# Instructional Annual Program Review and Planning Update Form Fall 2023

**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.

**DIRECTIONS:**

This form shall be completed annually by **all** programs.

- Instructional programs must submit their Annual Program Review Update form to their dean by 5pm on Monday, November 27, 2023.
- Deans will forward the completed form to the Program Review and Planning Committee Chairs by 5pm on Monday, December 4, 2023.
- Questions or concerns?
  - Committee contacts:
    - Co-chairs Mary Bogan (mbogan@fullcoll.edu) and Bridget Kominek (bkominek@fullcoll.edu)
    - Division representatives on the Program Review and Planning Committee
  - Office of Institutional Effectiveness

**SUBMISSION:**

Program: Physics Division: Natural Sciences Date: 11/27/2023

☐ We have reviewed our most recent self-study and **have not identified** any significant changes that necessitate resource requests for the upcoming academic year. *(Complete part 1 only)*

☒ We have reviewed our most recent self-study and **have identified** significant changes that necessitate additional resource requests, which are attached in our submission. *(Complete parts 1 and 2)*

Principal Author Signature: Printed Name: Seung K. Ji

Date: 11/27/2023

Dean Signature: Bridget Salzameda Printed Name: Bridget Salzameda

Date: 11/27/2023

## Part 1: Review of Data

**Institution Set Standards (ISS)**

1. Use the data provided by the Office of Institutional Effectiveness (OIE) to review your course completion and success rates and provide a comparison to the Institution Set Standards for course completion and success rates.

   After August 15, you will be able to access PDF copies of your program's ISS data here: ISS_ISLO_Documents. The folder will also include instructions to access Tableau dashboards with the same information. The instruction document will also provide more context about how these standards are calculated. If you have any questions, please reach out to the Office of Institutional Effectiveness at ie@fullcoll.edu.

| Course | Success Standard | Completion Standard | Avg. Success | Avg. Completion |
|---|---|---|---|---|
| **PHYS 130 F** | ++ | + | 64.4% | 86.7% |
| **PHYS 205 F** | ++ | ++ | 82.1% | 92.3% |
| **PHYS 206 F** | ++ | ++ | 95.0% | 95.0% |
| **PHYS 210 F** | ++ | ++ | 87.8% | 91.8% |
| **PHYS 211 F** | ++ | ++ | 95.5% | 95.5% |
| **PHYS 221 F** | Below Standard | Below Standard | 57.5% | 72.8% |
| **PHYS 222 F** | + | + | 73.9% | 84.1% |
| **PHYS 223 F** | ++ | ++ | 86.8% | 89.5% |
| **ESC 116 F** | + | + | 70.5 % | 79.3% |
| **ESC 116 LF** | ++ | ++ | 85.9% | 89.4% |

The ISS data show completion and success rates increase except PHYS 221 F. The average success rate in AY 2022/2023 is 70.8%, higher than 66.8% in AY 2021/2022. PHYS 205 F and 210 F show dramatic increases in success rates. The success rate of PHYS 205 F increases from 55.9% to 82.1 %, and the success rate of PHYS 210 F increases from 54.8% to 87.8%. This enhancement could be due to the transition from remote lecture/in-person lab to in-person lecture and lab. All other physics classes increased the success rate except PHYS 221. The success rate of PHYS 221 decreased from 62.6% to 57.5%. This low success rate could be due to the sudden leave of one instructor and the hiring of adjunct instructors in a short time. PHYS 221 has been a bottleneck class in which students struggle to move on to the subsequent courses. We devise several plans to improve students' success.

2. If your program meets or exceeds the standard for completion and success, to what do you attribute your success? If your program does not meet this standard, please examine the possible reasons, and note any actions that should be taken, if appropriate.

   In AY 2021/2022, the physics and astronomy classes are offered as online lectures and in-person laboratory activities. However, we transitioned to fully in-person in the Fall 2022. The increases in the success rate can be explained by this transition of modality since there were no significant curriculum changes. It is unclear why the success rate in PHYS 221 F was lower than in the past year. We need to see more data to understand the result. The possible cause is the sudden changes in PHYS 221 F courses. In Fall 2022, an instructor who taught PHYS 221 tried more interactive teaching pedagogy, but the change was not well organized, and many students dropped PHYS 221F. In Spring 2023, the full-time instructor left the department, and three adjunct instructors were hired to teach PHYS 221 F classes quickly. These abrupt changes could influence the success rate of PHYS 221. The hired adjunct instructors have more experience now, and we expect to see improvement in the success rate next AY.

   In AY 2021/2022, we initiated various action plans to improve the physics and astronomy classes: to have embedded tutors (Hornet tutors) in all physics classes and to develop new SLO assessment tools in AY 2021/2022. We will continue to execute our current plans next AY. In Spring 2024, we will have embedded tutors in most of our Physics classes. We finalized our SLO assessment method this year and tried a preliminary assessment. We will implement new SLO assessments next year.

   We will start new action plans in AY 2023/2024: Developing ALEKS courses, hiring new full-time faculty, rewriting lab manuals, and more collaborations among physics faculty members.

   We will create ALEKS courses for physics classes. ALEKS is an artificially intelligent learning and assessment system. Students can take self-guided online courses if they need additional help with mathematics. With the help of the academic support center, we will select key concepts students can learn from ALEKS courses and implement them next year.

   Currently, each instructor uses a different lab manual. We will combine all lab manuals to create one lab manual for each course. Students can attend a different section of the lab if they miss a lab with this change. Moreover, if the student failed the class first, it would be easier for students to retake a physics course with another instructor if the laboratory activities were identical. This plan is still in the initial stages, and we need more support to complete this mission.

   We will also evaluate SLOs and share teaching pedagogies more often. We plan to have department meetings once or twice each month to review SLO assessments together and develop a better pedagogical approach. We can boost the positive feedback from colleagues through constructive discussions.

**Institutional Student Learning Outcomes (ISLOs)--Global Awareness ISLO.**

1. Describe your program's participation in assessment of Institutional Student Learning Outcomes (ISLO's). Specifically, how does your CSLO attainment, for the courses that are mapped to the Global Awareness ISLO, compare to Fullerton College's ISLO attainment?

After August 15, you will be able to access PDF copies of your program's ISLO data here: ISS_ISLO_Documents. The folder will also include instructions to access Tableau dashboards with the same information. Please reach out to your SLOA representative if you have questions.

The Physics department did not submit CSLO assessments to eLumen in AY 2022/2023 because we were in the process of changing the assessment tools. We finalized our new CSLO assessment method this year and ran preliminary assessments in the Fall 2022 and Spring 2023 semesters.

The physics department will use standardized physics concept surveys to assess student's successes. We will give a standardized survey to students when a semester begins and give the same survey at the end of the semester. Then, we will measure the students' success using normalized gain, which is widely used in physics education research. For instance, the new PHYS 221 F assessment method is written as follows:

*Use a standardized survey like FCI(Force Concept Inventory) to assess the SLO. The survey is given to the students at the beginning of the class. Then, students take the same survey at the end of the course. The normalized gain is calculated by (posttest-pretest)/(100% -pretest). The average normalized gain in the US is 0.22. (Non Korff et al. 2016)*
*We define success to be a normalized gain above the US average.*

*Note: Several research studies show that interactive engagement teaching methods can increase the normalized gain to 0.39. Our future goal is to increase the normalized gain to 0.39.*

In Fall 2022, we assessed PHY 205 and 210 students, and the average normalized gain was 0.20. This result is slightly lower than the average normalized gain in the US, which is 0.22. In Spring 2023, we tested the same pretext/posttest assessment in one PHYS 222 (The survey is different.) The normalized gain was 0.26, and the typical normalized gain in the US is 0.23. The results show that our student learning outcome is similar to the US average. We will collect more data next year and devise plans to improve our courses to achieve greater success.

2. Does the SLO data show significant achievement gaps among demographic groups in your program? If so, where are the gaps, and what steps can your program take to shrink them? If not, to what do you attribute your success in minimizing the achievement gap?

We have new plans to reduce achievement gaps among demographic groups: new ALEKS courses, support-enhanced transfer-level courses, and dual enrollment programs with a high school. However, we need more data to assess the significant achievement gaps among demographic groups. We will implement the new SLO assessment tools this semester and analyze the data next semester. We can develop a better plan once we see more CSLO assessment results next AY.

We plan to create additional courses to support underprepared students. First, we will create ALEKS courses. ALELK are AI-guided online courses. Students can do extra practice with the ALEKS courses. Also, we discussed the possibility of developing a new support-enhanced transfer-level course. For a class with low success rates, such as PHYS 221 F, we can add one lecture hour to the current course to give students more time to practice problem-solving skills. We will have one or two department meetings each month to devise more specific plans.

We recently agreed to open dual enrollment physics classes at Esperanza High School next year. We will offer PHYS 205 and 210 at the high school. This will help reduce achievement gaps for high school students.

## Part 2: Additional Resource Request Reasoning and Support

For each separate resource request, complete steps A, B, and C.

Step A: Briefly describe the request.

We need more full-time faculty members to achieve a higher success rate and execute our plans to provide more support to socio-economically disadvantaged students. We request hiring one full-time physics instructor in AY 2024/2025.

Step B: Answer the following questions:

1. Is it imperative that this resource request be processed now rather than during the next comprehensive program review? Why?

   We anticipate having more underprepared students in mathematics and science due to the implementation of AB 1705. To address this, we require more full-time instructors who can develop and provide support-enhanced transfer-level courses. The AB 1705 implementation guide states that "By July 1, 2023, a community college shall not require students to repeat coursework that they have successfully completed in high school or college or take coursework that repeats competencies that the student has demonstrated through other methods of credit for prior learning. " This implies that more mathematically underprepared students will enroll in physics courses. As a department, we intend to create courses with additional support. The physics department needs to hire a new full-time faculty member to develop and execute effective action plans to reduce achievement gaps among demographic groups.

2. How will this additional resource allocation specifically enhance your program's services, activities, processes, etc. to continue or improve student learning and achievement?
   - Is the resource request personnel-related? If so, please provide evidence to justify the requested positions such as retirements, program growth or curricular demands, full-time/adjunct ratios, etc.

   One full-time instructor left the department in Fall 2022. Unfortunately, we are unable to offer additional classes due to a shortage of instructors. In each semester, we can only provide one elementary physics course and three physics for Life Sciences I and II combined. This shortage of full-time instructors is hindering our ability to offer more classes. Furthermore, we plan to launch a dual enrollment program at a local high school. We require more instructors who can teach dual enrollment classes to achieve this.

3. How will this additional resource allocation help you serve the college mission or strategic initiatives, and/or your program's goals for improvement, as stated in your last program review?

   We proposed various action plans in the last program review. However, the progress has been slow because we do not have enough workforce. A new full-time faculty member can contribute to developing new class curriculums and revision of physics lab manuals. We can also expand the dual enrollment programs to other high schools. All these tasks are not possible by hiring more adjunct instructors.

Step C: Complete this chart with details of the request:

| Type of Resource | Requested Dollar Amount | Potential Funding Source<br>It is only necessary to list potential funding forces if you are aware of specific grants/program funds appropriate to the request, such as Strong Workforce. |
|---|---|---|
| Personnel | Full-time instructor<br>100,000/year | |
| Facilities | | |
| Equipment | | |
| Supplies | | |
| Computer Hardware | | |
| Computer Software | | |
| Training | | |
| Other | | |
| **Total Requested Amount:** | $100,000/year | |