End of Year Assessment Report for Programs

Program: Physics	Semester/year: 2017-2018
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Program Mission Statement

Physics Program strives to provide students with quality education in physics in a caring Christian environment.

Program Objectives

At the close of their degree, students should be able to:

1. Be able to explain various concepts in Physics (Knowledge: GU SLO 1.4)
2. Comprehend key principles and theories in Physics (Comprehension: GU SLO 1.2)
3. Work on exercises and solve problems using laws and principles of Physics (Application: GU SLO 1.3)
4. Know how to use lab equipment and theories in labs and able to perform experiments and analyze their results. (Analysis: GU SLO 1.4)
5. Demonstrate the understanding of contemporary and unresolved issues in Physics (Synthesis: GU SLO 1.2)
6. Be able to solve (or make progress on) complex or unresolved physics problems. (Advanced Comprehension)
7. Appreciate God's creation and consider one's career calling though physics (Evaluation: GU SLO 4.2, 4.3)

Assessment Methods and Benchmarks – SPRING SEMESTER

Program Objective	Introducing	Developing	Mastering
PO1. Knowledge	*Not taught this semester*	*Not taught this semester*	*Not taught this semester*
PO2, PO6 Comprehension	PHYS210 CO2 (GU SLO 1.4) Exams >= 75%	PHYS311 CO1 (GU SLO 1.4) Homework 1-7 and all Midterm 1 >= 75%; PHYS311 CO3 Homework 10, 11 and Final Exam >= 75%	PHYS409 Essays >= 75%
PO3. Application	PHYS210 CO3 (GU SLO 4.3) WebAssign Assignments >= 75%	PHYS311 CO2 (GU SLO 4.3) Homework 5-11 and Midterm Exam 2, 3 >= 75%	*Not taught this semester*
PO4. Analysis	PHYS210 CO1 (GU SLO 1.2) Exams & Essays >= 75%	*Not taught this semester*	PHYS403 Final Report >= 75%

PO5. Synthesis	*Not taught this semester*	*Not taught this semester*	PHYS409 Essays >= 75%
PO7. Evaluation	*Not taught this semester*	*Not taught this semester*	PHYS409 Essays >= 75%

Assessment Findings – SPRING SEMESTER

PO1.

A. Introducing: N/A.
B. Developing: N/A.
C. Mastering: N/A.

PO2.

A. Introducing: PHYS210 – Lab Reports. Students must attain an average of 75% of the points assigned to these tasks to achieve the objective. 17 students (68%) has achieved the objective while 8 students (32%) have not achieved it.
B. Developing: PHYS311 – Homework 1-7 and all Midterm -- Students must attain 75% of the points assigned to this part to achieve the objective. 5 students (83%) has achieved the objective while 1 student (17%) have not achieved it.
C. Mastering: N/A.

PO3.

A. Introducing: PHYS210 – WebAssign Assignments. Students must attain an average of 75% of the points assigned to these tasks to achieve the objective. 20 students (80%) have achieved the objective while 5 students (20%) have not.
B. Developing: PHYS311 – Homework 5 -11 and Midterm Exam 2, 3. Students must attain 75% of the point assigned to this part to achieve the objective. 5 students (83%) has achieved the objective while 1 student (17%) have not achieved it.
C. Mastering: N/A.

PO4.

A. Introducing: PHYS210 –Lab Reports are used for assessment. Students must attain an average of 75% of the points assigned to these tasks to achieve the objective. 24 students (96%) have achieved the objective while 1 student (4%) have not.
B. Developing: N/A.
C. Mastering: PHYS403.

PO5.

A. Introducing: N/A.
B. Developing: N/A.

C. Mastering: PHYS409 – Essays. Students must attain an average of 75% of the points assigned to these tasks to achieve the objective. 3 students (100%) achieved the objective..

PO6.

A. Introducing: N/A.
B. Developing: PHYS311 -- Homework 10, 11 and Final Exam. Students must attain an average of 75% of the points assigned to these tasks to achieve the objective. 5 students (83%) has achieved the objective while 1 student (17%) have not achieved it.
C. Mastering: PHYS409 – Essays. Students must attain an average of 75% of the points assigned to these tasks to achieve the objective. 3 students (100%) achieved the objective.

PO7.

A. Introducing: N/A.
B. Developing: N/A.
C. Mastering: PHYS409 – Essays. Students must attain an average of 75% of the points assigned to these tasks to achieve the objective. 3 students (100%) achieved the objective.

Analysis of Assessment Findings – SPRING SEMESTER

PO1. Be able to explain various concepts in Physics (Knowledge: GU SLO 1.4)

We have listed a few courses for this category in our program assessment meta-plan. But we do not have data to report as we had discrepancies between the overall assessment plan and what is actually analyzed through course objectives. This needs to be corrected in the future.

PO2. Comprehend key principles and theories in Physics (Comprehension: GU SLO 1.2)

PHYS210 has a bi-polar distribution of students' academic readiness. We tried to offer alternative to this calculus-based physics (i.e., PHYS130). But we did not have enough students to take the course as our advising coordination among science departments was not well established. We hope to change this in the future. All PHYS311 students but one have achieved the goal.

PO3. Work on exercises and solve problems using laws and principles of Physics (Application: GU SLO 1.3)

PHYS210 become less bi-polar as these evaluations are done though WebAssign. This tool is utilized by different-levels of students. PHYS311 students but one have achieved the goal.

PO4. Know how to use lab equipment and theories in labs and able to perform experiments and analyze their results. (Analysis: GU SLO 1.4)

Students in PHYS210 are PHYS403 all done well in these labs as the labs have well-defined processes that students can easily follow.

PO5. Demonstrate the understanding of contemporary and unresolved issues in Physics (Synthesis: GU SLO 1.2)

All PHYS409 students (3 of them) found their interested areas in the frontier areas of physics. They were all successful in grasping the contemporary and unresolved issues in physics.

PO6. Be able to solve (or make progress on) complex or unresolved physics problems. (Advanced Comprehension)

PHYS311 students but one have achieved the goal while all PHYS409 students ended up having advanced comprehension of the topics they have chosen to investigate.

PO7. Appreciate God's creation and consider one's career calling though physics (Evaluation: GU SLO 4.2, 4.3)

All students in PHYS409 have shown appreciation of God's creation. They also related their career callings with what they have investigated.

Sharing and Discussion of Assessment Findings – SPRING SEMESTER

All full-time faculty members of the department met on May 22, 2018 to assess the program having prepared with FCARs. We've shared the achievements and concerns we had for Spring Semester of 2018 and discussed how we might improve the program and its pedagogy. The following findings are found through FCARs:

1. There are signs of improvement in Dr. Zhao's classes evidenced by students evaluations. PHYS102, PHYS311 have been improved with more demos and diverse ways of instructions.
2. PHYS210 was run better than PHYS200 as Prof. Reeves got used to the new text book and its WebAssign system.
3. PHYS409 is cross-listed with biology and chemistry. Dr. Choi has been involved in evaluating three physics students' papers/presentations. They all managed to do well.

Use of Assessment Findings for Program Improvement (Action Plan) – SPRING SEMSTER

We think our assessment becomes more and more useful as we get used to this new practice. As we have mentioned in the Fall Semester Assessment Analysis, we still have incompleteness and incoherence in our assessment efforts. Physics Assessment mapping between Program Outcomes and "relevant courses" is not consistent with what actual syllabi are stating what each courses are measuring. We will need to make them clear and consistent.

The most useful aspect of this new, more rigorous assessment process has to do with the fact that we are now able to make continuous improvements *via* systematic use of FCARs. As this process continues, we will be accumulating the institutional knowledge that informs us of what works and what doesn't work for our pedagogy.

Full Year Reflection – FALL/INTERTERM/SPRING TERMS

Physics program is still trying to figure out how to work best with the growing Engineering program. It turns out that the integration of the engineering program with physics program is hard to achieve without sacrificing the integrity of the programs. Currently, having the full spectrum of physics would be too much of a burden to teaching staff so we had to reduce the number of required courses for the physics major.

This assessment effort this year has assured us that the program's objectives are being met – but not to our full satisfaction. The most important and urgent task for physics program for now is to preserve the program's integrity while being able to help engineering program to grow.

Supporting Documents

The FCARs for the following courses are used in the analyses above: PHYS102, PHYS125, PHYS210, PHYS311, and PHYS409. These documents are available upon request.