Insert Academic Degree Name Here

Annual Program Report Template

Year:	AY2021-2022
Program:	Physics
Contact Person (include email & phone#)	Cengiz Sen, csen@lamar.edu, ext. 7876

Summary of Continuous Improvement Efforts since Last Report

Provide a brief description of how assessment results have been used for program improvement. Point to a specific example of how an assessment provided the program with data it could use for improvement and what that improvement was, if possible, also show evidence of the improvement. You may look at data from the two previous academic years to support this case.

Respond here: We met all our targets for AY2021-2022. However, due to low enrollment, PHYS 4480 (Optics) has not been offered in AY2021-2022, so this course was not considered in the analysis of the data for outcome #1. Also, we used cumulative data since 2009 to decide whether a target is met, since individual data isn't statistically reliable due to low enrollment for AY2021-2022.

Program Highlights Since Last Report

Identify and briefly discuss any programmatic curriculum changes made since the last report (e.g. new courses, course changes, SLO changes, course deletions).

Respond here: No curriculum changes have been made since last report.

Table 1. Assessment Results and Analyses for Current Cycle.

STAGE 1: PLAN				STAGE 2: DO		STAGE 3: STUDY
Departmental Student Learning Goal	**Program Student Learning Outcome**	**Assessment**	**Assessment Method/Location**	**Benchmark Expectations**	**Data Results**	**Actions/Goals Based on Data Results*** What do the data tell you? How will you use this data? How were data from the last cycle used to make changes during this cycle, and What were the results of those changes?
Students will learn about basic concepts of quantum mechanics, Schrodinger's equation and wave functions (PHYS 4320, Quantum Mechanics), and about light-matter interaction; interference; diffraction; spectroscopy; photonics and lasers; fiber optics (PHYS 4480, Optics, not assessed in AY2021-2022). These courses are used to assess SLO #1.	Develop proficiency in critical thinking	Met	The students have been tested, late in the semester, their written exams being collected and copied before being returned to them. For each area investigated the results below are given in terms of how the student scores are distributed on the skill levels 1-4, with skill level 1 being the lowest and skill level 4 being the highest (See note (8) below). Their distribution is indicated with percentages in the Rubric. In calculating the percentages, we used the following	85% at or above skill level 3	In the interest of space, please see note (5) below	See the last paragraph of note (5) below

			procedure: For each student in each particular skill investigated, we obtained scores by averaging those received from the three faculty members. Then, for each area investigated, we calculated the percentage of students that fall within each skill level.			
Students will learn about basic concepts of quantum mechanics, Schrodinger's equation and wave functions (PHYS 4320, Quantum Mechanics), and about crustal structure, crystal dynamics, energy bands in crystalline solids, semiconductors, magnetism, and superconductivity (PHYS 4370, Solid State Physics). These courses are used to assess SLO #2.	Develop mathematical models and standard derivations in Physics	Met	The students have been tested, late in the semester, their written exams being collected and copied before being returned to them. For each area investigated the results below are given in terms of how the student scores are distributed on the skill levels 1-4, with skill level 1 being the lowest and skill level 4 being the highest (See note (8) below). Their distribution is indicated with	85% at or above skill level 3	In the interest of space, please see note (6) below	See the last paragraph of note (6) below

			percentages in the Rubric. In calculating the percentages, we used the following procedure: For each student in each particular skill investigated, we obtained scores by averaging those received from the three faculty members. Then, for each area investigated, we calculated the percentage of students that fall within each skill level.			
Students will learn about crustal structure, crystal dynamics, energy bands in crystalline solids, semiconductors, magnetism, and superconductivity (PHYS 4370, Solid State Physics), and about light-matter interaction; interference; diffraction; spectroscopy; photonics and lasers; fiber optics (PHYS 4480, Optics, not assessed in AY2021-	Communicating Physics processes in writing	Met	The students have been tested, late in the semester, their written exams being collected and copied before being returned to them. For each area investigated the results below are given in terms of how the student scores are distributed on the skill levels 1-4, with skill level 1 being the	85% at or above skill level 3	In the interest of space, please see note (7) below	See the last paragraph of note (7) below

2022). These courses are used to assess SLO #3.			lowest and skill level 4 being the highest (See note (8) below). Their distribution is indicated with percentages in the Rubric. In calculating the percentages, we used the following procedure: For each student in each particular skill investigated, we obtained scores by averaging those received from the three faculty members. Then, for each area investigated, we calculated the percentage of students that fall within each skill level.			

(5) TARGET COURSE: PHYS-4320 (2 Students) Skill Level #1 Level #2 Level #3 Level #4

1) Attaching the correct meaning to the given information with proper units 0% 0% 0% 100%
2) Identifying for what the physics problem is asking 0% 0% 0% 100%
3) Identifying the physics relationships that need to be used 0% 0% 0% 100%
4) Correct application of mathematics and reaching the correct numerical solution 0% 0% 17% 83%

Since every year we test a relatively small number of students, so it is more helpful to compare this year's results (combined) with the cumulative results of the past few years. Such cumulative results and combined results are as follows:

CUMULATIVE DATA FOR OUTCOME 1, 2009-2021 (142 Students) Skill Level #1 Level #2 Level #3 Level #4

1) Attaching the correct meaning to the given information with proper units 0.37% 2.56% 18.35% 79.44%
2) Identifying for what the physics problem is asking 1.05% 4.06% 24.68% 69.10%
3) Identifying the physics relationships that need to be used 2.42% 5.32% 27.99% 63.63.60%
4) Correct application of mathematics and reaching the correct numerical solution 2.42% 10.81% 31.63% 53.24%

Based on the above data, we reached our goal of 85% cumulative threshold at or above Level #3 for all skills 1-4. Thus, we consider that Outcome 1 is met. However it should be noted that since the number of students attended in this course was small, the data for academic year 2021-2022 is not as reliable as the cumulative data is. So, our target as being met for Outcome #1 is based on the cumulative data, and not for the academic year 2021-2022.

(6) TARGET COURSE: PHYS-4370 (2 Students) Skill Level #1 Level #2 Level #3 Level #4
1) Attaching the correct meaning to the given information with proper units 0% 0% 17% 83%
2) Identifying for what the physics problem is asking 0% 0% 0% 100%
3) Identifying the physics relationships that need to be used 0% 0% 17% 83%
4) Correct application of mathematics and reaching the correct numerical solution 0% 0% 17% 83%

TARGET COURSES: PHYS-4320 (2 Students) Skill Level #1 Level #2 Level #3 Level #4
1) Attaching the correct meaning to the given information with proper units 0% 0% 0% 100%
2) Identifying for what the physics problem is asking 0% 0% 0% 100%
3) Identifying the physics relationships that need to be used 0% 0% 0% 100%
4) Correct application of mathematics and reaching the correct numerical solution 0% 0% 0% 100%

Since every year we test a relatively small number of students, it may be helpful to compare this year's results (combined) with the cumulative results of the past few years. Such cumulative results and combined results are as follows:

CUMULATIVE DATA FOR OUTCOME 1, 2009-2021 (156 Students) Skill Level #1 Level #2 Level #3 Level #4
1) Attaching the correct meaning to the given information with proper units 0.0% 4.44% 15.49% 80.06%
2) Identifying for what the physics problem is asking 0.34% 5.26% 30.94% 63.47%
3) Identifying the physics relationships that need to be used 0.34% 6.63% 30.14% 62.88%
4) Correct application of mathematics and reaching the correct numerical solution 0.34% 8.33% 26.84% 64.48%

COMBINED RESULTS FOR OUTCOME 1, 2021-2022 (4 Students) Skill Level #1 Level #2 Level #3 Level #4
1) Attaching the correct meaning to the given information with proper units 0.0% 0.0% 8.5% 91.5%
2) Identifying for what the physics problem is asking 0. 0% 0.0% 0.0% 100.0%
3) Identifying the physics relationships that need to be used 0.0% 0.0% 8.5% 91.5%
4) Correct application of mathematics and reaching the correct numerical solution 0.0% 0.0% 8.5% 91.5%

Combining both courses, and based on the above data, we consider that Outcome 2 is met. However it should be noted that since the number of students attended in these classes were small, the data for academic year 2021-2022 is not as reliable as the cumulative data is. So, our target as being met for Outcome #2 is based on the cumulative data, and not for the academic year 2021-2022.

(7) TARGET COURSE: PHYS-4370 (2 Students) Skill Level #1 Level #2 Level #3 Level #4
1) Attaching the correct meaning to the given information with proper units 0% 0% 0% 100%
2) Identifying for what the physics problem is asking 0% 0% 0% 100%
3) Identifying the physics relationships that need to be used 0% 0% 0% 100%
4) Correct application of mathematics and reaching the correct numerical solution 0% 0% 50% 50%

Since every year we test a relatively small number of students, it may be helpful to compare this year's results (combined) with the cumulative results of the past few years. Such cumulative results and combined results are as follows:

CUMULATIVE DATA FOR OUTCOME 1, 2009-2021 (208 Students) Skill Level #1 Level #2 Level #3 Level #4
1) Attaching the correct meaning to the given information with proper units 0.73% 4.42% 20.13% 74.71%
2) Identifying for what the physics problem is asking 0.42% 5.12% 28.86% 64.19%
3) Identifying the physics relationships that need to be used 0.42% 6.53% 34.05% 59.0%
4) Correct application of mathematics and reaching the correct numerical solution 0.58% 8.58% 38.60% 52.23%

Based on the above data, we consider that Outcome 3 is met. However it should be noted that since the number of students attended in this classe was small, the data for academic year 2021-2022 is not as reliable as the cumulative data is. So, our target as being met for Outcome #3 is based on the cumulative data, and not for the academic year 2021-2022.

(8) Skill levels: - level 1: unacceptable – 1 point. The student’s answer is very poor. - level 2: poor – 2 points. The student’s answer is acceptable. - level 3: acceptable– 3 points. The student’s answer has minor deficiencies. - level 4: well done – 4 points. The student shows command of the subject.

Table 2. Continuous Improvement Results Since Last Report

Stage 4: ACT		
Actions/Goals Based on Data Results **Copy last cycle's actions/goals and report on progress toward continuous improvement on those here.*	**Status** *C=Complete* *P=Progressing* *N=No Action Taken*	**Discussion of Status** *If C, describe efforts that led to accomplishment of actions/goals.* *If P, provide update on progress made toward accomplishing actions/goals and what tasks remain* *If N, discuss why action toward accomplishing actions/goals has been delayed and what work will be initiated toward accomplishment.*
No further action needed, see note (9)	C	See note (9) below
No further action needed, see note (9)	C	See note (9) below
No further action needed, see note (9)	C	See note (9) below

(9) This action plan was created in AY2020-2021 and targeted SLO #2 in PHYS-4370 and PHYS-4320, giving an additional assignment targeting the noted deficiencies. No further action plan was implemented in AY2021-2022 as all targets were met. A similar plan has worked nicely in bringing up the scores in both courses in previous years. However, in AY2019-2020 a higher-than-desired number of students still scored on Level #4 for SLO #2 in PHYS-4370. In AY2021-AY2022. this target focused on the "logically structured presentation" of mathematical skills of our students; and we wanted to understand better how those skills developed, as the course progressed. We therefore implemented a tracking assignment, similar to what was done, in AY2020-AY2021, in PHYS-4370 and in PHYS 4320. We assessed for SLO #2 an assigned problem around the midway point of the semester in addition to a problem at the end of the semester. This allowed us to gauge the mathematical skills at two different points in the semester to track development. Hence our target was met in SLO #2 in AY2021-2022.