

## ASSESSMENT PLAN: Bachelor of Science (BS)

**Date Updated: 25 May 2021**

### PROGRAM MISSION

[CSUEB Missions, Commitments, and ILOs, 2012](#)

### PROGRAM LEARNING OUTCOMES (PLOs)

Students graduating with a BS in Physics will be able to:

<i>PLO 1</i>	Describe the fundamental principles of physics and be able to apply these core ideas to analyze physical processes
<i>PLO 2</i>	Use quantitative reasoning and critical thinking to solve complex problems, both theoretical and experimental in nature
<i>PLO 3</i>	Learn new technical subjects and skills
<i>PLO 4</i>	Construct, assess and troubleshoot experiments, quantitatively analyze the results using appropriate statistical procedures and tests of systematic errors, and draw meaningful conclusions
<i>PLO 5</i>	Effectively explain scientific ideas, both theoretical and experimental, to diverse audiences through written and oral presentations, both formal and informal
<i>PLO 6</i>	Work professionally, effectively, and inclusively as a member of diverse collaborations to solve problems

### Year 1: 2020-2021

1. <i>Which PLO(s) to assess</i>	PLO 4
2. <i>Is it aligned to an ILO?</i>	Yes
3. <i>If yes, list ILO.</i>	ILO 4 Specialized Discipline, particularly: Demonstrating fluency in the use of tools, technologies and methods in the field
4. <i>Course name and number</i>	Physics 381: Advanced Lab II
5. <i>SLO from course</i>	Design, construct, and troubleshoot experimental equipment; use appropriate statistical analysis methods to quantitatively compare experimental results to the physical model.

6. <i>Assessment activity</i>	Have students independently design an experiment to measure the acceleration of gravity, including statistical methods to assess the accuracy of experimental setup
7. <i>Assessment Instrument</i>	Rubric for scoring student experiment method and results
8. <i>How data will be reported</i>	Quantitative
9. <i>Responsible person(s)</i>	Dr. Amy Furniss and Dr. Kathryn Grimm (Department assessment coordinator and incoming coordinator)
10. <i>Time (which semester(s))</i>	Fall 2020
11. <i>Ways of closing the loop</i>	The quantitative scores from the lab on this activity will be included within the department annual report, and compared to methods and scores from previous years.

### Year 2: 2021-2022

1. <i>Which PLO(s) to assess</i>	PLO 5
2. <i>Is it aligned to an ILO?</i>	Yes
3. <i>If yes, list ILO.</i>	ILO 2: Communication
4. <i>Course name and number</i>	Phys 480: Advanced Lab III
5. <i>SLO from course</i>	Present a well-organized, quantitative argument in the form of a written report; present a clear, well-organized oral argument concerning their experiments to their peers.
6. <i>Assessment activity</i>	Written lab report and oral presentation of lab and results
7. <i>Assessment Instrument</i>	Department accepted standard rubric for grading group project oral presentation and written report
8. <i>How data will be reported</i>	Qualitative and quantitative
9. <i>Responsible person(s)</i>	Dr. Kathryn Grimm (Department assessment coordinator)
10. <i>Time (which semester(s))</i>	Fall 2021
11. <i>Ways of closing the loop</i>	This data will be reported within the assessment portion of the Physics Department annual report and compared to scores from this same course from previous years.

### Year 3: 2022-2023

1. <i>Which PLO(s) to assess</i>	PLO 6
2. <i>Is it aligned to an ILO?</i>	Yes
3. <i>If yes, list ILO.</i>	ILO4: Collaboration
4. <i>Course name and number</i>	Phys 481: Advanced Lab II
5. <i>SLO from course</i>	Effectively communicate scientific ideas
6. <i>Assessment activity</i>	Group project – written report on laboratory experiment by student group
7. <i>Assessment Instrument</i>	Department accepted standard rubric for grading group written lab report
8. <i>How data will be reported</i>	Quantitative
9. <i>Responsible person(s)</i>	Dr. Kathryn Grimm (Department assessment coordinator)
10. <i>Time (which semester(s))</i>	Spring 2023

11. <i>Ways of closing the loop</i>	This data will be reported within the assessment portion of the Physics Department annual report and compared to scores from this same course from previous years.
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#### Year 4: 2023-2024

1. <i>Which PLO(s) to assess</i>	PLO 2
2. <i>Is it aligned to an ILO?</i>	Yes
3. <i>If yes, list ILO.</i>	ILO 1 Thinking and Reasoning
4. <i>Course name and number</i>	PHYS 351
5. <i>SLO from course</i>	Students will be able to use perturbation theory to calculate corrections to energies and eigenstates of various quantum systems.
6. <i>Assessment activity</i>	Specific problem set solved by students (same set each year)
7. <i>Assessment Instrument</i>	Rubric used to score problems
8. <i>How data will be reported</i>	Qualitative
9. <i>Responsible person(s)</i>	Dr. Kathryn Grimm (Department assessment coordinator)
10. <i>Time (which semester(s))</i>	Spring 2024
11. <i>Ways of closing the loop</i>	Qualitative results are included in assessment report for annual department report, comparing scores according to rubric.

#### Year 5: 2024-2025

1. <i>Which PLO(s) to assess</i>	PLO1
2. <i>Is it aligned to an ILO?</i>	Yes
3. <i>If yes, list ILO.</i>	ILO 2 Communication
4. <i>Course name and number</i>	PHYS 451 Electromagnetism II
5. <i>SLO from course</i>	Students will be able to analyze problems and explain a variety of complex electromagnetic phenomena utilizing the fundamental equations known as Maxwell's Equations.
6. <i>Assessment activity</i>	National Electromagnetism Assessment Exam
7. <i>Assessment Instrument</i>	Grading of Assessment Exam and comparison to national averages
8. <i>How data will be reported</i>	Quantitative
9. <i>Responsible person(s)</i>	Dr. Kathryn Grimm (Department assessment coordinator)
10. <i>Time (which semester(s))</i>	Spring 2025
11. <i>Ways of closing the loop</i>	This data will be reported within the assessment portion of the Physics Department annual report and compared to scores from this same course from previous years and to the national averages.