

# Biology/Education, B.S.

Majors in Biology/Education earn their bachelor's degree concurrently with a California Preliminary Single Subject Teaching Credential. Individuals who hold this credential are authorized to teach biology and general science in a middle school or high school.

**All students must meet the University Requirements** (<http://catalogue.uci.edu/informationforadmittedstudents/requirementsforabachelorsdegree/>).

**All students must meet the School Requirements** (<http://catalogue.uci.edu/schoolofbiologicalsciences/#schoolrequirementstext>).

School requirement variation: BIO SCI 100, CHEM 51C, and CHEM 51LC are not required of Biology/Education majors.

## Major Requirements for the B.S. in Biology/Education

### A. Required Major Courses:

Select three of the following:

BIO SCI D103	Cell Biology
BIO SCI D104	Developmental Biology
BIO SCI D105	Cell, Developmental, and Molecular Biology of Plants
BIO SCI E106	Processes in Ecology and Evolution
BIO SCI E109	Human Physiology
BIO SCI N110	Neurobiology and Behavior

### B. Upper-Division Laboratories:

Select two of the following:

BIO SCI D111L	Developmental and Cell Biology Laboratory
BIO SCI E106L	Habitats and Organisms
BIO SCI E112L	Physiology Laboratory
BIO SCI E115L	Evolution Laboratory
BIO SCI E131L	Image Analysis in Biological Research
BIO SCI E140L	Evolution and the Environment Laboratory
BIO SCI E160L	Biology of Birds Lab
BIO SCI E166L	Field Biology
BIO SCI E179L	Field Freshwater Ecology
BIO SCI M114L	Biochemistry Laboratory
BIO SCI M116L	Molecular Biology Laboratory
BIO SCI M118L	Experimental Microbiology Laboratory
BIO SCI M121L	Advanced Immunology Laboratory
BIO SCI M130L	Advanced Molecular Lab Techniques
BIO SCI N113L	Neurobiology Laboratory

One laboratory can be satisfied with completion of Excellence in Research in the Biological Sciences.

### C. Upper-Division Biology Electives:

Select two, four-unit courses from the following:

BIO SCI D103–D190, E106–E190, M114–M190, N110–N190 <sup>1</sup>	
PHRMSCI 170A	Molecular Pharmacology I
PHRMSCI 170B	Molecular Pharmacology II
PHRMSCI 171	Physical Biochemistry
PHRMSCI 173	Pharmacotherapy
PHRMSCI 174	Biopharmaceutics and Nanomedicine
CHEM 177	Medicinal Chemistry

The following courses can be used to partially satisfy the Upper-Division Biology Elective Requirement:

PHYSICS 147B      Techniques in Medical Imaging I: X-ray, Nuclear, and NMR Imaging

Additionally, Psychology/Biological Sciences double majors may also use PSYCH 112A-PSYCH 112C to partially satisfy the Upper-Division Biology Elective Requirement.

### D. Science Teaching Courses:

BIO SCI 14	California Teach 1: Introduction to Science and Mathematics Teaching
BIO SCI 101	California Teach 2: Middle School Science and Mathematics Teaching

BIO SCI 108	Research Methods
EDUC 55	Knowing and Learning in Mathematics and Science
EDUC 109	Reading and Writing in Mathematics and Science
EDUC 143AW	Classroom Interactions I
EDUC 143BW	Classroom Interactions II
EDUC 148	Complex Pedagogical Design
EDUC 158	Student Teaching Mathematics and Science in Middle/High School (two quarters)
LPS/HISTORY 60	The Making of Modern Science

<sup>1</sup> BIO SCI D103, BIO SCI D104, BIO SCI D105, BIO SCI E106, BIO SCI E109, BIO SCI N110 may not be used to satisfy more than one requirement.

NOTE: Double majors within the School of Biological Sciences or with Public Health Sciences, Biomedical Engineering: Premedical, Nursing Science, or Pharmaceutical Sciences are not permitted.

### Requirements for the Teaching Credential

BIO SCI 14	California Teach 1: Introduction to Science and Mathematics Teaching
BIO SCI 101	California Teach 2: Middle School Science and Mathematics Teaching
BIO SCI 108	Research Methods
EDUC 55	Knowing and Learning in Mathematics and Science
EDUC 109	Reading and Writing in Mathematics and Science
EDUC 143AW	Classroom Interactions I
EDUC 143BW	Classroom Interactions II
EDUC 148	Complex Pedagogical Design
EDUC 158	Student Teaching Mathematics and Science in Middle/High School (two quarters)
LPS 60	The Making of Modern Science

Beyond course work, some additional requirements for teacher certification are described below. With careful, early planning, it is possible for students to complete their bachelor's degree and teacher certification in four years. This is a more time-efficient and cost-effective route than the traditional five-year teacher preparation model, which usually involves a full academic year of teacher education courses and clinical teaching experience after completion of a bachelor's degree.

After the School of Biological Sciences verifies the completion of all requirements for the bachelor's degree, students are awarded their degree from UC Irvine. By contrast, the Preliminary Single Subject Teaching Credential is awarded by the California Commission on Teacher Credentialing (CTC) upon completion of a bachelor's degree and the state-approved UCI teacher education program, which combines course work, student teaching, and a teaching performance assessment. The UCI School of Education must verify completion of all requirements for the teaching credential and then recommend that the credential be awarded to a candidate by the CTC.

**Additional Requirements for Teacher Certification.** In addition to the required course work for a California Preliminary Single Subject Teaching Credential, some additional requirements must be satisfied:

1. The School of Biological Sciences requires a *cumulative* GPA of 2.0 (C) to graduate with the bachelor's degree.

BIO SCI 101	California Teach 2: Middle School Science and Mathematics Teaching
EDUC 55	Knowing and Learning in Mathematics and Science
EDUC 109	Reading and Writing in Mathematics and Science
EDUC 143AW	Classroom Interactions I
EDUC 143BW	Classroom Interactions II
EDUC 148	Complex Pedagogical Design
EDUC 158	Student Teaching Mathematics and Science in Middle/High School

- a. However, students must earn a grade of *C or better* in the following courses in order to be recommended for the Preliminary Single Subject Credential:
- b. In the final phase of teaching preparation, students enrolled in EDUC 158 gain teaching experience as a "student teacher" at a local middle school or high school, while also attending a weekly student teaching seminar at UCI. Each student teacher is paired with a highly qualified science teacher who acts as a mentor while the student teacher gradually takes on full responsibility for daily lesson planning, instruction, and assessment. Cal Teach program instructors select the mentor teachers and match them with student teachers. During the winter and spring

quarters when students are enrolled in EDUC 158, they should expect to spend a minimum of four hours per day (typically mornings), five days per week, in their student teaching assignment at a middle school or high school.

2. The following must be completed and verified prior to the start of student teaching in EDUC 158:

- a. Pass the California Basic Education Skills Test (CBEST), a basic mathematics and literacy skills test. For more information, see [http://www.ctcexams.nesinc.com/PageView.aspx?f=GEN\\_Tests.html](http://www.ctcexams.nesinc.com/PageView.aspx?f=GEN_Tests.html).
- b. Pass the California Subject Exam for Teachers (CSET) in science: biology/life science. Although secondary teachers are only required to pass the CSET exam in one discipline, those who pass the CSET exam in more than one disciplinary field (e.g. biology/life science and chemistry) can be authorized to teach classes in each of those disciplines. For more information about the CSET exam, see [http://www.ctcexams.nesinc.com/PageView.aspx?f=GEN\\_Tests.html](http://www.ctcexams.nesinc.com/PageView.aspx?f=GEN_Tests.html).
- c. Secondary school science teachers in California are expected to have a broad range of general science knowledge in addition to their discipline of specialization, because their Single Subject Teaching Credential in one of the sciences also authorizes them to teach classes in general or integrated science. The general science subtests of the CSET exam cover foundational topics in astronomy, geodynamics, Earth resources, ecology, genetics and evolution, molecular biology and biochemistry, cellular and organismal biology, waves, forces and motion, electricity and magnetism, heat transfer and thermodynamics, and structure and properties of matter. Although students can prepare for the CSET exam's general science subtests through independent study, Biological Sciences students can also prepare by taking lower-division courses that cover the content. Here are some suggested courses for Biology/Education majors:

EARTHSS 1	Introduction to Earth System Science
EARTHSS 7	Physical Geology
PHYSICS 20A	Introduction to Astronomy

- d. Obtain a Certificate of Clearance from the State of California.
- e. Obtain a TB test with negative results.
- f. Demonstrate readiness for student teaching responsibilities as evidenced in course work and satisfactory observations of a candidate during the following required courses:

BIO SCI 101	California Teach 2: Middle School Science and Mathematics Teaching
EDUC 143AW	Classroom Interactions I
EDUC 148	Complex Pedagogical Design

3. The following must be completed and verified before the School of Education is able to recommend an individual for the Preliminary Single Subject Credential:

- a. Pass a state-approved teacher performance assessment, which is completed concurrently with student teaching in EDUC 158.
- b. Complete a college-level course or pass an examination on the U.S. Constitution. POL SCI 21A satisfies this requirement. Contact the UCI School of Education Student Affairs Office for information about the exam.
- c. Obtain a CPR certificate in adult, child, or infant training.

**Declaring Intention to Complete the Biology/Education Major and Teacher Certification.** Prospective teachers who want to complete their degree and a teaching credential in four years are encouraged to start planning early by reviewing the sample program for the Biology/Education major, and consulting with an academic counselor. Interested students are encouraged to get started on the suggested first- and second-year credentialing course work, including BIO SCI 14 and BIO SCI 101, and can do so without officially declaring their intention to complete the credential. However, students must declare their intention to complete requirements for the Biology/Education major and requirements for the Preliminary Single Subject Teaching Credential prior to enrolling in EDUC 55, which they would typically take in fall of their third year. Forms for declaring an intention to complete the teaching credential are available in the Biological Sciences Student Affairs Office or in the Cal Teach Science and Mathematics Resource and Advising Center (137 Biological Sciences Administration).

<b>Freshman</b>		
<b>Fall</b>	<b>Winter</b>	<b>Spring</b>
BIO SCI 93	BIO SCI 94	MATH 5A
CHEM 1A	CHEM 1B	CHEM 1C- 1LC
Lower-Division Writing <sup>1</sup>	Lower-Division Writing <sup>1</sup>	Lower-Division Writing <sup>1</sup>
BIO SCI 2A		BIO SCI 14
<b>Sophomore</b>		
<b>Fall</b>	<b>Winter</b>	<b>Spring</b>
BIO SCI 97	BIO SCI 98	BIO SCI 99
CHEM 51A	CHEM 51B- 51LB	HISTORY 60
BIO SCI 101	BIO SCI 108	MATH 5B
CHEM 1LD		
<b>Junior</b>		
<b>Fall</b>	<b>Winter</b>	<b>Spring</b>
Bio. Required Major course	Bio. Required Major course	Bio. Required Major course
PHYSICS 3A	PHYSICS 3B- 3LB	PHYSICS 3C- 3LC

EDUC 55	EDUC 143AW	EDUC 148
STATS 8	General Education	
<b>Senior</b>		
<b>Fall</b>	<b>Winter</b>	<b>Spring</b>
Bio. Sci. U-D elective	Bio. Sci. U-D elective	Bio. Sci. U-D lab
Bio. Sci. U-D lab	EDUC 158	EDUC 158
EDUC 143BW	EDUC 109	General Education
General Education	General Education	

<sup>1</sup> Students have the option of taking HUMAN 1AS, HUMAN 1BS, HUMAN 1CS or WRITING 39A, WRITING 39B, WRITING 39C in order to fulfill the lower-division writing requirement.