

PROGRAM REVIEW Fall 2018

Program: Physics and Astronomy

Division: STEM

Date: 10/22/18

Writer(s): Eric Harpell

SLO/SAO Point-Person: Eric Harpell

Audience: Deans, Vice Presidents of Student Services and Academic Services, All Planning and Allocation Committees. This document will be available to the public.

Uses: This Program Review will be used to inform the campus and community about your program. It will also be used in the processes of creating Division Summaries, determining College Planning Priorities and allocating resources. A final use is to document fulfillment of accreditation requirements.

Time Frame: This Program Review should reflect on program status during the 2017-18 academic year. It should describe plans starting now and continuing through 2018-19. This document also provides the opportunity to describe more long-term plans (optional).

Sections: The first section of this Program Review focuses on general program reflection and planning. The second section has specific questions to be filled out by all programs this year. The third section is an SLO/SAO update. The fourth section is a review of curriculum. Only programs with curriculum need to complete Section 4.

Topics: A list of topics of particular interest to Program Review readers can be found here:

<https://goo.gl/23jrxt>

Help: Contact Karin Spirm: kspirm@laspositascollege.edu

Instructions:

- 1) Please respond to each question as completely as possible.
- 2) If the requested information does not apply to your program, write "Not Applicable."
- 3) Optional: Meet with your dean to review this document before October 22.
- 4) Send an electronic copy of this form to Karin Spirm and your Dean by October 22.

Links:

Program Review Home Page: <https://goo.gl/XATqjJ>

Fall 2017 Program Review Updates : <https://goo.gl/pkv76m>

Frequently Asked Questions: <https://goo.gl/ilhRtt>

Section One: Program Snapsho

No Significant Changes Option

X

Contact person: Eric W. Harpell

By marking an X in the box above, the writers of this Program Review indicate that there have been no significant changes to their program or their program's needs in the past year. In this case, programs may opt not to complete Program Review Section One: Program Snapshot.

Programs must still complete all other sections (as applicable).

Please note: Choosing this option means that your program's information may not be included in the yearly Division Summary.

The No Significant Changes Option may only be used for two years in a row; after two years, programs must complete a full Program Review including the Program Snapshot. Our program's most recent Program Review was submitted in the following semester: Fall 2017 .

- A. Program Description: Briefly describe your program, including any information or special features of your program that will provide helpful context for readers of this Program Review.**

- B. Changes to Program and Needs: Describe any significant changes to your program or your program's needs since the previous Program Review Update (Fall 2017).**

Mark an X before each area that is addressed in your response.			Definitions of terms: https://goo.gl/23jrxt		
	Community Partnerships/Outreach		Facilities, Supplies and Equipment, Software		LPC Planning Priorities
	Curriculum committee items		Financial/Budgetary		LPC Collaborations
	Enrollment Management		Human Resources		Pedagogy
	External Factors		Learning Support		Professional Development
					Services to Students
					SLO/SAO Process
					Technology Use

- C. Reflection: What plans from the [2017 Program Review](#) or any [previous Program Reviews/Updates](#) have been achieved and how? You may also describe achievements that were not planned in earlier Program Reviews.**

Mark an X before each area that is addressed in your response.			Definitions of terms: https://goo.gl/23jrxt		

Community Partnerships/Outreach		Facilities, Supplies and Equipment, Software		LPC Planning Priorities		Services to Students
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Enrollment Management		Human Resources		Pedagogy		Technology Use
External Factors		Learning Support		Professional Development		

D. IR Data Review: Describe any significant trends in your program’s data from the office of Institutional Research and Planning. (Note: Not all Programs have IR data packets available; if your program does not have a data packet, you may note that in the response box). You may also discuss any other data generated for your program by the Office of Institutional Research and Planning.

IR Data packets are available here: <http://www.laspositascollege.edu/research/progrev.php>

Course Success Rates Dashboard can be found at the bottom of this page: <http://www.laspositascollege.edu/research/outcomes.php>

Although we have indicated that there are no significant changes to the program, I have included Success data for easy reference:

Astronomy success information:

		Success (A,B,C,CR,P)		Non-success (D,F,NC,NP,I)		Withdrawal (W)			
		Num	Pct	Num	Pct	Num	Pct	Num	Pct
ASTR 10	2012-13	104	54%	42	22%	47	24%	193	100%
	2013-14	120	65%	27	15%	37	20%	184	100%
	2014-15	119	64%	38	20%	30	16%	187	100%
	2015-16	126	68%	32	17%	26	14%	184	100%
	2016-17	146	63%	55	24%	32	14%	233	100%
	2017-18	106	53%	46	23%	47	24%	199	100%
ASTR 20	2012-13	92	56%	39	24%	32	20%	163	100%
	2013-14	109	65%	22	13%	36	22%	167	100%
	2014-15	67	63%	20	19%	19	18%	106	100%
	2015-16	50	47%	24	22%	33	31%	107	100%
	2016-17	50	51%	24	24%	24	24%	98	100%
	2017-18	91	65%	20	14%	30	21%	141	100%
ASTR 30	2012-13	20	59%	3	9%	11	32%	34	100%
	2013-14	29	58%	5	10%	16	32%	50	100%
	2014-15	19	54%	5	14%	11	31%	35	100%
	2015-16	22	65%	6	18%	6	18%	34	100%
	2016-17	35	85%	5	12%	1	2%	41	100%
	2017-18	31	66%	8	17%	8	17%	47	100%

Physics Success information:

		Success (A,B,C,CR,P)		Non-success (D,F,NC,NP,I)		Withdrawal (W)			
		Num	Pct	Num	Pct	Num	Pct	Num	Pct
PHYS 1A	2017-18	90	65%	16	12%	32	23%	138	100%
PHYS 1B	2017-18	67	74%	10	11%	14	15%	91	100%
PHYS 1C	2017-18	37	90%	1	2%	3	7%	41	100%
PHYS 1D	2017-18	13	76%			4	24%	17	100%
PHYS 2A	2012-13	20	87%	1	4%	2	9%	23	100%
	2013-14	20	69%	5	17%	4	14%	29	100%
	2014-15	24	83%	2	7%	3	10%	29	100%
	2015-16	30	68%	5	11%	9	20%	44	100%
	2016-17	35	78%	5	11%	5	11%	45	100%
	2017-18	51	71%	7	10%	14	19%	72	100%
PHYS 2B	2012-13	17	100%					17	100%
	2013-14	8	89%			1	11%	9	100%
	2014-15	11	85%			2	15%	13	100%
	2015-16	15	100%					15	100%
	2016-17	18	82%	1	5%	3	14%	22	100%
	2017-18	21	91%	2	9%			23	100%
PHYS 8A	2012-13	66	68%	18	19%	13	13%	97	100%
	2013-14	72	69%	16	15%	16	15%	104	100%
	2014-15	83	72%	15	13%	18	16%	116	100%
	2015-16	85	67%	16	13%	26	20%	127	100%
	2016-17	88	66%	17	13%	28	21%	133	100%
PHYS 8B	2012-13	34	72%	12	26%	1	2%	47	100%
	2013-14	26	68%	2	5%	10	26%	38	100%
	2014-15	52	83%	3	5%	8	13%	63	100%
	2015-16	57	79%	10	14%	5	7%	72	100%
	2016-17	49	80%	9	15%	3	5%	61	100%
PHYS 8D	2012-13	16	94%	1	6%			17	100%
	2013-14	9	75%	2	17%	1	8%	12	100%
	2014-15	11	73%	1	7%	3	20%	15	100%
	2015-16	11	73%			4	27%	15	100%
	2016-17	9	75%			3	25%	12	100%
PHYS 10	2012-13	23	53%	4	9%	16	37%	43	100%
	2013-14	29	78%	2	5%	6	16%	37	100%
	2014-15	25	71%	4	11%	6	17%	35	100%
	2015-16	21	81%	1	4%	4	15%	26	100%
	2016-17	13	65%	3	15%	4	20%	20	100%
	2017-18	20	87%	2	9%	1	4%	23	100%
PHYS 10L	2012-13	10	48%	2	10%	9	43%	21	100%
	2013-14	18	75%			6	25%	24	100%

Mark an X before each area that is addressed in your response.

Definitions of terms: <https://goo.gl/23jrx>

	Community Partnerships/Outreach		Facilities, Supplies and Equipment, Software		LPC Planning Priorities		Services to Students
	Curriculum committee items		Financial/Budgetary		LPC Collaborations		SLO/SAO Process
	Enrollment Management		Human Resources		Pedagogy		Technology Use
	External Factors		Learning Support		Professional Development		

E. Other Data Review (Optional): Describe any significant findings based on other data regarding your program. Possible sources of relevant information might include, but are not limited to, the following:

- **Data generated by your program**
- **CEMC Data**
- **Labor Market Data**

Mark an X before each area that is addressed in your response.				Definitions of terms: https://goo.gl/23jrxt			
	Community Partnerships/Outreach		Facilities, Supplies and Equipment, Software		LPC Planning Priorities		Services to Students
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	External Factors		Learning Support		Professional Development		

F. Impacts to Students (Optional): Discuss at least one example of how students have been impacted by the work of your program since the last Program Review Update (only if you did not already answer this in Questions B-E).

Mark an X before each area that is addressed in your response.				Definitions of terms: https://goo.gl/23jrxt			
	Community Partnerships/Outreach		Facilities, Supplies and Equipment, Software		LPC Planning Priorities		Services to Students
	Curriculum committee items		Financial/Budgetary		LPC Collaborations		SLO/SAO Process
	Enrollment Management		Human Resources		Pedagogy		Technology Use
	External Factors		Learning Support		Professional Development		

G. Obstacles: What obstacles has your program faced in achieving plans and goals?

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Mark an X before each area that is addressed in your response.				Definitions of terms: https://goo.gl/23jrxt			
<input type="checkbox"/>	Community Partnerships/Outreach	<input type="checkbox"/>	Facilities, Supplies and Equipment, Software	<input type="checkbox"/>	LPC Planning Priorities	<input type="checkbox"/>	Services to Students
<input type="checkbox"/>	Curriculum committee items	<input type="checkbox"/>	Financial/Budgetary	<input type="checkbox"/>	LPC Collaborations	<input type="checkbox"/>	SLO/SAO Process
<input type="checkbox"/>	Enrollment Management	<input type="checkbox"/>	Human Resources	<input type="checkbox"/>	Pedagogy	<input type="checkbox"/>	Technology Use
<input type="checkbox"/>	External Factors	<input type="checkbox"/>	Learning Support	<input type="checkbox"/>	Professional Development	<input type="checkbox"/>	

H. Short Term Planning: What are your most important plans (either new or continuing) for next year? Describe plans starting now and continuing through AY 2018-19.

Mark an X before each area that is addressed in your response.				Definitions of terms: https://goo.gl/23jrxt			
<input type="checkbox"/>	Community Partnerships/Outreach	<input type="checkbox"/>	Facilities, Supplies and Equipment, Software	<input type="checkbox"/>	LPC Planning Priorities	<input type="checkbox"/>	Services to Students
<input type="checkbox"/>	Curriculum committee items	<input type="checkbox"/>	Financial/Budgetary	<input type="checkbox"/>	LPC Collaborations	<input type="checkbox"/>	SLO/SAO Process
<input type="checkbox"/>	Enrollment Management	<input type="checkbox"/>	Human Resources	<input type="checkbox"/>	Pedagogy	<input type="checkbox"/>	Technology Use
<input type="checkbox"/>	External Factors	<input type="checkbox"/>	Learning Support	<input type="checkbox"/>	Professional Development	<input type="checkbox"/>	

I. Long Term Planning (Optional): Please detail any long-term plans for the next 3-5 years. (Only if you have significant plans, such as implementation of a grant project, creation of long-term initiatives including those using restricted funds such as Equity or SSSP, construction and outfitting of a new building).

Mark an X before to each area that is addressed in your response.				Definitions of terms: https://goo.gl/23jrxt			
<input type="checkbox"/>	Community Partnerships/Outreach	<input type="checkbox"/>	Facilities, Supplies and Equipment, Software	<input type="checkbox"/>	LPC Planning Priorities	<input type="checkbox"/>	Services to Students
<input type="checkbox"/>	Curriculum committee items	<input type="checkbox"/>	Financial/Budgetary	<input type="checkbox"/>	LPC Collaborations	<input type="checkbox"/>	SLO/SAO Process
<input type="checkbox"/>	Enrollment Management	<input type="checkbox"/>	Human Resources	<input type="checkbox"/>	Pedagogy	<input type="checkbox"/>	Technology Use
<input type="checkbox"/>	External Factors	<input type="checkbox"/>	Learning Support	<input type="checkbox"/>	Professional Development	<input type="checkbox"/>	

Section Two: Current Topics (Required for All Programs)

- A. **Educational Master Plan:** A list of goals and strategies appears on page ii of the Educational Master Plan, which can be accessed here:

http://www.laspositacollege.edu/about/assets/docs/LasPositas_Ed_Master_Plan.pdf

If applicable, describe how your program's upcoming plans reflect the goals described in the college's Educational Master Plan (your plans are described in Section 1, Questions H-I, or on a previous program review if you did not complete this year's Program Snapshot).

- 1) Achievement: We have updated update all course outlines in the Physics department. Primarily, this change supports the completion of students' transfer degrees by solidifying the articulation to transfer institutions.
- 2) Mathematics prerequisites and co-requisites have been updated for physics 1C, and 1D to improve articulation to local UC campuses, particularly UC Davis which increased the math level expected for students taking these classes. In particular, students taken physics 1D are now expected to have completed Math 5.
- 3) Achievement: We updated all course outlines for Astronomy classes.

- B. **Program-Set Standard (Instructional Programs Only):** Did your program meet its program-set standard for successful course completion? ___yes ___no

Program-set standard data can be found on this page:

<http://www.laspositacollege.edu/research/outcomes.php>

If your program did not meet your program-set standard, discuss possible reasons and how this may affect program planning or resource requests.

- C. **Facilities:** Do you have any facilities needs that are currently unmet? If yes, please describe.

- 1) As discussed in the 2017 Program review, Physics must have access to two lab rooms in order to offer all necessary physics sections and not conflict with required STEM classes. In spring of 2019 we have scheduled physics labs in room 1822 as well as the traditional lab space of 1831. This is less than idea as no physics equipment is stored in that room, engineering has dedicated equipment occupying much of the available space, and

scheduling has been a challenge to avoid conflicting with the use of the room for Engineering.

A better solution would be for physics to have two dedicated lab rooms that can be shared with astronomy, and a planned laboratory for Environmental Studies/Environmental science. A short term solution would be modifying room 1826 to accommodate physics labs. Currently power, water, and gas is available in that room as it was originally designed to be laboratory and lecture room when building 1800 was constructed. The Primary user of that facility for labs, Thomas Orf, has been consulted and he has suggested that he can move out of that space into more convenient space for his program.

A longer term solution is to construct two laboratories dedicated to physics, as well as a lecture hall that can accommodate double sections and house specialized demonstrations such a heavy pendulum that can be hung from the ceiling. Storage for labs and lectures would need to be specially designed to accommodate use in multiple and hopefully adjacent rooms.

2) New Storage needed.

Physics, and astronomy are quickly running out of storage. New equipment has been ordered so that two physics labs can run concurrently, but storing this new equipment will be a challenge since storage in the engineering lab is already full. Also, a number of large tools for engineering and physics have been purchased within the last year, but they are stored where telescopes would normally be located. This means that telescopes are packed away and cannot be used unless considerable advance time and effort is proved. There is no simple solution for the present other than better organization of existing spaces and all stakeholders can agree on consensus use of this equipment.

3) Astronomy still needs a home! The campus is one of the brightest places in the tri valley and all existing facilities for astronomy are virtually rendered blind the by the lighting. Current solutions are for instructors to personally move large telescopes to dark locations on the perimeter of campus or off campus. In reality, this means that our astronomy resources are rarely used. A dark sky site, with some storage and hopefully an observatory dome would be a good solution. Such a "dark sky" facility has been requested in every conceivable manner, but has been a low priority of the facilities committee, and apparently with administration.

A second plan would be to consider lighting when building a new science building so that a small dome, observing platform, and storage area can be located on the roof. Although lighting will still be an issue, it can be mitigated somewhat with careful planning- with the reward being that astronomy resources will be easily accessible to instructors and students and thus will be used frequently.

D.

Professional Development

Section 87153 of California Education Code specifies the type of Professional Development activities that may be funded by the Community College Professional Development Program. You can review these activities here: <https://goo.gl/w8sqBM>

D1. Summarize the aspects of professional development that have been working well for your program. This might include the process of obtaining funds, the types of training your program members have been attending, etc.

Our Full faculty has been reasonably active in seeking out and taking advantage of staff development opportunities including attending conferences in Fall 2017 (American Association of Physics teachers-Harpell), and organizing a meeting and following on the meeting agenda for implementing new SLO's in all physics class (Rehagen).

One of our adjuncts (White) has been particularly active in researching new techniques in teaching physics class and labs including development of new experiments, and development of an "AR sandbox" in conjunction with the Engineering club and the Astronomy department.

As always, our lab tech, Andrew Lozano, has been active in CTE events and trends, and has successfully used this information to apply for and receive grants that benefit both physics and engineering. For his efforts in this area, and his expertise as a lab tech, Andrew has received a Chancellor's award and an innovation grant.

Although it is not staff development, per se, Physics has worked closely with other STEM Divisions and Dean Ho to develop a STEM matrix so that classes can be scheduled without conflicts and programs can continue to grow, or at least achieve stability.

Summarize any needs, desires and visions your program has regarding professional development, as well as any challenges.

The Physics 1 series to grow in popularity as the number of engineering and related majors increases. Now, more than ever, it is the hope of the Physics department that we can allow a greater fraction of our students to succeed in physics and continue on into their major of choice. Part of the answer, we believe, is to place only the most qualified instructors in charge of these classes. Another part of the solution is to make the large number of math, physics, Engineering, chemistry, and computer science classes accessible to students when they need them, and without making significant compromises to their academic or personal schedules.

Although we will need data from 2018-2019, it appears that physics and engineering have agreed on a STEM matrix which will allow our students to take the required engineering courses and prerequisites without conflict. The change of physics 8 to the physics 1 series has also provided students with a reliable pathway to a physics, Engineering, or other STEM major. It is our hope that this reliable matrix will allow regular scheduling of physics 1 series classes and sections, without last minute additions or subtracts as has happened in many of the last several semesters. This will improve the quality of instruction and the productivity of the classes going forward.

Another hope of the department is that Physics 10 and 10L continue to serve the engineering tech cohort, as well as an increasing number of LPC students. Although fall 2018 is the first semester that it has been offered in this manner, the department looks forward to continued participation with the engineering tech program, making the necessary "tweaks" to the lecture and lab to best serve the engineering tech students and the non-engineering tech students who will be in the course.

A third hope of the department is the Physics 2A/2B class achieve stability and continue to meet the needs of the mostly bioscience students who attend the class.

Since the engineering tech students are no longer part of the physics 2 class, and Chabot College's change from physics 2 to physics 3 has been in place for a year now, we anticipate that physics 2 enrollment will also stabilize and will grow along with our overall student population

D2.

(and bio and chemistry students in particular). This will allow us to schedule the number of sections reliably and fit these new sections within the STEP matrix

It is the hope of the physics department that the physics 10 class not only meets the needs of a specialized student population but also increases in popularity among all GE students who need a physical science and can meet the new math co-requisites (math 55 or equivalent in high school or college).

Finally, it is hoped that the astronomy program is better supported by facilities, as well as by instructors and technicians with the time, energy, and enthusiasm to use new and existing resources the many students in the college with an interest in astronomy. As with all our classes, the existence of a STEM matrix will allow our astronomy classes to be scheduled at times that do not overlap with other suitable physics science GE classes, thus assuring more reliable predictions for the number of sections that can be offered. As with Physics 1, it also hoped that instructors with a strong astronomy background, as well as experience with doing and teaching astronomy, are able to teach the available astronomy classes and labs.

E. Program Review Suggestions (optional): What questions or suggestions do you have regarding the Program Review forms or process?

None. The "no significant changes" option was quite helpful this year!

Section Three: SLOs/SAOs (Required for All Programs)

A. In the box below, copy and paste your “Plans for Analysis of SLO/SAO Data” from last year's Program Review. This plan can be found in the [2017 Program Review](#) Section 1 Question L.

(If discussing multiple PSLO/SAOs copy the box below as needed.)

Circle One: CSLO ***PSLO*** SAO
Course, Program Name, or Student Service Area: Physics
Text of CSLO/PSLO/SAO: Upon successful completion of an AS in Physics, students are able analyze physical situations quantitatively using fundamental physics principles, ranging from Newtonian mechanics to modern physics.
If you plan to analyze a PSLO, identify the courses that are mapped to the PSLO. Physics 1A, 1B, 1C, 1D

B. Below, report on your program's progress on the plan described in Question (A) above.

Text of CSLO/PSLO/SAO: Upon successful completion of an AS in Physics, students are able analyze physical situations quantitatively using fundamental physics principles, ranging from Newtonian mechanics to modern physics.
SLOs: Assessment data collected from <u> 6 </u> sections over <u> 1 </u> semesters. SAOs: Assessment data collected from _____ students over _____ semesters.
Describe the quantitative or qualitative results: The results have not yet been discussed, because these SLOs are brand new as of Spring 2018. The meeting for the planned SLO discussion is slated to take place in early Spring 2019 semester (likely February) when we will have amassed 1 year of data. Because many of our sections are very small and few are offered per semester, we are hoping that additional data will facilitate a more in-depth analysis.

Discuss and reflect upon student achievement for this CSLO/PSLO/SAO. Discuss any actions taken so far (and results, if known) and your action plan for the future:

See above.

What changes in student achievement are evident across the semesters you analyzed? What are some possible explanations for these changes?

Not applicable – only 1 semester of data was available, since these SLOs were not activated until Spring 2018.

DO you plan to continue tracking this SLO in the next year? Explain.

Yes, unless we find that our discussions are identifying problems in other areas (GE, or physics 2 series, etc.)

C. Planning: What are your future plans (either new or continuing) for SLO/SAO analysis for next year? Identify the PSLOs, CSLOs, or SAOs that your program plans to focus on the upcoming year with subsequent analysis (next year's program review). (Copy the box below as needed.)

Circle One:

CSLO *****PSLO***** SAO

Course, Program Name, or Student Service Area:

Physics

Text of CSLO/PSLO/SAO:

Upon successful completion of an AS in Physics, students are able analyze physical situations quantitatively using fundamental physics principles, ranging from Newtonian mechanics to modern physics.

If you plan to analyze a PSLO, identify the courses that are mapped to the PSLO.

Physics 1A, 1B, 1C, 1D

D. SLO/SAO Suggestions (optional): What questions or suggestions do you have regarding SLO/SAO planning, assessment and reporting?

None.

**Section Four: Curriculum Review
(Programs with Courses Only)**

The following questions ask you to review your program's curriculum. To see the last outline revision date and revision due date:

1. Log in to CurricUNET
2. Select "Course Outline Report" under "Reports/Interfaces"
3. Select the report as an Excel file or as HTML

Curriculum Updates

A. Title V Updates: Are any of your courses requiring an update to stay within the 5 year cycle? List courses needing updates below.

None. All complete

B. Degree/Certificate Updates: Are any degrees/certificates requiring an update to do changes to courses (title, units) or addition/deactivation of courses? List needed changes below.

None. All complete

C. DE Courses/Degrees/Certificates: Detail your department's plans, if any, for adding DE courses, degrees, and/or certificates. For new DE degrees and/or certificates (those offered completely online), please include a brief rationale as to why the degree/certificate will be offered online.

No DE degrees or certificates planned