

BIOLOGY

Bachelor of Science degree with a major in Biology

Emphases include:
Cellular/molecular biology
Ecology
Environmental biology
General biology
Marine biology
Microbiology
Special major

Minor in Biology

Science Teaching Credential

Master of Arts degree with a major in Biology

College Faculty Preparation Program: Biology

Department Chair

Casey Lu, Ph.D.

Department of Biological Sciences

Science Complex B 221
(707) 826-3245
www.humboldt.edu/~biosci

The Program

Humboldt offers diverse facilities, including a well equipped biotechnology laboratory and the largest greenhouse in the California State University system. Near the campus are many parks, forests, and undisturbed habitats for studying plants and animals in their natural surroundings.

Students also use a vertebrate museum, containing bones and skins of animals, and a large invertebrate museum. Scanning and transmission electron microscopes are available for student use.

Humboldt's marine laboratory, located on the coast in the nearby town of Trinidad, gives students splendid opportunities for marine biology projects. The research vessel, the *Coral Sea*, is used for seagoing field trips. Several smaller boats are used in nearshore waters, coastal lagoons, and Humboldt Bay.

Biologists have many job opportunities: teacher, biological technician, food and drug specialist, museum curator, science librarian, clinical lab technologist, agricultural inspector, industrial hygienist, pest control technician, chemical analyst, laboratory technician, public health microbiologist, field biologist, marine biologist.

Preparation

In high school take biology, chemistry, and physics (with labs, if possible); beginning and intermediate algebra; geometry; and trigonometry.

REQUIREMENTS

Students who receive a grade below a C- in any prerequisite course will require instructor approval for enrollment.

REQUIREMENTS FOR THE MAJOR

Cellular/molecular Biology Emphasis

Lower Division

BIOL 105 Principles of Biology
BIOM 109 Introductory Biometrics
BOT 105 General Botany
CHEM 109/110 General Chemistry
MATH 105 Calculus for the
Biological Sciences &
Natural Resources*
PHYX 106/107 College Physics
ZOO 210 Principles of Zoology

Take all lower division courses before beginning upper division work.

Upper Division

BIOL 340 Genetics
BIOL 410 Cell Biology
BIOL 412 General Bacteriology
BIOL 440 Genetics Lab
BOT 310 General Plant Physiology **or**
ZOO 310 Animal Physiology
CHEM 328 Brief Organic Chemistry **or**
CHEM 321/322 Organic Chemistry
CHEM 438 Introductory Biochemistry **or**
CHEM 431/432 Biochemistry
BIOL 490 Senior Thesis **or**
BIOL 499 Directed Study

Ecology Emphasis

Lower Division

BIOL 105 Principles of Biology
BOT 105 General Botany
ZOO 210 Principles of Zoology
CHEM 109 General Chemistry
PHYX 106 College Physics:
Mechanics & Heat
PHYX 118 College Physics:
Biological Applications

MATH 105 Calculus for Biological
Sciences & Natural
Resources*
BIOM 109 Introductory Biometrics

One course from the following:
GEOL 109 General Geology
OCN 109 General Oceanography
FISH 320 Limnology
SOIL 260 Introduction to Soil Science
GEOG 106 Physical Geography

Upper Division

CHEM 328 Brief Organic Chemistry
BIOL 340 Genetics **or**
BIOL 345 Genetics with Population
Emphasis
BIOL 445 Evolution
BIOL 330 Principles of Ecology
BIOL 431 Population Ecology **or**
WLDF 478 Ecology of Wildlife
Populations

BIOL 432 Community Ecology
BIOM 333 Intermediate Statistics **or**
BIOM 408 Experimental Design and
ANOVA
BIOL 438 Field Ecology **or**
BIOL 490 Senior Thesis

One course from the following:
ZOO 310 General Animal Physiology
BOT 310 General Plant Physiology

Two courses from the following:
ZOO 314 Invertebrate Zoology
ZOO 316 Freshwater Invertebrates
ZOO 352 Natural History of the
Vertebrates
ZOO 358 General Entomology
FISH 310 Ichthyology
ZOO 354 Herpetology
WLDF 365 Ornithology I
ZOO 356 Mammalogy
ZOO 556 Marine Mammalogy
BOT 350 Plant taxonomy
BOT 354 Agrostology
BOT 355 Lichens and Bryophytes
BOT 353 Phycology
BOT 359 Biology of Ascomycetes
and Basidiomycetes
BOT 358 Biology of Microfungi
BIOL 412 General Bacteriology

Upper Division Electives:

At least two upper division courses in the ecological or biological sciences to be chosen in consultation with advisor. Courses taken to satisfy this requirement should be chosen

to provide subject breadth, rather than a particular focus of study.

HSU offers a diverse array of ecology courses in a number of departments (Biology, Botany, Zoology, Fisheries, Oceanography, Wildlife, Forestry, Geology). Some of these ecology courses are habitat focused (i.e. marine, freshwater, desert, forest), or they may be focused on particular organisms (plants, insects, microorganisms, invertebrates, etc.). **Courses chosen to satisfy this requirement must be approved by an Ecology advisor.**

Environmental Biology Emphasis

Lower Division

BIOL 105	Principles of Biology
BIOM 109	Introductory Biometrics
BOT 105	General Botany
CHEM 109	General Chemistry
CHEM 110	General Chemistry
MATH 105	Calculus for the Biological Sciences & Natural Resources*
PHYX 106	College Physics: Mechanics & Heat
PHYX 118	College Physics: Biological Applications
ZOOL 210	Principles of Zoology

Take all lower division courses before beginning upper division work.

Upper Division

BIOL 330	Principles of Ecology
BIOL 340	Genetics or
BIOL 345	Genetics with Population Emphasis
BIOL 410	Cell Biology or
BOT 310	General Plant Physiology or
CHEM 328	Brief Organic Chemistry or
ZOOL 310	Animal Physiology

Two courses in plant groups from:

BOT 350	Plant Taxonomy
BOT 353	Phycology
BOT 354	Agrostology
BOT 355	Lichens & Bryophytes
BOT 359	Biology of the Ascomycetes & Basidiomycetes
BOT 360/360L	Biology of the Fleshy Fungi/Lab

Two courses in animal groups from:

FISH 310	Ichthyology
WLDF 365	Ornithology I
ZOOL 314	Invertebrate Zoology
ZOOL 316	Freshwater Aquatic Invertebrates
ZOOL 352	Natural History of the Vertebrates
ZOOL 354	Herpetology

ZOOL 356	Mammalogy
ZOOL 358	General Entomology
ZOOL 556	Marine Mammals

One anatomy/morphology course from:

BOT 321	Developmental Plant Anatomy
BOT 372	Evolutionary Morphology of Plants
ZOOL 370	Comparative Anatomy of the Vertebrates
ZOOL 374	Introduction to Human Anatomy

Two practical applications courses from:

BIOL 412	General Bacteriology
BOT 394	Forest Pathology
BOT 458	Pollination Biology
BOT 553	Marine Macrophyte Ecology
NRPI 360	Natural Resource Planning Methods
REC 330	Outdoor Education
SOC 320	Social Ecology
SOIL 260	Introduction to Soil Science
WLDF 460	Conservation Biology
ZOOL 430	Comparative Animal Behavior
ZOOL 452	Parasitology

Or other courses selected in consultation with an advisor

One unit from:

BIOL 490	Senior Thesis or
BIOL 499	Directed Study

General Biology Emphasis

Lower Division

BIOL 105	Principles of Biology
BIOM 109	Introductory Biometrics
BOT 105	General Botany
CHEM 109	General Chemistry
MATH 105	Calculus for the Biological Sciences & Natural Resources*
PHYX 106	College Physics: Mechanics & Heat
PHYX 118	College Physics: Biological Applications
ZOOL 210	Principles of Zoology

Take all lower division courses before beginning upper division work.

Upper Division

BIOL 330	Principles of Ecology
BIOL 412	General Bacteriology
BIOL 340	Genetics or
BIOL 345	Genetics with Population Emphasis
BIOL 410	Cell Biology or
BOT 310	General Plant Physiology or
ZOOL 310	Animal Physiology

CHEM 321/322	Organic Chemistry or
CHEM 328	Brief Organic Chemistry

At least 15 additional units of upper division courses in biological sciences, chosen in consultation with an academic advisor.

Marine Biology Emphasis

BIOL 105	Principles of Biology
BIOM 109	Introductory Biometrics
BOT 105	General Botany
CHEM 109	General Chemistry
OCN 109	General Oceanography
MATH 105	Calculus for the Biological Sciences & Natural Resources*
PHYX 106	College Physics: Mechanics & Heat
PHYX 118	College Physics: Biological Applications
ZOOL 210	Principles of Zoology

Take all lower division courses before beginning upper division work.

Upper Division

BIOL 330	Principles of Ecology
BIOL 340	Genetics
BIOL 412	General Bacteriology
BIOL 430	Intertidal Ecology
BOT 353	Phycology
CHEM 328	Brief Organic Chemistry
ZOOL 314	Invertebrate Zoology
BIOL 410	Cell Biology or
BOT 310	General Plant Physiology or
ZOOL 310	Animal Physiology

▪ An additional course in vertebrate zoology **or** ZOOL 430 Comparative Animal Behavior, chosen in consultation with an advisor

One unit from:

BIOL 490	Senior Thesis or
BIOL 499	Directed Study

Microbiology Emphasis

Lower Division

BIOL 105	Principles of Biology
BIOM 109	Introductory Biometrics
BOT 105	General Botany
CHEM 109/110	General Chemistry
MATH 105	Calculus for the Biological Sciences & Natural Resources*
PHYX 106	College Physics: Mechanics & Heat
PHYX 118	College Physics: Biological Applications
ZOOL 210	Principles of Zoology

Take all lower division courses before beginning upper division work.

Upper Division

BIOL 330	Principles of Ecology
BIOL 340	Genetics
BIOL 412	General Bacteriology
BIOL 433	Microbial Ecology
BIOL 440	Genetics Laboratory
BIOL 445	Evolution
BOT 358	Biology of the Microfungi
CHEM 328	Brief Organic Chemistry
CHEM 431/432	Biochemistry or
CHEM 438	Introductory Biochemistry
BIOL 410	Cell Biology or
BOT 310	General Plant Physiology or
ZOOL 310	Animal Physiology
BIOL 490	Senior Thesis or
BIOL 499	Directed Study

Special Major Emphasis

Lower Division

BIOL 105	Principles of Biology
BIOM 109	Introductory Biometrics
BOT 105	General Botany
CHEM 109	General Chemistry
MATH 105	Calculus for the Biological Sciences & Natural Resources*
PHYX 106	College Physics: Mechanics & Heat
PHYX 118	College Physics: Biological Applications
ZOOL 210	Principles of Zoology

Take all lower division courses before beginning upper division work.

Upper Division

Three required courses:

CHEM 328	Brief Organic Chemistry
BIOL 330	Principles of Ecology
BIOL 340	Genetics

One of the following:

BIOL 410	Cell Biology or
BOT 310	General Plant Physiology or
ZOOL 310	Animal Physiology

Plus additional courses (chosen in consultation with an advisor) meeting the needs of the student which bring the total to at least 30 units in upper division biological sciences.

REQUIREMENTS FOR THE MINOR

BIOL 105	Principles of Biology
BOT 105	General Botany
ZOOL 110	General Zoology or
ZOOL 210	Principles of Zoology

One of the following:

BIOL 410	Cell Biology or
BOT 310	General Plant Physiology or
ZOOL 310	Animal Physiology

An additional eight upper division units (approved by the minor advisor) in at least two of these three areas: biology, botany, zoology.

SCIENCE (BIOLOGY) TEACHING CREDENTIAL

(See Science Education)

REQUIREMENTS FOR THE MASTER'S DEGREE

Requirements For Admission

- Bachelor's degree in biology, botany, zoology, or a related subject area approved by the Department of Biological Sciences
- Undergraduate GPA at least 2.5 overall or 3.0 for the last 60 semester units of credit
- Submitted results of the aptitude portion of the Graduate Record Examination (GRE)

Requirements For The Degree

- 30 upper division or graduate units in biological sciences or supporting courses approved by the graduate committee, including BIOL 683 and 684 (normally taken at the first opportunity) and two seminars (BIOL 685). A minimum of 18 units must be at the graduate level.
- Combined total of not less than four nor more than eight units of BIOL 690 and/or 699 (with a maximum of six units in 690) and a thesis approved by the graduate committee
- While in residence, enrollment in a minimum of two units per semester of BIOL 690 or 699
- Oral presentation of the thesis work and defense of the thesis before the graduate committee

COLLEGE FACULTY PREPARATION PROGRAM

A Graduate Certificate in College Teaching: Biology

This discipline-specific program is designed to better prepare the graduate student interested in a teaching career at the community college or university level. **Participation requires completion of, or current enrollment in, the biology master's program.**

The certificate consists of five components (12 units), described below. After consulting with your graduate advisor, and under the advisement of the College Faculty Preparation Program coordinator, develop a plan of study tailored to meet your specific timelines and professional goals. The CFPP coordinator and the dean for Research and Graduate Studies must approve each plan of study.

Notation of certificate completion will appear on your official university transcript.

1) Discipline-Specific Teaching Methods

Introduces undergraduate biology teaching through a practical presentation of the processes and issues involved in laboratory instruction. Three units, taken first or second semester of the MA program:

Biol 597	Methods of Laboratory Instruction and
Biol 683	Introduction to Graduate Studies

2) Higher Education Teaching Methods

Guidance in the skills and knowledge relevant to teaching in higher education. Three units, taken first or second semester of the MA program:

EDUC 583	Teaching in Higher Education
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Certificate requirements #3 & #4 come after completion of #1 (Discipline-Specific Teaching Methods) and after or concurrent with #2 (Higher Education Teaching Methods).

3) Professional Development Seminar

Explore the nature and philosophy of post-secondary institutions and their roles and functions in higher education. One unit, concurrent with the fourth requirement, which follows.

SP 684	Orientation to Higher Education
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* A full year of calculus (MATH 109 & 110) may substitute for MATH 105.

4) Mentored Teaching Internship Experience

One of the following tracks:

- **Community College Track**

Three units of a mentored teaching experience at College of the Redwoods.

SP 683 College Faculty
 Preparation Internship

(Note: Students successfully completing this course may apply in later semesters for a paid CR Faculty Internship if positions are available.)

OR

- **Pre-doctoral College Track**

Three units of mentored teaching experience at HSU.

BIOL 700 In-Service Professional
 Training in Biology

5) Capstone Experience

Guidance in developing a professional teaching portfolio and job-search support materials. Two units, taken after all previous components have been completed.

SP 685 Instructional Resources for
 Higher Education

