

## 2018 Physics/Astronomy Annual Program Plan

### PHYS Physics/Astronomy

#### I.A. Program Profile: Purpose

Describe the program(s) to be reviewed. What is the purpose of the program and how does it contribute to the mission of Skyline College?

#### **Narrative**

Physics & Astronomy offers a wide range of course work, intended to support GE options and specific transfer pathways. The courses in our department (on three tracks: Conceptual, General, and Calculus-based) support a number of different majors for their AS-T and other transfer degrees. These majors include Physics and other Physical Science (Engineering, Computer Science, Chemistry), most Life Sciences (Biology and many Pre-health) and other majors (e.g. Elementary Teacher Education.)

**I.B. Program Planning Team**

Annual program planning is intended to be a collaborative process which promotes dialogue and reflection. Please identify all individuals who contributed to or shaped the narrative. Include names and the title or role of each person.

**Narrative**

Adam Windham - Associate Professor

Ilkka Koskelo - Professor

Marco Wehrfritz - Physics Laboratory Technician

## II.A. Analysis: Progress on Prior Program Objectives (Goals) and Activities

Describe the progress made on previously established program objectives (goals) including identification of achievements or areas in which further effort is needed. New programs which have not yet established CPR/APP objectives should discuss progress on program implementation or activities.

### Narrative

#### 1) Laboratory Development

##### **Progress:**

The IT issues with the laboratory seem largely resolved. Network printing is working smoothly, and network folders can be routinely accessed. Some new equipment has been purchased (or built in-house) to meet increased demand, but not enough to fully resolve equipment conflicts across the two lab spaces.

##### **Further Effort:**

The new networked printers are not clearly delineated between Fab Lab printers and Physics Lab printers, sometimes causing students to send documents to printers in the wrong lab. Some assistance from IT in making these printers more clear to students (and possibly dedicated to specific laptops) could reduce waste and confusion.

Equipment limitations still limit our ability to concurrently run similar labs in the two spaces. This limits scheduling flexibility, and has even impacted instruction when equipment is unavailable to run appropriate experiments in multiple courses simultaneously. Continued budgetary support would be helpful to take best advantage of the new instructional space.

#### 2) Diversity Outreach

##### **Progress:**

The connection with ASTEP in PHYS 105/106 has not progressed satisfactorily; very few ASTEP students were actually enrolling in the ASTEP sections, and physics faculty were given no support by the program. Progress on connecting with other learning communities has been delayed until a working solution with ASTEP can be found.

##### **Further Effort:**

The ASTEP learning community is being redesigned, and physics faculty are directly involved in how STEM courses will fit into that redesign. We are hopeful that meaningful professional development will come of this to help physics faculty support ASTEP students, and that those techniques will likely apply to other under-served communities as well. We will intentionally reach out to other learning communities (such as Puente and FYE) once a successful model has been adopted with ASTEP.

### 3) Hybrid Expansion

**Progress:**

Hybrid offerings are continuing to expand, with the addition of ASTR 100 as an online option beginning Summer 2018. An adjunct professor of astronomy (Kevin Reil) is scheduled to complete the online teaching training in Spring 2018, increasing the number of faculty that can teach online offerings.

**Further Effort:**

Additional faculty still need to be trained in online instruction. The other full-time physics faculty (Adam Windham) is scheduled to go through this training with the next cohort.

Associated Objectives
 <a href="#">447-Diversity Outreach</a>
 <a href="#">476-Hybrid Expansion</a>
 <a href="#">475-Laboratory Development</a>

## **II.B. Analysis: Program Environment**

Describe any recent external or internal changes impacting the program or which are expected to impact the program in the next year. Please include when the specified changes occurred or are expected to occur.

### **Narrative**

#### **1) Base11 Curriculum**

The partnership of our engineering department with Base11 has resulted in a variety of new courses being offered in Fall 2018 and beyond. This has limited our ability to utilize engineering faculty to teach physics courses (as they are tapped for the Base11 courses), and has necessitated the hiring of new adjuncts to support our existing course offerings.

#### **2) Faculty Leave**

Our full-time faculty have taken considerable family leave (Adam Windham in Fall 2017, Ilkka Koskelo in Spring 2018 and Fall 2018) this year and next. This has limited our ability to engage in meaningful expansion of the program in some ways, as coursework and administrative duties normally divided between the full-time faculty are instead concentrated on one person.

#### **3) Engineering/Computer Science Expansion**

The continued expansion of our Engineering and Computer Science programs have led to increased demand in the calculus-based physics sequence (PHYS 250/260/270). This has required us to expand the number of sections for these courses, and may cause us to offer some of these courses more often to meet program demands. (PHYS 260 is currently offered in Spring only, but may be offered every semester to meet demand.)

## II.C. Analysis: Student Learning Outcomes (SLOs and PSLOs)

(1) Instructional Programs Only: Describe what was learned from the assessment of course SLOs for the current and past year.

(2) Student Service Programs Only: If PSLOs are being assessed this year (3-year cycle), describe what was learned. If no assessment was done because this is an off-cycle year, please state that this item is not applicable.

### Narrative

In Astronomy, SLO results continue to be quite positive, with students reliably reaching department benchmarks. Assessment methods still need to be revised to better assess the "History and Development" SLO in ASTR 100, but otherwise these results show strong performance of students across all aspects of lecture and lab in astronomy.

In Physics, the results are less consistent:

- \* CHEM/PHYS 114 was assessed for the first time, with consistently positive results. These were primarily analyzed by the Chemistry department, but show strong performance across multiple content areas.
- \* PHYS 105 results continue to show poor performance across all aspects of the course. These assessments were made in the Spring 2017 semester, when the department was using MasteringPhysics for online homework. This was expensive for students (\$30 - \$60 per semester), and was often linked to a textbook purchase that some students did not complete until a few weeks into the semester. Beginning in Spring 2018, the department has transitioned to Canvas for all assignments in this course, providing Day One access at zero cost. Further assessment will determine if this improves performance in the course by improving access to assignments and early engagement with the material; if not, further investigation of alternative assessment methods or instructional methods may be needed.
- \* PHYS 106 assessment was completed this last year (the "Group Work" assessment having been inconclusive the prior year), and showed that students are far exceeding our benchmark for collaborative laboratory work.
- \* PHYS 210 assessment was inconclusive, due to miscommunication between full-time faculty on family leave. This data has been collected, but was not entered properly until after the assessing faculty left campus for an extended period of time. These results will be updated when that faculty member returns to full-time instruction (before the next review cycle).
- \* PHYS 211 assessment methods were updated to better emphasize differentiation, and those results have come out overwhelmingly positive as well. PHYS 221 results are even better.

- \* PHYS 270 results have been consistently close to the benchmarks, either just above or just below the target success rate. The exception to this is the "Group Work" SLO, which was not effectively assessed this year. This SLO (for this course and others with a laboratory component) may need to be assessed differently; its assessment requires considerable effort, and may prove to be unsustainable in its current form.

No other courses were assessed in this cycle.

Evidentiary Documents
 <a href="#">2018-APP-SLOreport-ASTR.pdf</a>  <a href="#">2018-APP-SLOreport-PHYS.pdf</a>

### III.A. Reflection: Considering Key Findings

Consider the previous analysis of progress achieved, program environment, and course-level SLOs or PSLOs (if applicable). What are the key findings and/or conclusions drawn? Discuss how what was learned can be used to improve the program's effectiveness.

#### Narrative

Overall the program seems to be thriving: course offerings are expanding to meet student demand, our facilities are being better utilized to help meet that demand, and student success has been maintained during this expansion. Proposed improvements to the program are discussed elsewhere in the plan: continued improvement of laboratory equipment to best utilize new lab space; outreach to students in under-represented areas; expansion of our presence online to diversify our offerings.

It has been difficult to enact sweeping changes to the program this year, however; with half of our full-time faculty on leave for three consecutive semesters, department meetings have been brief, rare, and focused on the most pressing issues facing the department. This has led to some great opportunities for us - we have brought some new adjunct faculty into the department that seem quite promising - but has limited our ability to move forward confidently and consistently into new directions. For example, it has been challenging for faculty to reinvent their instructional methods or discuss SLO assessment in detail when they are being asked to cover instructional and administrative duties usually handled by their colleagues. This will make the department stronger in the long term (as we all gain experience with everyone else's duties), but is challenging in the short term.

One area of specific emphasis needs to be the general-education Conceptual Physics course (PHYS 105). As an introduction to STEM for some students, and (so far) our first connection to the ASTEP learning community, the poor performance on SLOs in this course is concerning. Adoption of Canvas to get students free and immediate access to assignments is a good start, but further assessment will be necessary to determine if that is sufficient to improve student performance. If not, further development of this course may be necessary to bring it up to the high standards of the rest of the department.

Associated Objectives	
	<a href="#">447-Diversity Outreach</a>
	<a href="#">476-Hybrid Expansion</a>
	<a href="#">475-Laboratory Development</a>

-  [447-Diversity Outreach](#)
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### **III.B. Reflection: ISLOs**

If your program participated in assessment of ISLOs this year:

- (1) What are the findings and/or conclusions drawn?
- (2) Does the program intend to make any changes or investigate further based on the findings? If so, briefly describe what the program intends to do.

#### **Narrative**

The program did not participate in formalized ISLO assessment this year.

#### IV.A. Strategy for Program Enhancement: Continuation/Modification

Indicate whether the program is continuing implementation of the last CPR strategy or revising the strategy. Please describe the modifications if revisions are intended.

Note: Any new strategies should be linked to Institutional Goals through creation of objectives in the next section. If the program has not yet participated in comprehensive program review, an annual or multi-year strategy can be defined in this item.

##### **Narrative**

We are continuing to implement our strategy for improvement as outlined in our 2015 CPR.

<b>Associated Objectives</b>
 <a href="#">447-Diversity Outreach</a>
 <a href="#">476-Hybrid Expansion</a>
 <a href="#">475-Laboratory Development</a>

#### **IV.B. Strategy for Program Enhancement: Action Plan and Resource Requests**

Based on the most recent CPR and any desired modifications, develop an annual action plan with related resource requests. No narrative response will be entered in this section, but the objectives you create will be printed automatically in the APP report under this item.

(1) To begin, click on PLANNING at the top of the page, then CREATE A NEW OBJECTIVE. To view previously created objectives, click PLANNING at the top of the page, then VIEW MY OBJECTIVE.

(2) IMPORTANT! Make sure to associate each objective to this standard in the APP. Need help? Contact the PRIE Office for further instructions. Institutional Goals.

#### **Narrative**

<b>Associated Objectives</b>
 <a href="#">447-Diversity Outreach</a>
 <a href="#">476-Hybrid Expansion</a>
 <a href="#">475-Laboratory Development</a>
 <a href="#">Budget and Objectives of Physics/Astronomy Department</a>

# Objectives of Physics/Astronomy Department

Planning Year: 2018-2019

Planning Year: 2018-2019

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Unit Code	Planning Unit	Unit Manager
2414PHYS00	Physics/Astronomy	Koskelo, Ilkka

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## Objective Status: New/In Progress

447	Diversity Outreach
	Recruit and excite students under-represented in STEM, by expanding conceptual offerings to reach across math barriers and by partnering with learning communities to increase enrollment and success for populations under-represented in physics.
475	Laboratory Development
	Continue development of new laboratory (the "Fab Lab") to best utilize its potential as an instructional space, and improve instructional opportunities for students and scheduling flexibility for faculty and administration. This will require additional investment in new equipment, beyond the department's usual operating budget (which is primarily used to repair or replace damaged or worn-out equipment as needed).
476	Hybrid Expansion
	Continue expansion of hybrid and online offerings in physics and astronomy (online lectures, face-to-face laboratories). This will improve access for students that are unavailable during traditional daytime instruction hours, and provide additional flexibility for the program during campus construction.

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