Instructional Annual Program Review and Planning Update Form Fall 2024

## BACKGROUND:

**Program review is an integral part of the campus planning process. As programs and areas monitor their progress on the current comprehensive four-year program review, changes in need and scope can be expected. This Annual PR Update form is designed to outline and request modifications to the current program review that occur between comprehensive four-year review cycles, as needed.**

**Examples of a requested change include new information such as action plans, outcomes modifications, personnel changes, technology needs, and capital expenditures requirements. As programs and areas monitor their progress on the previous comprehensive four-year program review, the form provides the basis to suggest a change in plans and processes to improve student success and institutional effectiveness.**

## SUBMISSION:

**Program:**

Earth Sciences

**Principal Author(s):**

W. Sean Chamberlin, PhD

**Dean:**

Bridget Salzameda

**Submission Date:**

11/18/2024 9:48:01 AM

**Author Signature:**

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| Electronically signed by William Chamberlin on 11/13/2024 7:40:09 AM |

**Manager Signature:**

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| Electronically signed by Bridget Salzameda on 11/18/2024 9:48:01 AM |

# Part 1: Review of Data

## Use the data provided by the Office of Institutional Effectiveness (OIE)--[available in August 2024](https://fullcolledu-my.sharepoint.com/:f:/g/personal/dberumen_fullcoll_edu/Ejn54PAVVhJLqimOjiLWBBYBPkPdoZEFZxZtScvvyibo6A)--to review your program completion and success rates and compare them to the Institution Set Standards for course completion and success rates. Then, answer these questions:

1. **Where your program meets or exceeds the college-wide standard for completion and success, to what do you attribute your success?**

Earth Sciences in aggregate achieved completion and success rates above the institution-set standards. Latinx students, who comprised the largest percentage of our enrollments (62.5%), achieved an average completion rate of 86.2% and success rate of 72.5%. Though it's challenging to attribute any one set of factors to our success, Earth Sciences has long engaged in culturally responsive instruction, choice-based curriculum, social-emotional learning, and similar inclusive practices designed to make our teaching equitable for diverse learners. Through grants and participation in workshops—including CoRE, the Course Redesign for Equity workshop—we have integrated active, technology-enhanced instruction in campus and online courses. We have also strived to apply the principles of Universal Design for Learning (UDL) to our courses. We also note that some of our highest achieving courses are those where students engage in field studies, both in our field-based "lab" courses, and in our field courses, where students travel and spend time in natural settings—coastlines, deserts, national parks. We are the only department in our division (and perhaps at the college) that offers dedicated field study classes to students. Earth Sciences has a strong commitment to exposing students to natural environments and building the human-nature connection in our students (e.g., Barragan-Jason et al. 2021). Nature-based assignments are part of nearly all of our courses. These strategies offer distinct yet interconnected opportunities to create inclusive, engaging, and effective STEM learning environments. They ensure that students not only gain academic knowledge but also develop the practical skills and emotional resilience needed for success in STEM fields and careers.

1. **Where your program does not meet this standard, please examine the possible reasons and note any actions that should be taken, if appropriate.**

On an individual course basis, our Earth Sciences lecture and lab course performed below the institution-set standard for some student populations. Latinx and Filipino students underachieved in the lecture course (ESC 100 F), while Black/African-American and Latinx students underperformed in the lab class (ESC 100LF). Black/African American students also struggled in our oceanography lecture classes (ESC 130 F). Understanding the reasons for these results—like with success—requires speculation without a clearer view of the students and their challenges in specific courses. These courses are taught by the same instructors using the same delivery methods (lecture, hybrid, and online) with the same equity-based approaches as courses where students are achieving above the institution-set standard. It's possible students perceive the course as an easy one, only to find it's one of the more challenging courses due to its breadth. Earth Science includes an overview of four major scientific disciplines—geology, oceanography, meteorology, and astronomy. The overarching themes that connect these disciplines may prove overly broad and abstract for students accustomed to more "down-to-earth" topics. Be that as it may, we endeavor to take a closer look at the curriculum and explore ways to make it more responsive to the needs and challenges of underperforming students. Recently. we have endeavored to develop tools and strategies for studying intersectionality as it applies to Earth Science courses. To that end, we are developing a grant proposal that addresses the following:

1. Recognizing intersectionality—Students embody multiple, interacting identities that should be made visible and relevant in the pedagogy and structure of our classrooms and institutions.

2. Fostering an inclusive STEM culture—STEM education should embrace teaching methods beyond traditional lectures, ensuring that content and classroom environments do not reinforce gender and racial stereotypes but support all learners equally.

3. Addressing assumptions and barriers—Institutions should recognize that students come from diverse backgrounds and experiences and should work to remove structural barriers for women, students of color, first-generation college students, working students, disabled students, students with children, older students, and the intersections of these identities.

4. Building connections—Instructors and institutions should create space for students' stories, experiences, and social contexts, ensuring that education is relevant and connected to their lives.

5. Clarifying career relevance—Courses should make clear how the skills and knowledge gained apply to future STEM careers, as well as to non-STEM fields, helping students understand the value of their learning.

6. Providing diverse pathways—STEM education should be framed as a dynamic network of opportunities, focusing on identifying and removing barriers rather than presenting education as a rigid pipeline.

7. Using comprehensive data—Institutions should take a holistic view of student experiences, gathering and utilizing data that fully reflect the intersectional identities and complexities of their student body.

In short, we aim to take an intersectional focus that reveals the factors "shaping students' individual realities and shared experiences" (NSF 2024) and how those identities impact student performance in our courses.

1. **Compare your data analysis in questions 1 and 2 to the review of data in your 2023 Annual Program Review update (available on the** [**Program Review and Planning Committee**](https://committees.fullcoll.edu/program-review/) **website). Are there significant changes? Do you notice any patterns from year to year?**

While our current data indicate a slight decrease in the percentage of completion and success, the numbers are in range of historic ranges for our department. Year-to-year variations in completion and success are to be expected. According to our program's KPIs in Tableau, rates of completion have varied from 84% in 2019 to 89.9% in 2023. Success in the past five years has varied from 67.8 (2019) to 81.5% (2021). Over the past three years, success has remained around 76.5% (plus or minus 1 or 2 percentage points). We note that these rates for completion and success consistently remain a few percentage points higher than the division as a whole. We would take credit for that based on our efforts, but this is likely a reflection of the predominance of majors courses in other departments. These courses tend to be more challenging than the general education courses taught in our department. Looking further back (as far as 1992), we can see that average success has slowly increased over time. We attribute this to our efforts to our multiple types of teaching modalities and the plasticity of instructional delivery (campus, hybrid, online, field, and laboratory). Nevertheless, attributing any patterns in completion and success to teaching efforts remains tenuous without more complete studies. At the same time, the changing demographics of students, their changing life circumstances (e.g., the pandemic) and numerous other factors complicate direct links between our efforts and student success. As noted above, incorporation of tools and strategies that address the intersectional identities and needs of students could shed more light on these questions.

# Part 2: Additional Resource Request Reasoning and Support

**We have reviewed our most recent self-study and have not identified any significant changes that necessitate resource requests for the upcoming academic year.**

**We have reviewed our most recent self-study and have identified significant changes that necessitate additional resource requests.**

**For programs that have identified significant changes that necessitate additional resource requests, answer the following questions for each separate resource request:**

1. **Briefly describe your resource request.**

First, we'd like to express our gratitude for the resources provided as a result of our prior program review. These funds have been earmarked for field trips taking place in Fall 2024 and Spring 2025.

Nevertheless, our request for resources in this program review underscores the critical, ongoing need within our department to ensure that students are served safely, equitably, and with the best opportunities for success. Currently, the Earth Sciences department lacks a dedicated annual budget to cover essential expenses associated with our field courses, including entrance and campsite fees, transportation costs, and fees for educational experiences such as trams, tours, museums, and aquariums. These costs are inherent to field trips vital to our curriculum, including excursions to USC Wrigley – Catalina Island, Santa Cruz Island, the Cal State Desert Studies Center, as well as trips to national and state parks and camping sites throughout the Southwest. Additionally, we offer students optional field trip opportunities to places like the Aquarium of the Pacific, Dana Point whale watching, the Bolsa Chica Conservancy Interpretive Center, and the Ocean Institute at Dana Point. Unfortunately, students currently bear these costs out of pocket, creating an inequitable financial burden that limits access for many. While we remain firmly committed to our philosophy of “no student left inside,” financial barriers have forced us to reduce these invaluable experiences to ensure inclusivity. Funding for these field-based activities is essential to delivering an equitable, comprehensive, and transformative educational experience in Earth Sciences. As highlighted in our 2023 annual update, field trips are instrumental in exposing students to the rich diversity of field-based sciences—geology, oceanography, meteorology, ecology, environmental science, biology, and more. These trips foster hands-on learning, allowing students to experience scientific concepts and ecosystems directly rather than solely through classroom instruction. Field trips serve as a powerful recruitment tool, drawing students to our Earth Sciences programs by sparking a passion for the natural world and the field of Earth Science itself.

The impact of these trips on student engagement and success is significant, as reflected in both our consistently high success rates in field-based courses and the overwhelmingly positive feedback we receive. Students repeatedly express how these real-world experiences broaden their perspectives, deepen their understanding, and inspire a commitment to learning and environmental stewardship. In short, our field trips are not merely supplemental—they are foundational to our mission of fostering scientific curiosity, building technical skills, and nurturing the next generation of Earth scientists. Without reliable funding, we risk losing this critical component of our curriculum, potentially limiting access to Earth Sciences for underrepresented and economically disadvantaged students who otherwise might not experience the transformative power of field-based learning.

Our field courses, typically offered each semester with a class size of 20 students, also require dedicated drivers to ensure safe and efficient travel to field sites. Historically, we have relied on a combination of faculty and student volunteer drivers; however, with the retirement of two key Earth Science faculty members (Heath and Lozinsky), finding available faculty drivers has become increasingly challenging. Additionally, we recognize the potential risks and understandable concerns associated with relying on student volunteer drivers, as safety is paramount in these excursions.

To address this need, we requested funding in our last program review to compensate two faculty drivers per semester. Faculty drivers provide a dual benefit: beyond safely transporting students, they offer instructional insights and observational context en route to field sites, turning travel time into a valuable part of the learning experience. This funding would help secure the continuity of our field courses while enhancing the educational impact for our students.

In addition, in 2023, ESC requested iPad software, which was unable to be used as the iPads were found to be outdated, and ACT could not support the management of outdated devices. In addition, it was found that a significant number of iPads could not hold a charge after no use by students during the pandemic. More than 40 of the iPads were retired as a result. We are requesting that replacement iPads be purchased for use in the classroom to facilitate the completion of lab activities and for collecting and storing data during field trips.

The use of modern software and technology is important for students to develop skills in using digital resources for data collection and processing. Although students are reliant on personal mobile devices for tutorial videos, access to documents and files, and assignment submission, the use of iPads will facilitate these tasks. In addition, students on field trips will be able to build a digital database of photos and videos on the iPads as references for other students, e.g., iNaturalist. Finally, a dedicated set of iPads for field use will allow students to use wireless instruments (i.e., Vernier Go Direct sensors) already owned by ESC. Previously, these instruments were not able to be used with the outdated iPads. The replacement iPads will support student success in the classroom, in the lab, and out in the field, supporting the ESC motto: No Student Left Inside.

1. **Is this request related to an essential safety need?**

Yes

**Please explain how this resource will help your program meet an essential safety need.**

Having faculty drivers enhances safety and ensures a smoother experience for students in several important ways. Faculty bring experience in managing the unique dynamics of student passengers, who may be energetic, ask spontaneous questions, or react excitedly to wildlife sightings (like a sudden "COYOTE!"). Faculty are also adept at handling common student needs on the road, from planning timely bathroom breaks to addressing car sickness or hunger.

Moreover, faculty possess the skills and experience to handle unexpected vehicle issues, such as flat tires, engine trouble, or other mechanical malfunctions, minimizing disruptions and potential delays. Their familiarity with driving under adverse weather conditions—whether it's rain, flooding, high winds—or navigating challenging terrain, including dirt roads, muddy paths, and pothole-laden areas, further supports safe travel. Our request to compensate faculty drivers is an investment in both the safety and comfort of students, enhancing the overall quality of our field experiences.

**For each separate resource request, complete this chart with details of the request:**

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| **Type of Resource** |  |
| Personnel | Professional Expert |
| Facilities |  |
| Supplies |  |
| Computer Hardware | 24 iPads: $14,400  24 Apple Pencils: $1,920  16 Indoor Cases: $1,440  8 Outdoor Cases: $960  TOTAL: $18,720 |
| Computer Software |  |
| Training |  |
| Other | $12,500 (field trips); $5280 (faculty drivers) |
| **Total Requested Amount:** | $36,500 |

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| --- |
| **Is the funding requested ongoing or one-time funding?**  Ongoing funds |
| **Is the funding requested for**[**enrollment and reengagement activities?**](https://ie.fullcoll.edu/wp-content/uploads/sites/27/2024/05/ER-2.0-Program-Review-Guide.pdf)  No |