



**Division of Health, Natural Sciences & Human
Services**

**Earth Sciences Department
Program Review
2014-2018**

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Table of Contents

	Page
1. Overview	1
A. Program Description	1
B. Status of Previous Recommendations	2
2. Analysis of Research Data	5
a) Head Count of Students in the Program	5
b) Course Grade Distribution	5
c) Success Rates	5
d) Retention Rates	7
e) Comparison of success and retention rates in face-to-face with Distance education classes	8
f) Enrollment Statistics with Section and Seat Counts and Fill Rates	8
g) Scheduling of Courses	9
h) List of Related Recommendations	9
3. Curriculum	10
4. Assessment of Student and Program Learning Outcomes (SLOs & PLOs)	12
5. Analysis of Student Feedback	13
6. Facilities and Equipment	14
7. Technology and Software	15
8. Staffing	16
9. Future Direction and Vision	17
10. Prioritized Recommendations	18
Appendix	19
I SLO and PLO Alignment Grid	19
II. SLO and PLO Timeline	24

1. Overview of the Program

A. Program Description

The Earth Sciences program offers courses in geology and geography. It is a small department with one professor teaching geology and geography, and any other course offerings taught by adjunct faculty. The mission statement of the Compton College Earth Science program reads as follows:

“The Earth Sciences Department provides an opportunity for all undergraduates to learn about Earth, its resources, and the processes that change it. By emphasizing the importance of the scientific method to discovery, courses in Geography, Geology, Meteorology, and Oceanography train students to think critically about the relationship humans have with the environment. We seek to prepare future community members, educators, and leaders to apply their knowledge about earth science in a way that ensures a sustainable future.”

Earth Sciences program serves a student body that is predominantly female, Latino and 25 – 29 years in age. Most students attend part time having already obtained a high school diploma. Many students taking earth science courses intend to transfer, and are able to complete their general education requirements in physical sciences with our course offerings.

Earth Sciences is relevant to many students facing imminent environmental issues. Geographic mapping and global positioning utilization may be taken for granted, but courses in the Earth Sciences explain how data is gathered and utilized. Human activities, overconsumption of resources and climate change are topics presented in class which make students keenly aware of the Earth’s condition. Along with lectures, students’ opinions and conclusions are valued. Global environmental issues are covered and courses in the Earth Sciences may provide a career path of which students may be unaware. Associate of Science degrees are offered at Compton College in physical science and general science. The course offerings in the Earth Sciences provide the foundation for these degrees.

The department is aligned with the college mission statement by providing a welcoming environment where all students of diverse backgrounds have something to contribute to any Earth Sciences course they enrolled in. Contemporary technology is available in the classrooms so that students are well prepared for the present-day workforce. All courses in the Earth Sciences encourage academic excellence, which promotes inquiry and life-long learning. The Earth Sciences department is growing as data shows an increase in geography/ geology course offerings, it is recommended that another instructor be hired in order to accommodate an increase in geography/ geology courses.

1B. Status of Previous Recommendations:

Two recommendations of the five given in the previous review have been completed:

- WiFi accessibility in the Math/Science has been installed.
- Transportation for students to a remote field trip location has consistently been available.

However, several items are in need of consistent resupply:

- High quality mineral & rock samples
- Inexpensive field microscopes
- Office supplies.

2. Analysis of Research Data

All data has been provided by Institutional Research & Planning

a) Head count of students in the program

During fall 2013-2017, the students who participated in our program consisted of 69.25% female and 30.75% male. The difference in the numbers of the two groups is more than it is for the general Compton population. It could be that more female are completing general education and are on their way to transferring to four-year colleges. The main ethnicity was Latino (64.57%) followed by African American (29.1%). The ratio of Latinos compared to the other groups in the Earth Sciences program was higher than that compared to the others in the campus population. This means more Latinos are completing more of our courses than the other courses on campus, illustrating the importance and relevance of Earth Science program to the college. Each year of the 2013-2017 period, the 20 year olds were the most numerous in our program, followed by 25-29, and then 30-39 years old.

The percentages of full time students enrolled in the Earth Sciences program in the fall semester from 2013 through 2016 were consistently higher than the Compton College average of 25.5%. It was 39% in 2013 and remained above 45% for the following three fall semesters. This could be understood from the point that most of these students are high school graduates who are yet unemployed. The high school graduates make up more than 85% of the Earth Sciences students for the four fall semesters and an average of 40% of our students plan to transfer.

For spring 2014 – 2017, Earth Sciences students on average consisted of mostly females (64.1%) and the remaining 37%, male. These students were mostly Latino (62.3%) and African American (37.7%). While 35.9% of the college population was enrolled in Earth Sciences courses, African Americans made up an average 33.1%, which is consistent with the college average of 32.5%. This finding indicates that African American student participation in Earth Sciences is equivalent with the college average. The dominant age group in these courses is 25 - 29 years old. Most students in the program are part time (55.3%). Students in Earth Sciences program are high school graduates, and are either undecided or intend to transfer to a four-year college or university.

Fall Terms 2013-2016					Compton Student Population	
		Term				
		2013	2014	2015	2016	Fall 2016
Term Headcount		172	157	147	144	7,701
Gender	F	61.6%	75.2%	69.4%	70.8%	63.4%
	M	38.4%	24.8%	30.6%	29.2%	36.2%
Ethnicity	African-American	32.0%	27.4%	31.3%	25.7%	34.6%
	Amer. Ind. or Alask. Native	0.0%	0.0%	0.0%	0.0%	0.2%
	Asian	2.9%	0.6%	0.0%	0.7%	4.7%
	Latino	59.9%	64.3%	65.3%	68.8%	53.7%
	Pacific Islander	1.7%	1.9%	0.0%	0.0%	0.7%
	White	1.7%	0.6%	1.4%	2.1%	2.9%
	Two or More	1.2%	3.8%	2.0%	2.8%	2.7%
	Unknown or Decline	0.6%	1.3%	0.0%	0.0%	0.5%

Age/ Age Group	<17	0.0%	0.0%	0.0%	0.0%	0.6%
	17	0.0%	0.0%	0.0%	0.0%	2.2%
	18	1.7%	1.9%	2.7%	1.4%	7.5%
	19	11.6%	14.0%	7.5%	6.3%	9.2%
	20	18.6%	17.8%	18.4%	18.1%	9.8%
	21	10.5%	10.8%	14.3%	9.0%	9.5%
	22	15.1%	11.5%	12.9%	6.9%	7.5%
	23	7.6%	3.8%	8.2%	9.7%	6.3%
	24	7.0%	3.8%	2.0%	9.0%	5.9%
	25-29	10.5%	15.9%	13.6%	16.0%	16.5%
	30-39	10.5%	12.7%	10.2%	13.2%	13.9%
	40-49	4.1%	5.1%	5.4%	4.9%	6.5%
	50-64	2.9%	2.5%	4.1%	4.9%	3.6%
	65+	0.0%	0.0%	0.7%	0.7%	0.4%
Class Load	Full-time	39.0%	45.9%	47.6%	47.2%	25.5%
	Part-time	61.0%	54.1%	52.4%	52.8%	73.3%
Academic Level	College degree	8.1%	3.2%	4.1%	7.6%	10.0%
	HS Grad	85.5%	90.4%	91.2%	86.8%	81.6%
	Not a HS Grad	0.6%	0.6%	0.0%	0.7%	0.4%
	K-12 Special Admit	0.0%	0.0%	0.0%	0.0%	2.1%
	Unknown	5.8%	5.7%	4.8%	4.9%	5.9%
Educational Goal	Intend to Transfer	36.6%	38.9%	38.8%	49.3%	31.6%
	Degree/Certificate Only	7.0%	4.5%	8.2%	6.9%	7.6%
	Retrain/recertif.	1.2%	0.6%	2.7%	0.0%	3.8%
	Basic Skills/GED	7.6%	6.4%	7.5%	6.9%	6.8%
	Enrichment	2.3%	0.6%	3.4%	2.1%	1.7%
	Undecided	18.6%	12.1%	18.4%	16.0%	1.3%
	Unstated	26.7%	36.9%	21.1%	18.8%	34.1%

Spring Terms 2014-2017					Compton Student Population	
Term						
					Spring 2017	
Term Headcount					6,944	
Gender	F	64.4%	61.8%	63.4%	59.5%	64.1%
	M	35.6%	38.2%	36.6%	40.5%	35.9%

Ethnicity	African-American	34.6%	41.4%	27.6%	28.8%	32.5%
	Amer. Ind. or Alask. Native	0.0%	0.0%	0.0%	0.0%	0.2%
	Asian	1.6%	0.7%	1.6%	0.6%	5.0%
	Latino	58.0%	52.0%	62.6%	68.7%	55.2%
	Pacific Islander	0.0%	0.7%	0.0%	0.0%	0.7%
	White	1.6%	1.3%	0.8%	0.0%	3.0%
	Two or More	3.7%	3.3%	6.5%	1.8%	2.8%
	Unknown or Decline	0.5%	0.7%	0.8%	0.0%	0.5%
Age/ Age Group	<17	0.0%	0.0%	0.0%	0.0%	0.9%
	17	0.0%	0.0%	0.8%	0.0%	1.4%
	18	0.0%	1.3%	5.7%	3.1%	6.0%
	19	9.6%	11.8%	11.4%	9.8%	8.4%
	20	18.1%	15.1%	13.0%	19.6%	9.1%
	21	17.6%	11.8%	13.8%	9.2%	8.2%
	22	10.1%	12.5%	13.8%	11.0%	7.4%
	23	6.4%	11.8%	8.9%	11.7%	6.3%
	24	5.3%	2.6%	0.8%	8.6%	5.1%
	25-29	14.9%	13.2%	16.3%	16.0%	16.1%
	30-39	11.7%	9.2%	7.3%	7.4%	12.8%
	40-49	5.3%	6.6%	4.9%	2.5%	6.2%
	50-64	1.1%	3.9%	3.3%	1.2%	3.9%
	65+	0.0%	0.0%	0.0%	0.0%	0.4%
Class Load	Full-time	46.3%	50.0%	48.0%	42.9%	23.4%
	Part-time	53.7%	50.0%	52.0%	57.1%	71.5%
Academic Level	College degree	4.3%	3.3%	2.4%	15.3%	9.9%
	HS Grad	90.4%	89.5%	95.1%	79.8%	81.5%
	Not a HS Grad	0.5%	1.3%	0.0%	0.6%	3.1%
	K-12 Special Admit	0.0%	0.0%	0.8%	0.6%	2.8%
	Unknown	4.8%	5.9%	1.6%	3.7%	4.8%
Educational Goal	Intend to Transfer	38.8%	40.8%	51.2%	57.1%	31.7%
	Degree/Certificate Only	3.7%	4.6%	4.9%	6.7%	7.3%
	Retrain/recertif.	3.2%	1.3%	0.8%	2.5%	4.4%
	Basic Skills/GED	4.8%	7.9%	7.3%	6.7%	5.8%
	Enrichment	2.1%	1.3%	0.8%	1.2%	1.6%
	Undecided	16.5%	13.2%	13.0%	11.7%	13.6%
	Unstated	30.9%	30.9%	22.0%	14.1%	26.8%

b) Course grade distribution

The numbers of course passing grades (A, B, and C) showed a pattern throughout the courses and semesters with the A grades as the most followed by B and lastly, the C grades except in 2013 when the C grades slightly outnumbered the B grades. The non-passing grades (D, F, and W) were the very disappointing results. In 2013, the worst was recorded as 32.2% of the total grades while the following were at least less than 30%. We are unable to suggest a specific reason for the part of the 2015 data with more than 50% non-passing grades. It could be a reflection of the level of the preparedness of our students or the effectiveness of the instructor.

Year	COURSE	Method	We	Grade I										Total	Succ.	Reten.		
				'A'	'B'	'C'	'P'	'D'	'F'	'NP'	Inc P	Inc NP	'DR'				'W'	
2013	GEOL-1	Lecture	14	10	12	11		2	9			-	-		11	55	60.0%	80.0%
			16	18	23	20		5	8			-	-		13	87	70.1%	85.1%
	GEOL-3	Laborato	16	27	9	15		3	5			-	-		13	72	70.8%	81.9%
2013 Total				55	44	46		10	22			-	-		37	214	67.8%	82.7%
2014	GEOL-1	Lecture	14	11	9	9		2	9			-	-		6	46	63.0%	87.0%
			16	65	54	53		10	27			-	-		30	239	72.0%	87.4%
	GEOL-15	Lecture	16	2	7				7			-	-		16	56.3%	100.0%	
	GEOL-3	Laborato	16	49	23	16		3	3			-	-		15	109	80.7%	86.2%
2014 Total				127	93	78		15	46			-	-		51	410	72.7%	87.6%
2015	GEOL-1	Lecture	14	4	10	8		2	10			-	-		15	49	44.9%	69.4%
			16	55	54	44		6	22			-	-		31	212	72.2%	85.4%
	GEOL-3	Laborato	16	36	24	18		5	5			-	-		10	98	79.6%	89.8%
2015 Total				95	88	70		13	37			-	-		56	359	70.5%	84.4%
2016	GEOL-1	Lecture	14	8	6	6		1	4			-	-		6	31	64.5%	80.6%
			16	58	46	31		12	28			-	-		18	193	69.9%	90.7%
	GEOL-3	Laborato	16	36	21	22		2	4			-	-		10	95	83.2%	89.5%
2016 Total				102	73	59		15	36			-	-		34	319	73.4%	89.3%
2017	GEOL-1	Lecture	14	9	12	11		4	4			-	-		11	51	62.7%	78.4%
			16	20	21	17		2	9			-	-		13	82	70.7%	84.1%
	GEOL-3	Laborato	16	19	14	18		2	2			-	-		7	62	82.3%	88.7%
2017 Total				48	47	46		8	15			-	-		31	195	72.3%	84.1%

c) Success rates (Discuss your program's rates, demographic success characteristics and set a success standard for your program.)

Program Success Standard*	71.8%
5-year Program Success Average	73.5%

*Calculated as the average between the 5-year average and the lowest yearly rate in the 5-year period.

Year	Total Grades	Success Rate
FA 2013	214	67.8%
2014	410	72.7%
2015	359	70.5%
2016	319	73.4%
SP 2017	195	72.3%

From fall 2013 through spring 2017, the success rates were at least 70%, except in the fall 2013 semester which recorded 67.8%. The excellent success rates were accomplished without coordination among professors but may be attributed to excellent teaching methods. The five year program standard is exceeded by 1.7%. The two largest groups, African American and Latinos both performed comparatively well as the white male control group and were not impacted in fall 2013, spring 2016, fall 2016, and 2017 but were impacted in spring 2014, fall 2014, spring 2015, and fall 2015. This could be a result of the effectiveness of different

professors or the preparedness of the groups of students. Neither female nor male group through the period of study was impacted.

Demographic success shows that Latinos from 2013 to 2016 were 73.26% successful and 69.24% African Americans were successful during the same period. The success rate for males was 66.51% and 74.66% for females. For the dominant age group (20– 24) approximately 71.29% are successful in the Earth Sciences courses taken at Compton College.

Fall Term Demographic Success (2013-2016)

<i>Ethnicity</i>	Fall 2013		Fall 2014		Fall 2015		Fall 2016	
	Success	N	Success	N	Success	N	Success	N
African-American	65.7%	70	70.4%	54	66.0%	53	74.4%	43
Amer. Ind. or Alask. Native	0.0%	X	0.0%	X	0.0%	X	0.0%	X
Asian	66.7%	X	100.0%	X	0.0%	X	100.0%	X
Latino	69.1%	123	76.0%	125	76.7%	120	69.8%	116
Pacific Islander	50.0%	X	100.0%	X	0.0%	X	0.0%	X
Two or More	50.0%	X	85.7%	X	33.3%	X	50.0%	X
Unknown or Decline	100.0%	X	50.0%	X	0.0%	X	0.0%	X
White	80.0%	X	100.0%	X	100.0%	X	75.0%	X
<i>Gender</i>								
M	66.7%	84	68.0%	50	65.5%	55	68.9%	45
F	68.5%	130	77.8%	144	76.6%	124	71.2%	125
X	0.0%	X	0.0%	X	0.0%	X	0.0%	X
<i>Age Groups</i>								
19 or less	77.4%	31	69.4%	36	31.6%	19	66.7%	12
20 to 24	66.7%	123	77.8%	90	80.4%	102	66.7%	90
25 to 49	70.4%	54	76.6%	64	72.0%	50	74.6%	59
Over 49	16.7%	X	50.0%	X	87.5%	X	88.9%	X

X: Counts are suppressed for groups with less than 10 students.

Shaded regions indicate groups achieving at a rate less than 80% of the reference group, respectively. Reference groups are White, male, and 20 to 24 years old.

Spring Term Demographic Success (2014-2017)

	Spring 2014		Spring 2015		Spring 2016		Spring 2017	
	Success	N	Success	N	Success	N	Success	N
<i>Ethnicity</i>								
African-American	62.2%	74	69.9%	73	73.2%	41	72.1%	61
Amer. Ind. or Alask. Native	0.0%	X	0.0%	X	0.0%	X	0.0%	X
Asian	100.0%	X	100.0%	X	0.0%	X	100.0%	X
Latino	72.8%	125	67.0%	97	81.1%	95	73.6%	129
Pacific Islander	0.0%	X	0.0%	X	0.0%	X	0.0%	X
Two or More	87.5%	X	60.0%	X	77.8%	X	33.3%	X
Unknown or Decline	0.0%	X	0.0%	X	0.0%	X	0.0%	X
White	100.0%	X	100.0%	X	0.0%	X	0.0%	X
<i>Gender</i>								
M	62.2%	82	61.4%	70	72.7%	55	66.7%	84
F	75.4%	134	71.8%	110	78.7%	94	77.3%	110
X	0.0%	X	0.0%	X	0.0%	X	0.0%	X
<i>Age Groups</i>								
19 or less	73.7%	19	66.7%	24	79.3%	29	66.7%	24
20 to 24	69.3%	127	66.7%	102	71.1%	76	71.6%	116
25 to 49	72.1%	68	68.8%	48	82.5%	40	76.5%	51
Over 49	50.0%	X	83.3%	X	100.0%	X	100.0%	X
X: Counts are suppressed for groups with less than 10 students.								
Shaded regions indicate groups achieving at a rate less than 80% of the reference group, respectively. Reference groups are White, male, and 20 to 24 years old.								

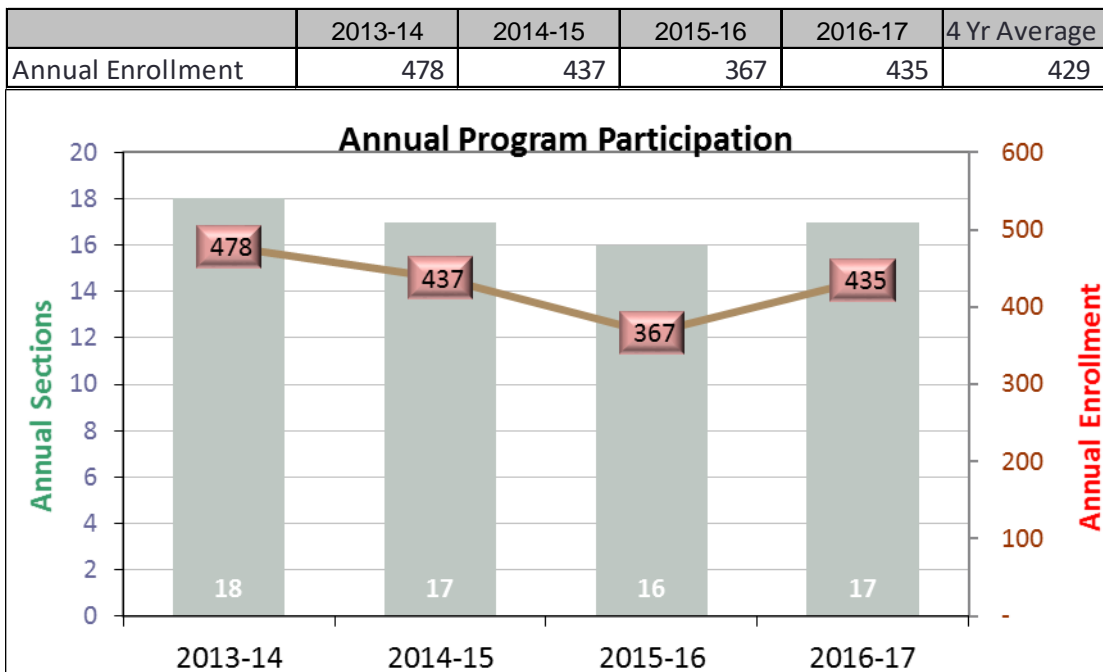
d) Retention rates

Year	Total Grades	Retention Rate
FA 2013	214	82.7%
2014	410	87.6%
2015	359	84.4%
2016	319	89.3%
SP 2017	195	84.1%

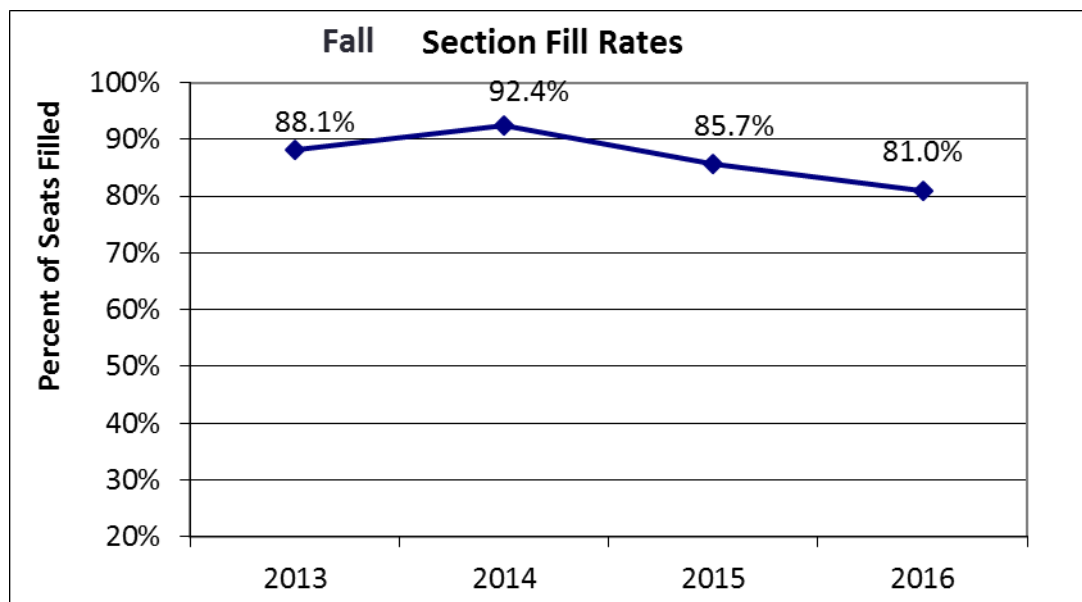
d. The Earth Sciences program has averaged an 86% retention rate from fall 2013 to spring 2017. It is so high because a variety of teaching styles is utilized in order to accommodate all varieties of learning styles, such as kinetic, auditory, textual, visual, tactile, etc. Each student is accommodated to ensure student success. A variety of resources, like tutoring and the Student Resource Center are available to maintain equity amongst students. All instructors are available to students during office hours and via email.

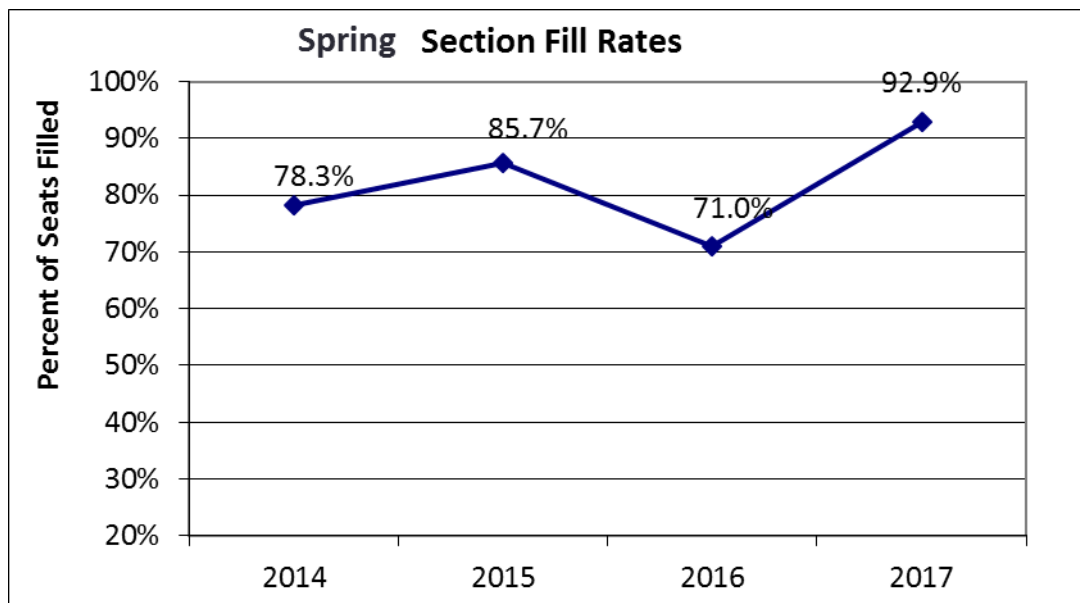
e) Comparison of success and retention rates in face-to-face classes with distance education classes
 No data is available for comparing success rates and retention rates of distance education courses against face-to-face courses between 2014 and 2017 because distance education courses were first offered in fall 2017.

f) Enrollment statistics with section and seat counts and fill rates
 The annual Earth Sciences program participation showed a decrease from the 2013-14 in 2014-15 and 2015-16 but an increase in 2016-17 back to the 2014-15 range. The changes tend to reflect the total number of sections offered for the year. The 2013-14 year had 18 sections, then the number decreased to 17 and 16 the following years and then back up to 17 in 2016-17.



The data available for annual section fill rates from fall 2013 to 2016, showed there was a slight increase from 88.1% (2013) to 92.4% (2014) and then a decrease in rates from 92.4% to 81.0% (2017). Spring 2014 – 2017 showed an increase in overall fill rates from 78.3% (2014) to 92.9% (2017). An explanation for these opposing trends is not apparent.





g. The following data show that courses were scheduled during the time slots for maximum enrollment. The enrollment rates in the night classes were consistently less than those for the day classes and showed continuous decrease from fall 2013 to fall 2016. The percentages for spring semesters had quite a similar distribution of 6:4 day to night classes. Only the 2016 term had a 7:3 day to night class distribution. The popularity of online classes may be responsible for the fewer night class offerings. The Earth Sciences program is currently exploring the success of the online offerings. Class offerings in Earth Sciences are congruent with institutional research. Most Earth Sciences courses are offered during the day Monday through Thursday.

Enrollment by Time of Day

Fall Term	2013	2014	2015	2016
Day	57.0%	59.8%	62.8%	64.7%
Night	43.0%	40.2%	37.2%	35.3%
Weekend/Unknown	0.0%	0.0%	0.0%	0.0%

Enrollment by Time of Day

Spring Term	2014	2015	2016	2017
Day	63.4%	61.1%	71.3%	61.0%
Night	36.6%	38.9%	28.7%	39.0%
Weekend/Unknown	0.0%	0.0%	0.0%	0.0%

h) Related recommendations.

The success and retention rates for the period 2013 to 2017 were above 70 % and 80% respectively. These numbers are good but may be improved upon. The program will continue to review and improve on its practices/methodologies and work so that by the next review the numbers will be closer to 90%.

i. No additional data has been compiled by faculty.

j. Nothing further is recommended

3. Curriculum

During the past four years, no curriculum work has taken place because the current curriculum has been adopted from El Camino College. Compton College faculty continues to work with El Camino faculty to review and update curriculum.

The following are the different courses offered at different times and semesters from the Earth Sciences schedule.

- Geology 1: physical geology
- Geology 3: physical geology lab
- Geology 6: Earth Science in Education
- Geology 15: natural disaster
- Geography 1: physical geography
- Geography 2: cultural geography

Geography 5: regional geography

Each course should be reviewed once every six years.

The curriculum timeline for Earth Sciences is shown below:

COURSE	CTE	ACTIVE	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018
GEOG 1	N	Y		X						X
GEOG 2	N	Y			X					
GEOG 5	N	Y			X					
GEOG 5H		Y							NEW	
GEOL 1	N	Y			X	X				
GEOL 15	N	Y				X		X		
GEOL 2	N	Y			X	X				
GEOL 3	N	Y				X				

b. Upon adopting the El Camino College curriculum, several additional courses have been offered such as Cultural Geography, World Regional Geography, and Geologic Hazards. The geography courses are yet to be fully integrated into our curriculum as they have been cancelled a number of times because of low enrollment.

c. There have been no course deletions or in-activations.

d. During the period under review, no online class was offered. Recently we have started to offer one section of Physical Geology lecture. It is the only Earth Sciences course being offered online.

e. All courses offered in the Earth Sciences department are transferrable and can be used for an AS degree in physical science or for general education requirements toward a Bachelor of Arts/Science degree. Some students are completing Earth Sciences classes for teacher certification. The department does not currently award any certificates or permits.

1. All courses required for a program degree are offered every semester except Geologic Hazards which is offered every other semester but has not made it due to low enrollment.
2. There are no concerns regarding any course offered in Earth Sciences program and university articulation. The courses in the Earth Sciences program are El Camino College's courses which have ongoing articulation with the four year universities.
3. No degrees or certificates have been awarded because most students use Earth Sciences course offerings for general education in order to transfer to a four-year college or university. There is no licensure exam for earth sciences students. The plan is that the program will soon be able to offer all the course complement for students to be able to graduate with an AS or AS-T degrees.
- f. There are no recommendations.

4. Assessment and Student and Program Learning Outcomes (SLOs & PLOs)

4a. The Earth Sciences SLO and PLO alignment is provided in the appendix. See Appendix A for alignment grid.

b. The timeline for course and program level SLO assessments is provided in the appendix. See Appendix B for program assessments.

c. In the past four years, 100% of the SLOs and PLOs have been assessed and reported.

d. The goal for the Earth Sciences Department is a score of 70% for 70% of all students on each assessment. The goal has been attained in Earth Sciences. This has occurred because the department has become more familiar with the assessment process, as a result assessments have improved because questions have improved. Being aware of expected outcomes has focused emphasis on suitable teaching strategies.

e. Reading and interpreting an article in a scientific journal was once a task for students in Earth Science. The SLO was changed to recognizing components of the Scientific Method. Familiarity and use of the scientific method is more appropriate, because the majority of students in the Earth Sciences seek only transfer credit, and have no training in reading and analyzing scientific data. The main type of discussion that the only Earth Sciences faculty member had was an informal exchange with part timers based on their results and suggestions to improve both the testing and reporting process. The testing is now done immediately after the material is covered in class.

f. No recommendations are made.

5. Analysis of Student Feedback

There is no student feedback to be analyzed because the analysis could have been conducted prior to writing this program review. The faculty was not aware that student feedback needed to be obtained prior to writing this program review.

Students have expressed tremendous satisfaction in taking a field trip on a Saturday to a desert site. The trip easily allowed them to apply concepts and techniques learned in class. Utilizing what was learned in class to a real-life field experience made the trip remarkable.

6. Facilities and Equipment

The program facilities are adequate, where the earth sciences classroom holds 32 students which is ideal to better ensure student success. The program has lots of resources such as rocks, maps, soil samples, microscopes, and hand lens for different lab activities. Equipment in the Earth Sciences Program is adequate as well, but rock and minerals, also maps and a map stand are needed for courses offered. Geology 6: Earth Science in Education, which is very popular with teachers seeking credential education/renewal, is in need of weather equipment like anemometers and barometric pressure meters.

b) The cost for museum quality rocks and minerals that display properties studied by the students is \$3000. Four by six foot maps and a maps stand will cost \$2000. Field microscopes, lab testing-materials and active-learning lecture transparencies are required for \$1000. Ice age fossils and weather instrument will cost \$3,000.

c) There are no long-term needs regarding facilities and equipment except that the program may need a larger classroom and regular maintenance of equipment as the program is envisaged to grow with the college.

d) All facilities and equipment are sufficient at this time.

7. Technology and Software

Presently, the Earth Science Department has a computer and touch-screen monitor for overhead projection. It can be used for instructor or student presentations, CD and YouTube video showings.

- b) To assist students to better understand concepts in the Earth Sciences, purchasing geologic- learning software would be beneficial and better guarantee student success.
- c) Purchasing earth sciences software is advantageous to students, but the cost and terms of licensing may be prohibitive.
- d) Technology and software resources are adequate at this time.

8. Staffing

a) Currently, there is one full-time faculty member in geology, and three adjunct faculty in geography, our dean is Abiodun Osanyinpeju. Ruben Valenzuela and Gustavo Ramirez are invaluable as classified staff.

b) Staffing in the program is sufficient for courses offered. Based on a robust enrollment in Geology 6 (Fall 2016) and an increase in geography courses offered, it is predicted that an increase in earth science faculty will be needed. Depending on the applicant's qualifications, the salary for an additional faculty member is approximately \$70,000. Additional faculty members are required in order to continue to increase the number of course offerings in the earth sciences.

c) Hiring an additional earth sciences faculty member will result in an increase in course offerings better facilitating increased enrollment and student success.

9. Future Direction and Vision

a) Industry jobs have become computer dependent. Technology is used in many facets of earth sciences, for example, computer cartography, modeling, exploration, and prediction. Particular changes in a field are dependent on the student's field of choice. The program should require that students perform computer-based tasks so that they are comfortable and familiar with computer technology. It has been known for some time that there are not many Earth Sciences professors around to teach those who may be interested in the Earth Sciences. The program believes that as it continues to provide quality instruction for our students, we will eventually have some that will choose to go into the teaching profession as college professors.

10. Prioritized Recommendations

Recommendations	Cost Estimate	Strategic Initiatives
1. Museum quality minerals, and rock	\$3000	A & B
2. Ice Age fossils	\$3000	A & B
3. field microscopes	\$3000	A & B
4. topographic maps	\$2000	A & B
5. transparency pens and transparencies	\$1000	A & B
6. weather instruments	\$5000	A & B

Obtaining each item will strengthen, support and foster a positive learning environment where students work cooperative/collaboratively toward student success **(SI A & B)**.

Appendix A

Program: Earth Sciences (Geography, Geology, Oceanography)		Number of Courses: 19	Date Updated: 09.10.2014	Submitted by: T. Jim Noyes, ext. 3356			
ILOs	1. Critical Thinking <i>Students apply critical, creative and analytical skills to identify and solve problems, analyze information, synthesize and evaluate ideas, and transform existing ideas into new forms.</i>	2. Communication <i>Students effectively communicate with and respond to varied audiences in written, spoken or signed, and artistic forms.</i>	Community and Personal Development <i>Students are productive and engaged members of society, demonstrating personal responsibility, and community and social awareness through their engagement in campus programs and services.</i>	4. Information Literacy <i>Students determine an information need and use various media and formats to develop a research strategy and locate, evaluate, document, and use information to accomplish a specific purpose. Students demonstrate an understanding of the legal, social, and ethical aspects related to information use.</i>			
	SLO-PLO-ILO ALIGNMENT NOTES: SLO/PLO is a major focus or an important part of the course/program; direct instruction or some direct instruction is provided; students are evaluated multiple times (and possibly in various ways) throughout the course or are evaluated on the concepts once or twice within the course. SLO/PLO is a minor focus of the course/program and some instruction is given in the area but students are not formally evaluated on the concepts; or if the SLO/PLO is minimally or not at all part of the course/program.						
PLOs				PLO to ILO Alignment			
				<i>(Mark with an X)</i>			
PLO #1 Basic Knowledge Students can identify the salient features of the basic concepts of earth science and geography. This includes the ability to recall the definitions of the specialized vocabulary of earth science and geography.				1	2	3	4
PLO #2 Relationship with Environment Students recognize and can accurately articulate how their environment (including the Earth, the atmosphere, ocean, and biosphere) affects humans' lives and how human activities affect their environment.				X	X		
PLO #3 Scientific Method Students can identify the key elements of the scientific method (hypotheses, tests, observations, conclusions/interpretation of observations) in popular accounts of scientific research in magazines, newspapers, etc.				X			

SLOs	SLO to PLO Alignment <i>(Mark with an X)</i>			COURSE to ILO Alignment <i>(Mark with an X)</i>			
	P1	P2	P3	1	2	3	4
	GEOG 1 Physical Elements: SLO #1 Basic Knowledge Students can identify the salient features of the basic concepts of physical geography. (This includes the ability to recall the definitions of the specialized vocabulary of physical geography.)	X					
GEOG 1 Physical Elements: SLO #2 Relationship with Their Environment Students recognize and can accurately articulate how their physical environment affects humans' lives and how human activities affect their physical environment.		X		X	X		
GEOG 1 Physical Elements: SLO #3 Nature of Science Students can identify the key elements of the scientific method (hypotheses, tests, observations, conclusions/interpretation of observations) in popular accounts of scientific research in magazines, newspapers, etc.			X				
GEOG 2 Cultural Geography: SLO #1 Basic Knowledge Students can identify the salient features of the basic concepts of cultural geography. (This includes the ability to recall the definitions of the specialized vocabulary of cultural geography.)	X						
GEOG 2 Cultural Geography: SLO #2 Relationship with Their Environment Students recognize and can accurately articulate how their cultural environment affects humans' lives and how human activities affect their cultural environment.		X		X	X		
GEOG 2 Cultural Geography: SLO #3 Nature of Science Students can identify the key elements of the scientific method (hypotheses, tests, observations, conclusions/ interpretation of observations) in popular accounts of scientific research in magazines, newspapers, etc.			X				
GEOG 20 Geography Field Studies: SLO #1 Basic Knowledge Students can identify the salient features of the basic concepts of geography. (This includes the ability to recall the definitions of the specialized vocabulary of geography.)	X			X			
GEOG 5 World Regional Geography: SLO #1 Basic Knowledge Students can identify the salient features of the basic concepts of physical geography. (This includes the ability to recall the definitions of the specialized vocabulary of cultural geography.)	X						
GEOG 5 World Regional Geography: SLO #2 Relationship with Their Environment Students recognize and can accurately articulate how their cultural environment affects humans' lives and how human activities affect their cultural environment.		X		X	X		
GEOG 5 World Regional Geography: SLO #3 Nature of Science Students can identify the key elements of the scientific method (hypotheses, tests, observations, conclusions/interpretation of observations) in popular accounts of scientific research in magazines, newspapers, etc.			X				

SLOs	SLO to PLO Alignment <i>(Mark with an X)</i>			COURSE to ILO Alignment <i>(Mark with an X)</i>			
	P1	P2	P3	1	2	3	4
	GEOG 6 Physical Geography Laboratory: SLO #1 Basic Knowledge Students can identify the salient features of the basic concepts of physical geography. (This includes the ability to recall the definitions of the specialized vocabulary of physical geography.)	X					
GEOG 6 Physical Geography Laboratory: SLO #2 Relationship with Their Environment Students recognize and can accurately articulate how their physical environment affects humans' lives and how human activities affect their physical environment.		X		X	X		
GEOG 6 Physical Geography Laboratory: SLO #3 Nature of Science Students can identify the key elements of the scientific method (hypotheses, tests, observations, conclusions/interpretation of observations) in popular accounts of scientific research in magazines, newspapers, etc.			X				
GEOG 7 Geography of California: SLO #1 Basic Knowledge Students can identify the salient features of the basic concepts of physical geography. (This includes the ability to recall the definitions of the specialized vocabulary of physical geography.)	X						
GEOG 7 Geography of California: SLO #2 Relationship with Their Environment Students recognize and can accurately articulate how their physical environment affects humans' lives and how human activities affect their physical environment.		X		X	X		
GEOG 7 Geography of California: SLO #3 Nature of Science Students can identify the key elements of the scientific method (hypotheses, tests, observations, conclusions/interpretation of observations) in popular accounts of scientific research in magazines, newspapers, etc.			X				
GEOG 8 Introduction to Geographic Information Systems: SLO #1 Basic Knowledge Students can identify the salient features of the basic concepts of mapping and Geographic Information Systems (GIS). This includes the ability to recall the definitions of the specialized vocabulary of maps and GIS.	X						
GEOG 8 Introduction to Geographic Information Systems: SLO #2 Relationship with Their Environment Students recognize and can accurately articulate the manner in which maps and GIS are used to show both how human activities affect their environment and how human lives are affected by their environment.		X		X	X		
GEOG 8 Introduction to Geographic Information Systems: SLO #3 Nature of Science Students can identify the key elements of the scientific method (hypotheses, tests, observations, conclusions/ interpretation of observations) when using maps and GIS to analyze and manipulate geographic data.			X				

SLOs	SLO to PLO Alignment <i>(Mark with an X)</i>			COURSE to ILO Alignment <i>(Mark with an X)</i>			
	P1	P2	P3	1	2	3	4
	GEOG 9 Weather and Climate: SLO #1 Basic Knowledge Students can identify the salient features of the basic concepts of meteorology and climate science. (This includes the ability to recall the definitions of the specialized vocabulary of meteorology and climate science.)	X					
GEOG 9 Weather and Climate: SLO #2 Relationship with Their Environment Students recognize and can accurately articulate how weather and climate affect humans' lives and how human activities affect weather and climate.		X		X	X		
GEOG 9 Weather and Climate: SLO #3 Nature of Science Students can identify the key elements of the scientific method (hypotheses, tests, observations, conclusions/interpretation of observations) in popular accounts of scientific research in magazines, newspapers, etc.			X				
GEOL 1 Physical Geology: SLO #1 Basic Knowledge Students recognize and can accurately articulate how the Earth affects humans' lives and how human activities affect the Earth.	X						
GEOL 1 Physical Geology: SLO #2 Relationship with Their Environment Students can identify the salient features of the basic concepts of geology. (This includes the ability to recall the definitions of the specialized vocabulary of geology.)		X		X	X		
GEOL 1 Physical Geology: SLO #3 Nature of Science Students can identify the key elements of the scientific method (hypotheses, tests, observations, conclusions/interpretation of observations) in popular accounts of scientific research in magazines, newspapers, etc.			X				
GEOL 15 Natural Disasters: SLO #1 Basic Knowledge Students can identify the salient features of the basic concepts of geology. (This includes the ability to recall the definitions of the specialized vocabulary of geology.)	X						
GEOL 15 Natural Disasters: SLO #2 Relationship with Their Environment Students recognize and can accurately articulate how the Earth affects humans' lives and how human activities affect the Earth.		X		X	X		
GEOL 15 Natural Disasters: SLO #3 Nature of Science Students can identify the key elements of the scientific method (hypotheses, tests, observations, conclusions/interpretation of observations) in popular accounts of scientific research in magazines, newspapers, etc.			X				

SLOs	SLO to PLO Alignment			COURSE to ILO Alignment			
	<i>(Mark with an X)</i>			<i>(Mark with an X)</i>			
	P1	P2	P3	1	2	3	4
GEOL 2 History of Planet Earth: SLO #1 Basic Knowledge Students can identify the salient features of the basic concepts of geology. (This includes the ability to recall the definitions of the specialized vocabulary of geology.)	X				X		
GEOL 2 History of Planet Earth: SLO #2 Relationship with Their Environment Students recognize and can accurately articulate how the Earth affects humans' lives and how human activities affect the Earth.		X		X			
GEOL 2 History of Planet Earth: SLO #3 Nature of Science Students can identify the key elements of the scientific method (hypotheses, tests, observations, conclusions/interpretation of observations) in popular accounts of scientific research in magazines, newspapers, etc.			X	X			
GEOL 3 Physical Geology Laboratory: SLO #1 Basic Knowledge Students can identify the salient features of the basic concepts of geology. (This includes the ability to recall the definitions of the specialized vocabulary of geology.)	X						
GEOL 3 Physical Geology Laboratory: SLO #2 Relationship with Their Environment Students recognize and can accurately articulate how the Earth affects humans' lives and how human activities affect the Earth.		X		X	X		
GEOL 3 Physical Geology Laboratory: SLO #3 Nature of Science Students can identify the key elements of the scientific method (hypotheses, tests, observations, conclusions/interpretation of observations) in popular accounts of scientific research in magazines, newspapers, etc.			X				
GEOL 30 Geology Laboratory of Death Valley: SLO #1 Basic Knowledge Students can identify the salient features of the basic concepts of geology. (This includes the ability to recall the definitions of the specialized vocabulary of geology.)	X			X			
GEOL 32 Geology Laboratory of Owens Valley and Sierra Nevada: SLO #1 Basic Knowledge Students can identify the salient features of the basic concepts of geology. (This includes the ability to recall the definitions of the specialized vocabulary of geology.)	X			X			
GEOL 34 Geology Laboratory of Southeastern California: SLO #1 Basic Knowledge Students can identify the salient features of the basic concepts of geology. (This includes the ability to recall the definitions of the specialized vocabulary of geology.)	X			X			
GEOL 36 Geology Laboratory of Coastal California: SLO #1 Basic Knowledge Students can identify the salient features of the basic concepts of geology. (This includes the ability to recall the definitions of the specialized vocabulary of geology.)	X			X			

SLOs	SLO to PLO Alignment			COURSE to ILO Alignment			
	<i>(Mark with an X)</i>			<i>(Mark with an X)</i>			
	P1	P2	P3	1	2	3	4
GEOL 4 History of Planet Earth Laboratory: SLO #1 Basic Knowledge Students can identify the salient features of the basic concepts of geology. (This includes the ability to recall the definitions of the specialized vocabulary of geology.)	X			X			
GEOL 4 History of Planet Earth Laboratory: SLO #2 Relationship with Their Environment Students recognize and can accurately articulate how the Earth affects humans' lives and how human activities affect the Earth.		X			X		
GEOL 4 History of Planet Earth Laboratory: SLO #3 Nature of Science Students can identify the key elements of the scientific method (hypotheses, tests, observations, conclusions/interpretation of observations) in popular accounts of scientific research in magazines, newspapers, etc.			X	X	X		
GEOL 6 Earth Science in Education: SLO #1 Basic Knowledge Students can identify the salient features of the basic concepts of geology. (This includes the ability to recall the definitions of the specialized vocabulary of geology.)	X						
GEOL 6 Earth Science in Education: SLO #2 Relationship with Their Environment Students recognize and can accurately articulate how the Earth affects humans' lives and how human activities affect the Earth.		X		X	X		
GEOL 6 Earth Science in Education: SLO #3 Nature of Science Students can identify the key elements of the scientific method (hypotheses, tests, observations, conclusions/interpretation of observations) in popular accounts of scientific research in magazines, newspapers, etc.			X				
OCEA 10 Introduction to Oceanography: SLO #1 Basic Knowledge Students can identify the salient features of the basic concepts of oceanography. This includes the ability to recall the definitions of the specialized vocabulary of oceanography.	X						
OCEA 10 Introduction to Oceanography: SLO #2 Relationship with Their Environment Students recognize and can accurately articulate how the ocean affects humans' lives and how human activities affect the ocean.		X		X	X		
OCEA 10 Introduction to Oceanography: SLO #3 Nature of Science Students can identify the key elements of the scientific method in popular accounts of scientific research in magazines, newspapers, etc.			X				

Appendix B

PLO ASSESSMENT 4-YEAR TIMELINE REPORT

ECC - NATURAL SCIENCES DIVISION

PLO Assessment Cycle	Unit Name	PLO Name	PLO
2014-15 (Fall 2014) Earth Sciences (Geography, Geology, Oceanography)	El Camino: PLOs (NSC) - Earth Sciences (Geography, Geology, Oceanography)	PLO #3 Scientific Method	Students can identify the key elements of the scientific method (hypotheses, tests, observations, conclusions/ interpretation of observations) in popular accounts of scientific research in magazines, newspapers, etc.
2015-16 (Fall 2015) Earth Sciences (Geography, Environment Geology, Oceanography)	El Camino: PLOs (NSC) - Environment Geology, Oceanography)	PLO #2 Relationship with	Students recognize and can accurately articulate how their environment (including the Earth, the atmosphere, ocean, and biosphere) affects humans' lives and how human activities affect their environment.

LO	Unit Name	PLO Name	PLO
AssessmentCyce 2016-17 (Fall 2016) Earth Sciences (Geography, Geology, Oceanography)	El Camino: PLOs (NSC) -	PLO #1 Basic Knowledge	Students can identify the salient features of the basic concepts of earthscience and geography. This includes the ability to recall the definitions of the specialized vocabulary of earth science and geography.

