



# Fullerton College

## Self-study for Physics Program

2025

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### Section 1: Introduction

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1. Briefly describe your program, make sure to include how your program helps the College achieve its mission.

The physics department at Fullerton College supports the college mission by offering the Associate Degree for Transfer and providing courses in support of other departments in the Natural Sciences Division, as well as general education courses for non-science students.

We offer three types of classes: physics and astronomy for non-science majors, physics for the life sciences (algebra and calculus based), and physics for science and engineering majors (calculus based).

Offerings in the first category consist of astronomy lecture, astronomy lab, a physics survey course with labs, and a special topics course which is currently a pedestrian's guide to special relativity (PHYS120). Other special topics courses are in development. The astronomy courses (ESC116/116L) are carried under earth sciences for historical reasons, and should be folded back into the physics department.

Physics for the life sciences consists of a two semester sequence, either algebra (PHYS205/210) or calculus based (PHYS206/211), covering all aspects of lower division physics, but in less detail than the sequence for science and engineering majors.

Physics for science and engineering majors is a three semester sequence. The first semester (PHYS221) covers classical mechanics. The second semester (PHYS222) covers electricity and magnetism, and elementary circuit theory. The third semester (PHYS223) is a grab bag of topics: thermodynamics, wave motion, optics, and an introduction to relativity and quantum physics.

Physics at Fullerton College is a small department, currently consisting of four full-time faculty and a lab technician. We rely heavily on adjunct faculty, of which we currently have four with three new adjunct hires in process. A major goal of in this review cycle is to hire at least one additional full-time faculty, as we are stretched thin in order to satisfy student demand. For example, the algebra and calculus based courses for the life sciences have to be combined in one classroom due to the shortage of faculty.

The previous cycle identified four areas for strategic action:

1. Hire new instructors.
2. Develop a systematic CSLO and PSLO assessment plan.
3. Develop new laboratory activities and repair/replace laboratory equipment.
4. Support creation of a campus STEM center.

Seven new adjuncts have been hired or are in process. A full time faculty member was hired in the previous review cycle, but his contract was not renewed. CSLO and PSLO assessment plans were developed. A campus STEM center was successfully established and currently sees heavy use by physics students. The development of new lab activities and repair/update of equipment is ongoing.

New areas for strategic action this review cycle are:

1. Strengthen the existing tutoring options.
2. Develop a systematic approach for hiring and training new faculty.
3. Develop new course offerings. Possibilities include:

PHYS221 with support

Special topics (general education level)

Advanced topics (bridge between our 221-223 sequence and upper division courses)

Numerical (computer) methods in physics

4. Explore development of a “lab practicum” for courses with embedded labs and include as part of final exams.
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## Section 2: Students

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### 2.1 Student Demographics and Enrollment Trends

1. Using the data provided by the OIE, describe the student population your department serves. Which demographic groups have the most enrollments in your program? Which student groups are underrepresented in your program? Has the demographic profile of your program changed over the last four years?

The Physics Department serves students' wide variety of educational goals through our range of classes. In academic year 2024-2025 there were 872 students enrolled in our physics and astronomy courses, up from 773 in 2020-2021, a 12.8% increase. The physics and astronomy course offerings can roughly be divided into three categories.

1: General education classes which primarily fulfill elective requirements for students majoring outside physical sciences. Courses include PHYS 130 (which includes a lab component), ESC 116 (Astronomy), and ESC 116 L (Astronomy Lab).

2: The physics sequence which fulfills a core requirement for life sciences majors. Courses include PHYS 205 and 210 (algebra based), and PHYS 206 and 211 (calculus based).

3: The calculus-based physics sequence which fulfills a core requirement for physical sciences, computer science, and engineering majors. Classes include PHYS 221, PHYS 222, and PHYS 223

Student demographics vary somewhat between these categories, likely due to which majors they primarily serve. Specifically, since all our astronomy courses are general education classes, they show some different demographic trends when compared against the other courses in the physics department.

Comparing headcount data for all PHYS courses (excluding Astronomy) against the school-wide values for academic year 2024-2025 showed representation was higher for Asian students (29% vs 13%), lower for Black/African American students (2% vs 3%), lower for Latina/o/x/e students (44% vs 59%), and lower for White students (11% vs 14%).

The most strongly underrepresented demographic in our physics courses overall seems to be our female students. Students enrolled in physics courses at Fullerton College are 25% female, 65% male, and 7% unknown, compared to the school-wide distribution 50% female, 42% male, 8% unknown. The largest discrepancy here is seen when focusing on the physics sequence for physical science and engineering majors (PHYS 221, 222 and 223) which was 15% female, 77% male, and 8% unknown for 2024-2025. In contrast, male students are slightly underrepresented in the physics for life sciences series (PHYS 205, 206, 210, 211) compared to the school-wide average ,with 54% female, 40% male, and 6% other.

Comparing headcount data for our Astronomy courses (ESC 116 and 116L) against the school-wide values for academic year 2024-2025 showed representation was lower for Asian students (6% vs 13%), lower for Black/African American students (1% vs 3%), higher for Latina/o/x/e students (67% vs 59%), and higher for White students (17% vs 14%). Students enrolled in our Astronomy classes are 55% female, 39% male, and 8% unknown, compared to the school-wide distribution 50% female, 42% male, 8% unknown.

There are some suggestions of overall demographic shifts in our physics students over the study period, though none are consistent year over year. For all PHYS courses (excluding Astronomy) representation of Asian students has decreased from 35% in 2020-2021 to 29% in 2024-2025, representation of Latina/o/x/e increased from 39% in 2020-2021 to 44% in 2024-2025, and representation of two or more races is up from 9% in 2020-2021 to 12% in 2024-2025.

For our physics sequence for physical sciences and engineering classes (PHYS 221, 222, and 223) gender representation shifted from 23% female, 73% male, 5% unknown for 2020-2021 to 15% female, 77% male, 8% unknown for 2024-2025, showing a significant decrease for the already underrepresented female students. However, when considering all PHYS courses the percentage of female students stayed flat overall for the study period. As discussed in the next question, we have expanded the number of sections for in our physics for life sciences series (which has a majority of female students) due to high demand. So, the falling female representation in PHYS 221, 222, and 223 may be explained by students shifting to the life sciences series, a side effect of changing our course offerings to better meet our students' needs.

For our Astronomy courses there were year-to-year fluctuations, but no clear demographic

trends over the study period.

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2. Briefly describe course-level enrollment trends in your program over the past five years. Have the enrollment trends in your program changed over the last five years? To what do you attribute any changes or lack of changes?

Enrollment numbers for each academic year starting in 2020/2021 to 2024/2025 are given in the following table.

Course #	2020/2021	2021/2022	2022/2023	2023/2024	2024/2025
ESC116	341	339	275	288	301
ESC116L		124	85	89	90
PHYS130		37	45	52	56
PHYS205	24	34	39	69	60
PHYS206	12	17	20	16	33
PHYS210	26	31	49	51	43
PHYS211	18	14	22	17	25
PHYS221	259	198	228	263	283
PHYS222	151	148	138	112	141
PHYS223	33	33	38	37	36

Enrollment in PHYS130 has increased since we began offering summer sessions in 2023. We

are offering an additional section each semester starting in spring 2026 based on the increases shown above. Offerings for PHYS 205 and 206 were increased from once/year to once/semester in 2023. We have doubled the number of sections for spring 2026. PHYS205 is taught alongside PHYS210 (due to lack of faculty) and we see enrollment responding to the increased number of sections. Enrollment in PHYS210 immediately shot up when we began offering it every semester, showing that there was a previously unmet demand for calculus based physics for the life sciences.

The number of PHYS221 sections per semester decreased from 6 to 5 in Spring 2022 due to staffing shortage and increased back to 6 in the fall 2025 semester.

We have been offering one section of PHYS223 each semester. Enrollment is depressed in the fall, but the course fills in the spring. We are offering 2 sections of PHYS223 for the spring 2026.

The basic enrollment trend seen above is that classes fill when new sections are offered, showing that there is unmet demand, especially in the physics for non-science majors (130), physics for life sciences (205/210) and introductory physics for science and engineering majors (221).

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3. How do you monitor and modify course offerings, including time and modality, to ensure that students' needs are being met?

The physics faculty monitor enrollment in our courses and discuss where demand exists to open additional sections of the courses we offer. The first courses in our main physics sequences (205, 210, and 221) tend to constantly be filled and have waitlists, so we have increased the number of sections for those courses. Informal surveys and discussions with students also helped us identify that some students who were life sciences majors were enrolling in our physics for PHYS 221 because space in PHYS 210 was filling up. That information motivated us to open an additional section of PHYS 205/210 to better fit student needs.

Strong demand for PHYS 130 has motivated us to begin offering courses during the summer session starting in 2023-2024, which our department had not done for several years previously, as well as to expand our general education offerings. We will be running a section of "Relativity for Poets" (PHS 120) in Spring 2026 for the first time in several years so that we

can offer something for those students that need a science elective without a lab requirement. This will be an asynchronous online course to maximize the flexibility for our students.

The physics department also remains mindful that many of our students have may have lower income and often have significant work or family responsibilities outside of class. For this reason, we have a department policy to always offer at least one night class for all our multi-section courses, as well as pathways through our main physics sequences which make use of free OER textbooks.

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## 2.2 Student Achievement

1. Using data provided by the OIE, describe overall student achievement counts, rates, and trends in your program over the past five years, these include: course success rates, degrees/certificates completion counts, transfer counts, licensing, job placement, wage improvements (not all of these measures apply to every program).

Overall combined course success rates for Physics and Astronomy exceed the institutional set standard of 62% for all years of this study, though there is variance between courses. Most courses have an increasing success rate over the study period, or have no clear trend. Two courses show a decreasing trend. One is PHYS 221, which had 100% success rate in 2020-2021 and 88% in 2024-2025. The other is ESC 116, which had an anomalously high success rate in 2020-2021 and has had a very consistent success rate near about 72% since then.

PHYS 221, which is the first course in the physics sequence for physical sciences and engineering majors, is the only course which has a total success rate less than the institutional set standard, at 59%. There is no clear trend in PHYS 221 success rates, which have bounced between 55% and 64% over the study period. The apparently low success rate is explainable in that PHYS221 is the first course in the series for physics and engineering majors, is very math intensive, and introduces concepts at odds with common perceptions of force and motion. Many students enroll in this course to find out if physics is for them, and it is not surprising that some of them discover that OFB (other fields beckon).

The vast majority of students in our physics and astronomy courses are fulfilling requirements for other majors, so the number of degrees and transfers for physics is quite small. Earned degrees have varied between 7 and 16 per year and are quite variable due to the low numbers of physics degrees awarded.

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2. Are there student groups whose success rates are below the institution-set standard or whose success rates are below other student groups? What factors can explain this?

The only ethnicity that falls below the institutional set standard of 62% for the physics and astronomy classes overall is Native Hawaiian or Other Pacific Islanders, but our department only had 8 students identify with that category during the study period, so it is hard to draw conclusions.

Looking at PHYS classes (excluding Astronomy) Black/African American students have a 58% success rate and Latina/o/x/e students are at 60%. Compared to higher performing student demographics, these low success rates are significant, even accounting for the small number of Black student enrollments in the study (N=43). One could, for example, compare against the 69% success rate for our white students (N=373), which shows that they differ by about 1.16 standard deviations. Not exactly publication worthy, but probably not a statistical fluke. Asian students tend to have higher success rates than all other demographics across our courses.

Comparing physics for physical sciences to physics for life sciences, success rates are lower across the board for the physical sciences sequence (PHYS 221, 222, 223), while differences between ethnic demographics remain persistent across all physics classes.

Female students have overall higher success rates in our physics and astronomy courses at 74%, compared to 71% for our male students. This difference is not consistent across courses, however. For example, Physics 130 shows success rates of 67% for male and 73% for female, Physics 221 shows 61% for male and 56% for female, and Physics 222 shows 66% for male and 71% for female.

First generation students have overall lower success rates in our physics and astronomy courses at 66% vs 75% for non-first-generation students. This pattern is seen consistently across all physics and astronomy courses. The success rate for first generation students in PHYS 221 is 49% compared to 64% for non-first-generation students.

While the data provided by OEI is helpful in showing that achievement gaps exist, identifying causes is more complicated. A deeper study of the covariance between groups in different categories (e.g., correlation between first generation status and various race/ethnicity groups), and more data to contextualize the physics department results (state and national statistics for comparison) would both be helpful. In reviewing our department's 2021 Program Review, it also seems that certain categories which were previously considered, such as veteran status, are no longer included in the OIE dashboard. The choice of what categories to consider and which to omit will inevitably constrain what "data based" conclusions can be drawn. With that in mind, we can speculate as to possible causes of some of the achievement gaps.

Many of the students who enter our core physics track are underprepared in mathematics, science, and critical thinking. Low-income students and students in disadvantaged

racial/ethnic groups are more likely to be underserved by their public school system. Students who enter the physics track without pre-developed study, time management, and computer literacy skills will struggle to gain these skills in the context of a fast-paced, high-content physics class. These students will have a steep hill to climb in order to achieve the standards of success for a course like Phys 221 (which has one of the lower success rates and higher withdrawal rates in our department). Low-income students may also be more likely to have work/family responsibilities which limit their time to study. Therefore, it seems plausible that physics classes with large outside-of-class time requirements would disproportionately affect low-income students. Additionally, reliance on expensive textbooks and online homework systems in some sections may disproportionately impact these same students.

One important factor which is not possible to assess with the OIE data is the effect that selection bias has on our student success data. We are not randomly sampling folks off the street and seeing how well they perform in our classes. As an example, gender equity gaps may tell us less about how men and women are performing in physics and more about which women are *not* enrolling in our courses. Average course success rates for female students can increase if selective pressures disproportionately prevent women from low-income or disadvantaged racial/ethnic groups from enrolling in physics courses or pursuing degrees in STEM fields. This example highlights the need for careful consideration of the data before prescribing targeted interventions.

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3. In terms of your degree and certificate completers, are there any groups who are underrepresented in your completion data compared to the overall enrollment in your program?

Considering the small number of degrees we give out in physics, it would be a fool's errand to try and tease out any patterns from our disaggregated data. It would, however, be reasonable to assume that the same factors which impact our success rates would also influence degree completion.

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4. Are your students completing your degree and certificate program requirements in the expected time frame? Are there certain groups whose rates are below other student groups? Discuss any efforts to improve time to completion.

Our average time to degree is 3.71 years, with a strong majority of degrees earned in the 3-5 year window for most years. That is well below the Natural Sciences Division average of 4.55 years, and the school wide average of 4.64 years. Given the small number of degrees we give out, trying to identify equity gaps in our time to degree would be speculative.

I do not know what reference we ought to use to establish an "expected time frame". In

principle, the nominal time to degree for the Physics Associates Degree for Transfer is two years, if the student is full time, if the student never fails or needs to drop a class, if a student never decides to take a lesser course load to balance their other responsibilities or for the sake of their mental health, etc. Providing our students with the opportunity to pursue their education on their own time frame, while allowing for a life outside the classroom is the niche that community colleges fill. So, for the students that we serve, I think we would expect the time to degree to typically be somewhat longer. This is all to say, “improve time to completion” on average may not be the best metric for a community college that has the students’ best interests at heart. Rather, a process that identifies and addresses specific stumbling blocks and issues that can disrupt an *individual student’s* degree timeline should be the focus. To clarify the distinction, it may be better to remove obstacles which delay a student's degree rather than creating incentives to make students try to earn their degree faster, though both would “improve time to completion”.

One way the physics department helps students reduce their time to degree is by focusing support on those classes which have the lowest success rates. For example, PHYS 221 likely has such low success rates because it is the first course in a sequence of challenging courses. For first-generation students, or those with less than stellar math and science prep from high school, this represents a significant jump in difficulty and time commitment which can be overwhelming. For these reasons, we have attempted to provide embedded tutors from Hornets Tutoring for all of our PHYS 221 sessions, including those taught by adjuncts. Our department also attempts to minimize the impact to a student’s time to degree if they do fail or need to drop a class by having varied class offerings, including night classes and a desire to offer more summer courses in the future.

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## 2.3 Student Learning Outcomes

1. Describe your program’s processes and practices for defining, assessing, and analyzing student learning outcomes at the course (CSLO) and program (PSLO) level. Include a discussion of how your program uses the results of CSLO/PSLO data to inform course and program improvement efforts.

The physics department adopted systematic CSLOs assessment tools in 2024. All faculty members agree to use standardized physics concept surveys supplied by the American Association of Physics Teachers, such as the Force Concept Inventory (FCI) and the Brief Electricity and Magnetism Assessment (BEMA). These standardized concept surveys are used to assess CSLOs. The survey is given to the students in the first week of the class and in the final week. The success of a student is measured by the improvement in the student’s score.

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2. (OPTIONAL/NOT REQUIRED) Using the data provided by OIE, describe the most salient results of CSLO or PSLO mastery rates. Did you find significant differences by race, ethnicity, gender, and other categories?
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## Section 3: Other Areas of Program Effectiveness

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1. Document any substantial changes to your program curriculum since the last review and discuss what prompted these changes. Looking forward, what changes to the curriculum do you plan based on the emerging needs of your discipline, industry, student population, etc.

The most significant change to the physics program during the previous review cycle is the creation of additional sections for our highest demand classes, namely the general education course for non-science majors, physics for life sciences, and the introductory mechanics course. Because of this expansion, we are at full stretch to meet student demand, with full time and adjunct faculty taking overload courses. We will be offering new courses in the future (see SAP #3), which makes it even more imperative to hire at least one new full time faculty member.

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2. Please briefly describe opportunities your students have to apply and deepen knowledge and skills through projects, apprenticeship, internships, co-ops, clinical placements, group projects outside of class, service learning, study abroad, and other experiential learning activities that you intentionally embed in coursework or elsewhere in your program.

Our students are heavy users of Hornets' tutoring, the tutoring center, and STEM center tutoring. Students in our department are frequent participants in the RAISE program. In the past, our department has supported the Fullerton Engineering Club in their participation in the NASA Minds program. (They were awarded first place nationally in this competition last year.) We will be expanding support for tutoring options in future (see SAP #1), and increasing support for the new Physics Club.

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3. Describe any laws, regulations, trends, policies, procedures, or other influences that have an impact on your program. These can include things like Vision 2030, CALGETC, Common Course Numbering, etc.

Physics is impacted by AB1705 just as are all the other Natural Sciences departments, although we are probably the most math intensive discipline. This bill ensure that students will be even less prepared in Math, and we will have to make up the slack. But we will be complaining about students' lack of math preparation until the end of time, no matter what,

so we will just have to muddle through.

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## Section 4: Faculty and Staff

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### 4.1 Population and Demographics

1. Using the data provided by OIE, describe your program's staff (full-time/part-time faculty, nonfaculty, classified). How reflective of your program's student population is your staff?

There are currently four full-time faculty and five adjunct faculty in the physics department, with four more adjuncts in the hiring process. Each adjunct typically teaches a single 6-unit course.

The workload for individual full-time faculty members has not changed appreciably over the years. Each faculty carries a standard load of 18 units which usually translates to three lecture/lab courses per semester. Full-time faculty occasionally must teach overload classes in order to meet student demand. Currently, some physics courses for the life sciences are combined into one classroom due to shortage of faculty.

All physics courses are in person, with the exception of two astronomy lectures and Relativity for Poets, which are online.

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2. Describe your program's staffing changes since fall 2021. How have these changes impacted your program's ability to achieve its strategic action plans?

During the previous review cycle, we were able to hire one new full-time faculty, but he was not granted tenure and left the department. One adjunct faculty accepted a full-time position elsewhere and is not continuing at Fullerton.

In the fall 2025 semester, 22 sections were offered, an increase of two sections over the previous semesters. In spring 2026, we will be offering 26 sections; eight of which will be taught by adjuncts. In order to staff these courses, at least two adjunct and one full time faculty will have to teach overload. Since our courses are 6 units, and adjunct faculty can only teach overload one semester every three years, it is essential that we hire another full time faculty member.

The average class size in 2024 was 22 students, this number being approximately constant over time. However, many students need classes but are unable to make the offered sections align with their schedules, and thus graduation is delayed. In particular, more evening classes are needed for students who must work while attending school. Also, some sections have long

waitlists for classes required for graduation, and faculty are forced to increase the size of the class beyond the standard number.

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## 4.2 Staff Support and Professional Development

1. Describe the regular discussions your program faculty are having about equitable grading, attendance, late work, extra credit policies, and other strategies to support equitable student success.

The physics department does not meet regularly to specifically discuss equitable grading, etc. These discussions typically happen informally during the normal course of our interactions as co-workers. It is worth recognizing that adjunct faculty will naturally have less opportunities for these conversations, due to having less time on campus, not being dragged to department meeting against their will, etc.

Full time faculty have participated in seminars and training on equitable grading, through Flex day, for example, but it is left to the individual instructor to make their own decisions about how to implement those concepts in their classrooms. Many of the most effective equitable teaching practices such as giving clear and explicit expectations, using a variety of teaching methods and materials, etc., are just *good* teaching practices. So, when discussions of equitable grading practices happen, they typically start as discussions of how to better serve *all* our students. We do not have formalized policies in the physics department regarding equitable grading practices. Our department has a very strong culture of academic independence, and we rely on the training, expertise, and judgement of our faculty to enable them to make the appropriate choices for how they operate their own classrooms.

2. How have these conversations shaped practices or policies in your program? What action has arisen from these discussions? If no action has been taken, why not?

Physics faculty are typically only reviewing each other's syllabi during the formal review process. We currently have a very "hands-off" approach with our adjuncts once we provide them with their necessary course materials, example syllabi, lab manuals, example HW sets, etc. This approach has likely limited what action adjunct faculty have taken on these topics. More familiarity with and review of each other's course materials would likely lead to more discussion of these topics and may lead to greater adoption of equitable grading policies.

The physics department supports the collegewide effort to equip faculty with equitable practices that improve students outcomes. We will encourage full time and adjunct instructors to participate in trainings such as Race-Conscious Certificate training,

3. What additional areas of professional development could help your faculty and staff engage in this work?

Physics is a small department, with only 4 full time faculty (one of which exclusively teaches astronomy). Prior to 2022 we had between zero and 1 adjunct faculty, and that number is rapidly increasing. For 2024-2025 we had 5 adjuncts, one more was hired for the start of Fall 2025, and 4 additional adjuncts are in the process of being hired for the Spring. Being “outnumbered” by their adjunct colleagues is a new experience during the tenure of any of the current full-time physics faculty. As our department expands, adjunct training will likely be a useful focus towards the adoption of equitable grading practices.

Adjuncts miss out on opportunities to discuss equitable grading practices compared to their full-time colleagues, and we cannot (nor should we) force adjuncts to attend additional meetings which they are not compensated for. Paid professional development which is available and targeted towards adjuncts would be helpful for this work. Since the goals and challenges of STEM courses are in some ways different from other topics, professional development should be targeted towards STEM specifically.

As the physics department expands and our ratio of adjuncts to full-time faculty increases, department coordination will likely need to become more structured and formalized process. Opportunities for training or professional development which focus on management, policy development, and academic coordination would be helpful in this regard. Training which specifically focuses on the balance between department wide consistency and individual academic freedom would be helpful. This might be a useful consideration for other small but growing departments as well.

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## Section 5: Program Planning

### 5.1 Progress on Previous Strategic Action Plans

1. Please discuss the goals (Strategic Action Plans, SAPs) from your last self-study. Assess and explain your progress on each of the SAP.

There were four Strategic Action Plans (SAPs) in the 2021 Self-Study for Instructional Programs: 1. Hiring new instructors, 2. Developing a systematic CSLOs and PSLOs assessment plan, 3. Developing new experiment activities and repairing or replenishing equipment for lab activities, and 4. Creating the STEM Resource Center. The physics

department made significant progress on the action plans, but there are still tasks left.

### ***SAP #1 Hiring new instructors***

The physics department successfully hired new adjunct instructors. In the 2021-2022 academic year, the physics department had five full-time instructors and zero adjunct instructors. From 2022 to 2025, we successfully hired five adjunct instructors, and are currently hiring four additional. The number of sections increased from 34 (2020-2021) to 40 (2024-2025). However, one full-time faculty member left the department, and we have four full-time instructors. Please see the Faculty and Staff section for more information about the current physics faculty and staff.

### ***SAP #2 Developing a systematic CSLOs and PSLOs assessment plan***

The physics department adopted systematic CSLOs assessment tools in 2024. All faculty members agree to use standardized physics concept surveys supplied by the American Association of Physics Teachers, such as the Force Concept Inventory (FCI) and the Brief Electricity and Magnetism Assessment (BEMA). These standardized concept surveys are used to assess CSLOs. The survey is given to the students in the first week of the class and in the final week. The success of a student is measured by the improvement in the student's score.

### ***SAP #3 Developing new experiment activities and repairing or replenishing equipment for lab activities***

New equipment is purchased for new laboratory activities. Some measurement devices are replaced and repaired with the funds provided. The physics department purchased seven Cavendish Gravitational Balances. This experimental setup can be used to measure the universal gravitational constant. The new experiment is implemented to some PHYS 221 classes. Also, the old simple harmonic motion setup and photoelectric effect setup were repaired. Current lab manuals need to be updated to include the new experiments and improve the student learning outcomes. This will be a future task for the department.

### ***SAP #4 Creating the STEM Resource Center.***

This action plan was a common goal for the natural sciences division. The STEM center was successfully established in March 2025. It has become a hub for many STEM students. Physics tutors use the place for tutoring sessions. Instructors have office hours in the STEM center. Science club, engineering club, and physics club use the STEM center for their regular meetings.

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2. If additional funds were NOT allocated to you in the last review cycle, how did the LACK of funds have an impact on your program?
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## SAPs

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### Strengthen the existing tutoring options

**Short Description:**

The physics department coordinates the effort to optimize the existing tutoring options: Hornet tutoring, STEM tutoring, and the STEM boot camp. The Hornet tutoring program has been an effective resource for underprepared students who need additional tutoring support. The physics department will work together on the tutor recruiting process. Our goal is to have embedded tutors (Hornet Tutoring) in all physics classes and to increase staffing in the tutoring center and STEM center. The physics department continues to offer boot camp sessions for PHYS 221 and 222 students to help with their preparation.

**Measurable Outcomes:**

Students who have a difficult time following the course materials can benefit from the tutoring. This additional support can reduce the equity gap of disproportionately impacted students. The expected result will be an increase in success rates.

**College Goals:**

2.4 Increase access to academic support in course with DI

**SAP Phase:**

New

### Resource Requests

#### Stable Funding for Hornets' Tutoring and Stem Tutoring

**Enhancement:**

The funding for the hornet tutoring and STEM boot camp is not well established. The consistent budget for the tutoring programs is important for providing reliable support.

**Personnel-Related:**

Need new student tutors.

**Resource Category:**

Non-Faculty Personnel

**Quantity:**

**Unit Cost:**

\$5,000.00

**Total Cost:**

\$50,000.00

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## **Develop a systematic approach to hiring and training adjunct faculty**

**Short Description:**

Currently, the department level training program is not fully established. A newly hired adjunct instructor gets educational resources and advice from full-time instructors upon request. The physics department will design a training program to assist adjunct instructors.

**Measurable Outcomes:**

The consistency of physics classes can be improved. Increase instructor participation in the campuswide DEIAA training programs in the training process. Increased success in passing courses taught by adjuncts.

**College Goals:**

3.5 Increase participation in DEIAA focused professional development

**SAP Phase:**

New

### **Resource Requests**

#### **Professional Development hours**

**Enhancement:**

More Instructors will participate in the training activities by giving them professional development hours.

**Personnel-Related:**

Not personnel related.

**Resource Category:**

Training

**Quantity:**

0

**Unit Cost:**

\$0.00

**TotalCost:**

\$0.00

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## **Develop new course offerings**

**Short Description:**

In the process of developing new courses, the physics department is adopting a dual-track approach to better serve both advanced and underprepared students. For the students who need additional help, a course to support PHYS 221 students will be developed. Also, the department plans to develop more general education courses. For the students who want to study more advanced topics for upper division course preparation, the department plans to develop physics with advanced topics. The courses that can be offered can be PHYS 221 with support, Special topics (general education level), Advanced topics (bridge between our 221-223 sequence and upper division courses), and Numerical (computer) methods in physics.

**Measurable Outcomes:**

Underprepared students can benefit from new courses with additional support. This will improve the success rate of DI students. More advanced students can better prepare for upper-division courses through advanced topic courses, as they will not have a " gap year." These courses can improve students' degree completion rate after transfer. Being able to offer new gen ed classes will broaden the appeal of physics among other majors and may positively affect the student demographic.

**College Goals:**

3.2 Reduce equity gaps in degree/certificate completion

**SAP Phase:**

New

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## **Explore development of a “lab practicum” for courses with embedded labs and include as part of final exams.**

**Short Description:**

Lab practicum is an effective method to train students' ability to use experimental apparatuses. STEM students will use various experimental apparatus after they transfer to universities. Introducing a lab practicum can enhance the student learning outcomes.

**Measurable Outcomes:**

This will allow us to evaluate the SLOs related to investigating physics scenarios experimentally and

explaining their results.

**College Goals:**

3.3 Reduce equity gaps in transfer attainment

**SAP Phase:**

New

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## Resource Requests

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### Hire new physics full time faculty

**Enhancement:**

The physics department is understaffed, like many other departments. All full-time faculty teach an overload. The success of all the SAPs depends heavily on having enough full-time faculty members.

**Personnel-Related:**

The physics department has been growing steadily. The major limiting factor of an increasing number of classes is the number of instructors. In Spring 2026, we have to open three new classes because of high demand from students, but we can only open 2 new classes because we are not able to hire enough instructors. To continue the current pace of growth, the physics department needs more full-time instructors. We have ambitious SAPs: Developing new courses and new lab practicums. Also, we plan to implement a new adjunct training program. All this additional work requires more manpower.

**Resource Category:**

Full-time Faculty

**Quantity:**

1

**Unit Cost:**

\$100,000.00

**TotalCost:**

\$100,000.00

### Lab equip[ment replacement

**Enhancement:**

In the physics labs, the Vernier LabPro data collection interface has been used. Vernier announced that it will discontinue the production and maintenance of the LabPro data collection interface. The physics department need to find an alternative New data collection system. The

current Interferometer setup is aged, and there are only five working apparatuses. We need to purchase seven new interferometer setups for PHYS 206, 211, and 223 classes. The He-Ne Lab Laser is used for various physics experiments. The laser in the physics department has been discontinued. The department needs to purchase seven new lasers for future use.

**Personnel-Related:**

Not personnel related

**Resource Category:**

Equipment

**Quantity:**

1

**Unit Cost:**

\$24,000.00

**TotalCost:**

\$24,000.00