



**COMMITTEE ON ACADEMIC PLANNING AND REVIEW
ANNUAL PROGRAM REPORT**

College	CoS
Department	Earth and Environmental Sciences
Program Unit	ENSC BS
Reporting for Academic Year	2016-2017
Department Chair	Jean Moran
Date Submitted	9/20/2017

1. SELF-STUDY (about 1 page)

A. Five-year Review Planning Goals

From the AY12-13 5 year review:

1. Curriculum

We plan to revise our curriculum during the next two years in response to the University’s plan to move from the quarter system to the semester system by Fall 2018. This will require a thorough review of all courses and program requirements. Some courses will be expanded, others eliminated, and some redesigned as hybrid or online courses. We plan to redesign the Environmental Science BS program by combining the current options, to offer increased flexibility and choice for students in designing a program to fit their needs, and decreased time-to-degree.

2. Degree Programs

Continued growth of our programs and improved graduation rates would be stimulated by developing new courses in areas that provide students with practical skills in areas that are becoming increasingly important; these include spatial analysis, environmental monitoring, instrumental analysis, soil science, and engineering geology.

We may develop additional hybrid or online courses on topics such as pollution modeling.

3. General Education

Cluster proposals are normally solicited and approved about every three years; we anticipate that our participation in clusters will continue. We foresee a growing demand for General Education (GE) curriculum related to climate. We have accordingly prepared a new course proposal for a lower- division Environmental Science course on Global Change for non-majors that has been approved as a new course and for GE (area B3) credit.

4. Etc.

The top priority for future faculty hires is for an Environmental Scientist with a specialty in climate/global change and/or interactions between the hydrosphere, atmosphere and solid Earth. The second priority for a new faculty hire would be in the area of Environmental Geoscience with a focus on surficial processes.

Outside reviewer comment: My main recommendation emerged very clearly from my discussion with students, and to a lesser extent with faculty. I recommend the department work with Dean Leung to find a way to reinstate the summer geology field camp that the department conducted for many years.

B. Five-year Review Planning Goals Progress

(1) A huge amount of time and effort over the past two years went into curriculum design and general education under semesters. Existing options for the ENSC BS degree were discontinued under the new degree program, as discussed in the 5 year review. A new concentration in Environmental Health was developed in collaboration with the Department of Nursing & Health Science.

(2) Courses in Soil Science, Engineering Geology, and Geographic Information Systems ('practical skills' areas noted in five year goals) have been approved for semesters.

(3) The lower division Global Change course was continued to semesters (now called 'Warming Planet, Rising Seas and Global Change'); however, enrollment has not been strong in this, or in other climate change-related classes so far, possibly because of climate change fatigue among students. The department will provide a service course, ENSC 280 (Humans and the Environment in California) to all Health Science and Environmental Science majors, beginning in Fall, 2018, which is expected to increase overall enrollment.

The department put forward four proposals for Freshman Learning Communities under semesters and continued to participate in four clusters in AY 16-17.

(4) During AY 16-17, a new faculty member, with expertise in carbon cycling and biogeochemistry, joined the department. Another new faculty member, with expertise in sedimentology and paleoclimatology, will begin in fall of 2017. These two hires fulfill the five year planning goals. However, one faculty member left the department during AY 16-17.

The Instructional Support Technician position was filled in October, 2015 and vacated in March, 2017. The position will be filled by a new IST in October, 2017. The department was the only one in the CoS with an ASAI position; a reclassification of the position to ACAI based on expectations for required skills and abilities was put forward, and is being evaluated by HR.

C. Program Changes and Needs

Department faculty were actively involved in designing the renovated laboratory space in South Science, and are looking forward with great anticipation to the much-improved space for research. The space provides potential for collaboration within the department and with other departments in science, and opens possibilities for new, externally funded research. Office space for lecturers, TT faculty, and staff is lacking.

The department anticipates increased needs for instructional software and for other instructional equipment as instruction becomes centered around active and experiential learning. For example, faculty requests for portable air quality monitoring equipment and water quality monitoring equipment could not be granted this year due to budget constraints, and software licenses for EdGCM, MATLAB, ROCKWORKS, and AnalyzeIT, etc. will amount to at least \$4,000 more than previously budgeted for software expenses. A2E2/EIRA has become an indispensable source of funds for field trip transportation and new equipment, and will continue to be relied

upon under semesters, to fund a portion of the field courses, and to update aging equipment in instructional laboratories.

The department holds teaching & learning workshops with instructional faculty to move toward student-centered, active learning. Funds are needed for release time for coordination of these events, and travel to NSF-SERC (Science Ed Resource Center) workshops. Funds for marketing/outreach/recruitment to both the REHS concentration and the new Environmental Geosciences MS will be requested in the department budget.

The department plans to submit a proposal for a TT faculty search in AY 17-18. The curricular demands of the new concentration in Environmental Health, and advances in inter-disciplinary approaches to the study of interactions between humans and the environment, call for a faculty member with expertise in these areas. Possible sub-disciplines include geostatistics, water quality and human health, air quality and atmospheric science, climate change and urban flooding & landslides, or the food-water-energy nexus.

2. SUMMARY OF ASSESSMENT (about 1 page)

A. Program Student Learning Outcomes

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

B. Program Student Learning Outcome(s) Assessed

2. Data and Analysis

C. Summary of Assessment Process

The assessment focused on calculation and data analysis on the course final exam for GEOL 4320 Hydrogeology, which was almost exclusively open-ended application of skills, calculations, and interpretation.
The Quantitative Literacy rubric was used to evaluate student work.

D. Summary of Assessment Results

Out of 18 possible, overall scores ranged from 2 to 17. The average total score was 8.6, with a standard deviation of 5.0. Eleven of 22 students displayed at least the basic level of competency (score of 1) in all six areas of quantitative literacy; only six of 22 displayed competency at the mastery level or higher (score of 2) in all areas. One student displayed an exemplary level (score of 3) in five of six areas of quantitative literacy; it should be noted, however, that this student was a visiting international student. A thorough mastery of basic algebra and graphing is an expected pre-requisite for the course, but some students lack the basic preparation. Others have the necessary preparation, but their quantitative skills are quite rusty.

More students received a score of 0 in the “calculation” area than any other, stemming from students’ lack of numeracy and confidence to apply quantitative skills to “real world” problems. In addition, some students have great difficulty connecting numbers in a computation to meaning and understanding of the problem at hand. For example, they may make errors in a calculation, but simply record the erroneous answer, rather than asking themselves if the answer is reasonable. In contrast, students who had a better command of basic numeracy were generally better able to reasonably interpret their answers in context, because their answers made more sense.

In response to student difficulties with basic quantitative skills, the instructor substantially

slowed the pace of the course and cut a significant amount of material in order to give students more time to practice and apply basic quantitative skills in the context of the discipline. These efforts were partially successful, but students who lack the skills and confidence to solve quantitative problems may not be able to catch up within an academic term, or possibly even during an undergraduate career.

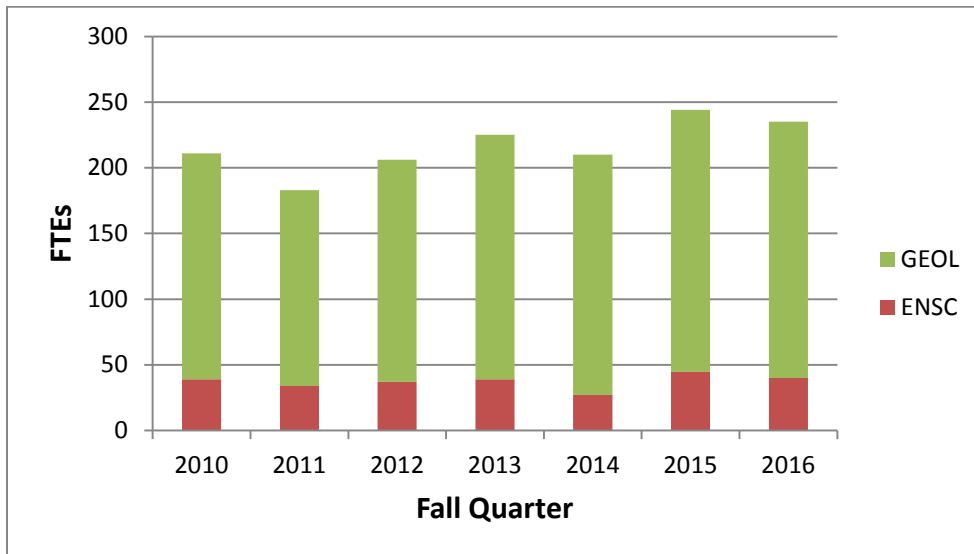
In the future, the instructor will continue to focus on giving students time inside and outside class to practice relevant quantitative skills. Students who have extreme difficulty will be referred for math tutoring at SCAA. Similar assessment material will continue to be assigned, since calculations of water volume, groundwater velocity, etc. are fundamental to understanding hydrology and fulfilling the learning outcomes for this course.

3. STATISTICAL DATA (about 1 page)

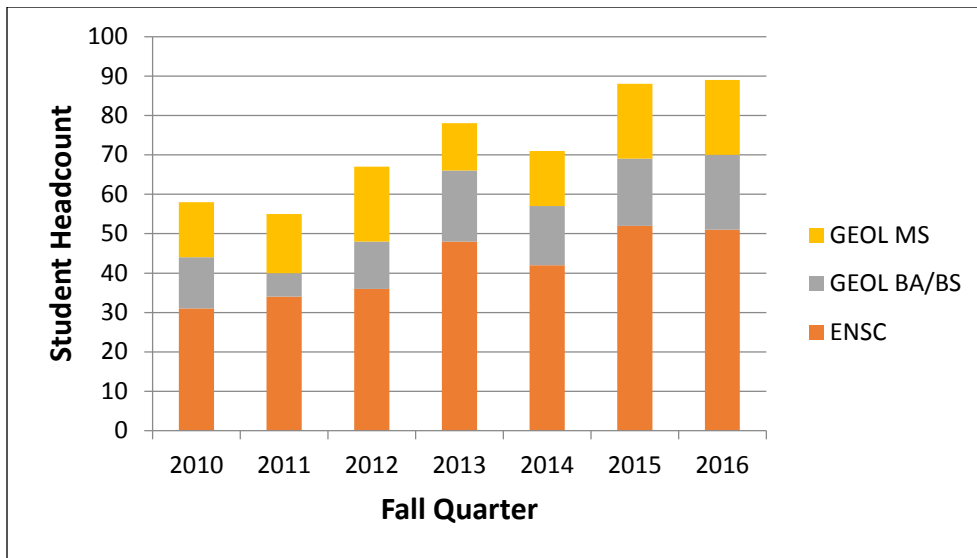
Please note: The Dashboard/Pioneer Data Warehouse does not show accurate data for Geology and Environmental Science. Some pages do not show both majors/degrees, some combine Environmental Studies and Environmental Science, etc. The faculty data are under the former (2005?) department name, Geological Science. A request to correct these problems resulted in some pages showing accurate data; however, several of the possible searches still exclude or misappropriate data.

Institutional Research, Analysis and Decision Support (IRAD) produces program statistics annually in standard format. These statistics (available on their page [here](#)) will be attached to the Annual Report of the Program Unit. This statistical document is expected to be approximately one page long and will contain the same data as required for the five-year review including student demographics of majors, student level of majors (e.g. Juniors, Seniors), faculty and academic allocation, and course data.

The Annual Report may include one or two pages of supplemental information, as appendices, in the form of graphical presentation (e.g., line graphs), tables, and pertinent discussion which summarize the data of the last several (3-5) years to make changes and trends more apparent.



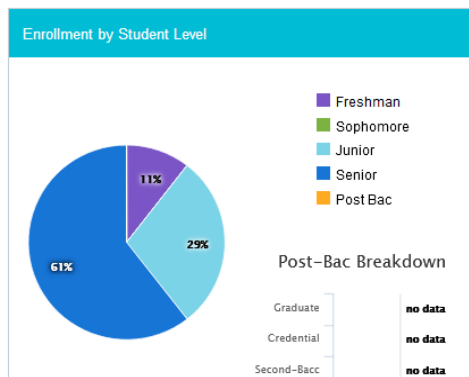
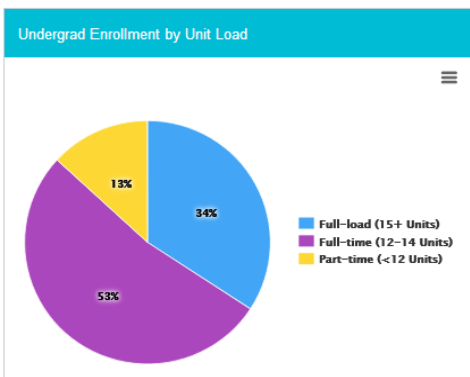
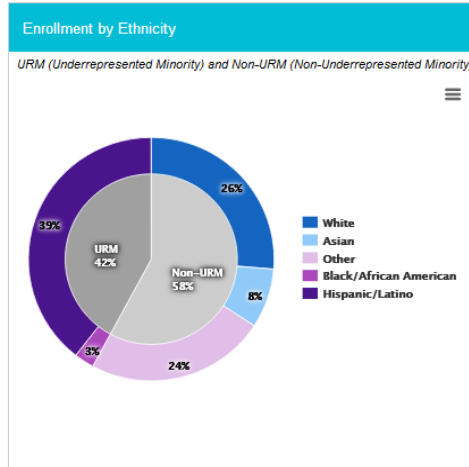
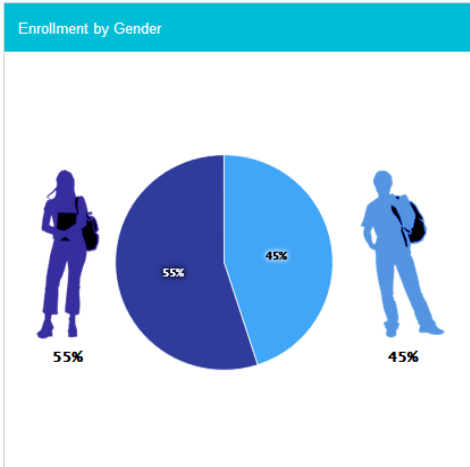
Enrollment in courses offered by the department as measured by Fall Quarter FTEs was 235 (not including self-support) for 2016, representing a small decrease from the previous year.



The total number of majors, or student headcount, in undergraduate (BS and BA) Geology programs is currently 19, a modest increase above the five-year average from 2010-2015. There were 7 students minoring in Geology in Fall, 2016. The number of Environmental Science majors was 51 in fall of 2016, almost the same number as the previous AY. The number of M.S. Geology students was 19 in fall of 2016, the same number as the previous AY. Four M.S. students graduated in AY 16-17.

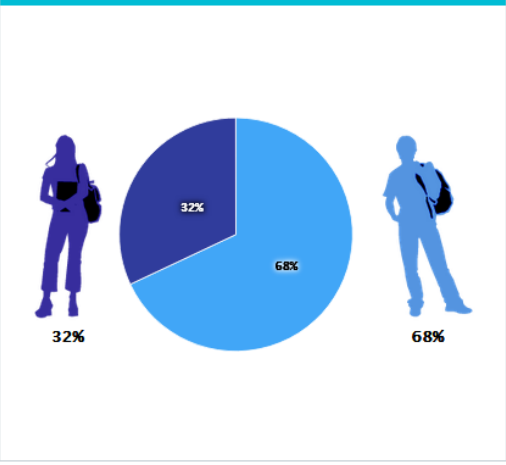
Appendix

Student data for ENSC B.S.

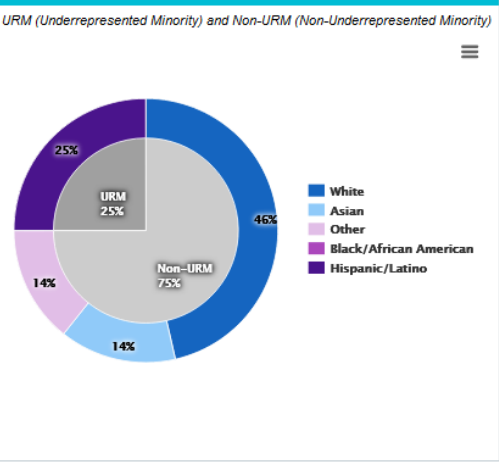


Student data for Geology (BS, BA, MS)

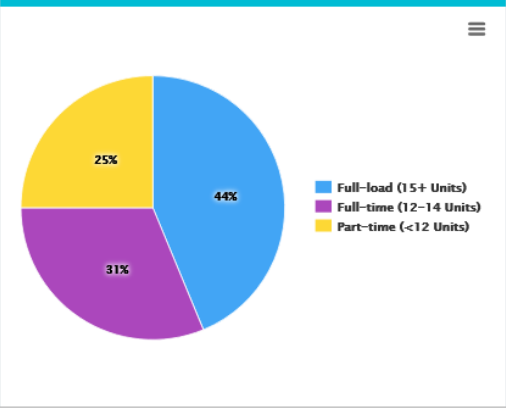
Enrollment by Gender



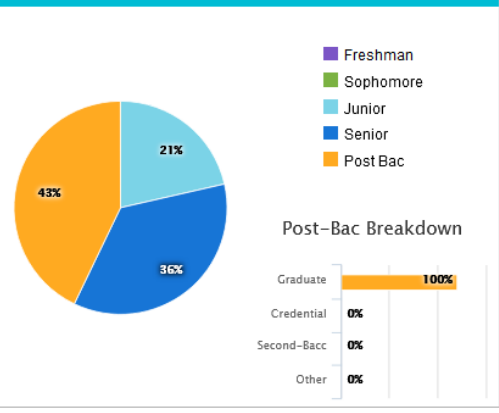
Enrollment by Ethnicity



Undergrad Enrollment by Unit Load



Enrollment by Student Level



Geological Sciences		Headcount												
		Tenured and Tenure Track						Lecturer						
		Fall 2011	Fall 2012	Fall 2013	Fall 2014	Fall 2015	Fall 2016	Fall 2011	Fall 2012	Fall 2013	Fall 2014	Fall 2015	Fall 2016	
STATUS	ETHNICITY													
Full Time	Black													
	Asian/Pacific													
	Hispanic													
	White	4	4	5	5	5	4							
	American Indian													
	International													
	Other						1							
	GENDER													
	Female	1	1	1	1	1	2							
	Male	3	3	4	4	4	3							
SUB-TOTAL		4	4	5	5	5	5							
Part Time	ETHNICITY													
	Black													
	Asian/Pacific							1	1	1	1	1	1	
	Hispanic													
	White							5	6	6	6	7	6	
	American Indian													
	International													
	Other							2	2	2	2	1	1	
	GENDER													
	Female							4	4	3	3	3	3	
Male							4	5	6	6	6	5		
SUB-TOTAL								8	9	9	9	9	8	
DEPARTMENT TOTAL		4	4	5	5	5	5	8	9	9	9	9	8	

California State University, East Bay
APR Summary Data
Fall 2011 – 2015

Geological Sciences					
	Fall Quarter				
	2011	2012	2013	2014	2015
A. Students Headcount					
1. Undergraduate	40	48	66	57	58
2. Postbaccalaureate	0	0	0	0	0
3. Graduate	15	19	12	14	17
4. Total Number of Majors	55	67	78	71	75
College Years					
	10-11	11-12	12-13	13-14	14-15
B. Degrees Awarded					
1. Undergraduate	6	7	5	10	16
2. Graduate	0	2	5	1	8
3. Total	6	9	10	11	24
Fall Quarter					
	2011	2012	2013	2014	2015

C. Faculty					
Tenured/Track Headcount					
1. Full-Time	4	4	5	5	5
2. Part-Time	0	0	0	0	0
3a. Total Tenure Track	4	4	5	5	5
3b. % Tenure Track	33.3%	30.8%	35.7%	35.7%	35.7%
Lecturer Headcount					
4. Full-Time	0	0	0	0	0
5. Part-Time	8	9	9	9	9
6a. Total Non-Tenure Track	8	9	9	9	9
6b. % Non-Tenure Track	66.7%	69.2%	64.3%	64.3%	64.3%
7. Grand Total All Faculty	12	13	14	14	14
Instructional FTE Faculty (FTEF)					
8. Tenured/Track FTEF	3.33	3.28	4.58	3.25	1.17
9. Lecturer FTEF	3.73	3.87	4.27	4	5.41
10. Total Instructional FTEF	7.07	7.15	8.85	7.25	6.57
Lecturer Teaching					
11a. FTES Taught by Tenure/Track	65.9	64.5	69.5	63.9	33.6
11b. % of FTES Taught by Tenure/Track	35.6%	31.1%	30.7%	30.2%	16.9%
12a. FTES Taught by Lecturer	119.2	143.3	157.1	147.7	165.2
12b. % of FTES Taught by Lecturer	64.4%	68.9%	69.3%	69.8%	83.1%
13. Total FTES taught	185.2	207.8	226.5	211.7	198.8
14. Total SCU taught	2752.0	3079.0	3377.0	3152.0	2959.0
D. Student Faculty Ratios					
1. Tenured/Track	19.8	19.7	15.2	19.7	28.8
2. Lecturer	31.9	37.0	36.8	36.9	30.6
3. SFR By Level (All Faculty)	26.2	29.1	25.6	29.2	30.2
4. Lower Division	30.9	35.3	24.7	25.2	32.1
5. Upper Division	25.5	35.0	29.9	35.9	29.2
6. Graduate	6.7	6.0	7.7	43.9	17.6
E. Section Size					
1. Number of Sections Offered	31.0	32.0	35.0	37.0	36.0
2. Average Section Size	30.1	34.9	32.1	29.8	29.8
3. Average Section Size for LD	34.3	36.1	33.3	28.8	31.6
4. Average Section Size for UD	26.4	35.3	34.2	34.7	29.6
5. Average Section Size for GD	14.0	14.0	10.0	14.0	15.0
6. LD Section taught by Tenured/Track	8	9	9	12	2
7. UD Section taught by Tenured/Track	2	0	7	0	4
8. GD Section taught by Tenured/Track	4	7	4	8	4
9. LD Section taught by Lecturer	8	6	9	7	15
10. UD Section taught by Lecturer	7	9	8	10	9
11. GD Section taught by Lecturer	2	1	0	0	2

Source and definitions available at:

<http://www.csueastbay.edu/ira/apr/summary/definitions.pdf>

Appendix B. Assessment Materials

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

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