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

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:

This exam is still in development, and the department needs contributions from external departments/faculty to cover the listed coursework.

RELATED ITEM LEVEL 3

Action - G1 Core Physical Science Knowledge

Action Description:

We must work with faculty across related departments to build the core intro assessment exam.

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:

During the Spring 2024 semester, GEOG 4432, a key physical science course in Environmental Science, 88% of the student received a C or better on the final and in the class. These numbers set a record over the last eight years of the course being taught, representing positive gains.

RELATED ITEM LEVEL 3

Action - G1 Advanced Physical Science Concepts

Action Description:

We must get feedback for more interdisciplinary classes to understand student performance.

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

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:

This pre-post assessment is still in progress as teh seminar was just added to the catalog for the 24-25 cycle.

RELATED ITEM LEVEL 3

Action - G2 Systems Thinking

Action Description:

GEOG 3320 will pilot systems thinking questions Fall 2024 to determine where students are at integrating physical and social science concepts.

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

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:

88% of students exceeded this benchmark in GEOG 4432 this past year.

RELATED ITEM LEVEL 3

Action - G3 Quantitative Methods and Applied Environmental Problems

Action Description:

We will reach out to instructors for Biostats and other quantitative courses to assess where students are at with their quantatitive foundation.

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

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 is in development, though we have begun verbal discussions, which seem positive anecdotally.

RELATED ITEM LEVEL 3

Action - G4 Student Satisfaction

Action Description:

Survey will be developed.

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:

We have had conversations with Biology, Agriculture, Chemistry, Sociology, and Political Science to continue strong relationships.

RELATED ITEM LEVEL 3

Action - G4 Meetings and Collaboration

Action Description:

We will continue to meet with relevant faculty and chairs.

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:

We fell just short this year with 4 students officially doing internships, though this may miss students that do not want to pay for internship hour credit and thereore do not report. However, we already hae 3 enrolled for next year.

RELATED ITEM LEVEL 3

Action - G4 Internships

Action Description:

We will continue to pursue paternships to get opportunities to students.

Update to Previous Cycle's Plan for Continuous Improvement Item

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

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

Update of Progress to the Previous Cycle's PCI:

We continue to work on the previous items. It remains a chllanege to run an interdisciplinary program without all contributing faculty in the same department.

New Plan for Continuous Improvement Item

Closing Summary:

We will continue to work on developing the student satisfaction survey, as well as the pre- and post-knowledge assessment exams.