INSTITUTIONAL PROGRAM REVIEW 2015 – 2016
Program Efficacy Phase: Instruction
DUE: March 30, 2016

Purpose of Institutional Program Review: Welcome to the Program Efficacy phase of the San Bernardino Valley College Program Review process. Program Review is a systematic process for evaluating programs and services annually. The major goal of the Program Review Committee is to evaluate the effectiveness of programs and to make informed decisions about budget and other campus priorities.

For regular programmatic assessment on campus, the Program Review Committee examines and evaluates the resource needs and effectiveness of all instructional and service areas. These review processes occur on one-, two-, and four-year cycles as determined by the District, College, and other regulatory agencies. Program review is conducted by authorization of the SBVC Academic Senate.

The purpose of Program Review is to:

- Provide a full examination of how effectively programs and services are meeting departmental, divisional, and institutional goals
- Aid in short-range planning and decision-making
- Improve performance, services, and programs
- Contribute to long-range planning
- Contribute information and recommendations to other college processes, as appropriate
- Serve as the campus' conduit for decision-making by forwarding information to appropriate committees

Our Program Review process includes an annual campus-wide needs assessment each fall and an in-depth efficacy review each spring of each program on a four-year cycle. All programs are now required to update their Educational Master Plan (EMP) narrative each fall. In addition, CTE programs have a mid-cycle update (2 years after full efficacy) in order to comply with Title 5 regulations.

Two or three committee members will be meeting with you to carefully review and discuss your document. You will receive detailed feedback regarding the degree to which your program is perceived to meet institutional goals. The rubric that the team will use to evaluate your program is embedded in the form. As you are writing your program evaluation, feel free to contact the efficacy team assigned to review your document or your division representatives for feedback and input.

Draft forms should be written early so that your review team can work with you at the small-group workshops (March 4 and March 25, 2016). Final documents are due to the Committee co-chair(s) by **Wednesday, March 30** at midnight.

It is the writer's responsibility to be sure the Committee receives the forms on time.

The efficacy process incorporates the EMP sheet, a curriculum report, SLO/SAO documentation. We have inserted the curriculum report for you. We have also inserted the dialogue from the committee where your last efficacy document did not meet the rubric. SBVC's demographic data will be available on or before February 26. Below are additional links to data that may assist you in completing your document:

California Community College Chancellor's Office Datamart: http://datamart.cccco.edu/

SBVC Research, Planning & Institutional Effectiveness:
http://www.valleycollege.edu/about-sbvc/offices/office-research-planning

California Community Colleges Student Success Scorecard:
http://scorecard.cccco.edu/scorecard.aspx

Program Efficacy
2015 – 2016

Complete this cover sheet as the first page of your report.

Program Being Evaluated

Geology/Oceanography/Environmental Science

Name of Division

Science

Name of Person Preparing this Report	**Extension**
Todd Heibel, (909) 384-8638	

Names of Department Members Consulted

Donald Buchanan, Leigh Dudash, Wallace (Britt) Leatham, and Matthew Robles

Names of Reviewers (names will be sent to you after the committee meets on February 19)

Sandra Moore, Romana Pires, and Wallace Johnson

Work Flow	**Date Submitted**
Initial meeting with department	Monday, 21st March 2016
Meeting with Program Review Team	Friday, 25th March 2016
Report submitted to Program Review co-chair(s) & Dean	**by midnight on March 30, 2016**

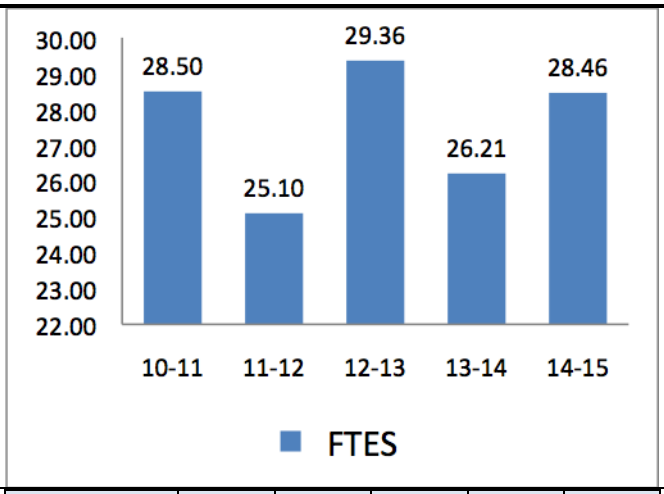
Staffing

List the number of full and part-time employees in your area (for Geology-Oceanography)

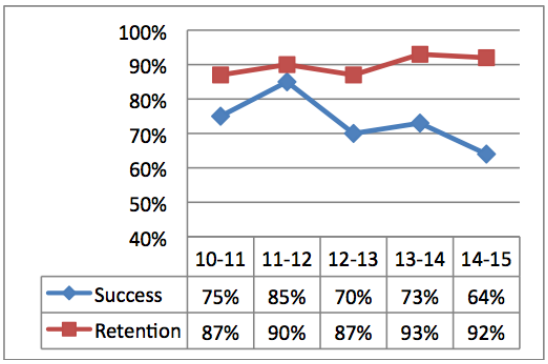
Classification	**Number Full-Time**	**Number Part-time, Contract**	**Number adjunct, short-term, hourly**
Managers	1	0	0
Faculty	0	0	4
Classified Staff	0	0	0
Total	1	0	4

Note that staffing levels for Environmental Science vary according to the department that administers each individual course.

EMP – GEOLOGY/OCEANOGRAPHY - 2014-2015



	10-11	11-12	12-13	13-14	14-15
Duplicated Enrollment	485	251	289	268	286
FTEF	2.36	1.25	1.48	1.98	2.18
WSCH per FTEF	617	588	595	397	392



Description: The Geology-Oceanography Department offers courses that examine the Earth's geological history, structure, and economic resources. These courses meet the needs of students: (1) planning to transfer to a four-year institution and to prepare for careers in research, mining, energy, hydrogeology, environmental sciences, hazards, and related fields; (2) fulfilling the undergraduate general education science requirement; and (3) who wish to better understand the planet on which we live.

Assessment:

- FTES, enrollment, and FTEF have increased from 2013-14 to 2014-15.
- Efficiency has fallen below the institutional goal of 525 since 2013-14, as the department retools courses and schedules.
- Retention has remained above institutional averages. However, success declined in 2014-15.
- Geology AS and AS-T degrees have not been awarded, however, curriculum has recently been updated to align with C-ID requirements and should allow students to earn degrees.

Department Goals:

- Hire a full-time faculty, as well as a tutor and supplemental instruction (SI) leader.
- Maintain curricular and SLO updates to meet changing transfer and career demands, including distance education (DE) courses.
- Incorporate environmental and energy (fossil fuel and alternative) research and careers into course curriculum.
- Offer historical, mineralogy, national parks, California, and field courses on a rotating basis to increase options for students, including the number of majors, degrees, transfers, and career-prepared students.
- Maintain laboratories with equipment and supplies needed for quality education.

Challenges & Opportunities:

- Lack of a full-time faculty member has curtailed growth, including: FTES, enrollment, FTEF, efficiency, success, retention, and degrees awarded.
- Renewed hiring within the environmental, energy, and geotechnical sectors should increase student interest in the program.
- Stagnant budgets over the last decade have curtailed program development.
- Lack of a dedicated tutor and SI leader continue to restrict growth and student success.

	10-11	11-12	12-13	13-14	14-15
Sections	14	8	11	15	16
% of online enrollment	0%	0%	9%	8%	0%
Degrees awarded	0	0	0	0	0
Certificates awarded	N/A	N/A	N/A	N/A	N/A

Action Plan:

- Hire a full-time faculty member.
- Offer diverse courses, including DE format, so that students can earn AS/AS-T degrees, successfully transfer to four-year institutions, and prepare for geotechnical careers.
- Coordinate with the institution to Increase the department budget for crucial field trip, equipment, tutor, and SI leader expenses and services.
- Increase the visibility of the program and better link it with other SBVC science and CTE programs, as well as off-campus entities.
- Pursue grant and scholarship opportunities to better prepare students for four-year schools and geotechnical industries.

EMP – GEOLOGY/OCEANOGRAPHY - 2014-2015

Description: Awareness of the issues of environmental quality is increasingly important in business, industry, and government. The growing human population and increasing consumption of resources are creating unprecedented pressures on our planetary life support systems. Environmental science majors need to complete an interdisciplinary set of core requirements that provide a basic understanding of the physical, biological, and social sciences and the relevance of these sciences to environmental processes and issues. In addition, the coursework will prepare students for related baccalaureate majors, including: biology, chemistry, engineering, geography (including emphasis in geographic information systems (GIS)), geology, mathematics, oceanography, and physics. For non-majors, the program's goal is to educate students to make better-informed choices about key environmental and health issues.

Assessment: Because the Environmental Science AS Degree is a collection of existing courses within disparate disciplines (refer to pages 17 and 18), there are NO stand-alone Environmental Science courses (e.g. ENVSCI), nor is there a stand-alone Environmental Science Department. Therefore, the only accurate "assessment" available is the total number of graduates earning an AS degree. In the future, the Environmental Science Degree and faculty chair will more closely coordinate with the Research, Planning, and Institutional Effectiveness and Admissions and Records Offices.

Department Goals: First, the faculty chair endeavors to update the degree to better match the various interdisciplinary course updates that have occurred during recent academic years. Second, degree modification is necessary to meet changing demands from primary transfer institutions like Cal State-San Bernardino and UC-Riverside. Third, awareness of the Environmental Science Degree must be increased, especially for STEM students. Fourth, greater collaboration among the Environmental Science faculty chair and the disciplines represented within the degree – Biology, Chemistry, Geography, Geology, GIS, Mathematics, and Physics – must occur in order to attract additional student majors and transfer-minded students.

Challenges and Opportunities: The greatest challenges for this degree include persistent low student awareness, enrollment, and completion, as well as lack of a single, full-time faculty who can devote more energy into the advertisement and improvement of this timely and important degree. Perhaps the greatest opportunity for this degree is that it is comprised of already-existing courses and requires no additional budgetary funds to maintain. In addition, the nearby transfer institutions of Cal State-San Bernardino and UC-Riverside offer BS degrees within the Environmental Sciences.

Action Plan: First, procure a grant in order to appoint a full-time faculty member to devote more time and attention to this important degree. Second, coordinate more closely with interdisciplinary departments, transfer

institutions, STEM Club, Success Center, and other stakeholders in order to attract more students. Third, modify the degree to meet curricular changes and external institutional demands.

Part I: Questions Related to Strategic Initiative: Access

Use the demographic data provided to describe how well you are providing access to your program by answering the questions below.

Strategic Initiative	**Institutional Expectations**	
	Does Not Meet	**Meets**
Part I: Access		
Demographics	The program does not provide an appropriate analysis regarding identified differences in the program's population compared to that of the general population	The program provides an analysis of the demographic data and provides an interpretation in response to any identified variance. If warranted, discuss the plans or activities that are in place to recruit and retain underserved populations.
Pattern of Service	The program's pattern of service is not related to the needs of students.	The program provides evidence that the pattern of service or instruction meets student needs. If warranted, plans or activities are in place to meet a broader range of needs.

Demographic Data – Geology-Oceanography and Environmental Sciences Departments (12-13 to 14-15)

Demographics - Academic Years - 2012-13 to 2014-15		
Demographic Measure	**Program: Geology/ Oceanography/ Environmental Sci.**	**Campus-wide**
Asian	3.2% (1.7% under-represented)	4.9%
African-American	13.1% (0.3% under-represented)	13.4%
Hispanic	55.2% (6.6% under-represented)	61.8%
Native American	1.0% (0.7% over-represented)	0.3%
Pacific Islander	0.5% (0.1% over-	0.4%

	represented)	
White	15.6% (0.2% over-represented)	15.4%
Unknown	11.4% (10.8% over-represented)	0.6%
Female	53.0% (2.1% under-represented)	55.1%
Male	47.0% (2.3% over-represented)	44.7%
Disability	3.4% (2.2% under-represented)	5.6%
Age Min:	16	15
Age Max:	75	83
Age Mean:	27 (no difference)	27

Does the program population reflect the college's population? Is this an issue of concern? If not, why not? If so, what steps are you taking to address the issue?

Geology-Oceanography and Environmental Science Demographic Patterns and Trends:

Before addressing specific demographic data attributes, it must be noted that **11.4 percent of are identified as "unkown,"** compared to a campus average of only **0.6 percent**. While it is mere speculation, some of this 11.4 percent may positively contribute to under-represented groups, including Asian, African-American, and Hispanic. This creates difficulty in assessing departmental service for specific ethnic groups. Nonetheless, the department is aware of under-represented groups and will continue taking steps to ameliorate the situation.

An additional prologue to this section must incorporate the lack of a full-time faculty member to properly recruit, expand, graduate, and transfer an acceptable number of traditionally under-represented groups. The Geology-Oceanography Department has been without a full-time faculty presence for approximately 10 years. A positive turn of events for this department has been the recent completion of the hiring process for a full-time faculty member to begin in the fall 2016 semester. It is anticipated that this full-time faculty member can assist with recruitment of additional Geology and Earth Science majors, including historically under-represented student cohorts. There is no full-time faculty member dedicated to the Environmental Science Degree. Rather, instructors from across a variety of disciplines teach courses that satisfy the demands of the degree.

Within the Earth Sciences, in general, under-represented groups have been a long-standing issue. According to *Preparing the Next Generation of Earth Scientists: An Examination of Federal Education and Training Programs* (2013):

> *[T]he federal earth science workforce—and the academic programs that produce graduates—does not yet mirror the ethnic, racial, and gender diversity of the U.S. [U]nderrepresented minorities (African American, American Indian, and Hispanic or*

Latino of any race) composed 30 percent of the U.S. population in the 2010 Census, but received only 7.2 percent of earth science bachelor's degrees awarded in 2009 ... Underrepresented minorities make up 3.5 percent of earth science-related positions at the U.S. Geological Survey ... and between 2.2 and 8.1 percent of all geoscience and environmental science occupations ... Women comprise 51 percent of the U.S. population and received 39 percent of bachelor's degrees in geoscience ... [Women] hold 21 percent of USGS earth science-related positions ... and 30 percent of all geoscience and environmental science occupations.

Although the Geology-Oceanography Department and Environmental Science Degree demographic data generally reflects that of the campus as a whole, under-represented groups include Asian, African-American, Hispanic, Female, and Disabled. Unfortunately, these (all but Disabled) are the same groups that remain perennially under-represented within Earth Science degree programs and subsequent Earth Science and Environmental Science careers.

In terms of gender, females are somewhat under-represented (2.1 percent under-represented) and males are somewhat over-represented (2.3 percent over-represented) within Geology and Oceanography, as compared to the overall campus population. However, females outnumber males within the department. Nonetheless, it remains a goal for both programs to continue to recruit, maintain, transfer, and graduate a larger population of women. As part of an overall STEM (science, technology, engineering, and mathematics) outreach effort, Geology and Oceanography endeavor to join other STEM programs on campus in the creation of grants, scholarships, tutoring and workshops, internships, career and transfer events and visits, field trips, guest speakers, and other events designed to attract women and other traditionally under-represented groups.

The average age for both programs is the same as the campus (27 years). Many Geology and Oceanography students are not science majors and may perceive other physical sciences courses such as Astronomy, Biology, Chemistry, and Physics as beyond their comprehension. However, anecdotal evidence suggests that some Geology and Oceanography students develop a passion for the Earth and physical sciences. Some students continue to take subsequent Geology courses at SBVC and transfer institutions and a few have completed undergraduate and graduate degrees within the Geological Sciences.

Disabled students are under-represented (2.2 percent under-represented) in the Geology-Oceanography Department and Environmental Science Degree. This may reflect the centrality of field work to both sciences. Although speculative, some disabled students may assume that they are unable to participate in field work and site visits as a result of mobility issues. While it is true that some field sites are not amenable to students with mobility issues, disabled students are able to participate and enjoy the field in a meaningful way. For example, when hiring a bus (department funds selected site visits), the instructor will request a bus equipped with a chair lift if one or more students requires this type of access. Instructors will also give special instructions to students who have varying mobility and other needs. This is true for the classroom, as well as the field. In short, Geology and Oceanography endeavor to be as accommodating as possible for students with a variety of disabilities and needs.

In terms of ethnic representation, it is important to reiterate that the data for the Geology-Oceanography Department and Environmental Science Degree reflect a large number of "decline to state," "other," and "unknown" categories when compared to the entire campus population. Nonetheless, it appears that Asian, African-American, and Hispanic populations are under-represented within the department. As with women, it is important for all STEM programs to continue to attract traditionally under-represented populations, including African-Americans, Hispanics, Native Americans, and Asian-Pacific Islanders. There are numerous opportunities to partner with other STEM programs on the SBVC campus, as well as four-year transfer institutions. Grant opportunities exist within the public and private realms, especially

within the Geological and Environmental Sciences. The Geology Department and Oceanography Program and Environmental Science Degree endeavor to increase on- and off-campus partnerships. Specifically the department and program will coordinate more fully with the SBVC grant director, other departments within the Science and Mathematics Divisions, and four-year transfer institutions in order to recruit, transfer, and graduate larger numbers of traditionally under-represented populations. Overall, there is an increased need for STEM majors and graduates throughout the United States and California, regardless of ethnicity. The SBVC Geology-Oceanography Department and Environmental Science Degree have a role to play in addressing the current shortage of STEM students.

Although the Geology-Oceanography Department and Environmental Science Degree continually strive to serve all students, a lack of a dedicated, full-time faculty member significantly hampers outreach and recruitment efforts. The recent full-time faculty member hire for this Geology-Oceanography Department has the potential to dramatically improve outreach efforts for traditionally under-represented students.

Pattern of Service

How does the pattern of service and/or instruction provided by your department serve the needs of the community? Include, as appropriate, hours of operation/pattern of scheduling, alternate delivery methods, weekend instruction/service.

Geology- Oceanography Department:

During the fall and spring semesters, daytime courses are typically offered during the week, Monday through Thursday, from 9:30 am through 3:50 pm. Evening courses are typically offered during the week, Monday through Thursday, from 6:00 to 8:50 pm. At least once per academic year (fall or spring semester), special topic field courses are offered on a short-term (compressed calendar) basis on Friday evenings, including a multi-day weekend field trip to pertinent sites of geologic interest.

It has been at least two years since the Geology-Oceanography Department has offered an interactive television (ITV) format course. This distributed education (DE) course is simulcast from the SBVC Campus to students on the Big Bear Campus. The department endeavors to offer another ITV mediated course within the next academic year (2016-17). In addition, GEOL 101: Introduction to Physical Geology Lecture and OCEAN 101: Elements of Oceanography Lecture have been approved for full online DE delivery. With the addition of a full-time Earth Science faculty, it is anticipated that GEOL 101 and OCEAN 101 will be offered in a hybrid or full online DE format within the next two academic years. Furthermore, DE curriculum for additional Geology courses will be submitted to the Curriculum Committee for approval during the coming academic year (2016-17).

Geology and/or Oceanography courses have been offered during the summer semester since 2012 (2012 through 2015), as funding and faculty availability allow. Both Geology and Oceanography courses are scheduled for the summer 2016 semester.

As a result of a lack of full-time faculty and funding, Oceanography was not offered during the following semesters: fall 2011, spring 2012, fall 2012, spring 2013, and fall 2013.

The following Geology and Oceanography courses have been offered during the 2010-11, 2011-12, 2012-13, 2013-14, and 2014-15 academic years (fall and spring semesters):

- 2010-11: GEOL 101, GEOL 111, GEOL 122, GEOL 222, OCEAN 101, and OCEAN 111,
- 2011-12: GEOL 101, GEOL 111, GEOL 122, and GEOL 222,
- 2012-13: GEOL 101, GEOL 111, GEOL 122, GEOL 222, and GEOL 251,
- 2013-14: GEOL 101, GEOL 111, GEOL 112, GEOL 170, GEOL 222, GEOL 270, OCEAN 101, and OCEAN 111, and
- 2014-15: GEOL 101, GEOL 111, GEOL 122, GEOL 222, GEOL 250, OCEAN 101, and OCEAN 111.

For the current 2015-16 academic year (fall and spring semesters), the following courses have been offered: GEOL 101, GEOL 111, GEOL 170, GEOL 222, GEOL 270, OCEAN 101, and OCEAN 111.

The following Geology and Oceanography courses have been offered during the summer semesters from 2012 through 2015:

- 2012: OCEAN 101 and OCEAN 111,
- 2013: OCEAN 101 and OCEAN 111,
- 2014: OCEAN 101 and OCEAN 111, and
- 2015: GEOL 101, GEOL 111, OCEAN 101, and OCEAN 111.

For the coming summer 2016 semester, the following courses will be offered: GEOL 101, GEOL 111, OCEAN 101, and OCEAN 111.

Although a comprehensive suite of Geology and Oceanography courses are offered during the daytime, evening, and summer time frames, expanding the DE online and hybrid presence, as well as compressed calendar formats (for example, eight weeks) may allow the department to attract and recruit additional students, especially those identified as under-represented. In addition, some courses, including GEOL 112: Historical Geology and GEOL 201: Mineralogy, are not regularly offered due to lack of a full-time faculty member. With the addition of a full-time faculty member in the fall 2016 semester, some of these significant structural issues can be resolved.

Environmental Science Degree:

Many of the individual courses that comprise the Environmental Science Degree are offered during a variety of daytime, evening, weekend, short-term, hybrid, and fully online formats. Some courses are offered during both fall and spring semesters, and a few are offered during the summer semester. Therefore, it is a relatively simple procedure for well prepared students – students who have assessed into or completed appropriate science and mathematics courses – to complete the Environmental Science Degree in a timely manner. Nonetheless, degree modification is in order to meet changing curriculum demands at the individual course level, as well as changes that have occurred at primary transfer destinations, including Cal State-San Bernardino and UC-Riverside.

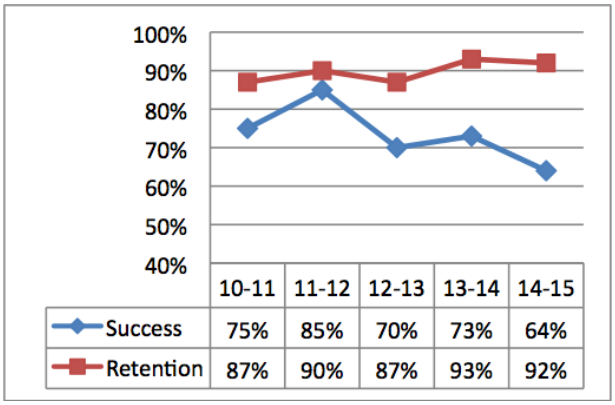
Part II: Questions Related to Strategic Initiative: Student Success

Strategic Initiative	**Institutional Expectations**	
	Does Not Meet	**Meets**
Part II: Student Success – Rubric		
Data/analysis demonstrating achievement of instructional or service success	Program does not provide an adequate analysis of the data provided with respect to relevant program data.	Program provides an analysis of the data which indicates progress on departmental goals. If applicable, supplemental data is analyzed.

Student Learning Outcomes (SLOs)	Program has not demonstrated that they are continuously assessing Student Learning Outcomes (SLOs) based on the plans of the program since their last program efficacy. Evidence of data collection, evaluation, and reflection/feedback, and/or connection to student learning is missing or incomplete.	Program has demonstrated that they are continuously assessing Student Learning Outcomes (SLOs) based on the plans of the program since their last program efficacy. Evidence of data collection, evaluation, and reflection/feedback, and connection to student learning is complete.

Provide an analysis of the data and narrative from the program's EMP Summary and discuss what it reveals about your program. (Use data from the Charts 3 & 4 that address Success & Retention and Degrees and Certificates Awarded")

Geology-Oceanography Department Success and Retention Data:



	10-11	11-12	12-13	13-14	14-15
Success	75%	85%	70%	73%	64%
Retention	87%	90%	87%	93%	92%

While retention has remained relatively high (upper 80s to lower 90s percent) during the five most recent academic years, success has declines from the low to mid 70s percent (with the exception of an 85 percent spike in 2011-12) to 64 percent. This is in spite of fairly steady FTES and duplicated student enrollment from 2011-12 through 2014-15 (FTES and duplicated student enrollment are reviewed in detail in the "Productivity" section), there has been a marked decline in student success between the 2013-14 and 2014-15 academic years. This could be the result of several factors, including:

- Lack of a full-time faculty member (and associated lack of faculty office hours and general support infrastructure for students),
- Lack of a dedicated Geography/Oceanography/Earth Science tutor/SI leader,
- Failure of faculty to drop chronically absent students, and
- Absence of a Geology Club (in which students can form beneficial study groups and other partnerships).

Potential solutions to remedy the recent decline in student success will (or may) include:

- The District has granted approval to hire a full-time faculty to begin teaching during the fall 2016 semester,
- Faculty Directed Tutoring (FDT) grant funds are currently (spring 2016 semester) supporting a

Geography/Oceanography/Earth Science tutor, and funds for future tutorial and SI support have been requested via the Program Review Needs Assessment process,

- Division and department meetings will redouble their efforts to encourage faculty (full-time and adjunct) to more actively monitor student progress, participation, and attendance, and
- The Geology Club can be more easily resurrected as soon as the full-time faculty member begins teaching.

Additional retention data below compares the Geology-Oceanography Department with the Science Division and College as a whole:

Academic Year:	Geology-Oceanography Retention	Science Division Retention	College Retention
2010-11	87 percent	79 percent	81 percent
2011-12	90 percent	83 percent	84 percent
2012-13	87 percent	89 percent	89 percent
2013-14	93 percent	88 percent	89 percent
2014-15	92 percent	88 percent	88 percent

With the exception of the 2012-13 academic year, the Geology-Oceanography Department supported student retention in excess of the Science Division and college as a whole. The department endeavors to maintain a high retention rate.

Geology-Oceanography Department Degrees and Certificates Awarded Data:

	10-11	11-12	12-13	13-14	14-15
Sections	14	8	11	15	16
% of online enrollment	0%	0%	9%	8%	0%
Degrees awarded	0	0	0	0	0
Certificates awarded	N/A	N/A	N/A	N/A	N/A

Neither Geology AS nor AS-T degrees have been awarded during the most recent five-year period. However, with the forthcoming full-time faculty member on board, infrequently offered courses can be more systematically and regularly offered such that students can begin to complete AS and AS-T degrees. In addition, the full-time faculty member will better be able to engage and outreach and recruitment to further expand the program, thereby attracting additional Geology majors.

Department Goals from EMP Narrative:

- Hire a full-time faculty, as well as a tutor and supplemental instruction (SI) leader: A full-time faculty member will begin teaching and supporting the department in the fall 2016 semester. A tutor is currently (spring 2016) funding through a Faculty Directed Tutoring (FDT) Grant.
- Maintain curricular and SLO updates to meet changing transfer and career demands, including distance education (DE) courses: All Geology and Oceanography courses have up-to-date curriculum, and GEOL 101 and OCEAN 101 have been approved for full DE online delivery. SLOs are regularly discussed and even updated each semester within departmental meetings. There is a concerted effort to assess each SLO for each section every semester with a subsequent three-year SLO evaluation for courses and program.
- Incorporate environmental and energy (fossil fuel and alternative) research and careers into course curriculum: With a full-time faculty member on board, curriculum updates that include Earth Science careers and research will be more feasible.
- Offer historical, mineralogy, national parks, California, and field courses on a rotating basis to increase options for students, including the number of majors, degrees, transfers, and career-prepared students: The full-time faculty member will better facilitate offering a greater variety of courses on a more systematic, regular basis.
- Maintain laboratories with equipment and supplies needed for quality education: The full-time faculty member will better be able to advocate (through the Program Review process) for additional departmental funding.

Supplemental Data

Provide any additional information, such as job market indicators, standards in the field or licensure rates that would help the committee to better understand how your program contributes to the success of your students.

Job market related to their majors or certificates: (resource: CC Benefits):

Available career paths for those with AS, BS, and BA Degrees within the Geological Sciences may include (*source: Dickinson College Department of Geology: www.dickinson.edu/career/student/geology.html*):

- Environmental consultant,
- Petroleum geologist,
- Hydrogeologist,
- Engineering geologist,
- Hydrologic technician,
- Mineralogist,
- Chemist,
- Gemologist,
- Environmental worker,
- Laboratory manager,
- Education (preschool, elementary school, secondary education, and higher education),
- Museum researcher,
- Soil engineer,
- Insurance researcher, and
- Attorney (environmental law).

Standards in the field:

In accordance with the California Board for Geologists and Geophysicists: *Anyone who offers to practice or practices geology or geophysics for the public in California must be licensed as a geologist or geophysicist.*

Licensure rates:

Specific licensure rates for Geologists and Geophysicists were difficult to obtain. However, according to the *Minutes of the Meeting of the*

Board for Geologists and Geophysicists and

Technical Advisory Committee (TAC), "As of Nov 6, 2005 there were 4,792 Professional Geologists (PG), 1,575 Certified Engineering Geologists (CEG), 821 Certified Hydrogeologists (CHG) and 229 Registered Geophysicists (RGP) with clear licenses" within the State of California.

Student Learning Outcomes

Course SLOs. Demonstrate that your program is continuously assessing Course Student Learning Outcomes (SLOs), based on the plans of the program since the last efficacy review. Include evidence of data collection, evaluation, and reflection/feedback, and describe how the SLOs are being used to improve student learning (e.g., faculty discussions, SLO revisions, assessments, etc.). Generate reports from the SLO Cloud as necessary. Include analysis of SLO Cloud reports and data from 3-year summary reports. This section is required for all programs.

See Strategic Goal 2.11

Three-Year SLO Summaries for Geology-Oceanography:

GEOL 101: Introduction to Physical Geology Lecture:

Course Summary Report

Year	2015 - 2016	Period	Last 3 Years		
Division	Science	Dept	GEOL	Course	GEOL-101

Tools

Course SLOs

Note: Course SLO Summary Evaluation Form is available.

#	SLO Statement	# of Students Assessed	# of Students who Met SLO	% of Students who Met SLO
1	Students will learn about the dynamics of the interior of the earth and the relationship between Plate Tectonics and the formation of the continents and the Ocean Basins. Students will be able to identify the geologic features that identify plate margins and, given an outline map of the world, be able to name to the major lithospheric plate and to draw reasonably accurate boundaries of the plates.	58	49	84.48%
2	Students will learn about the 3 major rock types that make up the surface of the earth and the geologic processes responsible for the formation of each rock type.	86	72	83.72%
3	Students will learn to identify major topographic features of the earth's surface through exposure to diagrams, photographs, aerial photographs, satellite images, and other visual media, and will be able to describe, using appropriate geologic terminology, the relationship between these features and the geologic processes responsible for their formation.	46	41	89.13%
4	Students will learn the major rock types through development of the major processes of the rock cycle and their occurrence in various geological environments.	16	14	87.50%
5	Students will demonstrate an understanding of the basic principles of plate tectonics and plate-boundary geological phenomena.	38	34	89.47%

Assessment Methods and Criteria:

- SLO #1: Students completed a quiz which summarized the stresses and strains associated with divergent, convergent, and transform plate boundaries SLO #2: This SLO was estimated from student performance on a comprehensive test of rock types and both surficial and tectonic processes.
- Both SLO 1 and SLO 2 were assessed using exams during the semester. A "good enough" threshold is if a student attained a 70% accuracy on the exam.
- Methods of assessment are quizzes and exams including diagrams. "Good Enough" is 70%.
- Students are given a quiz over the relationships between plate boundaries, stress/strain type, plate motion, faulting, and geographical correlates. 70% is considered sufficient to meet the SLO.

Reflections:

- SLOs on this form appear to be slightly out of date and do not align precisely with current curricula. SLO #2 was estimated based upon student performance on the most closely related test, and SLO #3 is not sufficiently aligned with current course curricula to be reliably assessed. SLOs are being re-examined and updated to closely follow the course outline by Fall 2015. The assessments and the course materials will continue to be monitored to assure that they are complementary and align with course objectives.
- In the future, these SLOs will be modified to better reflect the course objectives.
- I was pleased with the results of this assessment. In future semesters I will design similar assessments for the scientific method and the rock cycle.

Analysis:

More than 83 percent of students met each of the five GEOL 101 SLOs. However, per comments in the “Reflections” section and department SLO meeting, GEOL 101 SLOs have been updated to the following:

GEOL 101 Revised SLOs:

1. Students will be able to understand and apply the scientific method to assess Earth systems and components (e.g. atmosphere, biosphere, hydrosphere, geosphere, etc.).

2. Students will learn the major rock types through development of the major processes of the rock cycle and their occurrence in various geological environments.

3. Students will demonstrate an understanding of the basic principles of plate tectonics and plate-boundary geological phenomena.

GEOL 111: Introduction to Physical Geology Laboratory:

Course Summary Report

Year	2015 - 2016	**Period**	Last 3 Years		
Division	Science	**Dept**	GEOL	**Course**	GEOL-111

Tools

Course SLOs

Note: Course SLO Summary Evaluation Form is available.

#	SLO Statement	# of Students Assessed	# of Students who Met SLO	% of Students who Met SLO
1	Students will be able to recognize 20-30 of the most common minerals of the Earth using only the easily discernable physical properties of the minerals. It is expected that students will be able to identify at least 70% of the examples presented in a practical laboratory exam.	61	52	85.25%
2	Students will be able to develop a sense of scale in dealing with the Earth and the major features of the Earth (continents and ocean basins) by exposure to maps and charts of different scales, different kinds of map projections, and different kinds of map presentations. Students will be able to locate various features on maps, given the appropriate coordinates for the map (latitude and longitude, township and range, or some other system) and will be able to determine distances and directions to other points of interest using the appropriate scale and azimuth.	30	27	90.00%
3	Students will be able to identify rock samples representative of some of the more common varieties of the 3 major rock families. It is expected that students will be able to identify at least 70% of the examples presented in a practical laboratory exam	10	10	100.00%
4	Practically apply principles of the scientific method (e.g. making and recording observations and developing appropriate interpretations).	12	11	91.67%
5	Students will be able to identify common minerals using discernable physical properties.	12	10	83.33%
6	Students will be able to identify common igneous, sedimentary, and metamorphic rocks	12	8	66.67%

Assessment Methods and Criteria:

- Laboratory mineral exam 70%
- Students are given the opportunity to analyze common rocks and minerals, and then tested on their ability to identify new samples of these same rocks and minerals. SLO #1 is assessed via a measurement and conversion exercise utilizing significant figures. 70% is considered sufficient to meet the SLOs.

Reflections:

- Students were tested on mineral samples that were similar to those they had studied but were not the same samples. This resulted in a slightly more difficult but much more relevant experience because students are asked to study and learn the mineral properties rather than memorizing individual samples. Future emphasis should continue to be on understanding principles rather than teaching to the test.
- I would like for the success rate to be higher for #3. I will examine the appropriateness of my test and whether students are given sufficient time.

Analysis:

During a department SLO discussion, it became apparent that faculty were utilizing multiple sets of GEOL 111 SLOs. In other words, SLOs were not truly standardized for this course. This is somewhat evident in the relatively small number and consequent lower attainment within SLOs 3 through 6. GEOL 111 SLOs have since been updated accordingly:

GEOL 111 Laboratory Revised SLOs:

1. Practically apply principles of the scientific method (e.g. making and recording observations and developing appropriate interpretations).

2. Students will be able to identify common minerals using discernable physical properties.

3. Students will be able to identify common igneous, sedimentary, and metamorphic rocks.

GEOL 122: Historical Geology:

SLO data has not been collected for this course. This course has been offered only once (during the 2013-14 academic year) within the 2010-11 through 2014-15 period. As soon as the new, full-time faculty member is available to teach it on a more regular basis, SLO data will be collected and assed in a logical, systematic manner.

GEOL 122: Environmental Geology:

Course Summary Report

Year: 2015 - 2016 | Period: Last 3 Years

Division: Science | Dept: GEOL | Course: GEOL-122

Tools

Course SLOs

Note: Course SLO Summary Evaluation Form is available.

#	SLO Statement	# of Students Assessed	# of Students who Met SLO	% of Students who Met SLO
1	Students will demonstrate an understanding of the geologic basis for the origin of renewable and nonrenewable resources, as well as pros and cons of using these resources.	7	6	85.71%
2	Students will demonstrate an understanding of how volcanic eruptions can produce hazards that can affect humans.	7	7	100.00%
3	Students will demonstrate competence in the subject field by completing the course and attaining an overall 60% accuracy in all homework, out of class- assignments, in-class work, quizzes and examinations over the course of the semester	7	7	100.00%

Assessment Methods and Criteria:

- Students completed a total of four assessments during the semester for SLO 7: a pre-test at the beginning of the semester, a quiz after learning about volcanic hazards, an exam, and the final exam.
- Students completed a total of two assessments during the semester for SLO 6: a pre-test on renewable and nonrenewable resources at the beginning of the semester and the final exam at the end of the semester.
- Students completed homework, out of class- assignments, in-class work, quizzes and examinations over the course of the semester.
- Each volcanic hazards assessment was worth a total of 10 points. A “good enough” threshold is 7 out of 10 possible points (70 percent).
- Each renewable and nonrenewable resources assessment was worth a total of 10 points. A “good enough” threshold is 7 out of 10 possible points (70 percent).
- A "good enough" threshold is if a student attained an overall 60% accuracy in all homework, out of class-assignments, in-class work, quizzes and examinations over the course of the semester.

Reflections:

- This was my first time teaching this class, so everything was a new challenge and strategy. I found that students related well to the content when I showed and discussed videos of real-world examples of environmental and geologic issues. I will continue to use this strategy in the future.

Analysis:

While the SLO Cloud data suggest that GEOL 122 has collected on one semester's worth of data, in fact, this course has collected SLO data during each academic year that it has been offered (2010-11, 2011-12, and 2012-13). Prior to 2014-15, GEOL 122 SLO data have been collected on the older-format, hardcopy document. Nonetheless, SLO 3 will likely be deleted or replaced with an SLO that incorporates hydrogeology and water resource issues.

GEOL 170: Geological History of the Great Basin Province:

SLO Assessment Data Collection Sheet

(Due to the Division Office each semester by Final Grade Submission Date)

Faculty Name: Donald G. Buchanan Department: Geology/Oceanography Semester/Year Assessed: Spring/2014	Course: Geol 170 Section: 50 Units: 1

Outcomes	Students will document their field trip with annotated maps, photos of geological and historical sites, and collected literature. Students will prepare a college-level, typewritten field report that integrates lecture and laboratory (field) materials and observations.
Assessment Methods	Physical submission of annotated maps and college-level photo journal report for faculty review and comments.
Criteria – what is "good enough"? (Attach department or faculty rubric or use the generic rubric below)	Maps must have route of field trip with physical sites visited annotated sequentially. Photo journal report must be integration of typed lecture and notes with photo documentation.
Enter the distribution of student SLO assessment results. Is this distribution satisfactory?	Assessment results are not satisfactory as life and medical issues have lowered the completion of course requirements. Five Incompletes are a result of medical and life issues beyond student control impacting SLO assessment results.

Draft: Generic Rubric for use if Departmental or Faculty Rubric is Not Available.	Total number of students enrolled in the class	Number of students who met the SLO	Number of students who did not meet the SLO	Number of students who did not assess
SLO 1	17	12	4	1
SLO 2	17	8	8	1
SLO 3				

GEOL 201: Mineralogy:
This course has not been offered during the 2010-11 through 2014-15 academic period.

GEOL 222: Independent Study in Geology:

Course Summary Report

Year	2015 - 2016	**Period**	Last 3 Years		
Division	Science	**Dept**	GEOL	**Course**	GEOL-222

Tools

Course SLOs

Note: Course SLO Summary Evaluation Form is available.

#	SLO Statement	# of Students Assessed	# of Students who Met SLO	% of Students who Met SLO
1	Given a particular problem or project in geography, by using library and/or Internet work and related research, students will, on an independent basis, and under the guidance of the instructor, demonstrate a deeper understanding of the geographical concepts involved in the problem or project by correctly describing these concepts.	4	4	100.00%
2	By properly applying geographical principals, students will gain further insight into the problem or project.	4	4	100.00%
3	Students may use laboratory or field work to explore and analyze geographical systems in order to further study the physical and cultural aspects of a problem or project at an appropriate geographic scale.	3	3	100.00%
4	Students will discuss concepts of internal and external geophysical processes that have created the present-day Sierra Nevada and Basin and Range Provinces, based upon lecture material.	2	2	100.00%
5	Students will discuss geologic features common to selected national parks, monuments, wildernesses, and historical sites within the Sierra Nevada and Basin and Range Provinces.	2	2	100.00%
6	Students will prepare a time-sequential field notebook, including all geological sites with elevation and GPS for each site, as well as drawings and geological descriptions.	3	3	100.00%
7	Students will document their field trip with annotated maps, photos of geological and historical sites, and collected literature.	3	3	100.00%
8	Students will prepare a college-level, typewritten field report that integrates lecture and laboratory (field) material and observations.	3	3	100.00%
9	Using Google Earth software and in situ GPS recordings, students will verify the latitude, longitude, and elevation of selected metamorphic mineral and rock sites within a Google Earth map (final) product.	1	1	100.00%
10	Students will submit timely (weekly, monthly, etc.) work reports and noteworthy hand specimens to both immediate supervisor and Independent Study supervisor.	1	1	100.00%

Assessment Methods and Criteria:

- SBVC/CSU student assigned to develop bibliographic research for Cajon Pass region for use by SBVC faculty for Association of Environmental Engineering Geologist (AEG) Inland Chapter field trip and use by faculty for enhancing both Geology and Geography lab field trips. The evaluation of student's work by instructor and Department Chair were specifically addressing the following criteria: geotechnical evidence of landslides, earthquake faults, and erosional surfaces; documented paleontological findings in marine and non-marine sedimentary beds; and historical geologic structures found in the Cajon Pass via named stratigraphic formations. Multiple faculty evaluations of research accomplished led to continued expansion of literature found for field trip road log research reference list by three SBVC Geology faculty to establish publishable field trip document.
- Student was assigned to continue rock storage room labeling project of mineral and rock bin drawers begun in 2014 for multiple faculty use. The student was to correctly reorganize and relabel the entire collection of rock and mineral bins, over 100 per category: Minerals, Igneous rocks, Sedimentary rocks, and Metamorphic Rocks. Criteria was to replace old unreadable paper copy labels for hundreds of storage bins for SBVC rock and mineral collection as developed during the 20th Century by prior faculty who have long since retired. Improvement effort was also added to label not only the front metal slot, but also to add new label on pull drawer handles for easy viewing while standing looking down to floor level. Instructor and Department Chair

worked with student to ensure quality, accuracy and completeness of project.

- Assessment entailed instructor evaluation of each student's handwritten field notebook and annotated maps with required GPS data from the 3-day field trip with route highlighted and specific locations of field sites for evaluation of individual performance. In addition each student was required to submit a college-level, typewritten field report consisting of photos in a journal format documenting the 3-day field trip's geological and historical sites visited with descriptive text from field notes, textbook readings and literature search online or found in other materials obtained on the field trip. The photo journal reports were in three different modes: hard copy scrap book or binder, Word Document, or Power Point.
- Instructor worked with student to perform initial Google Earth research of ACME Mine location southeast of the Shoshone, CA area to locate desert roads to navigate into mine area to supplement San Bernardino County maps so as to correctly locate the mine property. Instructor supervised the student site visit to the 20 acre property during a weekend site search for property markers (cairns or piles of rocks with BLM ownership paperwork). Student and instructor used multiple GPS devices to determine elevation, latitude and longitude positions of the property markers, taking photos of each marker, and collecting representative specimens from the geological formation. The student subsequently used her National Geographic Society Topographic Data base CDs to locate the topo map for the historical ACME Talc Mine property for this project. The final document consisted of a typed field trip note log of the site visit and the GPS data results.

Reflections:

- These downloaded Geog 222 SLO Statements "were not accurate" and need to be rewritten as applied to this specific Geol 222 Independent Study course created by instructor and Department Chair. Each Geol 222 or Geog 222 class is independent from previous courses and presents a "moving target" for which SLOs are difficult to create, measure, and define as every Geol 222 class is unique, with new measurement assessment methods and criteria. There appeared to be no way to alter the previously used fall 2014 SLOs, as text for the SLOs would not allow deletion, addition, or any changes to correct downloaded examples from fall Geog 222 examples. I was instructed by Department Chair to go ahead and submit, and then to alert Dr. Bangasser, Dean of Science, and Dr. Huston, SLO Coordinator as to the challenge presented.
- These SLO Statements for Geog 222 from Fall semester 2014 do not apply to this specific Geol 222 project as rolled over and inserted into Geol 222 shell, and were not correctable. Dr. Heibel, Department Chair instructed me to go ahead and submit SLO records to reflect that a student did the course, and to alert Dr. Bangasser and Dr. Huston to the need for correction of the actual SLO statements. I will send e-mails to all concerned so that the submissions can be accomplished on time, and that the content can be corrected later. The major problem with this approach for submission is that we have unique Geol 222 and Geog 222 courses as Independent Study efforts to help the students and faculty with our two Departmental programs so that students can learn how to improved their understanding of our disciplines, and have to have an ability to change SLOs every course. Previously used SLOs for Independent Study courses don't work for Independent Study courses.
- The Geology 270 students with Geol 101 prerequisites were capable of grasping the geologic features and rock types much more effectively than the Geog 110 students, but that was to be expected. Shifting students over from photo journal report binders or scrap book binders to computerized Word Document and Power Point reports helped increase skill development for students, but took a lot of extra time by instructor to provide instruction on how to produce report in these formats. Hard copy scrap books or photo journal binders as prepared over the last decade have become too expensive for low income students, and moving to electronic computer documents has increased the successful development of scientific and cultural documentation techniques for these students.
- This project was a unique follow up effort to locate the historical ACME Talc Mine and to properly identify its location with GPS data for BLM documentation requirements using modern GPS devices and provide supporting mapping data from Google Earth and National Geographic Society's Topo Map CDs. This support to mine owner will allow our Geology Department to continue to take students to this mine with owner's permission for collecting talc specimens as well as geologic formation rock and mineral materials normally

found in Death Valley where no specimen collecting is allowed.

Analysis:

Because of the nature of the GEOL 222 independent study course, topics change from one semester to the next. Oftentimes, students enrolled in this course during the same semester will engage in varied projects. This explains the "laundry list" of SLOs identified for this course.

GEOL 250: Geology of California:

SLO Assessment Data Collection Sheet

(Due to the Division Office each semester by Final Grade Submission Date)

Faculty Name: Donald G. Buchanan Department: Geology/Oceanography Semester/Year Assessed: Fall 2014	Course: Geol 250 Section: 02 Units: 3

Outcomes	Students will develop their knowledge of California's 12 geomorphic provinces during the semester by active participation in chapter study guides to identify key geologic concepts associated with each province in relation to plate tectonics and geological time. SLO 1 will evaluate student knowledge of the 12 provinces through a series of nomenclature development using four quizzes. SLO 2 will ensure that basic concepts of fault terminology found in all provinces is attained through two concept quizzes.
Assessment Methods	Students will correctly identify the 12 provinces and develop understanding of geologic time via quizzes, perform power point presentations on selected geologic features or locations within the provinces, and turn-in typed field trip reports covering five areas of concern. Specifically: • Students completed four geomorphic province quizzes – to measure knowledge of California's 12 geomorphic provinces – in order to assess SLO 1. • Students completed two fault terminology quizzes – to measure knowledge of faulting within California's 12 geomorphic provinces – in order to assess SLO 2.
Criteria – what is "good enough"? (Attach department or faculty rubric or use the generic rubric below)	Students will demonstrate competence of the major geologic internal and external processes involved with faults, plate tectonics and hydrologic cycle through geologic time, as well as identification of the 12 distinct provinces created by these processes in quizzes, assignments and exercises, and attainment of overall 70% accuracy in all assessment methods.
Enter the distribution of student SLO assessment results. Is this distribution satisfactory?	All students demonstrated 79 % or better on SLO 1 with a 96.6% average score to attain very satisfactory achievements. The SLO 2 lowest score was 80% and averaged 95.9% score for all students, again quite satisfactory knowledge development.

Draft: Generic Rubric for use if Departmental or Faculty Rubric is Not Available.	Total number of students enrolled in the class	Number of students who met the SLO	Number of students who did not meet the SLO	Number of students who did not assess
SLO 1	11	11	0	0
SLO 2	11	11	0	0

Assessment Methods and Criteria:

- Students completed four geomorphic province quizzes – to measure knowledge of California's 12 geomorphic provinces – in order to assess SLO 1.
- Students completed two fault terminology quizzes – to measure knowledge of faulting within California's 12 geomorphic provinces – in order to assess SLO 2.
- Students will demonstrate competence of the major geologic internal and external processes involved with faults, plate tectonics and hydrologic cycle through geologic time, as well as identification of the 12 distinct provinces created by these processes in quizzes, assignments and exercises, and attainment of overall 70% accuracy in all assessment methods.

Reflections:

- We had students perform individual power point presentations on key geologic locations within the provinces (i.e. Sutter Buttes, Lassen Peak National Park, Devils Postpile National Monument, Coastal Ranges and Yosemite National Park, etc.) as a new assessment tool to help students develop research skills, as well as learn how to do power points and appropriately communicate with fellow students on newly learned concepts with a minimum of 50 slides.
- We also added four field trip opportunities (three single day trips and one 3 day weekend field trip) to the students to spend time in the Basin and Range Province, Mojave Desert Province, Transverse Range Province and the Peninsular Range Province, each with their own geologic history and features.
- The power point presentations, field trips, typewritten field trip report, chapter study guides, and geologic time, rock cycle, and hydrologic cycle quizzes supplemented the geomorphic province and faulting quizzes used to assess SLO 1 and SLO 2. It is clear that students benefitted from this diversity of in- and out-of-class assessment methods.

Analysis:

The assessment results appear to be positive, although the sample size is low with only one section of GEOL 250 offered during the past five years. It will be instructive to offer this course again during future semesters. The current SLOs appear to be effective measures of subject mastery.

GEOL 251: Geology of National Parks and Monuments:
SLO data has not been collected for this course. This course has been offered only once (during the 2012-13 academic year) within the 2010-11 through 2014-15 period. As soon as the new, full-time faculty member is available to teach it on a more regular basis, SLO data will be collected and assed in a logical, systematic manner.

GEOL 260: Introduction to Field Geology:
This course has not been offered during the 2010-11 through 2014-15 period.

GEOL 270: Geology of the Eastern Sierra Nevada:

Course Summary Report

Year	2015 - 2016	**Period**	Last 3 Years		
Division	Science	**Dept**	GEOL	**Course**	GEOL-270

Tools

Course SLOs

Note: Course SLO Summary Evaluation Form is available.

#	SLO Statement	# of Students Assessed	# of Students who Met SLO	% of Students who Met SLO
1	Students will prepare a time-sequential field notebook, including all geological sites with elevation and GPS for each site, as well as drawings and geological descriptions.	30	30	100.00%
2	Students will document their field trip with annotated maps, photos of geological and historical sites, and collected literature.	30	30	100.00%
3	Students will prepare a college-level, typewritten field report that integrates lecture and laboratory (field) material and observations.	30	28	93.33%
4	Students will discuss concepts of internal and external geophysical processes that have created the present-day Sierra Nevada and Basin and Range Provinces, based upon lecture material.	17	17	100.00%
5	Students will discuss geologic features common to selected national parks, monuments, wildernesses, and historical sites within the Sierra Nevada and Basin and Range Provinces.	17	17	100.00%

Assessment Methods and Criteria:

- Assessment entailed instructor evaluation of each student's handwritten field notebook and annotated maps with required GPS data from the 3-day field trip with route highlighted and specific locations of field sites for evaluation of individual performance. In addition each student was required to submit a college-level, typewritten field report consisting of photos in a journal format documenting the 3-day field trip's geological and historical sites visited with descriptive text from field notes, textbook readings and literature search online or found in other materials obtained on the field trip. The photo journal reports were in three different modes: hard copy scrap book or binder, Word Document, or Power Point.

Reflections:

- The Geology 270 students with Geol 101 prerequisites were capable of grasping the geologic features and rock types much more effectively than the Geog 110 students, but that was to be expected. Shifting students over from photo journal report binders or scrap book binders to computerized Word Document and Power Point reports helped increase skill development for students, but took a lot of extra time by instructor to provide instruction on how to produce reports in these formats. Hard copy scrap books or photo journal binders as prepared over the last decade have become too expensive for low income students, and moving to electronic computer documents has increased the successful development of scientific and cultural documentation techniques for these students.

Analysis:

The SLO assessments indicate sufficient student mastery of lecture and laboratory components of the GEOL 270 course. SLOs 4 and 5 were not assessed during the 2013-14 academic year but were assessed during the 2015-16 academic year. Because these SLOs (4 and 5) are somewhat difficult to assess as currently written, they may be revised in future semesters.

OCEAN 101: Elements of Oceanography Lecture:

Course Summary Report

Year: 2015 - 2016 | Period: Last 3 Years

Division: Science | Dept: OCEAN | Course: OCEAN-101

Tools

Course SLOs

Note: Course SLO Summary Evaluation Form is available.

#	SLO Statement	# of Students Assessed	# of Students who Met SLO	% of Students who Met SLO
1	Students will be able to identify the geologic features that identify plate margins and, given an outline map of the world, be able to name to the major lithospheric plates and to draw reasonably accurate boundaries of the plates	24	23	95.83%
2	Students will be able list the major chemical components in sea water and be able to explain how the structure of the water molecule is responsible for many of the unusual properties of liquid water	35	23	65.71%
3	Students will be able to describe, using appropriate scientific terminology, the dynamics of wind generated waves, tsunami, surface water currents, and tidal fluctuations	35	21	60.00%
4	Students will be able to list, using the appropriate taxonomic terminology, the major groups of living organisms in the ocean	35	27	77.14%
5	Students will demonstrate competence in the subject field by completing the course and attaining an overall 70% accuracy in all homework, out of class assignments, in-class work, quizzes, and examinations over the course of the semester.	63	50	79.37%
6	Students will be able to understand and apply the scientific method to assess Earth systems and components (e.g. atmosphere, biosphere, hydrosphere, geosphere, etc.).	34	27	79.41%
7	Students will comprehend large-scale atmospheric and oceanic circulation patterns.	28	23	82.14%

Assessment Methods and Criteria:

- Student Learning Outcomes (SLO's) for Ocean 101 are clarified and elucidated in the course syllabus, and are based on the core concept as defined by the ocean research and education community which I have participated in developing and reviewing with COSEE in Washington DC, Nov. 2010. (Retrieved from http://oceanliteracy.wp2.coexploration.org/ocean-literacy-framework/ on 08.20.14): Core Concept: Students will demonstrate Ocean Literacy, its Essential Principles and the Fundamental Concepts of Ocean Science. "Ocean literacy is an understanding of the ocean's influence on you and your influence on the ocean. An ocean-literate person understands: • the essential principles and fundamental concepts about the functioning of the ocean; • can communicate about the ocean in a meaningful way; and • is able to make informed and responsible decisions regarding the ocean and its resources.
- Essential Principles of Ocean Literacy Every ocean literate person should understand the seven essential principles of Ocean Literacy: 1. The Earth has one big ocean with many features. 2. The ocean and life in the ocean shape the features of Earth. 3. The ocean is a major influence on weather and climate. 4. The ocean makes the Earth habitable. 5. The ocean supports a great diversity of life and ecosystems. 6. The ocean and humans are inextricably interconnected. 7. The ocean is largely unexplored.
- Thirty nine supporting fundamental concepts, which are analogous to the fundamental concepts that underlie each content standard of the National Science Education Standards (NSES) were each touched in the course through class discussion, essays, movies, projects, and course analyses.
- Although the Course SLO's documented in the SLO cloud in this document are somewhat cherry-picked, they do not follow with those listed and elucidated during instruction of OCEAN 101. Furthermore, the Course SLO's listed below are NOT aligned with the Next Generation Science Standards (NGSS) NOR are they within the realm of outcomes of the national Common Core.
- The Course SLO's listed below however CAN be somewhat linked with the major principles of Ocean Literacy

as listed above. Assessment of national Ocean Literacy Standards (SLO's employed for this course), was achieved through through several student-centered pedagogies, as outlined on the course syllabus.

- Selected activities for formative assessment include: 1: Weekly self-assessment of both classroom discussion/activities: what went well, what was difficult and troublesome, and developing content questions about the topics in both book and discussion. A student who has met the SLO "Good Enough" standard, will have generated 70% of the 15 one-page essays required for course. 2. Understanding and using terminology is a requisite activity in all sciences--Consequently development of personal understanding of the plethora of terms associated with understanding ocean science is being evaluated for meeting the SLO standards by students generation of self-defined terms from each of the book chapters through development of handwritten/handdrawn vocabulary definition pages. For purposes of assessment of those SLO's, any students receiving a two-thirds score, based both on topics attempted and numbers of self-defined terms, will be assessed as meeting the SLO at the "good enough" level. 3. Additionally, to meet the terminology SLO assessments at the "good enough" level, students must have passed at least two of the three content/perspective assessments (quizzes, exams) which required use of terms to develop poetry on the basic principles of Ocean Science literacy (ten correct terms minimum used on a page of poetry) AND successful completion of a major “applied-definition-based” crossword puzzle (34 terms). 4. Students who meet the "good enough" standard must also score better on the post-semester ocean-systems map-labeling exercise given as both a pretest the first day of the semester as well as the last day of the semester. In both instances, this blank “fill-out-a-global-map” exercise represents an impromptu exercise that reflects learned concepts.
- There was no studying required for this “exam” and students were not prepared for it purposely. Consequently it is assumed to represent total knowledge acquired through the course of study and does not give students the advantage who have acquired more pre-course knowledge and learning skills.

Reflections:

- SLO's for the cloud need to be changed to reflect course objectives and SLO's as presented on the syllabus. Learning to describe phenomena, measure, and evaluate concepts is essential to building personal understanding-scaffolds for the learning process, especially in science and spatially oriented fields like oceanography. Understanding how to develop and/or interpret “stories” or explanations that are valid, provable, and supported is an essential skill in the sciences.
- Repeating what is mentioned in course discussion, read in the text, or memorized from the internet is not really understanding. Most of the students are coming into these types of courses without the basic skills requisite to do those types of things, and need to develop these basic skills using the nature of the oceans as the content. Communication skills are part of this deficit—not having a general understanding of generally accepted concepts of college attending students greatly hinders development of new perspectives and communication about the validity of those perspectives.
- Most importantly this semester, students assessed about their overall knowledge of the world oceans based on concepts of ocean science literacy as outlined on the syllabus, expressed a tremendous increase in knowledge and perspective, as well as interest and the ability to critically think, measure, and understand. For example, based on pre- and post-test "blank-fill-in-the-map" exercise, statistics from those students who participated in both recorded an overwhelming increase in general knowledge of the oceans, ranging up to 15x what they knew when they came into the course. The minimal knowledge increase of valid responses (n=23), if representative of the overall nature of course content, was about 2 fold (i.e. 200%), and the average increase was about 5.5x (i.e. 550%).
- Overall activities of the course are student-centered, and as an instructor, I try to facilitate and coach them to succeed, not to stuff their heads with memorized things that are typically forgotten, misconstrued, or simply not understood, although they may be able to repeat it back “blindly”. I think the general design of the course is good, but nonetheless am working on making it better, a step at a time. For example, based on student performance, I also plan to add a component to the course, in which students actually chart phenomena weekly on their own charts---an essential component of ocean-ography and to make it related to the logic of

the oceans, or the less-used term “ocean-ology”!

Analysis:

While attainment on SLOs 2 and 3 was low when compared to attainment on the other SLOs, the more profound faculty discussion centered upon the mismatch among SLOs, course content, and classroom pedagogy. During a department meeting, faculty updated the OCEAN 101 SLOs to the following:

OCEAN 101 Revised SLOs:

1. Students will be able to understand and apply the scientific method to assess Earth systems and components (e.g. atmosphere, biosphere, hydrosphere, geosphere, etc.).

2. Students will comprehend large-scale atmospheric and oceanic circulation patterns.

3. Students will understand the formation and evolution of ocean basins.

4. Students will understand the temporal nature of ocean ecosystems and the interconnected nature of ocean life.

OCEAN 111: Elements of Oceanography Laboratory:

Course Summary Report

Year: 2015 - 2016 | Period: Last 3 Years

Division: Science | Dept: OCEAN | Course: OCEAN-111

Tools

Course SLOs

Note: Course SLO Summary Evaluation Form is available.

#	SLO Statement	# of Students Assessed	# of Students who Met SLO	% of Students who Met SLO
1	Students will be able to develop a sense of scale in dealing with the earth and the major features of the earth (Continents and Ocean Basins) by exposure to maps and charts of different scales, different kinds of map projections and of different kinds presentations. Students will be able to locate various features on maps given the appropriate coordinates for the map (Latitude and Longitude, Township and Range, or some other system) and will be able to determine distances and directions to other points of interest using the appropriate scale and azimuth.	22	19	86.36%
2	Students will be able to identify a variety of marine habitats by recognizing the specific life forms that are present.	18	18	100.00%
3	Students will demonstrate competence in the subject field by completing the course and attaining an overall 70% accuracy in all homework, out of class assignments, in-class work, quizzes and examinations over the course of the semester	22	18	81.82%

Assessment Methods and Criteria:

- Two SLO's for the lab component of introductory oceanography were not addressed because the essential lab components listed for them are NOT available currently, and are actually NOT very common in introductory type labs for this course at most other institutions where it is offered.
- All students in the course are required to record observations and interpretations in a laboratory notebook, as well as evaluations of how well their observations and interpretations may be repeated or justified, just like real scientists!

- Sense of scale, an essential component in spatial sciences, was assessed through open-ended inquiry built around the concepts of the Next Generation Science Standards and the "Common Core". Those small group activities included interpretation of bathymetric maps from NOAA, plotting courses for cargo ships along the California Coast and interpreting interactions with marine fauna, salinity, and seafloor topography; building 3-D models of selected seafloor features and making a bathymetric map and profile of other groups models using sounding technologies, as well as interpreting marine life zones and habitats present in those "unseen" features; interpreting marine faunas and their human exploitation; and determining the nature, position, and sense of scale of the largest secret mission of the cold war--the raising and discovery of the russian nuclear submarine with ICBM, the K-129 in the north Pacific (includes making scale models using the third to ground floors of the Physical Sciences building to indicate the scale of the manganese nodule abyss from which part of the sub was retrieved); and determination of the type of sediment in which the sub was located by microscopic examination of typical marine sediments from around the globe.
- For SLO "Good Enough" assessments, justifiable and sensible interpretations for each of the activities, including recording those interpretations and descriptions in lab notebooks, was the primary criterion. This included guided constructivism during these lab activities.

Reflections:

- Development of the aqueous physics and chemistry of the course is pending next offering as enough "tanks" are made available for the group work on which this class is built.
- SLO's for the course need to be reassessed and changed as described in the prerequisite/corequisite Ocean 101 SLO assessment. Both activities will be worked on this summer.

Analysis:

As with the OCEAN 101 SLOs, faculty identified a mismatch between the OCEAN 111 SLOs and actual course content and classroom pedagogy. With input from faculty, the OCEAN 111 SLOs have been modified:

OCEAN 111 Laboratory Revised SLOs:

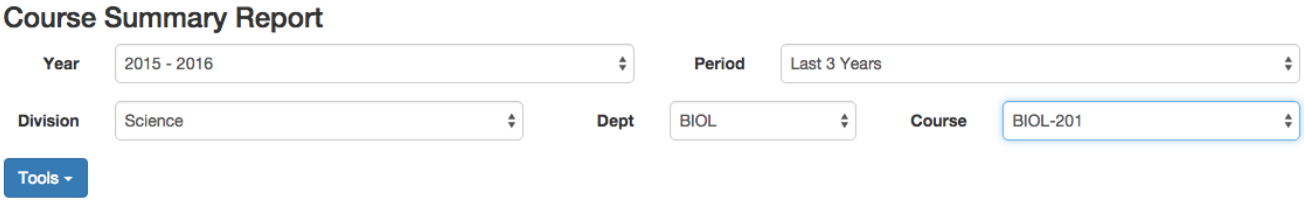
1. Practically apply principles of the scientific method (e.g. making and recording observations and developing appropriate interpretations).

2. Students will be able to characterize the ocean basins, sediments, water, and life.

Three-Year SLO Summaries for Environmental Science:

Note that only the core set of five courses is discussed and analyzed below:

BIOL 201: Cell and Molecular Biology:



Course SLOs

Note: Course SLO Summary Evaluation Form is available.

#	SLO Statement	# of Students Assessed	# of Students who Met SLO	% of Students who Met SLO
1	Students will demonstrate these skills by observing the offspring results from a simple mating and correctly inferring the genotypes and phenotypes of parents and offspring using a Punnett Square procedure.	229	129	56.33%
2	Students will demonstrate these abilities by discussing the variables that could effect a metabolic pathway and design and implement a controlled experiment testing their predictions. The results will be critically interpreted in a written report.	150	96	64.00%
3	Students will demonstrate these abilities by observing cells differing in organelle composition or number and correctly predicting and writing about the functional differences inferred from the structural cell patterns.	173	80	46.24%

Assessment Methods and Criteria:

- SLO 1. Lecture exam, short---essay question SLO 3. Lecture exam, short---essay question. SLO 1. The answer shows translation of phenotype information to genotype, and ability to infer parent genetics from offspring. It also includes application of the process of natural selection in the mode of genetic frequencies. SLO 3. Identifies the relationships in structure and function of organelles and cell components and predicts the effect on cellular functions when one of the organelles is abnormal or absent.
- SLO 1 was assessed using an open response, short answer question in lecture exam 2 SLO 2 was assessed using the lab experiment on the light dependent reactions of photosynthesis (lab 11}. SLO 3 was assessed using an open response, short answer question in lecture exam 5
- SLO 1: A score of 3 is considered passing. (Lecture Exam short answer question) 1 = student is able to convert offspring phenotype to genotype 2 =1 and, student is able to generate parental genotype from genotype of offspring 3 = 2 and, based on selection pressures, student is able to predict the most common genotype/phenotype for next/future generation. SLO 2: A score of 4 is considered passing. (Formal lab report) 1 = student is able to introduce the core knowledge of metabolic pathways 2 = 1 and, student is able to generate a prediction on the effect of a factor as it influences the metabolic pathway 3 = 2 and, student is able to distinguish factors to control in experiment 4 = 3 and, student is able to interpret experiment's results given the prediction made SLO 3: A score of 2 is considered passing. (Lecture Exam short answer question) 1 = student is able to identify relationships in structure and function of a given cell based on the organelles/cell components present 2 = 1 and, student is able to generate a prediction that distinguishes the effect of an abnormal/absent organelle/cell component on the cell's function and/or structure.
- All SLOs contain expectations to meet higher order thinking under Bloom's taxonomy. The questions for SLO 1 and SLO 3 are essay questions in lecture exams. They are given at different times of the semester which means that growth towards critical thinking might not be measured accurately. Additionally each SLO evaluates different skill set in content. SLO 2 consisted of a written lab report. This was the last report of the semester.
- Exam Question: Pass = 90% of points 2. Laboratory Report: Pass = 90% of points 3. Exam Question: Pass =

90% of points

- SLO 1. Exam, short-essay question (exam 2). Scored 90% or greater. SLO 2. Written Lab report in the scientific format (photosynthesis lab). Scored 90% or greater. SLO 3. Exam, short essay question (exam 5). Scored 90% or greater. SLOs aim to address high-order Bloom's taxonomy thus what is considered good enough relies on the evaluation of the question or report. These are measures of abstract & procedural knowledge.

Reflections:

- In general, the SLO statements require editing, in each statement there are too many different criteria to be considered. As SLOs are embedded within SLOs, new simplify statement of skill assessment should be made. Improvements on the goals of these SLOs should be targeted instead.
- SLO1 was assessed on the 7th week of the semester. SLO3 was assessed on the last exam of the semester. This course is for entering Biology students and few returning students. The challenges are stacked for this set of students because they must learn to manage science and math courses and their associated demands rather quickly. Several students are taking more than 16 units this semester. The challenges are comparable each semester, but this semester was different than others I have taught. Students had access to Supplemental Instruction. This venue provided more opportunities for student development in higher order thinking and content practice. The improvements are marginal in SLO3 and SLO1 is somewhat similar in distribution to last year's semester. Students require more practice in answering questions but most importantly learning how to think with a higher order perspective. I will continue to increase the opportunities to practice thinking and writing during lecture activities. My aim will be to use more classroom assessment techniques that address teaching and learning critical thinking and study skills.
- SLO1- Students were assessed using an in class group worksheet. Students seemed to perform well with coaching in class and scored well on the quiz the following week. However, integrating the concept with other challenging topics learned within that module proved difficult for the students on their exam. In the future, an additional problem set that integrates multiple ideas could be assigned prior to the exam SL02- Many students failed to turn in their assignment. In the future, the schedule could be rearranged to avoid confusion. SL03-Students seemed to respond well to the design elements implemented in this module. There was an improvement in scoring over previous semesters.
- To better capture students' competency on SLO assessments, perhaps a 5 category system could be implemented. For example Level of understanding = Highly proficient 90%, Proficient 80%, Basic 70%, Below Basic 60%, Poor <60%.
- In the future, I will make sure that the expectations for a lab report are as clear as possible. Some students had elements missing from their reports, so they did not meet SLO #2. I will also provide more homework problems where students must predict phenotype and genotype from genetic crosses.
- These BIOL 201 SLOs allow us to assess the critical thinking and writing abilities of our students. I think they are very appropriate. The only reason I didn't do SLO 3 is because this was my first time teaching this course (or any community college course at all, for that matter) and I wasn't told about how to do this SLO until after we had already covered cell organelle function in an exam.
- SLO modification might be necessary to assess learning curve in critical and scientific thinking. Since the majors program is undergoing modifications, SLOs will also need to be created to identify both teaching and learning gaps. This semester, the course was taught by one full-time faculty and three adjunct faculty. Currently, we have no statistical design to group section data. Although we all share the same rubric for SLO evaluation, there are possibly differences in the student population across course sections and exam assessments.
- This section is a learning community with Chem 150. Students overall had an impressive insight on collaborative efforts. Overall the learning community was helpful to create in most students a sense of engagement and purpose in their efforts. Nevertheless, they are still developing critical thinking skills, written communication, and time management. I continue to make an organized effort to incorporate these needs into the course curriculum so that students have more opportunities to learn how to develop them in both Bio and

Chem courses.

Analysis:

While the overall SLO performance is low, the faculty reflections are instructive and point to the need to rewrite course SLOs, rearrange the teaching sequence, and continue supporting interdisciplinary student learning communities and related learning cohorts.

BIOL 202: Organismal Biology and Ecology:

Course Summary Report

Year: 2015 - 2016 | Period: Last 3 Years

Division: Science | Dept: BIOL | Course: BIOL-202

Tools

Course SLOs

Note: Course SLO Summary Evaluation Form is available.

#	SLO Statement	# of Students Assessed	# of Students who Met SLO	% of Students who Met SLO
1	Students will be able to correctly calculate and compare the predicted genotypic and phenotypic proportions by observing a hypothetical Hardy-Weinberg population and comparing it with a second population.	62	17	27.42%
2	Students will demonstrate these abilities by performing an observational or experimental field study and presenting the results in the form of both an oral and written presentation.	58	42	72.41%
3	Students will demonstrate these capabilities by performing a comparative dissection of various vertebrates and demonstrating the ability to identify, compare, and contrast these structures on a practical exam.	57	36	63.16%

Assessment Methods and Criteria:

- SLO 1. Lecture exam, short essay question. Higher order with a passing grade of 7 over 10. SLO 2. A written report using CSE scientific format. Semester project submitted at the end of semester. Higher order with a passing grade of 80 over 100. SLO 3. Lab exam, practicum format. Second lab exam with internal dissections in fish and cats. Higher order with a passing grade of 40 over 50.
- SLO 1. LECTURE EXAM; SHORT-ESSAY QUESTION WITH TWO PARTS. PASSING GRADE OF 7 OVER 10. SLO 2. WRITTEN REPORT, SCIENTIFIC FORMAT; RESEARCH/SEMESTER PROJECT. PASSING GRADE OF 80 OVER 100. SLO 3. PRACTICUM #2, LAB EXAM; PASSING GRADE OF 40 OVER 50.

Reflections:

- SLO 3. Reflects gains in the comparative anatomy portion of the course when compared with the skeletal anatomy exam of the same semester. This SLO in particular addresses the learning curve in comparative anatomy, but doesn't directly reflect comparisons and contrasting skills. This might be a possible approach to modify in future assessments. Comparisons of data with previous semesters will be conducted during the fall semester to gauge whether modifications are appropriate for both content and skills. Teaching theme for SLO 1 is often too brief to allow students to gain perspective and experience in evaluating it under an exam questions. In the future this course will be modified along with the major's program so the reduced access to content development will help student's learning growth.
- THE MAKE UP OF THE STUDENTS WAS SIMILAR TO THAT OF OTHER FALL SEMESTERS. IT IS A VERY MIXED BAG IN THE LEVELS OF EXPERTISE THEY BRING WITH THEM. IT IS CHALLENGING TO MEET EXPECTATIONS OF WRITTEN WORK. THE TARGET IS TO ACTIVATE THEIR LEARNING

PATHWAYS MORE FREQUENTLY SO THAT THEY CAN GET USED TO TESTING IN THIS NEW FORMAT AND ALSO MAKING CHECKS MORE FREQUENTLY SO THAT STUDENTS KNOW HOW TO IMPROVE AND WHAT TO CHANGE IN THEIR LEARNING PROCESS. THE MEASURES OF PASSING ARE ELEVATED TO ENCOURAGE TEACHING AND LEARNING PROGRESS.

Analysis:

The reflections provide insight into the eventual replacement of BIOL 201 and 202 sequence with BIOL 205 and 206. Difficulty with SLO 1 attainment is noted.

CHEM 150: General Chemistry I

Course Summary Report

Year: 2015 - 2016 | Period: Last 3 Years

Division: Science | Dept: CHEM | Course: CHEM-150

Tools

Course SLOs

Note: Course SLO Summary Evaluation Form is available.

#	SLO Statement	# of Students Assessed	# of Students who Met SLO	% of Students who Met SLO
1	Students will demonstrate an understanding of the relationships between chemical quantities by using dimensional analysis to convert units of concentration, mass, moles, molecules, atoms or other stoichiometric variables. In addition, students will interpret the results of dimensional analyses to accurately predict the theoretical yields of chemical reactions and compare this to experimentally determined yields.	377	269	71.35%
2	Based on the conceptual visualization of the atomic realm utilizing the periodic table, theories of bonding, and determinations of molecular structures, students will appraise the physical and chemical properties of substances.	372	223	59.95%

Assessment Methods and Criteria:

- Eight short answer questions as a separate quiz, with achieving 67% correct as meeting standard. Scoring a 67% on the SLO is considered passing.
- Gave the department quiz and calculated whether student received a passing grade on the appropriate sections.
- Chemistry department SLO quiz (20 pts), containing 8 questions.
- The assessment was based on a quiz which consisted of 8 written questions given to all Chem150 students. All attending members of the class were present and answered each question. 4 of the 8 questions were specific to dimensional analysis, chemical reactions, stoichiometry and yields. The other 4 questions were specific to drawing molecular structures and intermolecular forces. The responses were graded by individual instructors, therefore I graded my own class. My criteria for judging the responses may have been somewhat overcritical as I assumed any mistake other than an obvious calculation error, misrepresentation of significant figures or failure to give a complete answer which specified which intermolecular force was being involved was required to have demonstrated understanding.

Reflections:

- This course was accelerated and this semester was the 1st semester with accelerated courses in chemistry. Though the course is low enrolled (improve advertising?), the students did very well on the SLOs. The frequency is meeting (lecture and lab) per week may be part of the reason for the results. The students are

also doing very well in the course overall.

- Many of my students stated that they did not feel there was enough time to accurately complete the assessment. Also, a good portion of SLO #2 is taught at the very end of the term. I don't believe that many of my students have cemented specific concepts prior to taking the SLO quiz. I think I will try to address those concepts earlier in the term. For the next term, I might switch the order in which I cover a few of the last chapters in the term.
- The students could have used more time on the quiz. 30 minutes wasn't enough for my class. Also, the second part of the SLO was introduced later in the class. The students didn't seem to have it down as well as the other section. I will likely introduce this subject matter earlier in the semester next time.
- Judging from both midterm/quiz/final exams as well as SLO quiz, students overall showed fairly good understanding and problem solving skills with both SLO topics. Frequent small group discussion in both lecture and lab sessions significantly enhanced students' learning. This is an early morning class (lecture 8am through 9:15am) and significant percentage of students worked night shift jobs or even "graveyard" shifts. My recommendation would be more for Chem151 SLO: include weak acid-strong base titration curve calculation (acid base equilibrium), determination of reaction orders (kinetics), determine spontaneity of reaction (free energy/entropy, as well as standard reduction potential).
- The timing of the assessment was the period after the exam on which intermolecular forces tested. Students had been given a chance to see there results and a brief opportunity to see the key but had not yet had significant time to analyze how to improve their answers. As a result, answers to questions on the intermolecular forces which comprised 6, 7 and 8 of the assessment were often incomplete for those who had answered similarly on the recent exam. Therefore, I could have better prepared them for these questions by better review of the need to better explain the intermolecular forces. 3 students had difficulty using formal charge as the basis of VSEPR molecular geometry determination despite reviewing it often in class and having several assignments on the topic. Some are still reverting to use of the octet rule even when it no longer applies.

Analysis:

It appears that time constraints could have negatively impacted SLO assessment results. It is interesting to note that at least one instructor suggested that they could have better prepared students for specific SLO concepts. On the other hand, accelerated course formats appear to positively impact SLO assessment and overall subject attainment.

CHEM 151: General Chemistry II

Course Summary Report

Year: 2015 - 2016 | Period: Last 3 Years

Division: Science | Dept: CHEM | Course: CHEM-151

Tools

Course SLOs

Note: Course SLO Summary Evaluation Form is available.

#	SLO Statement	# of Students Assessed	# of Students who Met SLO	% of Students who Met SLO
1	Given a lab with multi-step aqueous reactions, students will design a sequence of steps in order to collect the necessary information, analyze the experimental data using principles of equilibrium, and form conclusions based on data and calculations. Students will evidence the application of the scientific method in their conclusions and analyze their results for sources of possible error.	178	84	47.19%
2	Students will apply principles of equilibrium, electrochemistry, thermodynamics or nuclear chemistry to explain natural or societally generated phenomena observed in the atmosphere, ocean, or during geological processes.	178	95	53.37%

Assessment Methods and Criteria:

- These two student learning outcome (SLO) objectives are accessed via a 2 question quiz given a couple of days before the final exam. A student is assessed to have met an objective if they earn 65% or more of the points for that question, with their answer.
- A 2 problem SLO quiz was given. Problem 1 dealt with applying principles of equilibrium to the dissolution of marble (calcium carbonate) in a large pool of liquid water. This problem is worth 12 pts. and students must earn 8 pts or more to be considered 'proficient' in objective #2. For problem 2, the system the students discuss is the reaction of NADH to form NAD+ via the 'help' of a catalyst. In part a. of the problem they discuss what is measured, how it is measured, how the data is to be plotted, and what the various plots (of absorbance, ln absorbance, or 1/absorbance) mean if they are linear, for the kinetics (order) of the system. Students should state what a plot of ln absorbance vs. time should look like if indeed the reaction is 1st order in NADH reactant. In part b. of the problem, student explain how in general an enzyme speeds up the reaction rate. For this 2nd problem, worth 8 pts. a score of 5.5 pts. or better is needed for 'proficiency' in objective #1. For both problems, partial credit is assigned depending on how much work is shown for each problem (and subpart) that is correct and applicable.
- A CHEM 151 SLO quiz was administered. It was common to all CHEM 151 classes this semester.

Reflections:

- Class performance was about the same this term as last term, for each objective, and overall on this quiz. We did not do any specific review for the quiz this term, but did last year. I will design a worksheet for students to complete at home about 2 weeks prior to the SLO quiz, and we will go over the questions and calculations on the worksheet about a week later. This will help to refresh the student's memory as to the main ideas in the topics of solubility, including the common ion effect and use of reaction tables, and then about kinetics and the factors which affect reaction rate such as temperature, concentration, and catalysts. We'll also review about the lab techniques used to study reaction kinetics and how the data can be analyzed to determine reaction order, rate constant value, etc. We'll also review the two main kinetics theories (collision and transition state) and how their aspects relate to reaction rates and reaction mechanisms.
- The students did badly on SLO#1 and I would like to see higher scores on SLO#2 as well. Honors students did well on SLO#3. This was my first time teaching Chem-151. In the future, I will spend more time asking students to relate questions to previous material and constantly ask how could we obtain this data in the lab. Additionally I will make more time at the end of the course to review some of the material again. This semester's student seemed to be very weak in Chem-150 material {the previous course in series}, and with several lab periods adopted for review of Chem-150 material the majority of them seemed to recover well. I will need to make time at the end of the course to review this courses material as well. This semester I felt I spend more time on preparing students for the ACS standardized test than reviewing this course material specifically. We may also want to consider changing the first SLO so that it encompasses more questions… currently if they get the first part of the SLO wrong they have no hope of getting any additional points for this SLO.
- I am not happy with the number of students who met the SLO. There has been discussion amongst the department about the tool used to assess the SLO and it was decided that perhaps the SLO was too difficult and written to cater an A student as opposed to the 65% decided by the department. This was determined by looking at past data of the SLO. I used a different assessment this semester and thought it was perhaps too easy, but still, many students did not pass the SLOs. Also, the second SLO is assessed at the very end of the course; however, students learn and apply the material in the first couple weeks of the course. In the future, I will continue to look at the validity of the instrument used to assess SLO 1 and perhaps assess SLO 2 earlier in the semester, when the students learn the material.

Analysis:

The percentage of students meeting both SLOs is somewhat low. Faculty addressed this through critiques of course and SLO assessment sequencing, SLO assessment instrument, and SLO questions.

MATH 250: Single Variable Calculus I

Course Summary Report

Year: 2015 - 2016 | Period: Last 3 Years

Division: Mathematics, Business & Computer Technology | Dept: MATH | Course: MATH-250

Tools

Course SLOs

Note: Course SLO Summary Evaluation Form is available.

Course SLOs

#	SLO Statement	# of Students Assessed	# of Students who Met SLO	% of Students who Met SLO
1	Students will demonstrate the ability to interpret and evaluate limits.	173	95	54.91%
2	Students will demonstrate the ability to differentiate functions and solve related applications	140	83	59.29%
3	Students will demonstrate the ability to evaluate integrals using basic integration formulas and numerical methods to perform both definite and indefinite integration.	176	74	42.05%

Assessment Methods and Criteria:

- The Student Learning Outcome Assessment Instrument is administered as an in-class assignment. The assessment instrument consisted of six questions corresponding to the three learning outcomes. Student responses to questions assessed cognitive mastery of calculus concepts. Achievement of learning outcomes is demonstrated by satisfactorily responding to questions included on the assessment instrument. Satisfactory response is being measured as 70% accuracy or greater.

Reflections:

- The exam are given on the last day of class, overall, majority of students in the course are able to grasp the concepts being tested but their algebra skills are weak. For example, in question #3, student fail to simplify fraction correctly. For the next term of Math 250, I will encourage students to review their algebra skills.
- Note that there are two SLO problems dealing with derivatives; these students did well on the Quotient Rule (15/16) but poorly on the related-rates (6/16). We will try to more effectively emphasize story problems; some students gave it but a cursory attempt. On limits we had a similar disparity; 13 out of 16 did well on a standard infinity rational problem, but only 6 out of 16 fully understood a complex fraction and how to successfully modify it. I would suggest in future semesters that these SLOs should be divided for more accurate assessment.
- I noticed students algebra skills are fairly weak, which explain a huge gap in the result.
- The students could have done just a bit better if it had not been at the end of the school year and full of distractions. The SLOs were given as an extra credit assignment which did not promote study time as if it were on the final exam. Overall, the students who passed the class showed an in-depth knowledge of the material and I'm looking forward to seeing them progress in Math 251. I do believe we as a department need to revise the SLOs in general.

Analysis:

The percentage of students meeting the three SLOs is somewhat low. Strategies to improve SLO attainment include assessing SLOs earlier in the semester, reviewing algebraic methods, and modifying SLOs.

Program Level Outcomes: If your program offers a degree or certificate, describe how the program level outcomes are being used to improve student learning at the program level (e.g., faculty discussions, SLO revisions, assessments, etc.). Discuss how this set of data is being evaluated or is planned to be evaluated. Generate reports from the SLO Cloud as necessary. Include analysis of SLO Cloud reports and data from 3-year summary reports. If your program does not offer a degree or certificate, this section is optional (but encouraged).

(INSERT COURSE MAP IF AVAILABLE)—Contact Dr. Celia Huston if you need assistance.

See Strategic Goal 2.11

Course Map for Geology AS Degree:

	Geology AS Degree	Have an understanding of the significance of Plate Tectonics in the overall picture of geologic processes.	Appreciate the magnitude of geologic time in explaining how the earth has changed over the course of geologic history.	Be able to recognize important rock-forming minerals; both as mineral samples and as they appear in common rocks.	Be able to identify the 3 major rock types (Igneous, Sedimentary, and Metamorphic) in field exposures.	Be able to recognize major landform features and explain what geologic processes were involved in their formation.	Be prepared to transfer to an accredited 4-year degree granting institution and compete effectively against "native" students in the same field of study
CLASSES							
GEOL 101		X	X	X	X	X	X
GEOL 111		X	X	X	X	X	X
GEOL 112		X	X	X	X	X	X
CHEM 150/150H							X
CHEM151/151H							X
MATH 250							X
MATH 251							X
CHOOSE TWO COURSES							
GEOL 122		X	X	X	X	X	X
GEOL 170				X	X		
GEOL 201		X	X	X	X	X	X
GEOL 250		X	X	X	X	X	X
GEOL 251		X	X	X	X	X	X
GEOL 260		X	X			X	X
GEOL 270		X	X	X	X	X	X

Program SLO Summary Evaluation Form
Division: Science
Program: Geology AS Degree
Semester Evaluated: Spring 2014
Next Evaluation: Fall 2015

Program Learning Outcome	1. Have an understanding of the significance of Plate Tectonics in the overall picture of geologic processes. 2. Appreciate the magnitude of geologic time in explaining how the earth has changed over the course of geologic history. 3. Be able to recognize important rock-forming minerals; both as mineral samples and as they appear in common rocks. 4. Be able to identify the 3 major rock types (Igneous, Sedimentary, and Metamorphic) in field exposures. 5. Be able to recognize major landform features and explain what geologic processes were involved in their formation. 6. Be prepared to transfer to an accredited 4-year degree granting institution and compete effectively against "native" students in the same field of study
Program SLO Assessment Methodology	Program Curriculum Mapping
Criteria – What is "good enough"? Rubric	Align courses to program level outcomes. Assess and evaluate alignment as a foundation for program outcomes assessment and determine if curriculum, SLOs or PLOs need rewritten. Determine future assessment methodology for PLOs.
What % of students met the criteria? Is this % satisfactory?	n/a
Were trends evident in the outcomes? Are there learning gaps?	The basic framework of the program curriculum map exists, but must be improved to BE measureable and to provide insightful information for students and instructors. An assessment of the program mapping shows that several PLOs are too wordy, vague and difficult to measure. PLOs are stacked, containing several PLOs in one statement.
What content, structure, strategies might improve outcomes?	All PLOs should be rewritten to better align with modified course SLOs as well as addressing the issue stated above.
Will you change evaluation and/or assessment method and or criteria?	No, after rewriting program, another curriculum map will be done to ensure that courses align with PLOs and create a solid and measurable framework for program assessment. The methodology for future assessment will be determined at that time.
Evidence of Dialogue (Attach representative samples of evidence)	*Check any that apply* x☐E-mail Discussion with ☐xFT Faculty ☐xAdjunct Faculty Date(s): ☐xDepartment Meeting. Date(s): Department meeting in August 2014, next meeting in December 2014 ☐Division Meetings. Date(s):

	☐Campus Committees. Date(s): (ex: Program Review; Curriculum; Academic Senate; Accreditation & SLOs) SLO Dialogue focused on: SLOs and PLOs
Will you rewrite the Program SLO?	Yes.
Response to program outcome evaluation and assessment?	☐Professional Development ☐Intra-departmental changes ☐Curriculum action ☐Requests for resources and/or services Click here to enter text.

Analysis:

As with the Geology course level SLOs, program level SLOs must adhere to a regular cycle of review, discussion, and possible modification. To date, only course level SLOs have been held to such scrutiny and subsequently modified. However, with the exception of program level SLO 6, the other SLOs are fairly simple and straightforward to assess when mapped to various course level SLOs. On the other hand, SLO 6 is difficult to assess. Appropriately measuring transfer preparedness is a difficult task.

The spring 2016 semester SLO discussion with faculty will include program level SLOs, in addition to course level SLOs. It is likely that program level SLOs will be modified as a result of this discussion.

Barriers to Geology AS and AS-T attainment include failure to offer GEOL 112: Historical Geology on a regular basis. This course is among the core set required to earn both degrees. Review of the program level SLOs and course map further reinforces the need to more regularly offer the GEOL 112 course.

Unfortunately, a three-year program level SLO assessment for the Geology AS and AS-T degrees has not yet occurred. This will also be an agenda item for discussion during the spring 2016 SLO faculty discussion.

Furthermore, neither course map nor program level SLO assessment has been created for the Environmental Science AS degree. Although this is an interdisciplinary degree, course map and program level SLOs will be discussed at both Geology and Geography SLO meetings.

Part III: Questions Related to Strategic Initiative: Institutional Effectiveness

Strategic Initiative	Institutional Expectations	
	Does Not Meet	**Meets**
Part III: Institutional Effectiveness - Rubric		
Mission and Purpose	The program does not have a mission, or it does not clearly link with the institutional mission.	The program has a mission, and it links clearly with the institutional mission.
Productivity	The data does not show an acceptable level of productivity for the program, or the issue of productivity is not adequately addressed.	The data shows the program is productive at an acceptable level.
Relevance, Currency, Articulation	The program does not provide evidence that it is relevant, current, and that courses articulate with CSU/UC, if appropriate. Out of date course(s) that are not launched into Curricunet by Oct. 1 may result in an overall recommendation no higher than Conditional.	The program provides evidence that the curriculum review process is up to date. Courses are relevant and current to the mission of the program. Appropriate courses have been articulated or transfer with UC/CSU, or plans are in place to articulate appropriate courses.

Mission and Purpose:

SBVC Mission: San Bernardino Valley College provides quality education and services that support a diverse community of learners.

What is the mission statement or purpose of the program?

The Geology-Oceanography and Environmental Science Departments provide quality education to students interested in fulfilling general education (GE) requirements in physical and environmental sciences, specifically mathematics, engineering, environmental studies/sciences, biology (paleontology and history of life), (geo)chemistry, and hydrology.

Specifically, the departments prepare students for careers in the fields of geology, oceanography, geographic information systems (GIS), education, cartography, surveying, civil engineering, petroleum exploration and delivery, hydrology and hydrogeology, environmental sciences, and other positions that demand knowledge and interpretation of internal and external geo-physical and environmental processes. In addition, Geology-Oceanography and Environmental Science courses allow students to make sense of the physical world around them. This increases their level of critical thinking and problem solving for a variety of applications, related to and disparate from geological and environmental processes.

How does this purpose relate to the college mission?

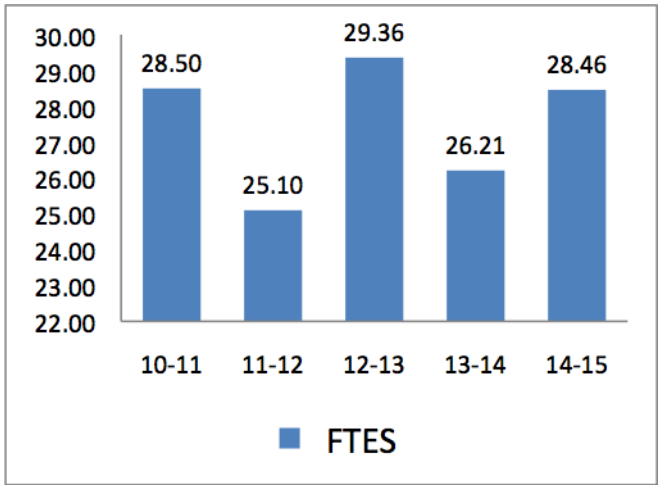
The mission of the College is to provide quality education to a diverse community of learners and is consistent with the purpose and mission of the Geology-Oceanography and Environmental Science Departments. The

departments serve a diverse community of learners, as evidenced in its demographic data, although ongoing efforts seek to increase service to diverse populations. In addition, the departments adhere to the college vision statement by creating "informed, responsible, and active members of society" and value statement where "students become self-sufficient learners and contributing members of society."

Productivity

Provide additional analysis and explanation of the productivity data and narrative in the EMP Summary, if needed. (Use data from charts 1 and 2 (FTEs; Enrollment; FTFE and WSCH per FTFE) on page 3 of this form). Explain any unique aspects of the program that impact productivity data for example; Federal Guidelines, Perkins, number of workstations, licenses, etc.

FTES Data for Geology-Oceanography:



Enrollment, FTEF, and Efficiency Data for Geology-Oceanography:

	10-11	11-12	12-13	13-14	14-15
Duplicated Enrollment	485	251	289	268	286
FTEF	2.36	1.25	1.48	1.98	2.18
WSCH per FTEF	617	588	595	397	392

Summary of Geology-Oceanography Productivity:

Year	**2010-11**	**2011-12**	**2012-13**	**2013-14**	**2014-15**
FTES	28.5	25.1	29.36	26.21	28.46

Enrollment	485	251	289	268	286
FTEF	2.36	1.25	1.48	1.98	2.18
Efficiency	617	588	595	397	392

Summary of Science Division Productivity:

Year	**2010-11**	**2011-12**	**2012-13**	**2013-14**	**2014-15**
FTES	2046.05	1708.21	1631.6	1629.68	1558.39
Enrollment	11663	9252	9030	9188	8262
FTEF	133.33	121.52	n/a	129.92	124.94
Efficiency	460	422	399	376	374

Summary of College Productivity:

Year	**2010-11**	**2011-12**	**2012-13**	**2013-14**	**2014-15**
FTES	10115.05	9185.38	8898.79	9141.29	9330.09
Enrollment	77556	67437	66418	69085	70343
FTEF	590.61	545.85	n/a	578.801	n/a
Efficiency	514	505	490	474	454

The Geology-Oceanography Department generally reflects the Science Division and College in terms of generally declining efficiency (WSCH/FTEF). As the department endeavors to attract students with additional sections across a wider variety of courses, the fill rate per section has declined since 2010-11. In addition, the Geology-Oceanography Department reflects Science Division trends in declining enrollment (duplicated enrollment) since 2010-11. The FTES, however, has remained fairly steady throughout the five year period. More strategic course scheduling may be one remedy to declining enrollment and efficiency. In addition, the department must market itself as a viable option for science- and STEM-minded students.

In tandem with workforce and job market demands, student awareness of environmental, energy security, water supply and wastewater treatment, and supply and demand for fuel and non-fuel mineral resource concerns has increased. Increasingly, students are seeking answers to these questions. They realize that Geology and Oceanography can provide not only answers but also solid transfer (to four-year institutions) and career skills. High-demand careers will increasingly incorporate environmental sciences and engineering, to which Geology and Oceanography will contribute. The California, national, and global scenarios all point toward increasing demand on finite resources, including metallic and non-metallic ores, fuel and non-fuel resources, and clean water supplies. A background in Geology, Oceanography, Earth, and Environmental Sciences will greatly benefit students as they endeavor to transfer to four-year institutions and enter the 21st-century job market.

Program growth and further advertisement (to students) of the benefits of a Geology-Oceanography skill set will be greatly improved with the addition of a full-time faculty member. This professional will have greater freedom and time to devote toward enhancement of student recruitment, enrollment, retention, success, transfer rates, degree attainment, and job market/career tracking (e.g. a full-time faculty member will be able to devote additional resources towards monitoring students who have successfully moved into Geology, Earth Science, Oceanography, Environmental, Engineering, Water, and related careers).

Relevance and Currency, Articulation of Curriculum

If applicable to your area, describe your curriculum by answering the questions that appear after the Content Review Summary from Curricunet.

The Content Review Summary from Curricunet indicates the program's current curriculum status. If curriculum is out of date, explain the circumstances and plans to remedy the discrepancy.

All Geology courses are up to date, with selected courses due for review beginning in November and December 2018. Originally, both Oceanography courses, OCEAN 101 and 111, were due for content review in December 2015. Both courses have recently received full Curriculum Committee approval (as of Monday, 7th March 2016) and are scheduled for Board of Trustees review and approval on Thursday, 14th April 2016. Please refer to the supporting documentation on page 17.

The course list and content review list (at the bottom of page 18) for the Environmental Science AS Degree is incorrect. The precise division "home" for these courses is unknown, as is the last date during which they have been offered. Perhaps their best fit is within the Applied Technology, Transportation, and Culinary Arts Division?

Instead, please see the list of required courses for the Environmental Science AS Degree on pages 17 and 18.

With the exception of the following courses, all courses within the existing Environmental Sciences degree are active and up to date, according to the CurricUNET Content Review report:

- BIOL 104 (due on 09/14/2015), BIOL 123 (deleted but replaced with BIOL 207), and BIOL 204 (deleted and not replaced), and
- GIS 131 (deleted with portions replaced in updated GEOG/GIS 130 curriculum).

During the coming academic year (2016-17), the Environmental Sciences AS Degree will be updated to reflect curricular changes within the Biology and GIS Departments, as well as changing demands from Cal State-San Bernardino and UC-Riverside transfer institutions where four-year Environmental Science degrees are awarded.

The incorrect content review report for the Environmental Science AS Degree follows at the bottom of page 18.

CURRICUNET REPORT IS PROVIDED – Please refer to pages 41 through 43.

Science				
	Geology			
	Course	**Status**	**Last Content Review**	**Next Review Date**
	GEOL101 Introduction to Physical Geology	Active	11/19/2012	11/19/2018
	GEOL111 Introduction to Physical Geology Laboratory	Active	12/10/2013	12/10/2019
	GEOL122 Environmental Geology	Active	12/03/2012	12/03/2018
	GEOL170 Geological History of the Great Basin Province	Active	12/03/2012	12/03/2018
	GEOL201 Mineralogy	Active	12/03/2012	12/03/2018
	GEOL222 Independent Study in Geology	Active	12/03/2012	12/03/2018
	GEOL251 Geology of National Parks and Monuments	Active	12/03/2012	12/03/2018
	GEOL260 Introduction to Field Geology	Active	12/03/2012	12/03/2018
	GEOL270 Geology of the Eastern Sierra Nevada	Active	12/03/2012	12/03/2018
	GEOL111 Introduction to Physical Geology Laboratory	Launched	12/10/2013	12/10/2019
	GEOL100 Physical Geology	Historical		
	GEOL100 Physical Geology	Historical		
	GEOL101 Introduction to Physical Geology	Historical		
	GEOL101 Introduction to Physical Geology	Historical		
	GEOL111 Investigations in Physical Geology	Historical		
	GEOL111 Physical Geology Laboratory	Historical		
	GEOL111 Introduction to Physical Geology Laboratory	Historical		
	GEOL112 Historical Geology	Historical		
	GEOL122 Environmental Geology	Historical		
	GEOL170X4 Geological History of Great Basin	Historical		
	GEOL200 Rocks and Rock Minerals	Historical		
	GEOL200 Rocks and Rock Minerals	Historical		
	GEOL201 Mineralogy	Historical		
	GEOL222 Independent Study in Geology	Historical		
	GEOL250 Geology of California	Historical		
	GEOL250 Geology of California	Historical		

	GEOL251 Geology of National Parks and Monuments	Historical		
	GEOL260 Introduction to Field Geology	Historical		
	GEOL270X2 Geology of the Eastern Sierra Nevada	Historical		

The following content review report is a more accurate update of the above content review report for Geology courses. Note the addition of GEOL 112: Historical Geology and GEOL 250: Geology of California:

Science				
Geology				
	Course	**Status**	**Last Content Review**	**Next Review Date**
	GEOL 101 Introduction to Physical Geology	Active	11/19/2012	11/19/2018
	GEOL 111 Introduction to Physical Geology Laboratory	Active	12/10/2013	12/10/2019
	GEOL 112 Historical Geology	Active	11/23/2015	11/23/2021
	GEOL 122 Environmental Geology	Active	12/03/2012	12/03/2018
	GEOL 170 Geological History of the Great Basin Province	Active	12/03/2012	12/03/2018
	GEOL 201 Mineralogy	Active	12/03/2012	12/03/2018
	GEOL 222 Independent Study in Geology	Active	12/03/2012	12/03/2018
	GEOL 250 Geology of California	Active	11/23/2015	11/23/2021
	GEOL 251 Geology of National Parks and Monuments	Active	12/03/2012	12/03/2018
	GEOL 260 Introduction to Field Geology	Active	12/03/2012	12/03/2018
	GEOL 270 Geology of the Eastern Sierra Nevada	Active	12/03/2012	12/03/2018

All Geology courses are up to date, with selected courses due for review beginning in November and December 2018. Originally, both Oceanography courses, OCEAN 101 and 111, were due for content review in December 2015. Both courses have recently received full Curriculum Committee approval (as of Monday, 7th March 2016) and are scheduled for Board of Trustees review and approval on Thursday, 14th April 2016. Please refer to the supporting documentation on page 17.

Content Review

Science				
Oceanography				
	Course	**Status**	**Last Content Review**	**Next Review Date**
	OCEAN101 Elements of Oceanography	Active	12/07/2009	12/07/2015
	OCEAN111 Elements of Oceanography Laboratory	Active	12/07/2009	12/07/2015
	OCEAN101 Elements of Oceanography	Pending	12/07/2009	12/07/2015
	OCEAN111 Elements of Oceanography Laboratory	Pending	12/07/2009	12/07/2015
	OCEAN100 Introduction to Oceanography	Historical		
	OCEAN100 Introduction to Oceanography	Historical		
	OCEAN101 Elements of Oceanography	Historical		
	OCEAN111 Investigations in Oceanography	Historical		

From the Monday, 7th March 2016 Curriculum Committee meeting minutes, the following curricular updates and approvals have occurred for both OCEAN 101 and 111:

San Bernardino Valley College

SBVC Curriculum Committee Minutes

Content Review:										
Course ID:	**C-ID:**	**TOP Code:**	**SLO:**	**Equate:**	**Requisite or Advisory:**	**Notes:**	**DE:**	**Effective:**	**Board Date:**	**Result:**
COMMST 140	COMM 140 Approved	1506.00	Yes	CHC COMMST 140	DA: ENGL 015	Only updated text books, and removed Formerly Speech note in schedule/catalog description. Effective Fall 2016.	**No**	**Fall 2016**	**4/14/16**	**Approved**
OCEAN 101	N/A	1919.00	Yes	CHC OCEAN 101	P: MATH 942 P: ENGL 914		**Yes**	**Fall 2016**	**4/14/16**	**Approved**
OCEAN 111	N/A	1919.00	Yes	No	C: OCEAN 101 P: OCEAN 101		**No**	**Fall 2016**	**4/14/16**	**Approved**

As of the Thursday, 14th April 2016 Board of Trustees meeting date, both OCEAN 101 and OCEAN 111 should be fully approved for the next six-year content review cycle.

The course list and content review list (at the bottom of page 44) for the Environmental Science AS Degree is incorrect. The precise division "home" for these courses is unknown, as is the last date during which they have been offered. Perhaps their best fit is within the Applied Technology, Transportation, and Culinary Arts Division?

Instead, please see the list of required courses for the Environmental Science AS Degree:

Required Courses:	
BIOL 201: Cell and Molecular Biology (being replaced with BIOL 205: Cell and Molecular Biology)	CHEM 151: General Chemistry II or CHEM 151H: General Chemistry II – Honors
BIOL 202: Organismal Biology and Ecology (deleted – replaced with BIOL 206: Organismal Biology)	MATH 250: Single Variable Calculus I

CHEM 150: General Chemistry I or CHEM 150H: General Chemistry I – Honors	
Choose Two Courses from the Following:	
BIOL 104: Human Ecology	GEOL 101: Introduction to Physical Geology
BIOL 123: Ecology and Environment (deleted – replaced with BIOL 207: Evolutionary Ecology)	GEOL 111: Introduction to Physical Geology Laboratory
BIOL 204: General Botany (deleted – no replacement to date)	GIS 130: Introduction to Geographic Information Systems (GIS) (cross-listed as GEOG 130)
BIOL 270: Microbiology	GIS 131: GIS Applications (deleted – portions of this course included in GEOG/GIS 130)
CHEM 205: Quantitative Chemical Analysis	GIS 133: GIS Cartography and Base Map Development
CHEM 212: Organic Chemistry I or CHEM 212H: Organic Chemistry I – Honors	MATH 108: Introduction to Probability and Statistics
CHEM 213: Organic Chemistry II or CHEM 213H: Organic Chemistry II – Honors	MATH 251: Single Variable Calculus II
GEOG 110: Physical Geography	PHYSIC 150A: General Physics for the Life Sciences I
GEOG 111: Physical Geography Laboratory or GEOG 111H: Physical Geography Laboratory – Honors	PHYSIC 150B: General Physics for the Life Sciences II

With the exception of the following courses, all courses within the existing Environmental Sciences degree are active and up to date, according to the CurricUNET Content Review report:

- BIOL 104 (due on 09/14/2015), BIOL 123 (deleted but replaced with BIOL 207), and BIOL 204 (deleted and not replaced), and
- GIS 131 (deleted with portions replaced in updated GEOG/GIS 130 curriculum).

During the coming academic year (2016-17), the Environmental Sciences AS Degree will be updated to reflect curricular changes within the Biology and GIS Departments, as well as changing demands from Cal State-San Bernardino and UC-Riverside transfer institutions where four-year Environmental Science degrees are awarded.

The incorrect content review report for the Environmental Science AS Degree follows:

Science				
Environmental Sciences				
	Course	**Status**	**Last Content Review**	**Next Review Date**
	ENVT101 Management of Hazardous Materials	Historical		
	ENVT103 Hazardous Substances and Environmental Consequences	Historical		
	ENVT105 Hazardous Waste Management	Historical		
	ENVT107 Toxicology	Historical		
	ENVT109 Transportation of Hazardous Materials	Historical		

Articulation and Transfer

List Courses above 100 where articulation or transfer is **not** occurring	With CSU	With UC

Describe your plans to make these course(s) qualify for articulation or transfer. Describe any exceptions to courses above 100.

All core courses within Geology-Oceanography and Environmental Science transfer as major preparation and elective credit to CSU and UC campuses.

Currency

Follow the link below and review the last college catalog data.
http://www.valleycollege.edu/academic-career-programs/college-catalog.aspx

Is the information given accurate? Which courses are no longer being offered? (Include Course # and Title of the Course). If the information is inaccurate and/or there are listed courses not offered, how does the program plan to remedy the discrepancy?

All Geography and Oceanography courses are accurately published within the catalog. All curriculum is up to date. The department endeavors to more regularly offer selected courses.

Within the Environmental Science Degree, the following courses have been deleted and are no longer offered:

- BIOL 123: Ecology and Environment,
- BIOL 204: General Botany, and
- GIS 131: GIS Applications.

The Environmental Science Degree is scheduled to be modified and submitted to the Curriculum Committee during the spring 2016 semester. The updated degree will be published in the 2017-18 catalog.

Part IV: Planning

Strategic Initiative	**Institutional Expectations**	
	Does Not Meet	**Meets**
Part IV: Planning - Rubric		
Trends	The program does not identify major trends, or the plans are not supported by the data and information provided.	The program identifies and describes major trends in the field. Program addresses how trends will affect enrollment and planning. Provide data or research from the field for support.
Accomplishments	The program does not incorporate accomplishments and strengths into planning.	The program incorporates substantial accomplishments and strengths into planning.
Challenges	The program does not incorporate weaknesses and challenges into planning.	The program incorporates weaknesses and challenges into planning.

What are the trends, in the field or discipline, impacting your student enrollment/service utilization? How will these trends impact program planning?

Current trends within the Earth, Environmental, Energy, Engineering, and Hydrologic Sciences, including Geology-Oceanography and Environmental Science, include:

- Environmental aspects related to global climate change and resource scarcity, specifically as it pertains to urbanization, air quality, and water use within the Inland Empire,
- Greater knowledge of geologic hazards within the Inland Empire region, including earthquakes, debris flows, and landslides,
- Inclusion of greater numbers of previously underrepresented populations, specifically through outreach, workshop, guest speaker, and job fair events,
- Land and resource management programs, specifically through partnerships with US Forest Service, San Bernardino County Museum, and other public and private entities within the Inland Empire,
- Depending on state and federal mandates, the demand for Earth Science school teachers (K-12) may increase,
- Energy security, including exploration and production of traditional fossil fuels (including on- and off-shore drilling for oil and natural gas, hydraulic fracturing (more commonly known as “fracking”), and above- and under-ground mining for coal),
- Energy security, including uranium exploration and production of nuclear fuels,
- Energy security, including procuring raw materials for and locating solar and wind electrical generation facilities,
- Exploration and production of Rare Earth minerals (including many used within the modern telecommunications and hybrid/electric vehicle industries),
- Surface and groundwater and wastewater supply and treatment facilities and techniques, and
- Continued site environmental mediation and cleanup efforts at the local, state, national, and international levels.

In addition to remaining abreast of the above local, state, national, and international trends, faculty and students will maintain curricular and pedagogical currency through the following means:

- Attendance and presentations at Geological Society of America (GSA) conferences, California Geological Survey (CGS) conferences, San Bernardino County Museum, and other national, regional, state, and local conferences, seminars, workshops, rock and mineral shows, and field excursions,
- Monitoring four-year college and university catalogues,
- Monitoring the “assist.org” website,
- Attending and participating in future DIG-TCM (Discipline Input Group-Transfer Model Curriculum) meetings and discussions,
- Continued collaboration with the SBVC and other four-year college and university Geological Sciences faculty and articulation officers, and
- Subscription to a variety of scholarly and industry journals and other publications.

An optimal level of service will be maintained by:

- Hiring the most competent and student-friendly faculty,
- Collaboration with Science, Math, and other ancillary Divisions and Departments,
- Collaboration with DSPS, Counseling, Financial Aid, Admissions and Records, and other ancillary services,
- Participation in campus outreach events, including Science and Math Day, Celebrating Women in Science, Super Saturday, and other events,
- Continued support and mentorship of students through the Geology Club, field excursions, scholarships, successful transfer to four-year institutions, and career-based internships, and
- Continued participation in Professional Development and other developmental activities.

Accomplishments and Strengths

Referencing the narratives in the EMP Summary, provide any additional data or new information regarding the accomplishments of the program, if applicable. In what way does your planning address accomplishments and strengths in the program?

To paraphrase the EMP Summary document, the greatest accomplishments and strengths of the Geology-Oceanography Department and Environmental Science Degree include:

- Continued updates of curriculum, SLO questions, and SLO assessment for individual courses and degree program,
- Active participation in many campus outreach activities (e.g. "Super Saturday," "Science and Math Day," "Celebrating Women in Science and Math," etc.),
- Several years' participation in the Annual California Coastal Commission "Coastal Cleanup Day" event,
- Maintenance of linkages with former students who have been able to "give back" to SBVC by offering workshops and providing guest lectures,
- During the past three academic years, offering courses in addition to traditional introductory courses, including GEOL 122: Environmental Geology, GEOL 170: Geological History of the Great Basin Province, GEOL 250: Geology of California, GEOL 251: Geology of the National Parks and Monuments, and GEOL 270: Geology of the Eastern Sierra Nevada, and
- Approval and successful hire of a full-time faculty member.

Building upon the various accomplishments and strengths of the Geology-Oceanography program, the following plan is proposed:

One-year plan:

- Partnership with the US Forest Service for students, families, and other community members.
- Resurrect the Geology Club.
- Continued participation in "Science and Math Day," "Men in Science," "Women in Science," and "Super Saturday" on-campus activities.
- More regularly offer GEOL 112: Historical Geology and GEOL 201: Mineralogy so that students can complete Geology AS and AS-T degrees.

Three-year plan:

- Partnership with the American Meteorological Service (AMS) within the "Minority Scholarship" and online "Weather Studies" and "Oceanography" programs.
- Partnership with the US Geological Survey (USGS) National Associated of Geology Teachers (NAGT) and other local, state, and federal (and non-governmental) institutions to promote recruitment, internships, scholarships, and transfer of additional (and traditional) underrepresented students.
- Expand outreach to include regional high school and adult education students.

Five-year plan:

- Write a grant to fund minority/underrepresented (and other) students to transfer into four-year Geology, Oceanography, and Environmental Studies/Sciences programs.
- Fund SBVC Geology student attendance and presentation at local, state, national, and international professional conferences.
- Host summer field camps for middle- and high school students interesting in the Geological Sciences (as broadly defined) and co-taught/led by SBVC community college students.
- Continue to develop and expand the Geology-Oceanography program courses, certificates, degrees, and budget under the leadership of one or more full-time Geology-Oceanography faculty.

Challenges

Referencing the narratives in the EMP Summary and/or your data, provide any additional data or new information regarding planning for the program. In what way does your planning address trends and weaknesses in the program?

The greatest barrier to the growth and overall stability of the Geology-Oceanography has been the lack of a full-time, tenure-track faculty member. This Department presently relies upon four adjunct faculty members. Increasing FTES and faculty load has remained extremely difficult without a full-time, tenure-track content expert. Now that a full-time faculty member has been hired, the department now has the potential to grow beyond its present configuration; offer students an AS or AS-T degree; more fully encourage women, students of color, and other underrepresented populations to enter into the Earth Sciences; and more positively contribute to FTES growth within the Science Division, College, and District.

At this time, GEOL 112, 201, 250, 251, and 260 have not been regularly offered. The addition of a full-time faculty member will better facilitate a more consistent scheduling of these important courses.

Students are presently unable to earn an AS degree in Geology, as GEOL 112 and 201 are not regularly offered. However, the new full-time faculty member has the potential to address this shortcoming.

Although a Geology-Oceanography tutor is currently serving students (spring 2016 semester) through a Faculty Directed Tutoring (FDT) grant, the funding is ephemeral and not guaranteed for future semesters. More stable, institutionalized funding is necessary for ongoing SI and tutorial support for both Geology-Oceanography and Environmental Science.

With the addition of a full-time Geology-Oceanography faculty member:

- Additional courses, certificates, and degrees can be developed,
- The timeliness and robustness of course and degree curriculum updates can be improved,
- The timeliness and robustness of course and degree SLO questions and assessments can be improved, and
- The program can finally grow and prosper, therefore meeting increased workplace (career) demands (especially within the STEM – science, technology, engineering, and mathematics – fields), improve upon recruitment of traditionally underrepresented groups, and greater integration with other disciplines on the SBVC campus.

Very few students currently pursue the Environmental Science degree. The degree must be modified and significantly better advertised to all science- and STEM-minded students. This degree has abundant potential for SBVC students, as nearby CSU-San Bernardino and UC-River offer Environmental Science degrees. In addition, environmental issues will only become more important within California, the United States, and Planet Earth.

V: Questions Related to Strategic Initiative: Technology, Campus Climate and Partnerships

Strategic Initiative	**Institutional Expectations**	
	Does Not Meet	**Meets**

Part V: Technology, Partnerships & Campus Climate		
	Program does not demonstrate that it incorporates the strategic initiatives of Technology, Partnerships, or Campus Climate. Program does not have plans to implement the strategic initiatives of Technology, Partnerships, or Campus Climate	Program demonstrates that it incorporates the strategic initiatives of Technology, Partnerships and/or Campus Climate. Program has plans to further implement the strategic initiatives of Technology, Partnerships and/or Campus Climate.

Describe how your program has addressed the strategic initiatives of technology, campus climate and/or partnerships that apply to your program. What plans does your program have to further implement any of these initiatives?

Geology-Oceanography and the Strategic Initiative of Technology:

In addition to traditional lecture methods, including class discussion and whiteboard, the Geology-Oceanography Department and Environmental Science Degree are using the following technologies:

- Classroom computer and LCD projector for PowerPoint, Google Earth, World Wind, YouTube, and other computer animation software,
- VHS and DVD educational videos,
- Blackboard course management system,
- Student e-mail, and
- Preparing for and launching updated Geology-Oceanography and Environmental Science pages on the new SBVC website operating system.

Geology-Oceanography and Environmental Science plan to offer hybrid and fully online DE (distributed education) formats, including interactive television (ITV) to increase student access and FTE. Naturally, only courses suitable to these DE formats will be implemented (e.g. lecture courses are more amenable to this technology than physical science laboratory and field courses). This Department will continue to work closely with the College, Science Division, Audiovisual Department, Curriculum Committee, Program Review Committee, and Technology Committee. Indeed, the following Geology and Oceanography courses have already been or soon will be submitted to the Curriculum and Online Committees for DE approval (fully online, hybrid, etc.): GEOL 101, GEOL 112, GEOL 122, GEOL 250, GEOL 251, and OCEAN 101.

Geology-Oceanography and the Strategic Initiative of Partnerships:

Geology-Oceanography and related (including the Geology-Oceanography faculty chair) faculty have been actively engaged within the following on- and off-campus partnerships:

- Faculty have served on the Interclub Council (ICC), as an advisor.
- Faculty have served as primary advisor for the Geology ("Southern California Trekkers"), Alpha Gamma Sigma (AGS), and Gay-Straight Alliance (GSA) student clubs.
- Faculty have collaborated with the Science Division on the Environmental Sciences/Studies Degree program.
- Faculty have successfully participated in the "Science Learning Center" grant and continue to support efforts within the Student Success Center (primary SBVC tutoring center).
- Faculty attend events and have collaborated with the San Bernardino County Museum. This partnership includes faculty presentations to the larger community and maintenance of the

seismometer on the Museum grounds.
- Working with Cal State-San Bernardino and UC-Riverside Geology Departments.
- Working with the US Forest Service in regards to Environmental Studies and Mining Geology.
- Collaborating with private geological environmental consulting firms, including Tetratech, Inc.
- Working with various local and regional gem and mineral societies (e.g. "Gem-o-Rama" event in Searles Lake, "Victorville Gem and Mineral Show" in the High Desert, Southern California Friends of Mineralogy (SCFM), Geological Society of America (GSA), and other public and non-governmental organizations).

Departments that comprise the Environmental Science degree have been actively engaged for many semesters within STEM-related activities, as well as a variety of campus "open house" and other outreach endeavors.

Future plans include:

- Increased collaboration with the SBVC Planetarium for special topics such as: Earth-Sun relations, seasonal differences in constellations, and extraterrestrial/planetary geology,
- Increased collaboration with the Student Success Center (tutoring center) grant and tutoring opportunities,
- Incorporation of Earth and Environmental Sciences into GIS Certificate Program (and, in turn, elements of GIS being increasingly incorporated into Geology-Oceanography and Environmental Science courses),
- Strengthened partnerships with Astronomy, Biology, Chemistry, Engineering, English, Environmental, Geography-GIS, Mathematics, Physics, and other courses outside of traditional Geology-Oceanography programs,
- Increasing the scope of grant development for student recruitment, retention, success, transfer, and internships within the Earth Sciences,
- Increasing the scope of partnerships with the US Geological Survey (USGS), California Geological Survey (CGS), and California Coastal Commission, and
- Creation of student internships at Cabrillo, Long Beach, and other regional aquariums.

<u>Geology-Oceanography and the Strategic Initiative of Campus Climate:</u>

The Geology-Oceanography department, as well as departments that comprise the Environmental Science degree have contributed to and participated in the following:

- STEM student organization, STEM grant planning, and related STEM activities,
- Informative scientific displays (bulletin boards and display cabinets), demonstrating the breadth of the discipline, especially within the new Physical Sciences Building and via participation in sanctioned events like the Week of Welcome and Club Rush activities,
- Planning for and presentation at on-campus "Great Shakeout" annual earthquake presentation activities (shakeout.org),
- Primary advisor service for the Geology Club student organization (currently defunct, but can be resurrected),
- Concern for student safety, as reflected in annual Program Review Needs Assessment and Efficacy documents,
- Concern for the local and regional environment through Geology Club and course-related fieldtrips (e.g. Ocean Cleanup Day and instilling in students a comprehensive understanding of the finite supply of many of our natural resources, understanding of geological and environmental hazards throughout Southern California, awareness of fuel and non-fuel resources within Southern California, and awareness of Geology-related job opportunities within Southern California),
- Planning and implementation of the new San Bernardino Valley College official website.
- Planning and participation in "Super Saturday," "Science and Math Day," "Women in Science and Mathematics," "Men in Science and Mathematics," and related campus open house events,
- Continued input into the operations of the Student Success Center (and related tutorial support services) via grant opportunities and recruitment of student tutors,
- Collaboration with campus Outreach and Student Services to attract a truly diverse student

population,
- Inviting former SBVC Geology and Oceanography students who have successfully transferred to Cal State, University of California, and other four-year institutions (and who are working in an Earth Science field) to give guest lectures and workshops to current SBVC students, and
- Faculty adviser service for the Geology Club, AGS Club, GSA Club, and Interclub Council (ICC) student organizations.

Future plans include:

- Participation in STEM (science, technology, engineering, and mathematics) projects in order to attract greater numbers of elementary school, middle school, high school, and community college students from our local community into these important, 21st-century transfer and career opportunities. This is especially important for traditionally underrepresented student populations.
- Participation in campus and community dialogue about the unique geologic and environmental hazards, natural resources, and job and educational opportunities within Southern California.
- Creation of permanent "geological wonder" displays throughout the SBVC campus (beyond the new Physical Sciences Building and perhaps including the San Jacinto Fault that runs through the center of campus).
- Co-hosting (with the Career and Transfer Center) an Earth Sciences Career and Transfer Day event for SBVC students and members of the community.
- Co-hosting (with Geological Society of America, Southern California Friends of Mineralogy, local four-year institutions, US Geological Survey, Southern California Earthquake Consortium, and other public and private environmental consulting and mining organizations and companies) an "Ask a Geologist" lecture/panel series.

VI: Previous Does Not Meets Categories

Listed below, from your most recent Program Efficacy document, are those areas which previously received "Does Not Meet." Address each area, by describing below how your program has remedied these deficiencies, and, if these areas have been discussed elsewhere in this current document, provide the section where these discussions can be located.

Neither program has completed an SLO assessment. However an assessment schedule has been provided in this document.

Address, in detail and with specific examples, how this deficiency was resolved:

The Geology-Oceanography Department has regularly collected SLO data for the following courses during the past three years (or longer, in some cases):

- GEOL 101: Introduction to Physical Geology Lecture,
- GEOL 111: Introduction to Physical Geology Laboratory,
- GEOL 122: Environmental Geology,
- GEOL 170: Geological History of the Great Basin Province,
- GEOL 222: Independent Study in Geology,
- GEOL 250: Geology of California,
- GEOL 270: Geology of the Eastern Sierra Nevada,

- OCEAN 101: Elements of Oceanography Lecture, and
- OCEAN 111: Elements of Oceanography Laboratory.

The following courses offered during the past five year period have not yet collected SLO data:

- GEOL 112: Historical Geology, and
- GEOL 251: Geology of National Parks and Monuments.

Note that these courses have been offered only once during the past five year period. As soon as the full-time faculty member is on board, it is anticipated that these courses will be offered and SLO data collected and assessed.

The Geology AS and AS-T Degrees have been mapped to individual course SLOs, and the program level SLOs have been assessed. However, a three-year program level SLO analysis has not yet been completed. The addition of a full-time faculty member will greatly facilitate this process.

The majority of the departments that contribute courses to the Environmental Science degree regularly collect course SLO data, analyze three-year SLO data for courses and programs, and have mapped course level SLOs to their respective programs.