

Assessment Data Physics and Engineering
General Education: Physics and Physical Science
2024-25

Learning Outcome: 1e. Quantitative Reasoning: Students will be able to solve problems that are quantitative in nature.

Components of this outcome as defined by the department:

- Translation of words into equations and conclusions
- Calculations and mathematical reasoning
- Reasonable and realistic view of nature

Outcome Measure: Questions embedded in the final exam are the basis for assessment in all GE Physics and Physical Science classes.

PHY1034 The Physics of Sound and Music (formerly PHY113)

PHY1044 General Physics I (formerly PHY141)

PHY1054 General Physics II (formerly PHY142)

PHY2044 University Physics (formerly PHY241)

PSC1004 The Cosmos (formerly PSC105)

PSC1014 Physical Science for Teachers (formerly PSC110)

Criteria for Success: At least 70% of students will have an average above 2.5 on each area of the Physics and Engineering Quantitative Reasoning Rubric. These aspects of quantitative reasoning in a scientific context are as follows: (1) translating graphs and words into equations and conclusions (2) calculation and mathematical reasoning (3) reasonable view of nature.

Scale Used:

- | | |
|---|---|
| 0 | Unsatisfactory - Completely Incorrect |
| 1 | Low Satisfactory - Missed more than one key concept or step |
| 2 | Satisfactory - Missed one key concept or step |
| 3 | High Satisfactory - Made a minor error |
| 4 | Outstanding - Completely correct |

Longitudinal Data

		Translate words or graphs into equations and conclusions	Calculations and mathematical reasoning	Reasonable and realistic view of nature
PHY141	Summer 2018	100%	95%	95%
PHY141	Fall 2018	89%	84%	74%
PHY141	Summer 2019	80%	100%	85%
PHY1044	Fall 2019	68%	100%	79%
<i>PHY1044</i>	<i>Summer 2020</i>	<i>100%</i>	<i>100%</i>	<i>100%</i>
<i>PHY1044</i>	<i>Spring 2021</i>	<i>90%</i>	<i>100%</i>	<i>95%</i>
<i>PHY1044</i>	<i>Fall 2021</i>	<i>94%</i>	<i>100%</i>	<i>89%</i>
PHY1044	Fall 2022	85%	100%	95%
PHY1044	Fall 2023	90%	80%	85%
PHY1044	Fall 2024	85%	85%	85%
PHY142	Spring 2018	90%	95%	85%
PHY142	Summer 2018	100%	100%	100%
PHY142	Spring 2019	95%	95%	89%
PHY142	Summer 2019	85%	85%	90%
<i>PHY1054</i>	<i>Spring 2020</i>	<i>100%</i>	<i>100%</i>	<i>100%</i>
<i>PHY1054</i>	<i>Fall 2020</i>	<i>69%</i>	<i>85%</i>	<i>77%</i>
<i>PHY1054</i>	<i>Spring 2021</i>	<i>85%</i>	<i>100%</i>	<i>100%</i>
PHY1054	Spring 2022	95%	85%	50%
PHY1054	Spring 2023	75%	75%	80%
PHY1054	Spring 2024	75%	70%	75%
PHY1054	Spring 2025	80%	80%	80%
PHY241	Spring 2018	84%	100%	89%
PHY241	Fall 2018	90%	90%	80%
PHY2044	Fall 2019	90%	100%	95%
<i>PHY2044</i>	<i>Fall 2020</i>	<i>100%</i>	<i>100%</i>	<i>100%</i>
<i>PHY2044</i>	<i>Fall 2021</i>	<i>85%</i>	<i>90%</i>	<i>85%</i>
PHY2044	Fall 2022	90%	85%	90%
PHY2044	Fall 2023	80%	70%	75%
PHY2044	Fall 2024	100%	95%	90%

		Translate words or graphs into equations and conclusions	Calculations and mathematical reasoning	Reasonable and realistic view of nature
PSC105	Spring 2018	85%	90%	90%
PSC105	Summer 2018	100%	100%	94%
PSC105	Fall 2018	94%	94%	89%
PSC105	Spring 2019	95%	95%	100%
PSC1004	Fall 2019	90%	95%	80%
<i>PSC1004</i>	<i>Spring 2020</i>	<i>100%</i>	<i>95%</i>	<i>63%</i>
<i>PSC1004</i>	<i>Summer 2020</i>	<i>89%</i>	<i>83%</i>	<i>89%</i>
<i>PSC1004</i>	<i>Spring 2021</i>	<i>94%</i>	<i>79%</i>	<i>100%</i>
<i>PSC1004</i>	<i>Fall 2021</i>	<i>95%</i>	<i>89%</i>	<i>95%</i>
<i>PSC1004</i>	<i>Spring 2022</i>	<i>85%</i>	<i>80%</i>	<i>65%</i>
PSC1004	Fall 2022	100%	90%	100%
PSC1004	Fall 2023	90%	90%	95%
PSC1004	Spring 2024	85%	80%	85%
PSC1004	Fall 2024	95%	85%	90%
PSC1004	Spring 2025	85%	75%	85%
PSC111	Fall 2017	90%	95%	95%
PSC111	Fall 2018	75%	90%	85%
PSC1014	Fall 2019	85%	85%	85%
<i>PSC1014</i>	<i>Fall 2020</i>	<i>85%</i>	<i>90%</i>	<i>95%</i>
<i>PSC1014</i>	<i>Spring 2021</i>	<i>100%</i>	<i>100%</i>	<i>100%</i>
<i>PSC1014</i>	<i>Fall 2021</i>	<i>81%</i>	<i>81%</i>	<i>94%</i>
PSC1014	Fall 2022	80%	80%	100%
PSC1014	Fall 2023	79%	79%	95%
PHY113	Fall 2018	84%	89%	89%
PHY1013	Fall 2019	89%	95%	100%
PHY1034	Fall 2019	89%	95%	100%
<i>PHY1034</i>	<i>Spring 2021</i>	<i>92%</i>	<i>100%</i>	<i>100%</i>
<i>PHY1034</i>	<i>Fall 2021</i>	<i>91%</i>	<i>91%</i>	<i>91%</i>
PHY1034	Fall 2022	100%	100%	100%
PHY1034	Fall 2023	79%	79%	86%
PHY1034	Spring 2025	74%	74%	84%

Italics represent the terms during the COVID pandemic.

PSC1004 and PHY1044 were not assessed in Fall 2020. This was due to the complexity of conducting the assessment in an all-remote pandemic semester. PSC1014 was not assessed in the Fall of 2024 due to a clerical error. This class is now being split into two separate courses (one Physics and one Chemistry) which will simplify assessment.

Note that the following changes have been made in the GE course offerings:

- PSC103 Earth Science has been eliminated as a GE class (data removed from data set).
- PSC110 Physical Science has been eliminated as a GE class (data removed from data set).
- PSC1014 Physical Science for Teachers has been added as a GE offering focused specifically on the preparation of elementary school teachers (this replaced PHY111).
- PHY1013 The Physics of Sound and Music is a new GE class and was subsequently renumbered PHY1034.

Conclusions Drawn from Data:

The students are meeting our benchmarks.

Changes to be Made Based on Data:

Overall, the students are meeting our criteria for success and did reasonably well during the COVID pandemic. We will continue to monitor the data.

Physics and Engineering GE Quantitative Reasoning Rubric
 (PHY1034, PHY1044, PHY1054, PHY2044, PSC1004, PSC1014)

Criteria	Outstanding	High Satisfactory	Low Satisfactory	Unsatisfactory
Translating words or graphs into equations or conclusions	<input type="checkbox"/> No mistakes	<input type="checkbox"/> Few mistakes, mostly correct	<input type="checkbox"/> Several mistakes, some understanding	<input type="checkbox"/> Many mistakes, not interpreting information
Calculation and Math reasoning	<input type="checkbox"/> No mistakes	<input type="checkbox"/> Few mistakes	<input type="checkbox"/> Several mistakes	<input type="checkbox"/> Many mistakes (incorrect use of data and equations)
Reasonable and realistic view of nature (sense of scale, etc.)	<input type="checkbox"/> Good understanding	<input type="checkbox"/> Minor misunderstandings	<input type="checkbox"/> Some clear understandings mixed with some misunderstandings	<input type="checkbox"/> Significant misunderstandings