

# BS IN BIOLOGICAL SCIENCE (ECOLOGY, EVOLUTION, AND CONSERVATION)

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**SACRAMENTO STATE**  
*Redefine the Possible*

## In Workflow

1. BIO Committee Chair (kneitel@csus.edu)
2. BIO Chair (kneitel@csus.edu)
3. NSM College Committee Chair (mikkel.jensen@csus.edu)
4. NSM Dean (datwyler@csus.edu)
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7. Dean of Undergraduate (james.german@csus.edu; celena.showers@csus.edu; renee.leonard@csus.edu)
8. Dean of Graduate (cnewsome@skymail.csus.edu)
9. Catalog Editor (catalog@csus.edu)
10. Registrar's Office (wlindsey@csus.edu)

## Approval Path

1. Tue, 22 Feb 2022 19:37:44 GMT  
Jamie Kneitel (kneitel): Approved for BIO Committee Chair
2. Tue, 22 Feb 2022 19:52:01 GMT  
Jamie Kneitel (kneitel): Approved for BIO Chair
3. Fri, 04 Mar 2022 01:31:20 GMT  
Mikkel Jensen (mikkel.jensen): Approved for NSM College Committee Chair
4. Fri, 04 Mar 2022 16:56:16 GMT  
Shannon Datwyler (datwyler): Approved for NSM Dean

## History

1. Apr 27, 2018 by clmig-jwehrheim
2. Aug 13, 2018 by 212408496
3. Oct 10, 2019 by Shannon Datwyler (datwyler)
4. Apr 28, 2020 by Celena Showers (celena.showers)
5. Apr 20, 2021 by Celena Showers (celena.showers)

Date Submitted: Tue, 22 Feb 2022 18:53:45 GMT

**Viewing: BS in Biological Science (Ecology, Evolution, and Conservation)**

**Last approved: Tue, 20 Apr 2021 20:57:40 GMT**

**Last edit: Fri, 04 Mar 2022 01:31:11 GMT**

Changes proposed by: Jamie Kneitel (102041418)

**Academic Group: (College)**

Natural Sciences & Mathematics

**Academic Organization: (Department)**

Biological Sciences

**Catalog Year Effective:**

2022-2023 Catalog

**Individual(s) primarily responsible for drafting the proposed degree major program:**

Name (First Last)	Email	Phone 999-999-9999
Jamie Kneitel	kneitel@csus.edu	9162786535

**Type of Program Proposal:**

Major

**Program Change Type:**

Non-Substantive

**Title of the Program:**

BS in Biological Science (Ecology, Evolution, and Conservation)

**Designation: (degree terminology)**

Bachelor of Science

**Briefly describe the program proposal (new or change) and provide a justification:**

The department has voted to discontinue the pre-major.

**Objectives of the degree program:**

To prepare students for careers in ecology, evolution and concentration.

**University Learning Goals****Undergraduate Learning Goals:**

Competence in the disciplines  
 Integrative learning  
 Intellectual and practical skills

**Will this program be required as part of a teaching credential program, a single subject, or multiple subject waiver program (e.g., Liberal Studies, Biology) or other school personnel preparation program (e.g., School of Nursing)?**

No

**Do these changes impact the Smart Planner roadmap?**

No

**Catalog Description:****Units required for Major: 73-85, includes units of study in chosen concentration (see below).****Total units required for BS: 120****Program Description**

The concentration in Ecology, Evolution, and Conservation is designed for students interested in wildlife management, conservation biology, or pursuing graduate study in ecological and evolutionary approaches in the Biological Sciences. By choosing the concentration, students get necessary training for a career working with local, state, or federal agencies as a biologist or environmental scientist. It will also prepare students for graduate study in the Biological Sciences.

As defined by policy <http://www.csus.edu/umannual/acadaff/fsm00010.htm>, a change in units constitutes a substantive change to the program. If your changes constitute a substantive change, please refer back to the "Program Change Type" field above to ensure that "Substantive" is selected.

**Program Requirements: (If new courses are being created as part of a new program, it will be useful to propose courses first.)****Program Requirements**

Code	Title	Units
<b>Required Lower Division Core Courses (37-41 Units)</b>		
BIO 1	Biodiversity, Evolution and Ecology <sup>1</sup>	5
BIO 2	Cells, Molecules and Genes	5
CHEM 1A	General Chemistry I <sup>1</sup>	5
CHEM 1B	General Chemistry II	5
Select one of the following:		3 - 6
CHEM 20	Organic Chemistry Lecture–Brief Course <sup>2</sup>	

CHEM 24 & CHEM 124	Organic Chemistry Lecture I Organic Chemistry Lecture II	
Select one of the following:		3 - 4
MATH 26A	Calculus I for the Social and Life Sciences	
MATH 30	Calculus I	
PHYS 5A	General Physics: Mechanics, Heat, Sound	4
PHYS 5B	General Physics: Light, Electricity and Magnetism, Modern Physics	4
STAT 1	Introduction to Statistics <sup>1</sup>	3
<b>Required Upper Division Core Courses (7 Units)</b>		
BIO 100	Introduction to Scientific Analysis	3
BIO 184	General Genetics	4
<b>Concentration (29-37 Units)</b>		
Select from the following concentrations:		29 - 37
General Biology		
Biomedical Sciences		
Cell and Molecular Biology		
Clinical Laboratory Sciences		
Ecology, Evolution, and Conservation		
Forensic Biology		
Microbiology		
<b>Total Units</b>		<b>73-85</b>

<sup>1</sup> Course also satisfies General Education (GE)/Graduation Requirement.

<sup>2</sup> CHEM 24 and CHEM 124 may be taken in lieu of CHEM 20. (CHEM 124 is not counted toward the 36 upper division unit requirement in the major except in the Biomedical Sciences Concentration.)

**Notes:**

- Pre-Health Professional students should take the Chemistry and Math requirements as stated in the Pre-Health Professional Program section of this catalog.
- With approval, up to six units of upper division coursework from related fields may be applied as electives in the major.

Concentration in Ecology, Evolution, and Conservation (29 units)

Code	Title	Units
<b>Required Courses (14 Units)</b>		
BIO 160	General Ecology	3
BIO 167	Quantitative Methods in Biology	3
BIO 178	Molecular Ecology	4
BIO/ENVS 186B	Ecological and Environmental Issues Seminar	1
BIO 188	Evolution	3
<b>Elective Courses (15 Units)</b>		
Select one of the following Structure and Function electives:		3
BIO 104	Physiology of Human Reproduction	
BIO 122	Advanced Human Anatomy	
BIO 123	Neuroanatomy	
BIO 126	Comparative Vertebrate Morphology	
BIO 127	Developmental Biology	
BIO 128	Plant Anatomy and Physiology	
BIO 130	Histology	
BIO 131	Systemic Physiology	
BIO 132	Neurophysiology	
BIO 133	Cardiovascular, Respiratory and Renal Physiology	
Select three of the following Ecology, Evolution, and Biodiversity electives: <sup>1</sup>		9
<i>Part A: Biodiversity Electives</i>		
BIO 103	Plants and Civilization	
BIO 112	Plant Taxonomy	
BIO 145	The Diversity of Microorganisms	
BIO 152	Human Parasitology	
BIO 157	General Entomology	

BIO 162	Ichthyology: The Study of Fishes	
BIO 164	Amphibians and Reptiles: An Introduction to Herpetology	
BIO 166	Ornithology	
BIO 168	Mammalogy	
<i>Part B: Ecology and Evolution Electives</i>		
BIO 113	Evolution and Speciation in Flowering Plants	
BIO 118	Natural Resource Conservation	
BIO 169	Animal Behavior	
BIO 173	Principles of Fisheries Biology	
BIO 179	Conservation Biology & Wildlife Management	
Select additional upper division elective courses in consultation with an advisor to total 15 upper division elective units		3

**Total Units** **29**

<sup>1</sup> At least one course must be from Part A and one course from Part B (each course must be a minimum of 3 units).

- No more than 3 units from the following combined can be applied to the Biological Sciences upper division major requirement. No more than 2 units from BIO 195 and 197 series courses may count toward this requirement.

Code	Title	Units
BIO 195	Biological Internship	1 - 2
BIO 197A	Laboratory Teaching Assistant	1 - 2
BIO 197B	Laboratory Techniques	1 - 2
BIO 197C	Co-curricular Activities in Biology	1 - 2
BIO 199A	Introductory Undergraduate Research	1 - 2
BIO 199B	Directed Readings	1 - 2

## General Education Requirements <sup>1</sup>

Code	Title	Units
<b>Area A: Basic Subjects (9 Units)</b>		
A1	Oral Communication	3
A2	Written Communication	3
A3	Critical Thinking	3
<b>Area B: Physical Universe and Its Life Forms (3 Units)</b>		
B1	Physical Science <sup>2</sup>	0
B2	Life Forms <sup>2</sup>	0
B3	Lab (Note: Lab experience to be taken with one of the following: B1, B2 or B5) <sup>2</sup>	0
B4	Math Concepts <sup>2</sup>	0
B5	Additional Course (Any B to reach 12 units) - Take upper-division course to complete Area & upper division requirements.	3
<b>Area C: Arts and Humanities (12 Units)</b>		
C1	Arts	3
C2	Humanities	3
C1/C2	Area C Course	3
C1/C2	Area C Course - Take upper-division course to complete Area & upper division requirements.	3
<b>Area D: The Individual and Society (9 Units)</b>		
Area D	Course	3
Area D	Course	3
Area D	Course - Take upper-division course to complete Area & upper division requirements.	3
<b>Area E: Understanding Personal Development (3 Units)</b>		
Area E	Course	3
<b>Area F: Ethnic Studies (3 Units)</b>		
Area F	Course	3
<b>Total Units</b>		<b>39</b>

<sup>1</sup> To help you complete your degree in a timely manner and not take more units than absolutely necessary, there are ways to use single courses to meet more than one requirement (overlap). For further information, please visit the General Education page (<http://catalog.csus.edu/colleges/academic-affairs/general-education/>).

**Note:** There is no way to list all possible overlaps so please consult with a professional advisor. The Academic Advising Center can be visited online (<http://www.csus.edu/acad/>), by phone (916) 278-1000, or email ([advising@csus.edu](mailto:advising@csus.edu)).

<sup>2</sup> Required in Major; also satisfies GE.

**Graduation Requirements**<sup>1</sup>

Code	Title	Units
<b>Graduation Requirements (required by CSU) (9 Units)</b>		
	American Institutions: U.S. History	3
	American Institutions: U.S. Constitution & CA Government	3
	Writing Intensive (WI)	3
<b>Graduation Requirements (required by Sacramento State) (12 Units)</b>		
	English Composition II	3
	Race and Ethnicity in American Society (RE)	3
	Foreign Language Proficiency Requirement <sup>2</sup>	6

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<sup>2</sup> If not satisfied before entering Sacramento State, it may be satisfied in General Education Area C2 (Humanities). "C- or better required." The alternative methods for satisfying the Foreign Language Proficiency Requirement are described here: <https://www.csus.edu/college/arts-letters/world-languages-literatures/foreign-language-requirement.html> (<https://www.csus.edu/college/arts-letters/world-languages-literatures/foreign-language-requirement.html>)

**Fiscal Impact to Change an Existing Program**

**Indicate programmatic or fiscal impact which this change will have on other academic units' programs, and describe the consultation that has occurred with affected units:**

None, this just eliminates the pre-major designation. All courses stay the same.

**Provide a fiscal analysis of the proposed changes:**

None

**How will the above changes be accommodated within the department/College existing fiscal resources?**

None

**Will the proposed changes require additional resources?**

No

**What additional space, equipment, operating expenses, library, computer, or media resources, clerical/technical support, or other resources will be needed?**

None

**Estimate the cost and indicate how these resource needs will be accommodated:**

None

Key: 289