

**EXECUTIVE COMMITTEE
COLLEGE OF NATURAL AND AGRICULTURAL SCIENCE**

**REPORT TO RIVERSIDE DIVISION
MAY 23, 2017**

To be adopted:

Proposed changes to the undergraduate major requirements in Environmental Sciences

PRESENT:

Major Requirements

Major

The Department of Environmental Sciences offers B.A. and B.S. degrees in Environmental Sciences. Students can choose to concentrate their studies in one of ~~three~~ options: Natural Science, ~~Social Science~~, or Environmental Toxicology.

The necessity of maintaining an acceptable level of environmental quality is placing increasing demands upon governments and industries locally, nationally, and worldwide. To help meet those demands, the Environmental Sciences program is designed to provide training for students intending to enter environmental professions or for students preparing for graduate study in law, research, or teaching in a capacity that utilizes a background in the science of the human environment.

The structure of the Environmental Sciences curriculum provides a broad scope of instruction that enables students to explore the various disciplines and professions involved with solving environmental problems as well as opportunities for students to focus their training in accordance with their own educational and career objectives. All students majoring in Environmental Sciences must complete a set of “core requirements” consisting of courses that provide a basic understanding of the physical, biological, and social sciences and their application to the analysis of environmental processes and issues. In addition to the core requirements, students must complete the required courses and an appropriate number of elective courses as designated in the option they select. Students are not expected to select an option during the freshman year so that they can be introduced to dimensions of the environmental sciences about which they may have no previous knowledge. Those wishing to change their selection of an option may do so at any time as

PROPOSED:

Major Requirements

Major

The Department of Environmental Sciences offers B.A. and B.S. degrees in Environmental Sciences. Students can choose to concentrate their studies in one of ~~two~~ options: Natural Science and Environmental Toxicology.

No Change

long as they are able to complete the requirements for the bachelor's degree within the 216-unit limit specified by the College of Natural and Agricultural Sciences.

Environmental Internship Program

The Environmental Internship Program offers students opportunities to work with government agencies, private firms, and nonprofit organizations involved in environmental affairs. As excursions into professional life, internships provide "hands-on" experience in applying the principles presented in courses. Beyond the highly specialized training associated with on-the-job activities, students can gain insights into their aptitudes, aspirations and work habits that enable them to clarify their academic and career objectives. Professional acquaintances established during internships can continue to serve as important contacts for students after the internship is completed.

Although most internships are part-time (12–15 hours per week) positions in the Riverside area, organizations that host student interns are located throughout the United States and in Washington, D.C. Students working as interns may receive stipends, hourly wages, or serve as volunteers, depending upon the specific appointment. Up to 16 units of credit toward the bachelor's degree may be earned by developing an academic component of the internship in consultation with a faculty supervisor and enrolling in ENSC 198-I.

Undergraduate Research

Students interested in enhancing the status of knowledge about environmental processes or seeking new solutions to environmental problems may gain training and experience as part-time employees in the department's research laboratories and other research facilities, such as the Air Pollution Research Center and the U.S. Department of Agriculture Soil and Water Research Service, located on campus. Those wishing to conduct their own research under faculty supervision may earn academic credit by enrolling in ENSC 197. Expenses for both laboratory and field experiments are eligible for funding by the campus mini-grant program which supports undergraduate research and creative activity.

Environmental Internship Program

No Change

Undergraduate Research

No Change

Environmental Toxicology Option

As a curriculum that emphasizes the chemistry and biochemistry of toxic substances in the environment, this option prepares students for careers dealing with the control of toxics in the environmental media of air, water, soil, and ecosystems and in such related fields as public health and industrial hygiene. Qualified students completing this option may enter UCR's graduate program in Environmental Toxicology without significant deficiencies in their undergraduate curriculum.

Natural Science Option

As a general curriculum emphasizing the natural sciences, this option is suitable for students wishing to maintain a broad range of choices in technically oriented environmental professions such as air and water pollution control, hazardous materials management, public health, natural resource management, and environmental impact analysis. The Natural Science option is also appropriate as background for graduate study in such disciplines as ecology, forestry, air and water science, and environmental engineering. Students may earn either the B.A. or B.S. degree by completing the requirements specified by the College of Natural and Agricultural Sciences.

Social Science Option

~~The Social Science Option is not currently accepting new students. Students interested in social science aspects of environmental sciences are encouraged to contact the Vice Chair of the Department of Environmental Sciences or the CNAS Undergraduate Academic Advising Center for alternative programs of study.~~

California Teach-Science/Mathematics

Initiative (CaTEACH-SMI) California Teach-Science Mathematics Initiative (CaTEACH-SMI) has a goal of addressing the critical need of highly qualified K-12 science and mathematics teachers in California. With an economy increasingly reliant on science, technology, engineering, and mathematics (STEM) and the anticipated large scale retirement of qualified teachers, this is an essential time to explore and prepare for a career in teaching science or mathematics.

CaTEACH-SMI at UCR offers undergraduate

Environmental Toxicology Option

No Change

Natural Science Option

No Change

California Teach-Science/Mathematics

Initiative (CaTEACH-SMI)

No Change

students paid/unpaid opportunities, such as the SMI & Alpha Center Apprentice Program, to explore STEM teaching as a career option. Through CaTEACH-SMI, students receive advising and mentoring to prepare for entrance into an intern teaching credential program while diligently coordinating with academic advisors to ensure completion of STEM degree requirements. The CaTEACH-SMI Resource Center provides future STEM teachers with material and financial resources which includes the National Science Foundation (NSF) Noyce Scholarship Program, to promote planning and professional development towards a science/mathematics education career.

For more information about the CaTEACH-SMI program, please visit smi.ucr.edu, the Resource Center at 1315 Pierce Hall, or on Facebook at [facebook.com/ScienceMathInitiativeAtUcr](https://www.facebook.com/ScienceMathInitiativeAtUcr).

Transfer Selection Criteria

Applicants to majors in the College of Natural and Agricultural Sciences are selected on the basis of academic preparation, as assessed by their GPA and the strength of preparation for the intended major. A GPA of at least 2.70 is required. (This is a baseline GPA for consideration and not a guarantee of admission.)

In addition, applicants will need to complete college courses comparable to at least two of the following UCR year-long sequences in order to meet selection criteria for this major. Courses must be completed with “C” grades or better:

MATH 009A and MATH 009B (mandatory)

And at least one sequence from:

1. BIOL 005A/BIOL 05LA and BIOL 005B (and BIOL 005C, if articulated)
2. CHEM 001A, CHEM 01LA, CHEM 001B, CHEM 01LB, CHEM 001C, and CHEM 01LC
3. Organic chemistry (one-year lower-division), each course completed with a grade of “B” or better
4. PHYS 002A, PHYS 02LA, PHYS 002B, PHYS 02LB, PHYS 002C, and PHYS 02LC
5. PHYS 040A, PHYS 040B, and PHYS 040C
6. MATH 009C, MATH 010A, MATH 010B, and MATH 046

Transfer Selection Criteria

No Change

MATH 007A or MATH 009A; MATH 007B or MATH 009B (mandatory)

And at least one sequence from:

1. BIOL 005A/BIOL 05LA or BIOL 020 and BIOL 005B (and BIOL 005C, if articulated)
2. No Change
3. No Change
4. No Change
5. No Change
6. No Change

Courses must be completed with a letter grade, with no grade lower than a “C.” Students should visit assist.org for updated and comprehensive major preparation requirements.

University Requirements

See Undergraduate Studies section.

College Requirements

See College of Natural and Agricultural Sciences, Colleges and Programs section.

Some of the following requirements for the major may also fulfill some of the College’s breadth requirements. Consult with a department advisor for course planning.

Major Requirements

The major requirements for both the B.A. and the B.S. degrees in Environmental Sciences are as follows: Students must fulfill MATH 009A; MATH 009B; CHEM 001A, CHEM 001B, CHEM 001C; BIOL 002 or BIOL 005A; BIOL 003 or BIOL 005B; ENSC 001, ENSC 002, ENSC 006, or ENSC 143A, ENSC 100, ENSC 101, and ENSC 102 with a grade point average of 2.0 or better and no grade lower than a C-. If a grade lower than a C- is received in 2 or more core courses required for the major, either in separate courses or repetitions of the same course, the student may be discontinued from the major. Students must, under such circumstances, petition the department to remain in the major. Students are also required to choose one of the options and satisfactorily complete the option requirements. Students in Environmental Sciences are required to demonstrate adequate progress towards earning the degree. Adequate progress is defined as completion of MATH 009B prior to the beginning of the Winter Quarter of the second year of residence or Junior standing (>90 units) and at least one course from ENSC 100, ENSC 101, or ENSC 102 must be completed prior to the end of the third year of residence or senior standing (>135 units).

Note To gain maximum benefit from participating in the Undergraduate Research and Environmental Internship Programs, students intending to enroll in ENSC 197 and ENSC 198-I should contact their advisor during the quarter prior to enrollment in

No Change

University Requirements

No Change

College Requirements

No Change

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Note No Change

these courses.

Core Requirements

1. Lower-division requirements (41-42 units)
 - a) ENSC 001, ENSC 002
 - b) CHEM 001A, CHEM 001B, CHEM 001C, CHEM 01LA, CHEM 01LB, CHEM 01LC
 - c) MATH 009A, MATH 009B
 - d) POSC 010
2. Upper-division requirements (14 units): ENSC 100, ENSC 101, ENSC 102, ENSC 191

Environmental Toxicology Option (70-79 units)

1. BIOL 005A, BIOL 05LA, BIOL 005B
2. CHEM 005 or BIOL 005C; CHEM 12A; CHEM 12B, CHEM 12C
3. ENTX 101, ENTX 154
4. PHYS 002A, PHYS 002B, PHYS 002C
5. PHYS 02LA, PHYS 02LB, PHYS 02LC are recommended
6. ENSC 006/ECON 006 or ~~ENSC 143A/ECON 143A (ECON 003 prerequisite)~~
7. BCH 100 or both BCH 110A and BCH 110B; BIOL 102 or BIOL 121/MCBL 121; BCH 110C or BIOL 107A
8. STAT 100A and STAT 100B
9. Elective Courses: At least one course from ENSC 127, ENSC 133/MCBL 133, ENSC 135/CHEM 135/ENTX 135, ENSC 136/CHEM 136/ENTX 136, ENSC 140, ENSC 141/MCBL 141, ENSC 144/ENVE 144, ENSC 163, BPSC 134/ENSC 134, ENSC 103/ENTX 103, ENSC 104, ENSC 107, ENSC 138/GEO 138, CBNS 150/ENTX 150, ENSC 197, ENSC 198-I

Natural Science Option (65-74 units)

1. ~~BIOL 005A, BIOL 05LA, BIOL 005B~~
2. PHYS 002A, PHYS 002B, PHYS 002C
3. PHYS 02LA, PHYS 02LB, PHYS 02LC are

Core Requirements

1. Lower-division requirements (36 units)
 - a) No Change
 - b) No Change
 - c) MATH 007A or MATH009A; MATH 007B or MATH 009B
 - d) No Change
2. No Change

Environmental Toxicology Option (72-78 units)

1. BIOL 005A, BIOL 05LA or BIOL 020, BIOL 005B
2. CHEM 005 or BIOL 005C; CHEM 008A and CHEM 08LA or CHEM 08HA and CHEM 8HLA or CHEM 12A, CHEM 008B and CHEM 08LB or CHEM 08HB and CHEM 8HLB or CHEM 12B, CHEM 008C and CHEM 08LC or CHEM 08HC and CHEM 8HLC or CHEM 12C
3. No Change
4. No Change
5. No Change
6. ENSC 006/ECON 006
7. No Change
8. No Change
9. No Change

Natural Science Option (70-71 units)

1. BIOL 005A, BIOL 05LA or BIOL 020, BIOL 005B
2. No Change
3. No Change

recommended

4. CHEM 12A, CHEM 12B

5. GEO 001 or GEO 002

6. ENSC 006/ECON 006 or ~~ENSC 143A/ECON 143A (ECON 003 prerequisite)~~

7. STAT 100A and STAT 100B

8. Elective Courses:

a) At least one course from BIOL 005C, CHEM 005, CHEM 12C, MATH 009C

b) A total of at least five courses from the following (at least three must be Environmental Sciences)

BIOL 116, BIOL 121/MCBL 121, BIOL 121L/MCBL 121L, BPSC 104/BIOL 104, BPSC 165, BPSC 166, CHEM 109, ENSC 120/NEM 120, ENSC 127, ENSC 133/MCBL 133, ENSC 135/CHEM 135/ENTX 135, ENSC 136/CHEM 136, ENSC 140, ENSC 141/MCBL 141, ENSC 144/ ENVE 144, ENSC 163, ENSC 174, BPSC 134/ENSC 134, ENSC 103/ENTX 103, ENSC 104, ENSC 107, ENSC 138/GEO 138, ENSC 197, ENSC 198-I, ENTX 101, GEO 157, GEO 160

Social Science Option (85-90 units)

1. BIOL 002, BIOL 003

2. GEO 001 or GEO 002

3. ECON 003

4. ~~ENSC 143A/ECON 143A, ENSC 143B/ECON 143B, ENSC 143C/ECON 143C, ENSC 172, ENSC 174~~

5. ~~ECON 101 or ECON 107 or SOC 110~~

6. STAT 100A and STAT 100B

7. Elective Courses:

a) ~~At least one course from ENSC 133/MCBL 133, ENSC 140, ENSC 141/MCBL 141, ENSC 142, ENSC 144/ENVE 144, ENSC 155, ENSC 163, BPSC 134/ENSC 134, ENSC 104, ENSC 107, ENSC 138/GEO 138, ENSC 197, ENSC 198-I~~

b) A total of at least six courses from the following:

Economics: ECON 102, ECON 103, ECON

4. CHEM 008A and CHEM 08LA or CHEM 08HA and CHEM 8HLA or CHEM 12A, CHEM 008B and CHEM 08LB or CHEM 08HB and CHEM 8HLB or CHEM 12B

5. No Change

6. ENSC 006/ECON 006

7. No Change

8. Elective Courses:

a) At least one course from BIOL 005C, CHEM 005, CHEM 008C and CHEM 08LC, CHEM 08HC and CHEM 8HLC, CHEM 12C, MATH 009C

b) No Change

BIOL 116, BIOL 121/MCBL 121, BIOL 121L/MCBL 121L, BPSC 104/BIOL 104, BPSC 165, BPSC 166, CHEM 109, ENSC 120/NEM 120, ENSC 127, ENSC 133/MCBL 133, ENSC 135/CHEM 135/ENTX 135, ENSC 136/CHEM 136, ENSC 140, ENSC 141/MCBL 141, ENSC 144/ ENVE 144, ENSC 163, ENSC 174, BPSC 134/ENSC 134, ENSC 103/ENTX 103, ENSC 104, ENSC 105 ENSC 107, ENSC 138/GEO 138, ENSC 197, ENSC 198-I, ENTX 101, GEO 157, GEO 160

~~104A, ECON 105A, ECON 116, ECON 129,
ECON 146, ECON 148, ECON 156, ECON
160/BUS 160, ECON 181, ECON 182, ECON
183~~

~~Society and culture: ANTH 110, ANTH 129,
ANTH 132, ANTH 134, ANTH 135, ANTH
142, ANTH 170, ANTH 186/LNST 166, PHIL
117, PHIL 137, SOC 137, SOC 143/URST
143, SOC 182/URST 182, SOC 184~~

~~Regulation and law: ECON 119, POSC 101,
POSC 106S, POSC 127, POSC 166, POSC
181, POSC 182, POSC 183~~

~~Management/Analytics: BUS 104/STAT 104,
BUS 122, BUS/ECON 162, ECON 110,
ECON 112, GEO 157, GEO 160, MATH 120,
SOC 111~~

Justification:

With the transfer of three environmental economics faculty to the School of Public Policy in 2014 (Drs. Ken Baerenklau, Ariel Dinar, and Kurt Schwabe), the ENSC Department lost the ability to sustain the Social Science Option in the ENSC Undergraduate Major. As of June 2017, all continuing students in the Social Science Option will have graduated and no more students will be enrolled in that option. Hence we have removed the Social Science Option from the major. In addition, the Department voted to eliminate two of the core courses from the Social Science Option, ENSC 143A and ENSC 143B, as electives for the Natural Science Option, since our colleagues in the School of Public Policy have indicated they will not teach these courses ever again.

We have added a new elective to the Natural Sciences Option: ENSC 105 Ecohydrology. This is a new upper division course being taught by our new Assistant Professor of Watershed Hydrology. The course strongly complements the Natural Science Option and provides students interested in water resource excellent training in the effects of water availability on ecosystems.

Lastly, we have removed mention of ENSC 017 in the curriculum map. This course and its listing in the UCR Catalog were eliminated in 2012-2013.

The course content of BIOL 002 is not recommended for science majors, and has no prerequisites (e.g. Chemistry). Hence, the rigor and expectations for the lecture and laboratory portions of BIOL 002 are not as high as for BIOL 020, which is for life science majors. In BIOL 020, students perform Polymerase Chain Reaction (PCR), do bioinformatics analysis, and open-ended experiments in genomics research. BIOL 020 is 6 hours/week, whereas BIOL 002 lab is 3 hours/week. Hence, the content, detail and expectations are much lower for BIOL 002. Finally, BIOL 002 includes the laboratory and lecture together in one course, whereas BIOL 20 is a standalone laboratory course that can substitute for BIOL 05LA for credit in BIOL 005A. The inclusion of the laboratory component in BIOL 002 allows some students who do not pass the laboratory portion to pass the entire course. This is not possible with BIOL 020 as a separate course from the lecture/discussion course BIOL 005A.

The Department of Chemistry has moved forward to separate Organic Chemistry courses into two courses (LEC and LAB) per the Undergraduate Studies Committee's recommendation for 2017 FALL. Also, renumbering the courses to "008" for the Organic Chemistry Lecture Series (CHEM 008A, CHEM 008B, CHEM 008C,) and "08" for the Honors Organic Chemistry Lecture (CHEM 08HA, CHEM 08HB, CHEM 08HC) and Organic Chemistry Labs (CHEM 08LA, CHEM 08LB, CHEM 08LC, CHEM 08HA, CHEM 08HB, CHEM 08HC, CHEM 08HLA, CHEM 08HLB, CHEM 08HLC) in order to comply with BANNERS system requirements.

The purpose of the new course is to present calculus in the context of biological sciences. The Mathematics Department created a new track of first-year calculus that runs parallel to Math 009A and 009B and has the same placement criteria as well as prerequisites. MATH 007A/B will be considered equivalent in terms of program requirements, and in the progression of the first-year calculus sequence. The content of Math 007A/B significantly overlaps with Math 009AB so that credit is only awarded for either Math 007A or Math 009A.

Approval:

Approved by the faculty of the Department of Environmental Science:	May 2, 2016
Approved by the Executive Committee College of Natural and Agricultural Sciences:	December 16, 2016
Reviewed by the Committee on Undergraduate Admissions:	April 25, 2017
Approved by the Committee on Educational Policy:	May 3, 2017