

SLO#1: Develop proficiency in critical thinking.

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). These courses are used to assess SLO #1.

MEASURES	RESULTS	ACTIONS																																																																																																																							
<p>SLO #1: Assessment using PHYS 4320 and PHYS 4480</p> <p>The students will be tested, late in the semester, their written exams will be 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. Following skills are used in the assessment process:</p> <ol style="list-style-type: none">1. Attaching the correct meaning to the given information with proper units.2. Identifying for what the physics problem is asking.3. Identifying the physics relationships that need to be used.4. Correct application of mathematics and reaching the correct numerical solution. <p>Their distribution is indicated with percentages in the Rubric. In calculating the percentages, we used the following procedure: For each student in each skill investigated, we obtained scores by averaging those received from faculty members. Then, for each area investigated, we calculated the percentage of students that fall within each skill level.</p> <p>*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.</p> <p>Direct - Exam (Course)</p> <p><i>Introduction Quantum Mechanics: PHYS 4320</i></p> <p>Target</p>	<p>MET</p> <p>Analysis</p> <p>The following table illustrates the results of our analysis for the 2024-2025 AY:</p> <table><tr><td>COMBINED 2024-2025</td><td>10</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>SKILL</td><td>LEVEL 1</td><td>LEVEL 2</td><td>LEVEL 3</td><td>LEVEL 4</td><td>TOTAL > 3</td><td></td></tr><tr><td>I</td><td>0.0%</td><td>0.0%</td><td>0.0%</td><td>100.0%</td><td>100.00%</td><td></td></tr><tr><td>II</td><td>0.0%</td><td>0.0%</td><td>0.0%</td><td>100.0%</td><td>100.00%</td><td></td></tr><tr><td>III</td><td>0.0%</td><td>0.0%</td><td>3.3%</td><td>96.7%</td><td>100.00%</td><td></td></tr><tr><td>IV</td><td>0.0%</td><td>3.3%</td><td>6.7%</td><td>90.0%</td><td>96.67%</td><td></td></tr></table> <p>Based on the above data, we reached our goal of 86% cumulative threshold at or above Level #3 for all skills I-IV. Thus, we consider that Outcome 1 is met. Since every year we test a relatively small number of students, 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:</p> <p>CUMULATIVE DATA FOR OUTCOME 1, 2009-2024 (166 Students):</p> <table><tr><td>CUMULATIVE 2009-2024</td><td>166</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>SKILL</td><td>LEVEL 1</td><td>LEVEL 2</td><td>LEVEL 3</td><td>LEVEL 4</td><td>TOTAL > 3</td><td></td></tr><tr><td>I</td><td>0.3%</td><td>2.2%</td><td>17.1%</td><td>76.1%</td><td>93.2%</td><td></td></tr><tr><td>II</td><td>0.9%</td><td>3.6%</td><td>22.9%</td><td>66.8%</td><td>89.7%</td><td></td></tr><tr><td>III</td><td>2.1%</td><td>4.7%</td><td>26.4%</td><td>61.4%</td><td>87.8%</td><td></td></tr><tr><td>IV</td><td>2.1%</td><td>9.5%</td><td>29.4%</td><td>52.4%</td><td>81.9%</td><td></td></tr></table> <p>COMPARATIVE DATA FOR OUTCOME 1, 2024-2025 vs. 2009-2024:</p> <p>COMPARATIVE 2024-2025 VS 2009-2024</p> <table><tr><td>SKILL</td><td>LEVEL 1</td><td>LEVEL 2</td><td>LEVEL 3</td><td>LEVEL 4</td><td>TOTAL > 3</td><td></td></tr><tr><td>I</td><td>-0.32%</td><td>-2.25%</td><td>-17.14%</td><td>23.91%</td><td>6.77%</td><td></td></tr><tr><td>II</td><td>-0.92%</td><td>-3.57%</td><td>-22.91%</td><td>33.20%</td><td>10.28%</td><td></td></tr><tr><td>III</td><td>-2.13%</td><td>-4.67%</td><td>-23.09%</td><td>35.31%</td><td>12.21%</td><td></td></tr><tr><td>IV</td><td>-2.13%</td><td>-6.18%</td><td>-22.77%</td><td>37.55%</td><td>14.79%</td><td></td></tr></table>	COMBINED 2024-2025	10						SKILL	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	TOTAL > 3		I	0.0%	0.0%	0.0%	100.0%	100.00%		II	0.0%	0.0%	0.0%	100.0%	100.00%		III	0.0%	0.0%	3.3%	96.7%	100.00%		IV	0.0%	3.3%	6.7%	90.0%	96.67%		CUMULATIVE 2009-2024	166						SKILL	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	TOTAL > 3		I	0.3%	2.2%	17.1%	76.1%	93.2%		II	0.9%	3.6%	22.9%	66.8%	89.7%		III	2.1%	4.7%	26.4%	61.4%	87.8%		IV	2.1%	9.5%	29.4%	52.4%	81.9%		SKILL	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	TOTAL > 3		I	-0.32%	-2.25%	-17.14%	23.91%	6.77%		II	-0.92%	-3.57%	-22.91%	33.20%	10.28%		III	-2.13%	-4.67%	-23.09%	35.31%	12.21%		IV	-2.13%	-6.18%	-22.77%	37.55%	14.79%		<p>No actions have been added.</p>
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We aim at 86% of students scoring at or above skill level 3.		
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SLO#2 Develop mathematical models and standard derivations in Physics.

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.

MEASURES	RESULTS	ACTIONS
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BS in Physics - BS-PHYS

<p>SLO #2: Assessment using PHYS 4320 and PHYS 4370</p> <p>The students will be tested, late in the semester, their written exams will be 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. Following skills are used in the assessment process:</p> <ol style="list-style-type: none">1. Attaching the correct meaning to the given information with proper units.2. Identifying for what the physics problem is asking.3. Identifying the physics relationships that need to be used.4. Correct application of mathematics and reaching the correct numerical solution. <p>Their distribution is indicated with percentages in the Rubric. In calculating the percentages, we used the following procedure: For each student in each skill investigated, we obtained scores by averaging those received from faculty members. Then, for each area investigated, we calculated the percentage of students that fall within each skill level.</p> <p>*Skill levels:</p> <p>Level 1: Unacceptable – 1 point. The student's answer is very poor.</p> <p>Level 2: Poor – 2 points. The student's answer is acceptable.</p> <p>Level 3: Acceptable– 3 points. The student's answer has minor deficiencies.</p> <p>Level 4: Well done – 4 points. The student shows command of the subject.</p> <p>Direct - Exam (Course)</p> <p><i>Introduction Quantum Mechanics: PHYS 4320</i></p> <p>Target</p> <p>We aim at 86% of students scoring at or above skill level 3.</p>	<p>MET</p> <p>Analysis</p> <p>COMBINED DATA FOR OUTCOME 2, 2024-2025 (7 students):</p> <p>The following table illustrates the results of our analysis for the 2024-2025 AY:</p> <table><tr><td>COMBINED 2024-2025</td><td>7</td></tr><tr><td>SKILL</td><td>LEVEL 1</td><td>LEVEL 2</td><td>LEVEL 3</td><td>LEVEL 4</td><td>TOTAL > 3</td></tr><tr><td>I</td><td>0.00%</td><td>0.00%</td><td>28.57%</td><td>71.43%</td><td>100.00%</td></tr><tr><td>II</td><td>0.00%</td><td>0.00%</td><td>42.86%</td><td>57.14%</td><td>100.00%</td></tr><tr><td>III</td><td>0.00%</td><td>0.00%</td><td>33.33%</td><td>66.67%</td><td>100.00%</td></tr><tr><td>IV</td><td>0.00%</td><td>0.00%</td><td>42.86%</td><td>57.14%</td><td>100.00%</td></tr></table> <p>Based on the above data, we reached our goal of 86% cumulative threshold at or above Level #3 for all skills I-IV. Thus, we consider that Outcome 2 is met. Since every year we test a relatively small number of students, 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:</p> <p>CUMULATIVE DATA FOR OUTCOME 2, 2009-2024 (173 Students):</p> <table><tr><td>CUMULATIVE 2009-2024</td><td>173</td></tr><tr><td>SKILL</td><td>LEVEL 1</td><td>LEVEL 2</td><td>LEVEL 3</td><td>LEVEL 4</td><td>TOTAL > 3</td></tr><tr><td>I</td><td>0.00%</td><td>3.05%</td><td>13.21%</td><td>78.18%</td><td>91.39%</td></tr><tr><td>II</td><td>0.31%</td><td>4.35%</td><td>27.72%</td><td>63.80%</td><td>91.52%</td></tr><tr><td>III</td><td>0.31%</td><td>5.21%</td><td>27.76%</td><td>62.88%</td><td>90.65%</td></tr><tr><td>IV</td><td>0.31%</td><td>5.97%</td><td>26.34%</td><td>66.63%</td><td>92.97%</td></tr></table> <p>COMPARATIVE DATA FOR OUTCOME 2, 2024-2025 vs. 2009-2024:</p> <p>COMPARATIVE 2024-2025 VS 2009-2024</p> <table><tr><td>SKILL</td><td>LEVEL 1</td><td>LEVEL 2</td><td>LEVEL 3</td><td>LEVEL 4</td><td>TOTAL > 3</td></tr><tr><td>I</td><td>0.00%</td><td>-3.05%</td><td>15.36%</td><td>-6.76%</td><td>8.61%</td></tr><tr><td>II</td><td>-0.31%</td><td>-4.35%</td><td>15.14%</td><td>-6.66%</td><td>8.48%</td></tr><tr><td>III</td><td>-0.31%</td><td>-5.21%</td><td>5.57%</td><td>3.78%</td><td>9.35%</td></tr><tr><td>IV</td><td>-0.31%</td><td>-5.97%</td><td>16.52%</td><td>-9.49%</td><td>7.03%</td></tr></table>	COMBINED 2024-2025	7	SKILL	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	TOTAL > 3	I	0.00%	0.00%	28.57%	71.43%	100.00%	II	0.00%	0.00%	42.86%	57.14%	100.00%	III	0.00%	0.00%	33.33%	66.67%	100.00%	IV	0.00%	0.00%	42.86%	57.14%	100.00%	CUMULATIVE 2009-2024	173	SKILL	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	TOTAL > 3	I	0.00%	3.05%	13.21%	78.18%	91.39%	II	0.31%	4.35%	27.72%	63.80%	91.52%	III	0.31%	5.21%	27.76%	62.88%	90.65%	IV	0.31%	5.97%	26.34%	66.63%	92.97%	SKILL	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	TOTAL > 3	I	0.00%	-3.05%	15.36%	-6.76%	8.61%	II	-0.31%	-4.35%	15.14%	-6.66%	8.48%	III	-0.31%	-5.21%	5.57%	3.78%	9.35%	IV	-0.31%	-5.97%	16.52%	-9.49%	7.03%	<p>No actions have been added.</p>
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SLO#3: Communicating Physics processes in writing.

Students will learn about crystal 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). These courses are used to assess SLO #3.

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<p>SLO #3: Assessment using PHYS 4370 and PHYS 4480</p> <p>The students will be tested, late in the semester, their written exams will be 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. Following skills are used in the assessment process:</p> <ol style="list-style-type: none">1. Attaching the correct meaning to the given information with proper units.2. Identifying for what the physics problem is asking.3. Identifying the physics relationships that need to be used.4. Correct application of mathematics and reaching the correct numerical solution. <p>Their distribution is indicated with percentages in the Rubric. In calculating the percentages, we used the following procedure: For each student in each skill investigated, we obtained scores by averaging those received from faculty members. Then, for each area investigated, we calculated the percentage of students that fall within each skill level.</p> <p>*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.</p> <p>Direct - Exam (Course)</p> <p><i>Solid State Phys: PHYS 4370</i></p> <p>Target</p> <p>We aim at 86% of students scoring at or above skill level 3.</p>	<p>MET</p> <p>Analysis</p> <p>COMBINED DATA FOR OUTCOME 3, 2024-2025 (11 students)</p> <p>The following table illustrates the results of our analysis for the 2024-2025 AY:</p> <table><tr><td>COMBINED 2024-2025</td><td>11</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>SKILL</td><td>LEVEL 1</td><td>LEVEL 2</td><td>LEVEL 3</td><td>LEVEL 4</td><td>TOTAL > 3</td><td></td></tr><tr><td>I</td><td>0.00%</td><td>3.03%</td><td>24.24%</td><td>72.73%</td><td>96.97%</td><td></td></tr><tr><td>II</td><td>0.00%</td><td>6.06%</td><td>48.48%</td><td>45.45%</td><td>93.94%</td><td></td></tr><tr><td>III</td><td>0.00%</td><td>3.03%</td><td>33.33%</td><td>63.64%</td><td>96.97%</td><td></td></tr><tr><td>IV</td><td>12.12%</td><td>9.09%</td><td>33.33%</td><td>45.45%</td><td>78.79%</td><td></td></tr></table> <p>Based on the above data, we reached our goal of 86% cumulative threshold at or above Level #3 for all skills but Skill IV. Thus, we consider that Outcome 3 is met/partially met. Since every year we test a relatively small number of students, 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:</p> <p>CUMULATIVE DATA FOR OUTCOME 3, 2009-2024 (224 Students):</p> <table><tr><td>CUMULATIVE 2009-2024</td><td>224</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>SKILL</td><td>LEVEL 1</td><td>LEVEL 2</td><td>LEVEL 3</td><td>LEVEL 4</td><td>TOTAL > 3</td><td></td></tr><tr><td>I</td><td>0.53%</td><td>3.96%</td><td>19.15%</td><td>70.59%</td><td>89.74%</td><td></td></tr><tr><td>II</td><td>0.24%</td><td>4.32%</td><td>26.67%</td><td>61.70%</td><td>88.37%</td><td></td></tr><tr><td>III</td><td>0.24%</td><td>5.62%</td><td>31.33%</td><td>57.03%</td><td>88.37%</td><td></td></tr><tr><td>IV</td><td>0.39%</td><td>7.38%</td><td>36.90%</td><td>49.56%</td><td>86.46%</td><td></td></tr></table> <p>COMPARATIVE DATA FOR OUTCOME 3, 2024-2024 vs. 2009-2024:</p> <p>COMPARATIVE 2024-2025 VS 2009-2024</p> <table><tr><td>SKILL</td><td>LEVEL 1</td><td>LEVEL 2</td><td>LEVEL 3</td><td>LEVEL 4</td><td>TOTAL > 3</td><td></td></tr><tr><td>I</td><td>-0.53%</td><td>-0.93%</td><td>5.09%</td><td>2.14%</td><td>7.23%</td><td></td></tr><tr><td>II</td><td>-0.24%</td><td>1.74%</td><td>21.82%</td><td>-16.25%</td><td>5.57%</td><td></td></tr><tr><td>III</td><td>-0.24%</td><td>-2.59%</td><td>2.00%</td><td>6.60%</td><td>8.60%</td><td></td></tr><tr><td>IV</td><td>11.73%</td><td>1.71%</td><td>-3.56%</td><td>-4.11%</td><td>-7.67%</td><td></td></tr></table>	COMBINED 2024-2025	11						SKILL	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	TOTAL > 3		I	0.00%	3.03%	24.24%	72.73%	96.97%		II	0.00%	6.06%	48.48%	45.45%	93.94%		III	0.00%	3.03%	33.33%	63.64%	96.97%		IV	12.12%	9.09%	33.33%	45.45%	78.79%		CUMULATIVE 2009-2024	224						SKILL	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	TOTAL > 3		I	0.53%	3.96%	19.15%	70.59%	89.74%		II	0.24%	4.32%	26.67%	61.70%	88.37%		III	0.24%	5.62%	31.33%	57.03%	88.37%		IV	0.39%	7.38%	36.90%	49.56%	86.46%		SKILL	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	TOTAL > 3		I	-0.53%	-0.93%	5.09%	2.14%	7.23%		II	-0.24%	1.74%	21.82%	-16.25%	5.57%		III	-0.24%	-2.59%	2.00%	6.60%	8.60%		IV	11.73%	1.71%	-3.56%	-4.11%	-7.67%		<p>No actions have been added.</p>
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I	-0.53%	-0.93%	5.09%	2.14%	7.23%																																																																																																																				
II	-0.24%	1.74%	21.82%	-16.25%	5.57%																																																																																																																				
III	-0.24%	-2.59%	2.00%	6.60%	8.60%																																																																																																																				
IV	11.73%	1.71%	-3.56%	-4.11%	-7.67%																																																																																																																				

General Outcome Actions

ACTIONS

Additional Training

IN PROGRESS

Extra home works and/or lab work might be necessary in PHYS 4480 so that the SLO #3 could be fully met in Skill Level IV. The definitions of skill levels have been provided in measures.

Recommended Due Date: 05/15/2026