2022-2023

Environmental Science BS

G1: Train Environmental Science Students to have a strong Physical Science foundation

Goal Description:

Students will develop core competencies across the disciplines of Biology, Chemistry, Geography, and Geology.

Providing Department: Environmental Science BS

Progress: Draft

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

G1 LO1 Intro Physical Science Foundation

Learning Objective Description:

Students will demonstrate proficiency in the intro physical lab science course material that serves as a foundation/pre-requisite for upper-level Environmental Science courses.

RELATED ITEM LEVEL 2

G1 LO1 ICF1 Core Physical Science Knowledge

Indicator Description:

Students will take a comprehensive exam that includes introductory (1400-level) Biology, Chemistry, Geography, and Geology concepts. This will be developed in collaboration with the Environmental Science committee that teaches the 1400-level courses required of all three Environmental Science concentrations (BIOL 1401, BIOL 1 and 2, CHEM 1411, GEOG 1401, and GEOL 1403 and 1405). Students will take the core exam toward the beginning of BIOL/GEOG 3320 that they should be enrolled in Fall of junior year.

Criterion Description:

75% of Environmental Science students will earn a 70% or higher on the interdisciplinary core physical science exam. Given student retention rates in the 70's for SHSU, it seems reasonable that 3/4 of Environmental Science students should have a C-level or better understanding of foundational concepts as they begin their advanced coursework.

Findings Description:

I have not been able to assemble an interdisciplinary assessment exam to this point. I need assistance from department faculty outside our own and only received some questions from one faculty member last summer when I asked for help in two emails. I will try again this summer to put together this interdisciplinary exam.

RELATED ITEM LEVEL 3

Action - G1 Core Physical Science Knowledge

Action Description:

The interdisciplinary exam instrument will be distributed during 2024.

RELATED ITEM LEVEL 1

G1 LO2 Advanced Physical Science Knowledge

Learning Objective Description:

Students will demonstrate proficiency in explaining concepts in the 3000- and 4000-level physical science courses that are required in each Environmental Science concentration.

RELATED ITEM LEVEL 2

G1 LO2 ICF 1 - Advanced Physical Science Concepts

Indicator Description:

Students will demonstrate knowledge of advanced physical science concepts that all three environmental science concentrations require: General Ecology; Environmental Geology; Soil Science; and one of Geomorphology OR Hydrology and Water Resources. Pooled comprehensive final exams from each of these courses will serve as the instrument.

Criterion Description:

75% of students will earn 70% or better on the comprehensive final exams in these courses. Given SHSU's retention rates in the 70's, this seems like a reasonable goal for a rigorous physical science program.

Findings Description:

The seminar where this instrument will be distributed was just approved for the 2023-24 catalog. However, given the delay in catalog cycles and students matriculating through, this will likely begin being offered during 2024-25.

At present, however, very few graduating seniors are receiving grades of C or less in the listed courses, indicating they are at least proficient across the interdisciplinary courses required of all majors.

RELATED ITEM LEVEL 3

Action - G1 Advanced Physical Science Concepts

Action Description:

The interdisciplinary exam instrument will be developed during late Summer and Fall 2023.

G2: Develop systems thinking

Goal Description:

Students will be able to link physical science, social science, and policy (i.e., human-environment) concepts by the time they graduate.

Providing Department: Environmental Science BS

Progress: Draft

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

G2 LO1 Linking Physical and Social Science Systems

Learning Objective Description:

Students will be able to connect physical and social science concepts by looking through a systems thinking lens.

RELATED ITEM LEVEL 2

G2 LO1 ICF1 Systems Thinking to Link Physical and Social Science

Indicator Description:

Students will be asked questions that link physical science, social science, and policy concepts in BIOL/GEOG 3320 (Sustainability and Environment) that should be taken Fall of their junior year. Similar questions will then be asked in the Applied Environmental Seminar Capstone class for last-semester seniors. In addition to BIOL/GEOG 3320, students should be taking GEOG 4331 (Conservation of Natural Resources) and POLS 3395 (Env Policy) their junior and senior year. These four courses should all help them understand the context of how physical and social science work informs policy and how policy and social factors guide the need for physical science work. The

Applied Environmental Seminar will also include guest speakers that work across disciplines and at the interface of physical science and policy. The matching pre-post exam style questions will be administered at the start of BIOL/GEOG 3320 and at the end of the Applied Env Seminar.

Criterion Description:

After completing physical science, social science, and policy coursework over their junior and senior years, including an applied interdisciplinary seminar their final semester, Env Sci students will demonstrate growth in linking physical science, social science, and policy as interconnected within a larger system. 85% of seniors in the seminar course should be able to answer similar questions to those they received at the start of their junior year in BIOL/GEOG 3320 with 80% accuracy or better. These gains are reasonable to expect given the coursework required and Applied Env Seminar capstone that will review these concepts over the final semester prior to students graduating.

Findings Description:

Students scored 66% on the systems thinking short-answer question on Exam 1 in GEOG 3320 during Fall 2022. Students scored 77% overall on the exam, indicating they are better at answering objective questions and concepts that don't require linking systems. More data will need to be collected in the seminar that will begin 2024-25 to determine progress between majors junior and senior years. However, these preliminary data indicate students have room to improve in the subsequent coursework.

RELATED ITEM LEVEL 3

Action - G2 Systems Thinking

Action Description:

Instructors for BIOL/GEOG 3320 will continue to assess systems thinking during each Fall semester.

G3: Proficiency in quantitative methods

Goal Description:

Students will be able to apply concepts from their required math courses to environmental problems.

Providing Department: Environmental Science BS

Progress: Draft

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

G3 LO1 Apply Quantitative Methods to Environmental Problems

Learning Objective Description:

Students will be able to use quantitative skills gained in their required statistics and/or calculus courses to work on real-world problems.

RELATED ITEM LEVEL 2

G3 LO1 ICF1 Quantitative Methods and Applied Environmental Problems

Indicator Description:

Students will be asked applied quantitative questions on comprehensive final exams in Biostatistics, Hydrology and Water Resources, Hydrogeology, and Geomorphology.

Criterion Description:

75% of students will earn a 70% or higher on quantitative-related questions across these courses. Environmental Science students need to be able to analyze numerical data, and it reasonable to expect 3/4 of juniors and seniors to demonstrate C-level proficiency of better in this area.

Findings Description:

74% of students earned a C or higher on the quantitative-heavy first exam in GEOG 4330, and 83% earned a C or higher on the most math-intensive lab on evapotranspiration. By the end of the semester in GEOG 4330, 83% were proficient (C or better) on the quantitative portion of the final exam. In GEOG 4432 during Spring 2023, 64% of students earned a C or higher on Exam 2, which included the most quantitative concepts. Additionally, 68% of the students were proficient (C or better) with quantitative concepts on the final exam, which included questions related to what they'd learned through the whole semester.

Biostatistics will require collaboration with Drs. Ulseth and Lutterschmidt in BIOL.

RELATED ITEM LEVEL 3

Action - G3 Quantitative Methods and Applied Environmental Problems

Action Description:

Students in GEOG 4330 and GEOG 4432 will continue to be assessed on the quantitative components of their exams. We will work with BIOL to obtain statistics for BIOL 4374 during 2023-24.

G4: Maintain strong interdisciplinary relationships across contributing departments

Goal Description:

The Environmental Science coordinator will continue to convene meetings with the COSET Environmental Science Committee and with dept. chairs and coordinators for contributing programs. Changes will be made as necessary given feedback from committee and contributing faculty.

Providing Department: Environmental Science BS

Progress: Draft

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

G4 PO1 Consistent Interdepartmental Coordination

Performance Objective Description:

The Environmental Science coordinator will meet with AG, BIOL, CHEM, GEOG, and GEOL coordinators to make sure course schedules work for Env students (i.e., limit upper-level conflicts across depts.). The Env Sci coordinator will also work to communicate with dept. chairs and coordinators to help make sure there are enough seats available to meet growing demand.

The Environmental Science committee members (a group of faculty that's been in place since 2016) will continue to meet and work together annually to make changes to the degree concentrations if issues arise.

As a result of meetings and coordination, Env Sci majors and minors will be able to get seats in all required courses as juniors and seniors.

RELATED ITEM LEVEL 2

G4 PO1 KPI1 Student Satisfaction with Interdisciplinary Degree

KPI Description:

Students will be given a survey their last semester before graduation to give feedback on any issues with the program, including scheduling, course offerings, course content, and overall satisfaction with the depts. contributing to Env Sci and the program as a whole.

Target Description:

We aim for 80% of our graduating students to be satisfied with dept. advising, scheduling, and curriculum offerings. Because of limited numbers of graduates some semesters, this will be a 3-year running average.

Results Description:

The survey needs to be developed in collaboration with other departments to make sure questions align with the interdisciplinary nature of the program. This will be done along with meeting about the collaborative, interdisciplinary exam this summer.

RELATED ITEM LEVEL 3

Action - G4 Student Satisfaction

Action Description:

This survey will be developed Summer and Fall 2023 and distributed for the first time to Spring 2024 graduates.

RELATED ITEM LEVEL 2

G4 PO1 KPI2 Meetings and Collaboration

KPI Description:

This will include a list of relevant meetings and changes and issues that arise from meetings between the Environmental Science coordinator and contributing dept. chairs and coordinators.

Target Description:

We will have a minimum of one annual, interdisciplinary meeting per year to discuss ongoing issues.

Results Description:

This will occur late Summer 2023 given emails last summer did not receive responses.

RELATED ITEM LEVEL 3

Action - G4 Meetings and Collaboration

Action Description:

The department will schedule a meeting for August to meet and review issues from 2022-23 and how to prepare for 23-24.

RELATED ITEM LEVEL 1

G4 PO2 Interdisciplinary Internships

Performance Objective Description:

At least five junior and senior students will obtain internships across a range of environmental science disciplines.

RELATED ITEM LEVEL 2

G4 PO2 KPI1 Completing Internships

KPI Description:

Students will be supervised by Environmental Science-related faculty that are aligned most closely with their internship focus. Five completed internship packets jointly signed by employer and advisor will indicate completion. Students will also present internship experiences to fellow students to encourage networking and demonstrate opportunities to their peers.

Target Description:

At least 5 junior or senior students will obtain and complete relevant internships annually that relate to different areas of focus related to AG, BIOL, CHEM, or ENV and GEO disciplines.

Results Description:

This data will come end of summer 2023 given not all students contact faculty about internships ahead of time. Summer 2022, we had 4 students complete formal full-time internships.

RELATED ITEM LEVEL 3

Action - G4 Internships

Action Description:

We will continue to encourage and advertise internships to students on department listervs and advertise credit opportunities in GEOG/GEOL 4399 (Internship) that is now listed in the 23-24 catalog.

Update to Previous Cycle's Plan for Continuous Improvement Item

Previous Cycle's Plan For Continuous Improvement (Do Not Modify):

Closing Summary

For 2022-23, we look forward to using this brand new assessment plan developed during the Winter of 2021-22 to determined where Environmental Science stands and what we can do to address student issues and potential shortcomings, as well as continuing to emphasize points and actions that are working well for our students.

Update of Progress to the Previous Cycle's PCI:

Because this plan was re-rewritten last cycle, we are still making progress on developing the exam and survey instruments. We look forward to more concrete results during 23-24.

New Plan for Continuous Improvement Item

Closing Summary:

- Develop comprehensive exam to assess introductory physical science knowledge
- Work with BIOL to obtain metrics for BIOL 4374 quantitative proficiency
- Develop survey to assess students satisfaction with interdisciplinary program and scheduling
- Meet with instructors and/or chairs that have required courses in the program during Aug. 2023 to determine issues and solutions moving forward