2026-27 Comprehensive Program Review

Program: Geology

Division: STEM

Writers: Dani MacArthur

SLO/SAO Point-Person: Dani MacArthur

Email your completed form to Karin Spirn and your dean by November 2, 2026.

Helpful Links:

- Tools for Writers - with contacts and info for help with specific sections.
- Program Review Glossary - defines key terms you can review when writing.
- Discipline Data Packets – institutional research about disciplines and student services
- Course Success Rates Dashboard – allows you to research your program's success rates

Detailed information and instructions appear at the end of this form. For help, please contact Karin Spirn at kspirn@laspositascollege.edu.

Section 1: Program Reflection and Planning

These questions appear on all Program Reviews including comprehensive and updates.

1. Please describe your program's most important **achievements** in year 25-26.

Looking back on the past year or two, the Geology program has a *lot* of achievements to report.

Enrollment, student engagement and success

- Enrollment is up 73% since 2023 and we have seen strong growth in the number of geology majors as well (though this is harder to quantify precisely).
- The Geology club is regularly hosting activities with 20+ people in attendance
- Geol 2 (the "upper division" Geology class) was full in Spring 26 with 14 Geology majors enrolled, the most in many years
- Geology students graduated and transferred to earth science programs (e.g. UC Davis)
- First ever honors Geol 1 section taught this semester. The section is full and the students are doing a lot of amazing hands-on research (see more below)

Here are some other highlights:

Student Assistants and MESA Collaboration

- **2025–2026 academic year:** Worked with a student graphic designer to update department materials and create graphics for Amanda Brown's Zero Textbook Cost (ZTC) GEOL 1L online lab.
- **2025–present:** Worked with Daniel, a physics major and Mathematics, Engineering, Science Achievement (MESA) student, on the Raspberry Shake project. His contributions include improving network connectivity, writing Python code to retrieve and analyze seismic data, and developing a dashboard for viewing earthquake recordings.
- **2026–present:** Working with a mechanical engineering major and MESA student who is shadowing Daniel and preparing to take over the project in the next academic year.

Instructional Support and Lab Development

- Helped Amanda develop materials for her ZTC GEOL 1L course.
- Updated some existing lab demonstrations and created some new ones.
- Supported the use of Raspberry Shake equipment and earthquake data in classroom activities and Honors student poster projects.
- Organized special hands-on activities for Amanda's GEOL 1 class, including rock-cutting days.

Outreach and Events

- Hosted annual tours of the geology area connected with LLNL's Science on Saturday lecture series, creating new displays each year.
- Participated in local elementary school science nights and school district science fairs.
- Helped establish Earth Science Day at LPC and organize its first two annual events. Approximately 300 students attended the second event.

Equipment Funding and Displays

- Obtained IER funding for Raspberry Shake equipment in 2024/2025.
- Received a CARE grant for a rock saw in 2025.
- Applied for additional Raspberry Shake equipment through the 2026 IER process.
- Purchased a GLOBox using lottery funds for a fluorescent mineral display in 2026.

University Relationships

Developing relationships with the following departments to support outreach and student connections:

- California State University, East Bay: Earth, Environmental and Sustainability Sciences
- Sonoma State University: Geology
- San José State University: Earth and Environmental Sciences

Honors Geology

As part of their Honors Geology research, LPC students investigated significant earthquakes from around the world using real seismic data recorded by a global network of seismographs. Their objective was to understand how seismic waves travel through Earth's interior and how earthquake recordings vary with distance from the epicenter. Students used Python and ObsPy, a scientific programming library for seismology, to retrieve, process, and visualize earthquake waveforms.

1. Selecting an Earthquake

Each student selected a significant earthquake to investigate, examining its magnitude, depth, geographic location, tectonic setting, and origin time. Students researched the plate boundaries and geologic processes responsible for their earthquake, establishing a scientific context for interpreting the seismic data.

2. Retrieving Global Seismic Data

Using Python and ObsPy, students connected to seismic data services and accessed recordings from **seismograph stations around the world**. These stations were located at different distances from the earthquake's epicenter, allowing students to compare how the same earthquake was recorded across the globe. Students worked with actual seismic waveforms, which represent ground motion recorded over time, rather than relying on pre-generated graphs or simulated data.

3. Processing and Organizing Seismic Waveforms

Students prepared the seismic recordings for analysis by organizing waveforms according to their recording stations and distances from the earthquake. This involved working with seismic time-series data and considering differences in signal quality, amplitude, and the arrival times of seismic energy. Using Python allowed students to work with large datasets and apply a consistent approach to displaying recordings from multiple stations.

4. Creating Seismic Record Section Plots

Students generated **seismic record section plots**, which display multiple earthquake recordings together, arranged according to each station's distance from the epicenter.

These plots allowed students to visualize how seismic waves propagate across Earth. By comparing recordings, students could investigate:

- The arrival times of primary (P) and secondary (S) seismic waves.
- How seismic travel times change with epicentral distance.
- Differences in seismic wave amplitude and waveform characteristics.
- Patterns related to seismic wave propagation through Earth's interior.
- How Earth's internal structure influences the seismic signals recorded at different locations.

5. Interpreting Results and Communicating Research

Students used their seismic record sections to connect their observations to fundamental concepts in seismology, including seismic wave velocities, earthquake depth, plate tectonics, and Earth's internal structure.

They then organized their research into scientific posters, incorporating earthquake background information, methods, seismic plots, observations, and interpretations. This gave students experience presenting technical results in a format commonly used at undergraduate research symposiums and scientific conferences.

Research Skills and Outcomes

Through this project, students developed practical experience in Python programming, ObsPy, scientific data retrieval, waveform visualization, seismology, geological interpretation, and research communication. They also gained experience working with authentic scientific datasets and translating complex observations into evidence-based conclusions.

This project was completed in collaboration with Geology MESA intern Daniel Tomas and provided students with research skills directly applicable to upper-division STEM coursework, undergraduate research opportunities, and transfer to four-year institutions.

2. Please describe your most important **challenges** in year 25-26

- Getting new (or infrequently offered) courses past the 20 student threshold. This is a pretty high bar for a new course and requires intensive outreach to the academic counselors and the student community
- Space in our lab room remains constrained. Since we only have one lab room but there are no less than 5 different lab classes taught in that room, the lab setup turnover is intense and very demanding on Marisa, our amazing lab tech. Offering additional in-person labs is practically impossible at this point, even though student demand for them is strong. As such, we have had to add online lab sections instead, which is not ideal
- SLO's have, to my knowledge, never been comprehensively assessed. As both a new faculty and the program coordinator, I didn't have bandwidth to learn how to create SLO assessment plans and execute them, so I'm just now learning to do this. But many courses don't even have SLO's, much less a history of assessing them. More below
- Program staff bandwidth. Both the program coordinator (Dani MacArthur) and the lab tech (Marisa Pascal) are at full capacity in terms of their bandwidth to do more, take on additional initiatives, etc. The Geology program has really grown over the past several years (73% enrollment growth) and we are doing way more than we did before (honors sections, additional instructional equipment, a student club, etc.). Without a second full time faculty to help out, we risk hitting burn out if we were to try and do more, even with amazing support and engagement from some of our part time faculty

3. What are your upcoming **plans**? Please note any ways that these support student achievement and equity.

- We are mapping an unnamed local fault near campus with a lidar drone as part of an ongoing student research project
- We are upgrading our on-campus seismic network to record small, local earthquakes with greater detail and accuracy, as well as developing software to retrieve, analyze, and view the data
- Teach Geol 13: Intro to Climate Science for the first time in the Fall of 27
- Develop new SLOs and update old ones for our curriculum
- Create and execute an SLO assessment plan for the first time

Section 2: SLOs/SAOs

This section is completed every three years as part of the Comprehensive Program Review, with brief annual check-ins on the Program Review Updates. The following resources will be useful when completing this section:

- Three-Year Assessment Template
- Aggregated and Disaggregated Data from the following sources:
    - ELumen (if saved--no longer available online)
    - CurrIQunet
    - Student Success Dashboard

1. During the 2023-2026 three-year assessment cycle that just concluded, what did your program set out to learn through your PSLO/CSLO/SAO assessments?

Due to bandwidth constraints (the previous program coordinator retired and the new one was brand new during the last assessment cycle), no SLOs were assessed during the 23-26 cycle.

2. Based on your analysis of your PSLO/CSLO/SAO assessment data, what conclusions did you draw about student outcomes and equity in your program?

Using the student success dashboard, no statistically meaningful equity gaps were seen by race or modality. Our Black students are succeeding less than some groups (Filipino and Asian students, for instance), but not significantly less than the program overall. No difference was seen between online and in-person students.

Unfortunately, the dashboard doesn't allow us to view first-generation students as a group.

3. Explain potential plans to improve student outcomes and close equity gaps.

Developing new and updated SLOs and assessing them comprehensively over the next 3 years is our main objective, so we have more meaningful data to analyze.

4. Describe any obstacles that you encountered in your assessment process and any supports that would be helpful.

Unfortunately, the dashboard doesn't allow us to view first-generation students as a group. Since this is one of our core focus groups as a college, this is unfortunate.

Section 3: Data Discussion

This section is completed every three years as part of the Comprehensive Program Review. Workshops and office hours will be offered in Fall 2026 to support Program Review writers.

1. RPIE Data Review: Discuss any significant trends in the data provided by the Office of Research, Planning, and Institutional Effectiveness (or any other data you use for decision-making and planning).

*(**Note**: Not all Programs have RPIE data available; if your program does not have a data packet or dashboard data, you may note that in the response box and reach out to the RPIE team.)*

Data may come from:

- RPIE Data Packets
- Transfer data
- Succes Rates Dashboard (scroll down on page)
- Requested data from the Office of Research, Planning, and Institutional Effectiveness (RPIE)
- SLO/SAO data
- Data from program-created surveys or investigations
- Any other relevant source of quantitative or qualitative data

Insights from the RPIE data:

- Geology students are getting younger (90% are > 25 years old)
- Fraction of students taking all their classes online has continued to decrease, while those taking face-to-face courses only and students taking both have increased
- Fill rates are way up since 2023 and have hovered near 100% for the past 2 years

2. Equity: Did your data reveal any patterns of inequity? If so, please explain those patterns and any actions that should be taken at the program or college level.

- The data did not reveal any statistically robust trends in equity
- This conclusion is limited, however, since the data did not show success rates by race/ethnicity or by first generation status

3. Course Modality (Instructional Programs Only): In reviewing your program's data packet and Succes Rates Dashboard, are there differences in success rates by modality (i.e. face-to-face, asynchronous, synchronous, hybrid, or hyflex)? If so, reflect on what might account

for differences and any actions that should be taken. (Non-instructional programs may also choose to reflect on online vs. in-person services if applicable).

- No statistically robust difference in success rates were observed between modalities.

4. Program-Set Standard (Instructional Programs Only): The program-set standard is a baseline that alerts programs if their student success rates have dipped suddenly below 95% of the rolling 5-year average. There is no punishment for not meeting the standard, and many valid reasons this may occur. When a program does not meet this standard, they are asked to examine possible reasons and note any actions that should be taken, if appropriate. | Program-set standard data can be found on this page

5a. Did your program meet its program-set standard for successful course completion in AY25-26?

Yes___X_ No____

5b. If your program did not meet your program-set standard, discuss possible reasons and how this may affect program planning or resource requests. Success rates for individual courses can be found on the Success Rates Dashboard.

Section 4: Special Topics

These questions have been chosen for this year's Comprehensive Program Review to meet reporting mandates (for accreditation, Ed. Code, or other sources).

1. Mission: Describe 1-3 examples of how your program's work has aligned with the college's mission, vision, values, and/or educational master plan over the past three years. (Possibilities might include new initiatives, resource allocation/use, program improvements, or other activities).

- Mission, Vision, and Values
- Educational Master Plan

Most of this was listed under section 1 above, but I will repeat highlights here. Our main goals have been two-fold—to increase a sense of community among students and to enhance the quality of education for students

- Securing new equipment and developing digital tools to allows students to collect and analyze data in a hands-on way
    - Expanding our on-campus seismic network
    - Hosting geode smashing and rock cutting activities
    - Developing software to allow students to view and analyze local (and global) earthquakes

- Developing and teaching our first-ever Geology honors section which utilizes the equipment mentioned above
- Student-led Geology club hosting activities and creating community for geology students
- Regularly offering Geol 2, which is required for graduation but was only offered once every two years (and often was cancelled due to low enrollment). This extended graduation times for geology students and made it harder to earn an AS-T in Geology
- Connecting Geology students with local 4-year degree programs (e.g. SJSU, Sonoma, East Bay)

2. Regular Substantive Interaction (Instructional Programs Only)

To meet our college, ACCJC, state, and federal standards, **all online instructors** must demonstrate "**regular and substantive interaction**" (RSI) with students. That is, we must be clearly providing instruction and interacting with our online students, just like we would in an on-campus class. The following reflection questions allow us to capture how RSI is occurring in our classes.

The following documents explain requirements and best practices for RSI:

- ACCJC Quality Continuum Rubric for Distance Education
- Regular and Substantive Interaction (RSI) requirements

2a. If your program offers DE courses, how are Regular and Substantive Interaction (RSI) requirements met in your area? Examples appear on the DE addendums of your Course Outlines of Record. Place an X next to each method used in your courses.	
X	Course materials make clear to students how often and when the instructor will interact with students (e.g. syllabus/home page lists email/office hours/other ways to communicate and typical response times)
X	Provides direct instruction over Zoom (e.g. regularly scheduled live online class sessions in synchronous/hybrid/hyflex courses)
X	Provides direct instruction through instructor-created videos (e.g. lecture videos created using Studio in asynchronous courses)
X	Provides additional information from various sources/mediums to engage students with course content (e.g. instructor-curated content in Canvas pages that help deepen students understanding of course content)
X	Facilitates discussions (e.g. through Canvas discussion boards, Pronto, Studio, or Hypothesis)
X	Provides feedback on students' coursework (e.g. through detailed rubrics and/or assignment comments in Speedgrader; note: a grade alone does not quality as RSI, nor does auto-graded feedback students may get through completing publisher content)

X	Responds to students' questions (e.g. through timely responses to student messages in Canvas Inbox, discussion boards, social annotation assignments)
X	Facilitates student success through ongoing outreach (e.g. posts announcements; uses "Message Students Who" to encourage struggling students to attend office hours or access free tutoring)
	Other [explain]:

2b. What challenges if any have you faced in implementing RSI? What additional training or resources might instructors in your program need to increase the quality of RSI in online courses?

- Quality of RSI among part-time faculty is uneven and their understanding of minimum requirements and expectations is uneven as well. This is especially hampered by the fact that part-time faculty are only evaluated every 3 years, so there is no way to assess this in an ongoing manner

Section 5: Program Review Feedback

What questions or suggestions do you have about this year's Program Review forms or process?

Detailed Instructions

Instructions

1. Send an electronic copy of this form to Program Review chair, Karin Spirn, and your Dean by Monday, November 2.
2. Please respond to questions with enough detail to present your information; it doesn't have to be long.
3. If the requested information does not apply to your program, write "Not Applicable."
4. Even if you don't have much to report, we want to hear from you, so your voice is part of the college planning process.
5. Optional/suggested: Communicate with your dean while completing this document.

Sections: There are five sections to the document:

1. Program Reflection and Planning

2. SLO/SAO Review
3. Data analysis
4. Special topics
5. Feedback on the PR template and process

Time Frame: This Program Review should reflect your program status during the 25-26 academic year. It should describe plans starting now and continuing through 2026-27. It is fine to discuss topics beyond these time frames, but please specify the time frame in your responses.

Audience: Deans, Vice Presidents of Student Services and Academic Services, All Planning and Allocation Committees. This document will be available to the public.

Uses: This Program Review will inform the audience about your program. It is also used in creating division summaries, determining college planning priorities, and determining the allocation of resources. The final use is to document the fulfillment of accreditation requirements.

Equity: Here is the LPC definition of equity, which is a guiding principle in reviewing programs: “Equity is parity in student educational outcomes. It places student success and belonging for students of color and disproportionately impacted students at the center of focus.”

Please note: Program Review is NOT a vehicle for making requests. All requests should be made through appropriate processes (e.g., Instructional Equipment Request Process) or directed to your dean or supervisor.

Helpful Links:

- Tools for Writers - with contacts for help with specific sections.
- Program Review Glossary - defines key terms you can review when writing.
- Fall 2023 Program Reviews
- Program Review FAQs

For help with your program review, please contact Karin Spirn at kspirn@laspositascollege.edu

---