Department of Earth and Environmental Sciences
California State University, East Bay

ASSESSMENT REPORT 2015-16

ENVIRONMENTAL SCIENCE B.S.

28 June 2016

Department of Earth and Environmental Sciences
California State University, East Bay

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Contents

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Program Learning Outcomes
Environmental Science B.S.

1. demonstrate practical skills and theoretical knowledge of the biology, chemistry, geology, and physics relevant to the Earth system, in both laboratory and field settings *(physical and life science)*
2. collect, analyze, and interpret quantitative and qualitative data, individually and in groups, in order to characterize and address environmental issues *(data and analysis)*
3. critically consider scientific findings within the context of the social, cultural, economic, ethical, and human dimensions of contentious environmental issues *(socioeconomic context)*
4. synthesize knowledge of the major components of the Earth system, including physical, biological, and human systems, as well as human impacts *(synthesis)*
5. critically analyze environmental issues through the evaluation of scientific literature, and present their positions clearly and persuasively in written and oral form *(communication)*

ILO Alignment Matrix. The table below shows which Institutional Learning Outcomes (ILOs) are addressed by each of the Program Learning Outcomes (PLOs) listed above.

ILO	**PLO 1**	**PLO 2**	**PLO 3**	**PLO 4**	**PLO 5**
1. Thinking & Reasoning	**X**	**X**	**X**	**X**	**X**
2. Communication		X			X
3. Diversity			X	X	X
4. Collaboration		X		X	X
5. Sustainability			X	X	X
6. Specialized Education	X	X	X	X	X

Curriculum Map for Program Learning Outcomes

CSU East Bay, Dept. of Earth & Environmental Sciences

Degree: Environmental Science BS

			Program Learning Outcomes				
Prefix	**Course**	**Title**	**PLO 1**	**PLO 2**	**PLO 3**	**PLO 4**	**PLO 5**
ENSC	2210	Environmental Geology +		I	I	I	P
ENSC	2211	Environmental Geology Lab +			I	I	
ENSC	2400	Environmental Biology	I				
ENSC	2401	Environmental Biology Lab	P				
ENSC	2800	Environmental Problems of California	I	I	I	I	I
ENSC	2801	Global Environment Problems	I	I	I	I	I
ENSC	2802	Global Environmental Issues	I	I	I	I	I
ENSC	2900	Field Activity in Environmental Science	I	I	I	P	
ENSC	3500	Environmental Hydrology +			M	M	P
ENSC	3999	Issues in Environmental Science					P
ENSC	4140	Hazardous Waste Management +		P		M	P
ENSC	4200	Global Change					P
ENSC	4800	Seminar in Environmental Science	P	P	P	M	M
ENSC	4900	Independent Study				P	P
GEOL	2101	Physical Geology			I		
GEOL	2102	Earth and Life Through Time	I		I	I	
GEOL	2210	Environmental Geology +		I	I	I	P
GEOL	2211	Environmental Geology Lab +			I	I	P
GEOL	2600	Introduction to GIS			P	P	
GEOL	3500	Environmental Hydrology +		P	M	M	P
GEOL	4140	Hazardous Waste Management +		P		M	P
GEOL	4320	Hydrogeology			M	P	P

Notes:

See attached Program Learning Outcomes (PLOs)

+ This course cross listed, appears under both ENSC and GEOL

Levels: I = Introduced; P = Practiced; M = Mastered

CSUEB Department of Earth and Environmental Sciences

EES Critical Thinking Rubric, Modified

	Exemplary 3	Accomplished 2	Competent 1	Insufficient Evidence 0
1. Competencies *Strategies and skills that apply to Earth Science problem solving (i.e. discipline-specific exercises)*	**Clearly understands** purpose and role of the exercise and its importance and context within the Earth Sciences and/or related subfield. Proposes/develops **new means/methods** to address the problem.	**Strong understanding** of purpose and role of the exercise and its importance and context within the Earth Sciences and/or related subfield. Uses **discipline-appropriate means** to address the problem.	**Understanding** of the purpose and role of the exercise and some insight into its importance and context within the Earth Sciences and/or related subfield. **Follows instructions** and understands the steps.	Poor understanding of the purpose and role of the exercise with little/no insight into its importance and context within the Earth Sciences and/or related subfield. **Unable** to follow instructions.
2. Problem Articulation	Articulates a **logical problem**, **recognizes consequences and complexities** of solutions.	Articulates a **logical problem**, has some insight into **consequences and complexities** of solutions.	Articulates a **problem**, **considers multiple alternatives** for solving the problem, but displays **limited insight into consequences and complexities** of solutions.	Problem is **poorly articulated,** or only a **single approach** is considered.
3. Embracing Contradictions	**Integrates** alternate, divergent, or contradictory perspectives or ideas **fully**. **Proposes/uses** multiple working hypotheses.	**Incorporates** alternate, divergent, or contradictory perspectives or ideas in an **exploratory** way. **Applies** multiple working hypotheses.	**Includes** (**recognizes** value) alternate, divergent, or contradictory perspectives or ideas in a limited way. Has **difficulty** creating multiple working hypotheses.	**Fails to acknowledge** alternate, divergent, or contradictory perspectives or ideas. **No use** of multiple working hypotheses.
4. Innovative Thinking	**Creates** a novel/unique idea, method, hypothesis, format, or product.	**Imagines/conceives** a novel/unique idea, method, hypothesis, format, or product.	**Reformulates** a collection of available ideas.	**No new ideas.**
5. Connecting, Synthesizing	**Synthesizes** ideas or solutions into a **coherent whole.** **Creates** connections to higher-level discipline-specific concepts and practices.	**Connects** ideas or solutions in novel ways. **Recognizes** connections to higher-level discipline-specific concepts and practices.	**Recognizes existing connections** among ideas or solutions.	**No recognition** of significance of exercise to discipline or global context.

After American Association of Colleges and Universities, aacu.org

CSUEB Environmental Science B.S. Program Learning Outcome Evaluation

Overall Assessment Narrative

Out of the 27 examples of student work evaluated to assess the Program Learning Outcomes for **practical skills and theoretical knowledge in the physical sciences,** and the **socioeconomic context of environmental issues,** 24 examples scored, in aggregate, well enough to meet the respective PLOs for the Environmental Science BS degree. Students scored consistently well in areas of connecting and synthesizing ideas, which are important skills for scientists in an interdisciplinary field such as environmental science. Identified areas for improvement include submitting quality written work, dealing with contradictions and uncertainty, quantitative skills, and innovative thinking. Scores generally indicated basic competency, but scores above the basic level were uncommon. There is room for improvement in all areas. While most students displayed reasonable proficiency with quantitative skills, this is an important aspect of environmental science and a key feature of scientific literacy which needs additional work.

Moving forward, students will be encouraged to work on skills including discipline-specific communication, articulating complexities and nuances of difficult environmental issues, and quantitative skills. With the intent of ‘closing the loop’, possible strategies for improving student program learning outcomes include: 1) pre-assignments that give students practice with advanced numeracy skills, 2) recommendations for math and writing skills tutoring at SCAA for struggling students, 3) additional, optional, sessions where students may work on skill deficiencies with the instructor present.

Course evaluated: ENSC 4800 Seminar in Environmental Science, Winter 2016

Assignment evaluated: *Brief essay on the socioeconomic, cultural, ethical, political, and cultural context of environmental science*

PLO evaluated: *critically consider scientific findings within the context of the social, cultural, economic, ethical, and human dimensions of contentious environmental issues **(socioeconomic context)**.*

Rubric(s) used: EES BS/BA Critical Thinking Rubric, slightly modified (see above).

"Socioeconomic Context" objective evaluation (ENSC 4800 Seminar in Environmental Science)

14 students evaluated, 17 students in class

Class total average: (6.93 out of 15, 5 is meeting PLO), class total standard deviation: 2.43

Student	Competencies	Problem Articulation	Embracing Contradictions	Innovative Thinking	Connecting, Synthesizing	Total
01	1	1	1	1	1	5
02	1	1	1	2	2	7
03	2	2	1	1	2	8
04	1	1	1	1	1	5
05	2	3	2	1	2	10
06	1	1	1	1	1	5
07	1	1	1	2	1	6
08	1	1	1	1	1	5
09	2	2	2	1	2	9
10	2	2	1	2	2	9
11	3	2	2	2	2	11
12	0	0	0	1	1	2
13	2	2	1	1	1	7
14	2	2	1	1	2	8
Class average	**1.50**	**1.50**	**1.14**	**1.29**	**1.50**	**6.93**
Standard deviation	**0.76**	**0.76**	**0.53**	**0.47**	**0.52**	**2.43**

(Interpretation on next page.)

Interpretation: Students scored most consistently high on the “connecting and synthesizing” portion of the rubric, which aligns with the nature of the environmental science major (an applied science, requiring synthesis of broad interdisciplinary knowledge and skills). Students scored low in the area of embracing contradictions, an area that is very important for environmental science since “real world” scenarios deal with incomplete data, and many unknown factors. Low scores were also observed in the area of “innovative thinking,” but that may be an artifact of the assignment, which did not really encourage students to consider innovative solutions to the problems they articulated.

Overall, given the outcomes of this assignment (students generally displayed basic competency across all areas, but true proficiency and mastery is rare) students in the program would likely benefit from increased intensive writing experiences where they are pushed to consider and articulate their views on complex, nuanced environmental issues. Since the program focuses on the science related to environmental issues, students may not have many opportunities to consider the broader socioeconomic, cultural, or ethical context – these may need to be further incorporated into coursework.

ENSC 3500 Environmental Hydrology – Winter 2016: PLO 1 (Practical skills and theoretical knowledge in the physical sciences; lab and field setting).

Stream Discharge in San Lorenzo Creek is a field activity in which students make observations of stream morphology, choose and measure a cross section, operate a flow meter, and combine observations to determine stream discharge. Both practical skills and theoretical knowledge of a physical process are assessed.

Out of 12 possible, overall scores ranged from 5 to 11, with an average of 7.3 and standard deviation of 2.4 (three students who did not participate and received scores of zero are not included). Six of 13 students who completed the assignment displayed at least the basic level of competency (score of 2) in all three areas assessed; only three of 13 displayed competency at the mastery level (score of 3) in all areas. For most students, mastery would require additional practice with the equipment and procedures, since the practical skills learned via the assignment are entirely new to students. Theoretical knowledge of stream discharge continues to be acquired throughout the course, and all but 3 students showed mastery of these concepts in later assessments. Possible ways to improve learning outcomes for this assignment are: 1) a pre-assignment that gives students practice with units and the basic concepts calculations, 2) a longer time period to practice using the equipment, including a 'dry run' in the lab. In the future, similar assessment material will be assigned since a deep understanding of stream discharge is a key learning outcome for this course.

Quarter:	W 16					
Assignment:	Field Activity: Stream Discharge					
Student	Demonstrate practical skills	Demonstrate theoretical knowledge	Completeness, Accuracy	Total	Comments	
ID	0-4	0-4	0-4	0-12		
1	3	4	4	11		
2	2	4	3	9		
3	2	3	2	7		
4	3	2	2	7		
5	2	0	1	3		
6	3	3	4	10		
7	2	2	2	6		
8	3	2	2	7		
9	2	2	2	6		
10	2	2	2	6		
11	2	3	2	7		
12	3	4	4	11		
13	3	1	1	5		
14	0	0	0	0	did not hand in assignment	
15	0	0	0	0	did not attend field trip	
16	0	0	0	0	did not attend field trip	

Department of Earth and Environmental Sciences Program Assessment: The Bigger Picture

Given in the ENSC 4800 Seminar in Environmental Science course

Background

In the Department of Earth and Environmental Sciences, we primarily focus on physical and life sciences (geology, physics, chemistry, biology, etc.) related to the Earth and Earth Systems. As you probably have learned by now, though, the sciences that we focus on are only part of the picture when we are dealing with issues related to the Earth System: geologic resources, physical/chemical processes, or biological systems.

As part of our commitment to providing a broad, deep, and well-rounded educational experience, every year we assess our progress on different educational objectives. This short assignment is designed to help us understand your perspective(s) on the connections between Earth/environmental science, and broader social context (policy, economics, social justice, environmental justice, arts and culture, etc.)

The assignment

Please write a concise, one-page essay (single-spaced, ~2-3 paragraphs) in which you:

1) Identify one or more major environmental issues you have learned about during your time at CSU East Bay, and

2) Explain your perspective on the connections between **a) the scientific findings** regarding the issue(s) in question, and **b) the broader social, economic, ethical, political, and cultural context** that impacts those issues.

Grading

If you answer both questions above, turn the assignment in on-time, and do a reasonable job, you will receive full credit. **Please upload your essay to Turnitin on Blackboard by Wednesday, March 16, 2016 at 11:59 pm. Thanks!**

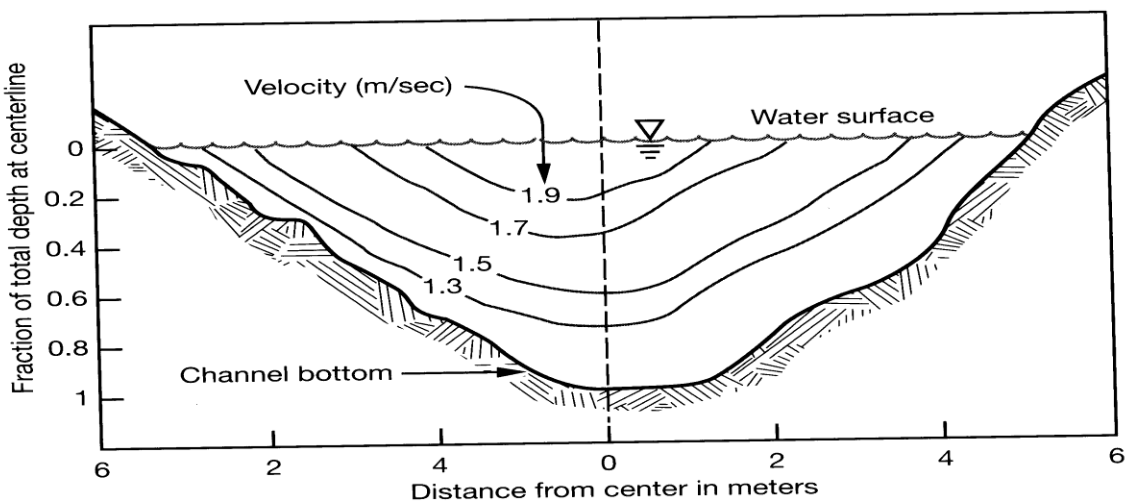
STREAM DISCHARGE in SAN LORENZO CREEK

PURPOSE

The purpose of this lab is for you to get hands-on experience with stream gauging by calculating the discharge of San Lorenzo Creek. You will also make and record stream characterization observations.

BACKGROUND

The process of measuring stream flow (volume rate of flow), or discharge, is called stream gauging. There are numerous methods of stream gauging, including direct methods, such as volumetric gauging, and dilution methods, as well as indirect methods involving stage-discharge relations, or rating curves. Since the velocity of a stream varies with depth and width, it is important to understand what it is you want to measure when choosing a stream gauging method. If you are interested in stream surface velocity, the float method would work well. This method involves throwing some buoyant, highly visible (biodegradable) object into the stream and measuring the time it takes to float a known distance. If you are interested in obtaining a more accurate stream discharge measurement, the velocity-area method is the method of choice.



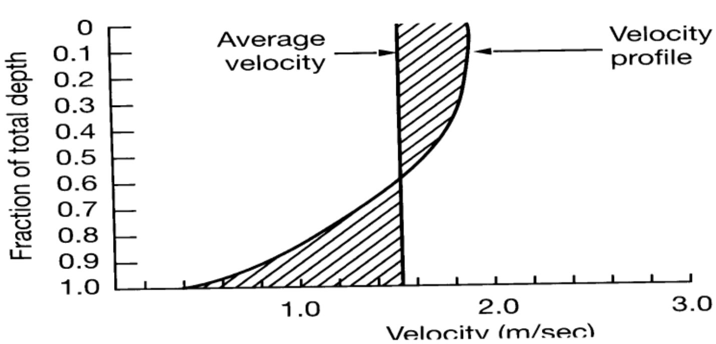


Figure 1a and 1b showing stream velocity distribution. Figure 1a is a cross -sectional view with

contours indicating how velocity varies from top to bottom and across the stream channel. Figure 1b is an example of a velocity profile. Notice how velocity changes with increasing depth, reaching the average velocity at approximately 0.6 of the total depth (or 0.4 of the depth from the bottom).

Figure 1a is an example of how the velocity of a stream can vary in the cross-stream direction and with depth. Stream velocity is typically faster at the surface and toward the middle of the channel, and slower along the sides and bottom of the channel due to differences in friction. The velocity profile in Figure 1b shows how the average velocity is usually at 0.6 times the total depth from the water surface, or 0.4 times the total depth from the bottom of the channel. This is why, in shallow channels (< 2.5 ft or < 0.75 m), current meter measurements are made at four tenths of total depth (from the bottom). From these diagrams you can see why the float method could give velocities that are higher than the average stream velocity. You can also see how the volume-area method, which involves more detailed measurements of the velocity distribution could give a more accurate representation of the discharge.

We will try two methods to calculate the discharge of San Lorenzo Creek; the float method and the velocity-area method. You will be measuring out a length of river for the simple float method. For the velocity-area method you will establish a cross section through San Lorenzo Creek and measure velocity at points along this cross section at known intervals. Functionally, you will do this by dividing your stream into discrete sections where you can calculate the cross-sectional area and measure an average velocity (area x velocity = discharge) (Figure 2). Then you will sum the discharges, Q, of each section to determine the total Q of the stream at that cross-section. Obviously, the more sections you include, the more accurate your determination of discharge is, but there must be a balance between accuracy and efficiency.

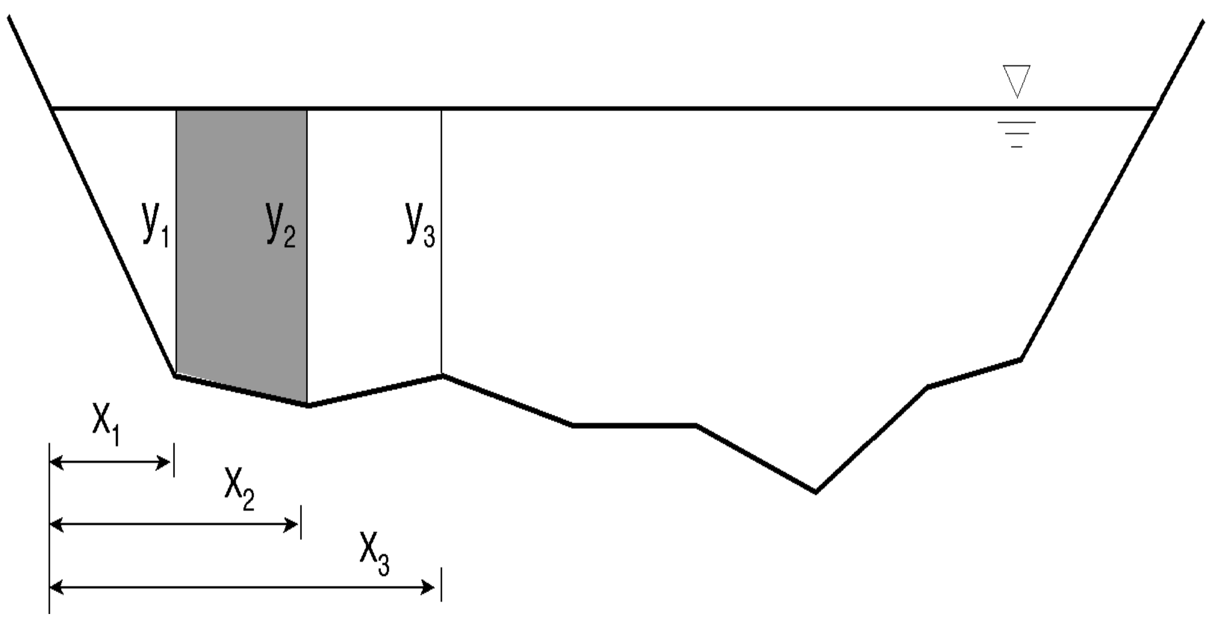


Figure 2 An example of the velocity-area stream gauging cross-sectional set up, where x is the distance from the initial point to a vertical, and y is the depth of a vertical.

$$q = w\left(\frac{y_1 + y_2}{2}\right)\left(\frac{v_1 + v_2}{2}\right)$$

Equation1 To calculate the discharge of each section, where q is the discharge of each section, w is the width of the section, y is the depth of each vertical, and v is the velocity at each vertical.

$$Q = \sum_{i=1}^{n} q_i$$

Equation 2 To calculate the stream discharge (Q) of Ward Creek you need to sum all the section discharge (q).

CHOOSING A SITE

Before getting started making velocity measurements, you need to choose a location for your stream gauging effort. To the extent possible, the site you choose should fit the following criteria:

- No eddies (or few eddies).
- A smooth cross section with minimal flow obstruction.
- Converging flow, or a location where the channel is not getting wider immediately down stream of your gauging location.

MEASURING VELOCITY: THE FLOAT METHOD

You need:

- marking tape
- tape measure
- stop-watch
- a highly visible, biodegradable, buoyant object such as a large orange peel
- at least three people; one at the top of your reach, one at the bottom, and someone to record data

Experiment:

For the float method, measure out some convenient distance along the stream bank (try at least 15 meters, i.e., a 15m "reach"). Station one person at the upstream end of your selected reach and one at the downstream end. The person at the upstream end has the stop-watch and the oranges. The person at the top releases an orange and starts the clock when the orange floats over the top boundary of your reach. When the orange passes the bottom boundary of your reach, the person at the bottom signals to the top person to stop the clock. Someone records the time and notes the distance traveled. Do this *at least three times*.

Calculations:

Surface Velocity = Distance / Time
Average Surface Velocity = Sum Surface Velocitites / Number of Trials

MEASURING VELOCITY: THE VELOCITY_AREA METHOD

You need:

- string with markings
- measuring stick
- **current meter**
- at least two people; one to measure flow rate, and one to record data

Experiment:

String a marked tape across the channel perpendicular to the flow and secure both ends. For this exercise you should have at least 4 verticals (mark 4 spots on the line with tape or ribbon). It is most convenient if the spacing between the verticals is even, but it is OK if they are not. Measure the velocity at each vertical using the current flow meter.

NOTE: *THE METER is DELICATE AND EXPENSIVE! PLEASE USE CARE!*

Keep good notes and record the distance from the bank (location of each vertical), flow rate, and depth for each vertical on your data sheet. When you have made velocity measurements for all the verticals along your cross section calculate the discharge of the Creek. To do this use the preceding equations, Figure 2, and the data you recorded in your data table.

TASKS AND QUESTIONS

1. **SITE MAP**
    - Sketch a map of the research site in your field notebook. Include the basic elements of stream morphology (label cut banks, bars, etc.), location-identifying features like bridges/roads, and a scale so the appx. width of the stream is recorded. Record the latitude, longitude, and elevation above mean sea level from the hand-held GPS unit.
    - Draw a cross-section of the area that we are profiling in your field notebook. Sketch the angles of the banks, hard surfaces, bolders, trees, etc. Label each section where discharge will be measured.

2. **MEASUREMENTS**
   In the field, record the information necessary to calculate the discharge using:
    - float method
    - velocity-area method

3. **CALCULATIONS**
   For the float method:
    - What is your average velocity from the float method?
    - What is the standard deviation of your three surface velocity measurements?
    - What is your discharge value in cfs for the float method? in m^3/s?

   For the velocity-area method:

    - What is your discharge value in cfs from the velocity-area method?
    - What is your discharge value in m^3/s from the velocity-area method?

- Use EXCEL to make a table similar to your handout that allows you to calculate discharge.

4. **COMPARE THE TWO METHODS**
    - Which discharge value is higher?
    - Why?
    - Look up the discharge recorded at the nearby USGS stream gage. Find data for Jan. 17 at: http://waterdata.usgs.gov/nwis/rt. (This site is San Lorenzo Creek above Don Castro Res)

5. **Record other important features of your chosen reach**
    - Describe the stream as meandering, braided, or straight (low sinuosity).

    - Characterize the bed material by estimating the percentages of silt/clay, fine/medium/coarse sand, fine/medium/coarse 2mm-40mm) gravel, small/medium/large cobble (60 mm-180mm), and boulders (200 mm and up)

6. Use the Thermo water quality meter to record basic water quality parameters: pH, temperature, conductivity, dissolved oxygen, oxidation-reduction potential. (We will compare these to the same parameters measured in well water later this quarter.)

Department of Earth and Environmental Sciences, CSCI

CALIFORNIA STATE UNIVERSITY EAST BAY

ASSESSMENT PLAN: B.S. in Environmental Science

PROGRAM MISSION

CSUEB Environmental Science Program Description

The Environmental Science program provides interdisciplinary scientific preparation for students wishing to pursue knowledge and employment in the fields of environmental research, consulting, and oversight. Additional objectives of the program include provision of sufficient preparation for graduate studies in environmental sciences and allied fields and partial satisfaction of the Single Subject Matter Preparation Program for a teaching credential in science.

The Bachelor of Science degree major in Environmental Science is an interdisciplinary program of study in the Department of Earth and Environmental Sciences with faculty participation from the Departments of Biological Sciences, Chemistry and Biochemistry, and Geography and Environmental Studies. In contrast to the B.A. degree major in Environmental Studies, the B.S. degree major in Environmental Science requires students to take a structured core of science courses from a variety of physical and life science disciplines, as well as a specialized upper division science coursework.

PROGRAM DRAFT STUDENT LEARNING OUTCOMES (PLOs)

Students graduating with a B.S. in Environmental Science will be able to:

PLO 1 *ILO 1,6*	Demonstrate practical skills and theoretical knowledge of the biology, chemistry, geology, and physics relevant to the Earth system, in both laboratory and field settings *(physical and life science)*
PLO 2 *ILO 1,2,4,6*	Collect, analyze, and interpret quantitative and qualitative data, individually and in groups, in order to characterize and address environmental issues *(data and analysis)*
PLO 3 ILO 1,3,5,6	Critically consider scientific findings within the context of the social, cultural, economic, ethical, and human dimensions of contentious environmental issues *(socioeconomic context)*
PLO 4 *ILO 1,3,4,5,6*	Synthesize knowledge of the major components of the Earth system, including physical, biological, and human systems, as well as human impacts *(synthesis)*
PLO 5 *ILO 1,2,3, 4,5,6*	Critically analyze environmental issues through the evaluation of scientific literature, and present their positions clearly and persuasively in written and oral form *(communication)*

Year 1: 2013-2014	
1. Which PLO(s) to assess	PLO 4 *(synthesis)*, PLO 5 *(communication)*
2. Assessment indicators	*Brownfield Remediation Capstone Report, Hazardous Waste Management Research Report*
3. Sample (courses/# of students)	ENSC 4800, ENSC 4140
4. Time (which quarter(s))	Winter 2014
5. Responsible person(s)	Michael Massey
6. Ways of reporting (how, to who)	The report was delivered to the Chair, and distributed to the faculty. It was also included within the department report.
7. Ways of closing the loop	Areas of improvement were discussed at faculty meetings, improvements and revisions to future courses are expected

Year 2: 2014-2015	
1. Which PLO(s) to assess	PLO2 *(data and analysis)*
2. Assessment indicators	Course assignments and projects, with department rubric
3. Sample (courses/# of students)	GEOL 4320, ENSC 2900
4. Time (which quarter(s))	Spring 2015
5. Responsible person(s)	Michael Massey, Jean Moran, affiliated faculty
6. Ways of reporting (how, to who)	Reports first to the Chair and then to the entire faculty for comment & discussion. An end-of-year meeting will be devoted to evaluating assessment results and “closing the loop.”
7. Ways of closing the loop	Students’ quantitative “areas for improvement” will be incorporated into modified/updated core courses for majors

Year 3: 2015-2016	
1. Which PLO(s) to assess	PLO 1 *(physical and life science),* PLO 3 *(socioeconomic context)*
2. Assessment indicators	Short assessment test given in capstone seminar, seminar paper focusing on the socioeconomic context of environmental science
3. Sample (courses/# of students)	ENSC 4800 and one of ENSC 3500, ENSC 4140, ENSC 4200, or other upper-division core
4. Time (which quarter(s))	Winter 2016
5. Responsible person(s)	Affiliated faculty (designing assessment), Michael Massey
6. Ways of reporting (how, to who)	Reports first to the Chair and then to the entire faculty for comment & discussion. An end-of-year meeting will be devoted to evaluating assessment results and “closing the loop.”
7. Ways of closing the loop	Disciplinary knowledge assessment will aid with program revision concurrent with quarter-to-semester conversion.

Year 4: 2016-2017	
1. Which PLO(s) to assess	PLO 2 *(data and analysis)*
2. Assessment indicators	Course assignments and projects, with department rubric
3. Sample (courses/# of students)	GEOL 4320, ENSC 2900
4. Time (which quarter(s))	Winter 2017, Spring 2017
5. Responsible person(s)	Michael Massey, Jean Moran, affiliated faculty
6. Ways of reporting (how, to who)	Reports first to the Chair and then to the entire faculty for comment & discussion. An end-of-year meeting will be devoted to evaluating assessment results and "closing the loop."
7. Ways of closing the loop	Assess progress made since 2014-2015, adjust strategies. Revise program requirements concurrently with quarter-to-semester conversion.

Year 5: 2017-2018	
1. Which PLO(s) to assess	PLO 4 *(synthesis)*, PLO 5 *(communication)*
2. Assessment indicators	*Brownfield Remediation Capstone Report, Hazardous Waste Management Research Report,* or other course assignments
3. Sample (courses/# of students)	ENSC 4800, ENSC 4140, other upper-division core
4. Time (which quarter(s))	Winter 2018
5. Responsible person(s)	Michael Massey
6. Ways of reporting (how, to who)	Reports first to the Chair and then to the entire faculty for comment & discussion. An end-of-year meeting will be devoted to evaluating assessment results and "closing the loop."
7. Ways of closing the loop	Assess progress made since 2013-2014, adjust strategies.