics (3)
Prerequisites: BIOL 370 or MICR 371; CHEM 320A,B or 322A,B and 323A,B, or 327, all with a grade of "C" or better.
BIOL 477 Biotechnology & Bioinformatics (4)
Prerequisite: BIOL 340 or 370 or CHEM 441A,B; all with a grade of "C" or better.
BIOL/MICR 416 Virology (3)
Prerequisite: MICR 320 or BIOL 340 with a grade of "C" or better.
BIOL/MICR 430 Immunology (3)
Prerequisite: BIOL 340 with a grade of "C" or better.

With permission of the appropriate advisor, students may substitute one course in the biological sciences that is not on the above list for one of these five courses.

The following courses do not meet any specific or elective requirements for this major: BIOL 301, 304, 305, 308, 309I; MICR 300I; and NSCI 492.

Students contemplating graduate or professional school should consider taking 1-3 units of BIOL 496 in addition to the requirements listed above. With prior permission of the advisor for this option, students may use 3 units of BIOL 496 as an elective.

4. Curriculum

a. Describe goals for the (1) program and (2) student learning outcomes. Program goals are very broad statements about what the program is intended to achieve, including what kinds of graduates will be produced. Student learning outcomes are more specific statements that are related to the program goals but that more narrowly identify what students will know and be able to do upon successful completion of the program.

By obtaining a degree from the Department of Biological Sciences, students will:

- Obtain an understanding of the fundamental principles and unifying concepts of biology
- Gain an understanding of multiple sub-disciplines of biology, including how specific concepts in these areas relate to the fundamental principles and to other sub-disciplines
- Know how to think as a scientists through exposure to the scientific process and through reading and analyzing the scientific literature
- Become scientifically literate, defined as the ability to communicate science effectively in both written and oral formats, to think critically and logically and to appreciate the linkage between biological science and society
- Understand how we acquire knowledge through research by direct participation in the process and/or through listening to scientific experts discuss their research

Option in Organismal Biology

Student Learning Outcome	Assessment of Outcome
Obtain an understanding of the fundamental principles and unifying concepts of biology.	Students will demonstrate content knowledge when completing essay, problem solving, and multiple-choice exams across the major areas of biological sciences.
Students will gain a comprehensive knowledge of the taxonomic diversity of at least one major group (i.e. animals, plants, fungi, and/or microbes), and will understand the influence of both abiotic and biotic interactions on organismal function and morphology. Students will understand key concepts in physiology and evolution.	Examinations, discussion of primary literature papers, hands-on laboratory exposure with field or practical examinations.
Know how to think as a scientist through exposure to the scientific process and through reading and analyzing the scientific literature.	In assignments or examinations, students will present oral or written critical analysis and interpretation of primary literature in the ecology, evolution, morphology, and/or integrative and comparative physiology fields.
Become scientifically literate, defined as the ability to communicate science effectively in both written and oral formats, to think critically and logically and to appreciate the linkage between biological science and society.	Students will communicate the scientific process in either an oral or written format, and will relate relevance of biological information to society on individual and community levels.
Understand how we acquire knowledge through research by direct participation in the process and/or through listening to scientific experts discuss their research.	Students will discuss and analyze current research presented during the BIOL 480 seminar, and other appropriate upper division courses.

Option in Molecular Cell Biology and Physiology

Student Learning Outcome	Assessment of Outcome
Understand the fundamental principles and broad unifying concepts of biology.	Demonstrate content knowledge when completing essay, problem solving, and multiple-choice exams

	across the major areas of biological sciences.
Gain a comprehensive knowledge of cell and molecular biology, cell structure and function, and the flow of genetic information. Understand key concepts in physiology and evolution.	Examinations, discussion of primary research, and hands-on laboratory experience with current research methods within the cell/molecular biology, genetics, and/or physiology fields.
Discover how to think critically as a scientist by learning the scientific method and analyzing scientific literature.	Present oral or written analysis that interpret the scientific literature of cell molecular biology, genetics, and/or physiology disciplines.
Become scientifically literate by effectively communicating science-based concepts in both written and oral formats, thinking critically of biological processes and investigating the linkage between discoveries in biology and society.	Communicate the scientific process in oral and written formats. Describe the value of molecular cell biology and physiology to society at the individual and community levels.
Understand how society gains knowledge through research by participating in faculty-mentored research and engaging with scientific experts discussing their research.	Discuss and analyze current research presented during the BIOL 480 seminar, and other appropriate upper division courses.

b. Include plans for assessing Program Learning Outcomes or Goals and Student Learning Outcomes. Creating a comprehensive assessment plan addressing multiple elements, including strategies and tools to assess Student Learning Outcomes directly related to overall Program Learning Outcomes or Goals, is a key component of program planning. Constructing matrices that show the relationship between all assessment elements, is one way to display assessment plans. Mapping student learning outcomes, the courses where they are found and indicating where course content related to the learning outcomes is Introduced, Developed, and Mastered at an advanced level present a comprehensive picture of program assessment. This will insure all Student Learning Outcomes that are directly related to overall program goals are assessed across the curriculum and at the appropriate times.

   (Please see the curriculum map and assessment matrices found in the TIPS document to assist in responding adequately to this section).

   Assessment methods specific to the SLO's of the proposed options are included in the chart above. We also assess our degree options together. That is discussed below.

   Students taking courses in the Biological Sciences will be prepared with critical thinking skills to enter the job force or graduate/professional school. They will leave our courses more knowledgeable of the diversity of life on Earth, and will be more aware of the similarities among all humans when our own bodies are considered at the biological level. Students taking courses in the Biological Sciences are exposed to natural science not only via content in lecture sections, but also in hands-on participation in our required

laboratories in courses for both our majors and students pursuing completion of GE requirements. While laboratory sections are fading in some universities, we are proud that our students get the active learning experience of collaborative problem solving and critical thinking afforded by the laboratory section. We continually strive to improve the laboratory experience for all students, as it is in our laboratories that most students gain practical skills, experience problem solving, and actually interact with biology at a level that fosters retention of material and appreciation of nature- inside or outside of our own skin.

The Department has, in a collaborative effort among faculty, assembled a "capstone" exam for all graduating seniors to take in the required BIOL 480 Seminar in Biological Sciences course (50 min seminar). This exam was re-worked over the 2011-2012 academic year, with Dr. Ashley Carter spearheading the effort to re-write the questions to target topics covered in our program. The original capstone exam was created in the style of, and in some cases using questions directly from, GRE Biology Subject Exams, and we decided that this may not be the best method for assessment of student performance. The Biology GRE is a test where the average student scores ~50%, which was what we were observing on our own original capstone exam. While this is a useful metric, only testing content knowledge might not best measure student success. With this in mind, Dr. Carter was appointed Associate Undergraduate Assessment coordinator and his job was to focus on increasing the Bloom's Taxonomy level of the questions on the capstone exam. He culled the exam of questions that required students to remember a particular name of a taxa or hormone, and replaced these low order concerned questions (LOCs) with higher order concerns (HOCs). His HOC questions required knowledge of the scientific process, data interpretation, and broader concept understanding. Many incorporated critical thinking and application of knowledge. These revised questions make up a test that is more in line with CSULB's Institutional Learning Objectives. In addition, the addition of more practical data interpretation brings us more in line with LEAP goals of having students critically assessing information within our field. The 50-question exam covers the following topics: Botany, Cellular and Molecular Biology, Diversity, Ecology and Evolution, Genetics, Marine Biology, Microbiology, Physiology,and Statistics.

Several questions on the exam, notably the statistics questions, ask students to assess a data set and either describe analysis or interpret results. Students were presented with graphs and asked to use data analysis and problem solving skills to determine an answer. The revised version of the exam asks many higher order or HOC-type questions that ask for synthesis and analysis of data.

c. Indicate total number of units required for graduation.

120

d. Include a justification for any baccalaureate program that requires more than 120-semester units or 180-quarter units.
N/A

e. If any formal options, concentrations, or special emphases are planned under the proposed major, identify and explain fully. Optional: You may propose a CSU degree program code and CIP code for each concentration that you would like to report separately from the major program, if the option is approximately equivalent to a degree currently listed on the CSU application-booklet degree program table. If an appropriate CSU code does not appear on the system-wide list at: http://www.calstate.edu/app/resources.shtml, you can search CIP 2010 at http://nces.ed.gov/ipeds/cipcode/Default.aspx?y=55 to identify the code that best matches the proposed degree program.

f. List all requirements for graduation, including electives, for the proposed degree program, specifying catalog number, title, total units required for completion of the degree, major requirements, electives*, and prerequisites or co-requisites (ensuring there are no "hidden prerequisites that would drive the total units required to graduate beyond the total reported in 4c above). Include proposed catalog descriptions of all new courses.

See attached and current catalogue. No new courses are proposed and all current courses are utilized.

g. List any new courses that are: (1) needed to initiate the program or (2) needed during the first two years after implementation. Include proposed catalog descriptions for new courses. For graduate program proposals, identify whether each new course would be at the graduate-level or undergraduate-level.

None.

h. Attach a proposed course-offering plan for the first three years of program implementation, indicating likely faculty teaching assignments.
N/A

i. For master's degree proposals, include evidence that program requirements conform to the minimum requirements for the culminating experience, as specified in Section 40510 of Title 5 of the California Code of Regulations.
N/A

j. For graduate degree proposals, cite the corresponding bachelor's program and specify whether it is (a) subject to accreditation and (b) currently accredited.
N/A

k. For graduate degree programs, specify admission criteria, including any prerequisite coursework.

N/A

l. For graduate degree programs, specify criteria for student continuation in the program.

N/A

m. For undergraduate programs, specify planned provisions for articulation of the proposed major with community college programs.

N/A (no changes)

n. Describe advising "roadmaps" that have been developed for the major.

These will remain similar, but consolidated.

o. Describe how accreditation requirements will be met, if applicable, and anticipated date of accreditation request (including the WASC Substantive Change process).

N/A

Accreditation Note:

Master's degree program proposals
If subject to accreditation, establishment of a master's degree program should be preceded by national professional accreditation of the corresponding bachelor's degree major program.

Fast-track proposals
Fast-track proposals cannot be subject to specialized accreditation by an agency that is a member of the Association of Specialized and Professional Accreditors unless the proposed program is already offered as an authorized option or concentration that is accredited by an appropriate specialized accrediting agency.

5. Societal and Public Need for the Proposed Degree Major Program

N/A- not a new degree program.

a. List of other California State University campuses currently offering or projecting the proposed degree major program; list of neighboring institutions, public and private, currently offering the proposed degree major program.

b. Differences between the proposed program and programs listed in Section 5a above.

c. List of other curricula currently offered by the campus that are closely related to the proposed program.

d. Community participation, if any, in the planning process. This may include prospective employers of graduates.

e. Applicable workforce demand projections and other relevant data.

Note: Data Sources for Demonstrating Evidence of Need

APP Resources Web http://www.calstate.edu/app/resources.shtml

US Department of Labor, Bureau of Labor Statistics

California Labor Market Information

Labor Forecast

6. **Student Demand**

N/A- not a new degree program.

a. Provide compelling evidence of student interest in enrolling in the proposed program. Types of evidence vary and may include national, statewide, and professional employment forecasts and surveys; petitions; lists of related associate degree programs at feeder community colleges; reports from community college transfer centers; and enrollments from feeder baccalaureate programs, for example.

b. Identify how issues of diversity and access to the university were considered when planning this program.

c. For master's degree proposals, cite the number of declared undergraduate majors and the degree production over the preceding three years for the corresponding baccalaureate program, if there is one.

d. Describe professional uses of the proposed degree program.

e. Specify the expected number of majors in the initial year, and three years and five years thereafter. Specify the expected number of graduates in the initial year, and three years and five years thereafter.

7. Existing Support Resources for the Proposed Degree Major Program

N/A- not a new degree program.

Note: Sections 7 and 8 should be prepared in consultation with the campus administrators responsible for faculty staffing and instructional facilities allocation and planning. A statement from the responsible administrator(s) should be attached to the proposal assuring that such consultation has taken place.

a. List Faculty who would teach in the program, indicating rank, appointment status, highest degree earned, date and field of highest degree, professional experience, and affiliations with other campus programs. For master's degrees, include faculty publications or curriculum vitae.

b. Note: For all proposed graduate degree programs, there must be a minimum of five full-time faculty members with the appropriate terminal degree. (Code Memo EP&R 85-20)

c. Describe facilities that would be used in support of the proposed program.

d. Provide evidence that the institution provides adequate access to both electronic and physical library and learning resources.

e. Describe available academic technology, equipment, and other specialized materials.

8. Additional Support Resources Required

N/A- not a new degree program.

Note: If additional support resources will be needed to implement and maintain the program, a statement by the responsible administrator(s) should be attached to the proposal assuring that such resources will be provided.

a. Describe additional faculty or staff support positions needed to implement the proposed program.

b. Describe the amount of additional lecture and/or laboratory space required to initiate and to sustain the program over the next five years. Indicate any additional special facilities that will be required. If the space is under construction, what is the projected occupancy date? If the space is planned, indicate campus-wide priority of the facility, capital outlay program priority, and projected date of occupancy. Major capital outlay construction projects are those projects whose total cost is $610,000 or more (as adjusted pursuant to Cal. Pub. Cont. Code §§ 10705(a); 10105 and 10108).

c. Include a report written in consultation with the campus librarian which indicates any necessary library resources not available through the CSU library system. Indicate the commitment of the campus to purchase these additional resources.

d. Indicate additional academic technology, equipment, or specialized materials that will be (1) needed to implement the program and (2) needed during the first two years after initiation. Indicate the source of funds and priority to secure these resource needs.

e. For self-support programs, please provide information on the per-unit cost to students and the total cost to complete the program.

Submit completed proposal packages to:
APP@calstate.edu

Academic Program and Planning
CSU Office of the Chancellor
401 Golden Shore
Long Beach, CA 90802-4210

Contact Academic Program Planning

Dr. Christine Mallon
Assistant Vice Chancellor
Academic Programs and Faculty Development

Phone (562) 951-4672
Fax (562) 951-4982
cmallon@calstate.edu

Ms. Norma Warren
Academic Programs and Faculty Development

Phone (562) 951-4722
Fax (562) 951-4982
nwarren@calstate.edu

Academic Program Planning is on the Web http://www.calstate.edu/APP/

Contact Extended Education

Ms. Sheila Thomas
State University Dean, Extended Education

Phone (562) 951-4795
Fax (562) 951-4982
sthomas@calstate.edu

ATTACHMENT 2.3

Coversheet for Program Projection, Implementation and Major Program Change

Check one: ( ) Projection
(X) Implementation

Check one: ( ) New degree
( ) New degree and option(s)
( ) New option for existing degree
( ) Elevation of option or concentration to a full degree
( ) Pilot program conversion to regular status
( ) New minor
( ) New certificate
( ) Title change to program
(X) Major proposed changes to degree, option or minor

Check one: (X) Consider for Fast Track (ONLY for new degrees, not options)
(Additional documentation required; see Section 2, p. 8-9)
( ) Consider for Pilot Program (ONLY for new degrees, not options)
(Additional documentation required; see Section 2, p. 9-10)

Proposed Name of Program: Option in Organismal Biology, Option in Molecular Cell Biology and Physiology

Department/Program Proposing Program: ____Biological Sciences_____

Department Chair/Program Director: ___Brian T. Livingston_____

Office Location: _HSCI 104_____ Campus Extension: _5-7927_____

ATTACHMENT 2.3 (con't.)

Review and Approval

1. Department/Program Approval:

   Curriculum Chair: _____ Date: 12/12/12

   Department Chair/Program Director: _____ Date: 12/9/12

2. College Approval:

   Curriculum Chair: John J. Pickett Date: 12-10-12

   Dean/Designee: _____ Date: 12-10-12

3. Academic Affairs Review:

   Reviewed for Projection: _____ Date: _____

   Reviewed for Implementation: _____ Date: _____

4. U.R. Council: _____ Not Applicable _____ Approved _____ Not Approved

   Chair: _____ Date: _____

   C.E.P. Council: _____ Not Applicable _____ Approved _____ Not Approved

   Chair: _____ Date: _____

5. Academic Senate: _____ Not Applicable _____ Approved _____ Not Approved

   Chair: _____ Date: _____

6. Academic Affairs: _____ Approved _____ Not Approved

   Vice Provost for Academic Affairs: _____ Date: _____

   Entered on Campus Master Plan (Date): _____

   Proposed Implementation Date: _____

   Actual Implementation Date: _____

CALIFORNIA STATE UNIVERSITY, LONG BEACH

COLLEGE OF NATURAL SCIENCES AND MATHEMATICS

Biological Sciences Chemistry and Biochemistry Geological Sciences Mathematics and Statistics Physics and Astronomy Science Education

November 21, 2012

Dr. Cecile Lindsey, Vice Provost
Office of Academic Affairs
California State University, Long Beach
Long Beach, CA 90840.

Dear Vice Provost Lindsey,

RE: Program Proposals for B.S. in Biological Sciences,
Option in Organismal Biology
Option in Molecular Cell Biology and Physiology

The above mentioned new options for the Bachelor of Science in Biological Sciences were reviewed by the College's Curriculum Committee and approved on October 24, 2012. The Minutes for the Committee meeting have also been approved.

The B.S. in Biological Sciences, Option in Organismal Biology collapses the three current options in Botany (BIOLBS03), Ecology (BIOLBS05), and Zoology (BIOLBS07) into an option and enables students with these interests to have a greater number of electives to select from to complete their degree requirements. The B.S. in Biological Sciences, Option in Molecular Cell Biology and Physiology provide in the two current options, Cell and Molecular Biology (BIOLBS04) and Physiology (BIOLBS06) a similar opportunity. These changes will likely reduce the time needed for the majors to earn their degrees in these new options.

Thank you for your assistance in this matter.

Sincerely,

Henry C. Fung
Associate Dean

1250 BELLFLOWER BOULEVARD · LONG BEACH, CALIFORNIA 90840-4501 · 562/985-4707 · FAX 562/985-2315

CALIFORNIA STATE UNIVERSITY, LONG BEACH

COLLEGE OF NATURAL SCIENCES AND MATHEMATICS

Biological Sciences Chemistry and Biochemistry Geological Sciences Mathematics and Statistics Physics and Astronomy Science Education

DATE: November 30, 2012

TO: Cecile Lindsay, Vice Provost for Academic Affairs and Dean of Graduate Studies

FROM: Laura Kingsford, Dean

SUBJECT: Support for Change in Degree Options in the Department of Biological Sciences

I have followed closely the process the faculty in the Department of Biological Sciences have undergone to address curricular needs for their majors. I am strongly supportive of the resulting changes to the B.S. in Biological Sciences degree such that they have reduced five options to two options: Option in Organismal Biology and Option in Molecular Cell Biology and Physiology. These changes strongly support the campus mission to provide highly valued degrees for students in the biological science and help streamline the degree requirements for students in both options. Because existing options were combined into two options, the programs are still available for the students, but in a way that simplifies requirements, will remove bottlenecks, and provide flexibility in course requirements such that students will be able to graduate in a more timely manner. This will not impede the successful operation and growth of existing academic programs.

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