



## **Program Review - Instructional Program Plan**

Program Title: Earth Science

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Writing Team: Susan Mahoney

### **Executive Summary**

Please summarize your program's strengths, opportunities/challenges, and action plans. This information will be presented to the Board of Trustees. (1000 word limit)

The earth science program at Cañada College introduces students to sub-disciplines of earth science and to the realm of scientific thinking. The courses require students to learn content, develop critical thinking skills, and practice thinking like a scientist. Most of our students are general education students, and for many it is their first college-level science course. The department is also building degree programs to accommodate students interested in completing earth science related degrees (e.g. earth science, geology, environmental science) and/or transferring in earth science related fields.

Strengths of the earth science program include the broad range of disciplines offered (i.e. geology, oceanography, meteorology, environmental science, and geography) and opportunities to use remarkable local natural and human resources. Our local environment provides amazing opportunities for students to explore the concepts and processes they learn about in the classroom. Additionally, the United States Geological Survey Regional Office in Menlo Park is an excellent resource for seminars, guest-speakers, and internship opportunities.

Underprepared students continue to be a challenge. Many general education students in our classes do not have college level reading, writing and/or math skills. Additionally, they may not possess the time management, organizational, and learning skills that make it easier to succeed. Further, many students are overextended and do not have a good understanding of the amount of time they need to dedicate each week to their classes. Earth science faculty work to help students gain the skills they need to succeed, and we continue to examine content and instructional methods to better match the background and abilities of students. Additionally, we are beginning to work closer with the Learning Center and STEM Center to provide greater access to tutoring and extra-curricular earth science opportunities.

With the expected construction of the new science building, the earth science program anticipates dedicated space for earth science lectures and labs. This will allow for displays of important samples, maps, and posters, an inviting space for student studying and research, and room for potential new lab classes. We anticipate this will positively impact learning. In the next year, the department hopes to introduce two new degree programs (environmental science and geology), increase field-trip opportunities, develop stronger ties with USGS and local 4-year universities, and increase the number of earth science related degrees and transfers.



## **Program Context**

1. Mission: Please identify how your program aligns with the college's mission by selecting the appropriate check box(es):

Career Technical    Basic Skills    Transfer    Lifelong Learning

If your program has a mission statement, include it here.

The Earth Science Department endeavors to prepare students for successful transfer to 4-year institutions, to provide the prerequisite earth science foundation for further study in earth science fields, to foster critical thinking and active learning, and to fulfill the needs and interests of students by having a well-rounded curriculum of lecture and laboratories.

2. Articulation: Describe how your program's articulation may be impacted by changes in curriculum and degree requirements at high schools and 4-year institutions. Describe your efforts to accommodate these changes.

There are not expected changes for earth science.

3. Community and Labor Needs: Describe how changes in community needs, employment needs, technology, licensing, or accreditation affect your program. CTE programs should identify the dates of their advisory group meetings.

Nationally, earth science jobs continue to outpace general employment growth.

## **Looking Back**

4. Curricular Changes: List any significant changes that have occurred in your program's curricular offerings, scheduling, or mode of delivery. Explain the rationale for these changes.

We had a 16% decline in evening enrollment, likely due to the reduced number of evening sections. Evening sections were dropped due to low enrollment and this trend has continued. We feel it is important to have evening sections to accommodate those students who cannot enroll in day classes, but we haven't been able to get those classes to reach the threshold of 20 students. Since our classes are general education classes, we plan to work with counselors to better target populations who typically take evening classes and may need a GE science class (e.g. ECE students and others).

5. Progress Report: Provide your responses to all recommendations received on your last program review and report on progress made on previous action plans and toward your strategic goals.

[Link: 2013-2014 Program Plan and Feedback forms](#)



We made progress on SLOAC. Outcomes were input for courses all courses that lacked outcomes in TracDat and assessment data was entered for most courses. Some courses taught by adjuncts are still lacking data. We intended to offer targeted training, but we did not yet do so. We also still need to address GE/ILO assessment.

6. Impact of resource allocations: Describe the impact to-date that each new resource (staff, non-instructional assignment, equipment, facilities, research, funding) has had on your program and measures of student success.

In 2013-2014, most of our instructional equipment went to support two classes, Oceanography Lab and Geology Lab. We believe that authentic hands-on exploration is likely to improve student success, and the new equipment allowed the students to work in smaller groups and thus get more personal hands-on time doing real science. Both courses showed gains in student success from F12 to F13 and from Sp13 to Sp14, and both courses reached success rates of at least 80% (and as high as 97%).

### **Current State of the Program**

Data packets link <http://www.canadacollege.edu/programreview/datapackets1314.php>

7. Connection & Entry:

- A. Observation: Describe trends in program and course enrollments, FTES, LOAD and Fill Rates. Cite quantitative data and specific tables from the data packets.

Our department head count and FTES both increased dramatically (~31%) in 2012/13 when a new full-time faculty was hired and more sections were offered. Fill rates and load decreased during that period. In 2013/14 FTES and fill rates dropped slightly, but load increased from 409 to 437. Our load and fill rates are still significantly below STEM averages, but this is to be expected as we build a program. For example, as we build to being able to consistently offer two geology sections each semester, the geology lab class will also gain enrollment.

Most (63%) of our students are in the 18-22 age range and most (70%) are continuing students. Both of these numbers are greater than STEM and college averages.

Our evening enrollment dropped 16% from 2012/13 to 2013/14.

- B. Evaluation: What changes could be implemented, including changes to course scheduling (times/days/duration/delivery mode/number of sections), marketing, and articulation that may improve these trends?

We need to continue to discuss and implement general and targeted marketing strategies. As noted previously, we plan to work with counseling to target groups who may need a science GE and typically take evening classes.

Department faculty are working on two new degree programs (i.e. Geology and Environmental



Science) that we hope will at least slightly impact enrollment. Additionally, department faculty are involved in the GE Pathways FIN. GE pathways may help spur enrollment in Environmental Science and Physical Geography.

Also, department faculty are working with the college Sustainability Committee and ASCC to increase awareness-building and student involvement in campus sustainability projects.

#### 8. Progress & Completion:

- A. Observation: Describe trends in student success and retention disaggregated by: ethnicity, gender, age, enrollment status, day/evening. Cite quantitative data and specific tables from the data packets.

Our overall department success and retention rates increased from 2012/13 to 2013/14. Both rates are above the college averages, STEM averages, and the stated goals. Our 2013/14 success rate was 73% and our retention rate was 90%.

Broken down by ethnicity, our 2013/14 retention rates were above the college goal of 84% for all ethnic groups, except Hispanic students. We had 100% retention for African American, Asian, and Native American students! Our lowest retention rate was for Hispanic students (82%). Broken down by ethnicity, our 2013/14 success rates were above the college goal of 70% for all ethnic groups, except African American (62%) and Hispanic (64%) students.

Broken down by gender, all gender groups (i.e. female, male, and unreported) meet the college retention and success goals. Males were slightly more likely to be retained (91% to 89%) and females were more likely to be successful (75% to 70%).

Broken down by age, all age categories except one met the college retention goal of 84%. The 23-28 age group was at 83%. All categories, except one met the college success goal of 70%. The 23-28 age group was at 67%.

- B. Observation: For online courses describe any significant differences in the success and retention of students who are taking online courses compared to face-to-face courses. Our 2013/14 retention rates for online (86%) and not online (92%) students were similar and both were over the college goal of 84%. Success rates for online students (66%) did not meet the college goal of 70%.
- C. Evaluation: Based on these trends, what do you feel are significant factors or barriers influencing student success in your courses and program? What changes (e.g. in curriculum, pedagogy, scheduling, modality) could be implemented to improve these trends?

Economic factors seem to be a big challenge. It would be interesting to know if our Hispanic and African American students are experiencing more economic challenges than the other groups. Similarly the 23-28 age group's lower retention and success may also be linked to



economic challenges, as perhaps this age group is less likely to have family support than the younger cohort. Spark Point may help with economic counseling. More ubiquitous counseling on time-management and the time requirements for college success may also be useful.

More personal contact with faculty in the classroom, office, by email, and through fieldtrips is important for retention and success. Additionally, more hands-on projects (e.g. labs, fieldtrips, campus projects, etc...) and further development of student-student interaction is likely to improve both retention and success. We also need to include these hands-on projects in our marketing materials.

More overt discussion of time-management and the expectations for time spent studying might help improve students success, especially in online classes.

9. SLO Assessment:

<https://smccd.sharepoint.com/sites/can/CANSLOAC/default.aspx>

- A. Are all course SLOs being systematically assessed at least once/4 years? Describe the coordination of SLO assessment across sections and over time.

Most courses have systematic assessment. It has been more difficult for courses that are offered sporadically and/or courses that have been cancelled due to low enrollment. We intend to develop a plan (this year) for each course to ensure systematic assessment. Further, for courses with multiple sections we want to ensure that all sections are used in SLO evaluation. Currently this is not the case.

- B. Summarize the dialogue that has resulted from these assessments. What are some improvements in your courses that have been implemented through SLO assessment? How has student learning been improved by changes in teaching? Cite specific examples.

We have discussed the differences between online and in-person sections and the need to access both, and we have discussed whether some of our outcomes need to be modified. We anticipate more discussion on SLOs and assessment in the future.

10. PLO Assessment:

[PLO Assessment link https://smccd.sharepoint.com/sites/can/prie/\\_layouts/15/start.aspx#/](https://smccd.sharepoint.com/sites/can/prie/_layouts/15/start.aspx#/)

- A. Describe your program's Program Learning Outcomes assessment plans and results of direct and indirect assessments.

We have not developed an effective plan for PLO assessment. Since most of our students are GE students, we should likely be addressing GE/ILO. However, we do have one degree and we will soon have two additional degrees. We need to develop a plan.

- B. Summarize the major findings of your program's PLO assessments. What are some improvements that have been, or can be, implemented as a result of PLO assessment?



None yet.

**Looking Ahead**

11. Strategic goal & action plans:

How will you address the opportunities for improvement that you identified above in Articulation, Community & Labor Needs, Connection & Entry, Progress & Completion and PLO Assessment? Identify timelines for implementation, responsible party, and resource requirements.

Action Plan	Timeline	Responsible party	Resources required
Contact counselors and admin for general outreach ideas and ideas to better target evening students.	Meet with counselors in March 2015.	Susan Mahoney	None.
Complete Environmental Science and Geology degree programs and submit to curriculum committee.	Ideally finished by 3/26/15 to facilitate approval in time for inclusion in catalog.	Susan Mahoney	None
Provide training and/or assistance in SLO assessment and data input for adjunct instructors.	May 2015	Susan Mahoney	Monetary incentives for adjunct instructors might be appropriate.
With input from department faculty, develop a plan for systematic SLO assessment for all classes.	Summer 2015	Susan Mahoney	None
Get more info on PLO/ILO assessment.	Summer 2015	Susan Mahoney	None
Build on current efforts for student involvement in fieldtrips, campus events, and internships, and include in our marketing.	ongoing	All faculty	Funds for expertise for the development of marketing material.



Complete the Resource Request form to request instructional equipment, IT equipment, facilities, professional development, research, or funding (if needed) and submit with this form to your Division Dean.

Link to resource request form <http://www.canadacollege.edu/programreview/instruction-forms.php>