

Instructional Program Review

Program Name: **Geologic Sciences**

Program Contact: **Hand, Linda**

Academic Year: **2016-2017**

Status: **Submitted for review**

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1. Description of Program

Provide a brief description of the program and how it supports the college's [College Mission and Diversity Statements](#), [CSM Strategic Goals 2013/14 to 2015/16](#), and other [Institutional Program Planning](#) as appropriate. What is the program's vision for sustaining and improving student learning and success over the next three years?

Geology, paleontology and oceanography are all small departments within the geological sciences program, each primarily offering one lecture course (Geol 100, Paln 110 and Ocen 100) and geology and paleontology offering one lab course (Geol 101 and Paln 111). All courses support the college mission of preparing students for transfer since all are CSU/UC transferable and fulfill GE requirements in science. The program addresses the following strategic goals:

Goal 1: Improve Student Success

Goal 2: Promote Academic Excellence

Goal 3: Develop Responsive, High-Quality Programs and Services

Four of the five courses are required for the AS in Geological Sciences and the AS-T in Geology.

Some of the efforts to improve student success and therefore transfer rates include the appropriate use of technology, delivery modes/methods through extensive use of WebAccess or Canvas, powerpoint, video, computer animations, online quizzes and interactive 3-D spatial visualization aids. To increase student engagement the program employs classroom demonstrations, hands-on activities, clicker questions, peer learning, computerized games, paleontology playing cards, role-playing, team competitions, prizes and field trips. The Ocen 100 course, which is part of the MANA curriculum, now includes a supplemental instructor and will hopefully continue to have an SI indefinitely.

2. Student Learning and Program Data

A. Discuss Student Learning Outcomes Assessment

1. Reflect on recent SLO assessment results for courses and degrees and certificates offered by the program. Specify how SLO assessment informs curriculum development and changes to curriculum.

Four SLOs for Geol 100 were assessed with the percentage of students deemed successful ranging from 85-92%. Two SLOs for Geol 101 were assessed with 83% and 94% of students deemed successful. Two SLOs for Paln 110 were assessed with 70% and 72% of the students deemed successful. For the aforementioned SLOs, no areas in need of improvement were identified. One SLO for Ocen 100 was assessed with only 56% of the students deemed successful, resulting in a recommendation that the students receive more practice (and modeling of) how to make connections that require both detailed knowledge and critical thinking. One SLO for Pain 111 was assessed but deemed inconclusive since the students worked in groups. Individual scores based on a quiz question are recommended for more meaningful assessment.

2. Comment on the success rates in the program SLOs that are aligned with specific course SLOs. What do the program SLO and course data reveal about students completing the program? Identify trends and discuss areas in need of improvement. Is the alignment between course and program SLOs appropriate and informative? Describe any additional methods used to assess program SLOs and reflect on the results of those assessments. See [course-to-program SLO alignment mapping](#).

The program SLO survey that can be voluntarily completed by AS and AS-T degree applicants had a total of 4 respondents to the 2-SLO survey with 3 choosing "agree strongly" and 1 choosing "agree" so the 100% success rate is somewhat comforting, but not statistically meaningful. Most of the geological science majors at CSM transfer to a 4-year university without applying for an associates degree, so this method of assessing program SLOs is unlikely to ever yield meaningful data.

The course SLOs could eventually become a better measurement of program SLO success if the course SLO data that I have just started tying to student ID numbers can be compiled with records of transferring or AS- degree-earning students by major.

3. For any courses in the program that satisfy a GE requirement, which GE SLOs are supported or reinforced by the course SLOs? What do assessment results for the course SLOs (and for the GE SLOs, if available) reveal about student attainment of the GE SLOs? See [GE SLO Alignment Summary Report](#) or [All Courses GE SLO Alignment Data](#).

Each course in geology, oceanography and paleontology has SLOs that reinforce the effective communication, quantitative skills and critical thinking GE SLOs. Assessment results indicate that students in geoscience courses usually attain the effective communication and critical thinking GE SLOs, while the quantitative skills success rates vary more. Since the levels of math competency possessed by students in classes without math prerequisites varies considerably, this fluctuation is to be expected. Furthermore, due to the small number of students in many of these classes compared to the large number of students in most math classes, the assessment of the quantitative skills GE SLOs is surely more accurately reflected in the SLOs of math courses.

B. Student Success Indicators

1. Review [Student Success and Core Program Indicators](#) and discuss any differences in student success indicators across demographic variables. Also refer to the [College Index](#) and other relevant sections of the [Educational Master Plan: Update, 2012](#), e.g., Student Outcomes and Student Outcomes: Transfer. Basic Skills programs should also refer to [ARCC](#) data.

This year the student success rates in the geological sciences (64.8%) was lower than that of the division (65.4%) but lower than that of the college (72.0%). This indicator hasn't changed from 2014-15 and is lower than the rate (68.3) for 2013-14. The retention rate for the geological sciences (83.0%) was higher than that of the division (80.8%) but lower than that of the college (85.3%). Demographic variables for low enrollments, Black (7), Pacific Islander (2) and Native American (1) continue to fluctuate wildly year to year, and are probably not statistically meaningful. The most successful ethnic groups with enrollments of at least 40 were Asian (77.8%) and White (64.7) with rates consistently above 60%. In the geosciences, females succeeded slightly more often than males last year, but the reverse was true the year before. This differs from the division and college results which show females are consistently more successful. The 50+ age bracket had the lowest success rates by age (20%) in the geological sciences, but last year had the highest (100%), another example of low enrollments resulting in meaningless statistics. The two youngest age brackets have the lowest success rates in the geological sciences, the division and the college now.

In the last program review I expressed concern about the 30-34 age bracket having the lowest success rates in the geological sciences, the division and the college (all less than 17%) based on the Spring 2015 submission cycle PRIE data for academic year 2013-14. Those 2013-14 numbers have now been changed to 74-80% success rates so it seems the concern was unwarranted.

Information from student surveys indicates that many of the students in all 3 programs are not striving to earn a C since they can fulfill a CSU general education transfer requirement with a D. The student success data is based on earning a C or better, and therefore differs from the students' perception of success.

2. Discuss any differences in student success indicators across modes of delivery (on-campus versus distance education). Refer to [Delivery Mode Course Comparison](#).

Not applicable, as the Oceanography and Geology Telecourses were discontinued many years ago.

C. Program Efficiency Indicators. Do we deliver programs efficiently given our resources?

Summarize trends in program efficiency as indicated in the [Student Success and Core Program Indicators](#) (LOAD, Full-time and Part-time FTEF, etc.)

This year's LOAD (563.8) is slightly higher than last year's (545.3) but well above the averages for both the Math/Science Division (486.1) and the college (498.7) as well as the State's productivity target (525). Although the lowest enrollments continue to be in the Paln lab, the large number of students majoring in geology makes it important to offer this course at least once a year since it is a major requirement for the AS and AS-T degrees and not offered elsewhere in the district.

One full-time faculty member currently teaches all of the fall and spring sections in geology, paleontology and oceanography.

The summer offerings have been temporarily discontinued. The oceanography lab has been banked.

3. Additional Factors

Discuss additional factors as applicable that impact the program, including changes in student populations, state-wide initiatives, transfer requirements, advisory committee recommendations, legal mandates, workforce development and employment opportunities, community needs. See [Institutional Research](#) as needed.

Faculty have noticed an increase in geology majors over the last few years. There are currently 12 self-reported geology majors at CSM.

Geological sciences majors are not as interested in oil industry jobs as in the past, with many leaning toward greener specialties such as hydrology and environmental geology.

According to the U.S. Department of Labor's Occupational Outlook Handbook, "Employment of geoscientists is projected to grow 10 percent from 2014 to 2024, faster than the average for all occupations. The need for energy, environmental protection, and responsible land and resource management is projected to spur demand for geoscientists in the future." The employment outlook for geological or petroleum technicians is also projected to grow faster than average at 12 percent over the next decade. In California, the expected growth is even higher with a 22% projected increase in the number of geoscientists, except hydrologists and geographers, from 2014 to 2024, according to the California Employment Development Department, Labor Market Information Division.

Skyline College will be offering Geol 220 Historical Geology (4-unit) for the first time in many years in the spring of 2017. It satisfies the same AS-T requirement as CSM's Paln 110 & Paln 111. This may have an affect on our enrollments since we will no longer be the only college in the district offering a course equivalent to C-ID Geol 110 & 110L or 111. Also, the new SFSU Earth Sciences BS degree (which replaces the Geology BS) does not require a course equivalent to C-ID Geol 110 & 110L or 111.

4. Planning

A. Results of Program Plans and Actions

Describe results, including measurable outcomes, from plans and actions in recent program reviews.

The Ocen 100 course outline is in the process of being updated.

The 10 SLO's that were assessed in spring 2016, were entered in TracDat.

Changes in state laws concerning the collection of fossils on public lands and loss of access to previously used public lands has caused the once popular authentic fossil-collecting field trips in Paln 111 to be replaced by simulated digs. At the request of faculty, a sand-filled area was constructed by the east entrance to building 36 during the summer of 2016. The first sandbox use on Oct. 8, 2016, was the Tooth Sleuth hunt for fossil shark teeth by the community on Family Science Day. It was very well-received, so we anticipate making it a regular Family Science Day activity.

The learning center did fulfill the request for an SI for Oceanography 100 starting in the spring of 2016, but faculty feel that more than one semester of data is needed to try to determine if having an SI is improving student success rates.

New materials for class demonstrations were purchased and have proven popular with the students who always appreciate hands-on learning experiences that link theory with objects/phenomena that they see in their everyday life.

B. Future Program Plans and Actions

Prioritize the plans to be carried out to sustain and improve student success. Briefly describe each plan and how it supports the [CSM Strategic Goals 2013/14 to 2015/16](#). For each plan, list actions and measurable outcomes. Plans may extend beyond a single year. Describe the professional activities and institutional collaborations that would be most effective in carrying out the program's vision to improve student learning and success.

Plans for improving student success and promoting academic excellence (Goals 1 & 2) during the next two years includes:

- making the transition from WebAccess to Canvas for all geoscience courses
- updating course outlines as necessary and to maintain CI-D approval for the AS-T
- assessing some SLOs to improve student success
- improving lecture delivery, sample collections, clicker applications, online materials and in-class lecture and lab exercises to promote academic excellence and increase student engagement
- consulting with faculty at other Bay Area colleges to share ideas and explore possible future collaborations

The continuation of the Supplemental Instructor in Ocen 100 (Goal 3) is desired, but dependent on student availability.

To ensure the effective use of resources (Goal 5) a long-term plan to duplicate the sample sets that are shared by 3 classes is planned. The current sharing of the same samples requires the sorting and reassembling of sample sets often with very short turnaround times. It is important to minimize the chores with very short turnaround times to better facilitate the shared hours of the 75% physics/25% geosciences lab technician. Currently the instructor is performing the geoscience technician duties since our technician is not available. To minimize the amount of time that the instructor needs to devote to the technician duties, a student assistant is also requested.

A temporary substitute technician is requested until we have a permanent technician again.

5. Program Maintenance

A. Course Outline Updates

Review the [course outline update record](#). List the courses that will be updated in the next academic year. For each course that will be updated, provide a faculty contact and the planned submission month. See the [Committee on Instruction](#) website for [course submission](#)

instructions. Contact your division's [COI representatives](#) if you have questions about submission deadlines. **Career and Technical Education courses must be updated every two years.**

Courses to be updated	Faculty contact	Submission month
Ocen 100	Linda Hand	October 2016

B. Website Review

Review the program's website(s) annually and update as needed.

Faculty contact(s)	Date of next review/update
Linda Hand	July 2017

C. SLO Assessment Contacts

Faculty contact(s)	Date of next review/update
Linda Hand	spring 2017

6. Dominant Themes Summary for IPC

Briefly summarize the dominant, most important themes or trends contained in this program review, for division deans to collect and forward to the Institutional Planning Committee. What are the key program issues that matter most? (Brief paragraph or bullet points acceptable).

Student success continues to be lowest in oceanography, and it's too early to tell if the addition of an SI has been able to improve success rates.

The current lack of the 75% physics/25% geoscience lab technician has prompted the need for duplicate sets of mineral and rock samples as well as a student assistant.

A temporary substitute technician is requested until we have a permanent technician again.