

Comprehensive Program Review Report



Program Review - Physical Sciences

Program Summary

2023-2024

Prepared by: Quinn MacPherson

What are the strengths of your area?: The physical science program consists of a single course, PSCI 20, which is offered only in the fall semester. This course fulfills the CSU and UC transfer requirements for a physical science course with a lab. The students enrolled in this course are typically not science majors but are drawn from a wide range of majors such as elementary education, business, welding, animal science, and child development. From fall 2020 through present PSCI 20 has been taught by Quinn MacPherson. The physical science program shares a laboratory budget with the other physical sciences though we occasionally use supplies from chemistry (Thanks Andy!).

In past years this course has struggled to keep students engaged with many students dropping or failing to attend class leading to low success rates (47% in 2021 and 55% in 2022). Over the summer of 2023 Quinn significantly redesigned the course. The redesign included reducing the expectations for the student's mathematical and problem solving skills. The students are no longer expected to solve problems involving multiple equations, and effort was taken only to use equations of the form $v=x/t$ whenever possible. Instead, lectures and homework were redesigned to emphasize conceptual understanding. More demos, activities, and interactions were added to the lecture periods. Lecture videos are no longer recorded (unless specifically needed, such as for a student with covid) to encourage attendance.

These changes have proved successful. Most students this semester attend lectures regularly and student interaction and engagement are lively. However, this may be due in part to the example set by a few particularly engaged students. It is too early to say what effect these improvements will have on success rates, but I suspect it will be substantial.

What improvements are needed?: Over the past several years the PSCI 20 course has generally filled or nearly filled. After drops, the enrollment was typically around twenty at time of census. However, this fall there are currently only 10 students enrolled.

I suspect that this significant drop is primarily caused by a change in the physical geography offerings and schedule. Like physical science, physical geography fulfills the physical science with a lab transfer requirement so the courses compete for enrollment. In fall 2022 COS offered 5 sections of physical geography (3 on Visalia campus) which were highly enrolled (40-49). None of the fall 2022 physical geography courses were at the 8:10 am time slot where physical science has been offered. In fall 2023, COS offered 8 sections of physical geography (6 on Visalia campus). Notably, a 8:10 am section with a maximum capacity of 63 was added. The additional geography courses were clearly needed with most section being either nearly full or even overfilled. However, the increased availability of geography resulted in reduced enrollment in physical science.

It is unknown to what extent the drop in physical science enrollment is caused by more geography sections and to what extent it is caused by having a geography section at the same time. In the former case, I would expect physical science to continue be underenrolled in future semesters. However, in the latter case it may be possible to reschedule physical science to a time that is not currently being served by geography (or perhaps a more convenient time more generally). Below I will list some options for rescheduling.

We could move Physical Science lab to Friday morning after class. This would mean the class would meet 3 days a week rather than 4 which may prove more popular. However, this would require a chemistry lab room to be available which is yet to be determined. In addition to moving the lab, we could also move the Monday and Wednesday lectures to 10 am, a time not

served by Geography.

Another potential source of low enrollment is an error on the COS transfer information and requirements website that mistakenly didn't include "lab" with physical science. This should get fixed before the next semester.

Note that physical science uses Gradescope and continued usage would be beneficial. See the gradescope institutional license action item in the program review from Physics.

Describe any external opportunities or challenges.: None

Overall SLO Achievement: Performance on the coulomb's law slo that was assessed in fall 2022 was poor.

Changes Based on SLO Achievement: I have considerably altered how the course is taught this year, including explicitly showing students how to use a calculator. Rather than just using my on-screen calculator or precalculated values I now put the calculator on the overhead projector and show students how to use it.

Overall PLO Achievement: N/A

Changes Based on PLO Achievement: N/A

Outcome cycle evaluation: The outcome assessment cycle was out of date so a flag didn't show up in trac dat and I didn't know I was supposed to assess last fall. Using saved exam submissions I was able to assess one of the three SLO's. I've scheduled all three SLO's to be assessed again this fall.

Action: (2023-2024) Adjust schedule to increase enrollment

We are planning to change the time physical science to 10:10-11:00am on Monday and Wednesday (keeping an 8am lecture on Friday) and move the lab from Tuesday to Friday. Shifting to two hours later will be done to serve students who aren't available at 8am on Monday and Wednesday as students available at this time are already served by Geography. Moving the lab to Friday will make the class a 3-day class rather than a 4-day class and therefore be more convenient for students. The new schedule will start in fall 2024. It is hoped that these changes will increase enrollment.

Leave Blank:

Implementation Timeline: 2023 - 2024

Leave Blank:

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Identify related course/program outcomes:

Person(s) Responsible (Name and Position): Quinn MacPherson and Joshua Dillard

Rationale (With supporting data):

Priority: Medium

Safety Issue: No

External Mandate: No

Safety/Mandate Explanation:

Link Actions to District Objectives

District Objectives: 2021-2025

District Objective 1.1 - The District will increase FTES 2% from 2021 to 2025.

Action: (Discontinued) Budget for Physical Science

Allocate a specific budget for Physical Science 20. I plan on discussing the needs of this course with our Division Chair, and the Department Dean in hopes of coming to an agreement on an adequate amount to provide equipment and supplies.

Leave Blank: Continued Action

Implementation Timeline: 2019 - 2020, 2020 - 2021, 2022 - 2023

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Identify related course/program outcomes: District objectives #1 and #7.

Person(s) Responsible (Name and Position): Francisco Banuelos (Dean) , and Quinn MacPherson

Rationale (With supporting data): There is currently no budget for this course even though there are many expenses for a course which meets for 3 hours of lecture, and 3 hours of laboratory every week. This course is a general Science course which

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covers Physics, Chemistry, Geology, and Astronomy.

Priority: High

Safety Issue: No

External Mandate: No

Safety/Mandate Explanation:

Update on Action	
<p><i>Updates</i></p> <p>Update Year: 2023 - 2024</p> <p>Status: Action Discontinued</p> <p>The current budget arrangement is working</p> <p>Impact on District Objectives/Unit Outcomes (Not Required):</p>	10/11/2023

Resources Description

<p>Adjustment to Base Budget - \$750 in above base budget allocation for instructional supplies. (Active)</p> <p>Why is this resource required for this action?: There is currently an allocation of \$2800 for all the physical sciences, which include Astronomy, Natural Science, Earth Science, Physics, Geology, and Geography. All of the courses have specific instructional supply, equipment, and field trip needs. \$2800 is not sufficient to provide students with an adequate learning experience within each of the physical sciences.</p> <p>Notes (optional):</p> <p>Cost of Request (Nothing will be funded over the amount listed.): 750</p>
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Link Actions to District Objectives

District Objectives: 2018-2021
District Objective 1.1 - The District will increase FTES by 1.75% over the three years
District Objective 2.1 - Increase the percentage of students who earn an associate degree or certificate (CTE and Non-CTE) by 5 percentage points over three years
District Objective 2.2 - Increase the number of students who transfer to a four-year institution by 10 percent over three years
District Objective 2.3 - By 2021, increase the percentage of students who complete transfer-level English by 15 percentage points and transfer-level math by 10 percentage point with their first year.
District Objective 3.1 - By 2021, increase the placement rates into transfer-level English and transfer-level math for targeted groups that fall below the District Average.
District Objective 3.2 - By 2021, increase the percentage of students in targeted groups who complete transfer-level English (by 10 percentage points) and transfer-level math (by 5 percentage points) within their first year
District Objective 4.1 - Increase the use of data for decision-making at the District and department/unit level
District Objective 4.2 - Improve organizational effectiveness by strengthening operations of and communication between District departments, divisions, and constituents
District Objectives: 2013-2015
2013-2015: District Objective #1 - District Objective #1 for 2013-2015: Provide effective academic support services as measured by an increase in the rate at which students successfully complete courses.
2013-2015: District Objective #7 - District Objective #7 for 2013 - 2015: Allocate resources based on an accountable and systematic District-wide planning and budget development process that links this allocation to Institutional Program Reviews and the Strategic Plan.
District Objectives: 2015-2018
District Objectives - 1.1 - Increase overall enrollment by 1.75% annually

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District Objectives - 2.1 - Increase the number of students who are transfer-prepared annually.

District Objectives - 2.2 - Increase the number of students who earn an associate degree or certificate annually.

District Objectives - 2.3 - Increase course success and completion rates in pre-transfer English, Math, and English as a Second Language courses annually.

District Objectives - 2.4 - Increase Career Technical Education course success rates and program completion annually.

District Objectives - 3.1 - Reduce the achievement gap of disproportionately impacted student groups annually, as identified in the Student Equity Plan.

District Objectives - 4.1 - Improve operational systems based upon data driven decision-making as described in the COS 2.0 manuals.

District Objectives - 4.2 - Improve the efficiency, effectiveness and communication of human, physical, technological, and financial resources to advance the District Mission.