		Degree: 2023-2024 Assessment Plan
	Student Learning Outcome #1	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.
PLAN	Assessment Method(s)	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:
		 Attaching the correct meaning to the given information with proper units. Identifying for what the physics problem is asking. Identifying the physics relationships that need to be used. Correct application of mathematics and reaching the correct numerical solution.
		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.
		*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.
	Proficiency	We will use a 4-point rubric to assess SLO #1. The minimum acceptable score is 3 out of 4.

O Benchmark	We aim at 86% of stu	We aim at 86% of students scoring at or above skill level 3.							
Results of Assessment	Thus, we consider that	Based on the above data, we reached our goal of 86% cumulative threshold at or above Level #3 for all skil Thus, we consider that Outcome 1 is met. Since every year we test a relatively small number of students, it more helpful to compare this year's results (combined) with the cumulative results of the past few years. S							
	SKILL	LEVEL 1					TOTAL > 3		
	1	0.0%	0.0%	0.0%			100.00%		
	ll u	0.0%	0.0%	22.29			100.00%		
	III	0.0%	0.0%	44.49	% 55.	6%	100.00%		
Analysis of Results	CUMULATIVE DATA FOR		1, 2009-20	11.19 23 (156 Stu	1	9%	100.00%		
Analysis of Results	CUMULATIVE DATA FOR CUMULATIVE 2009-2023 SKILL I	156 LEVEL 1 0.3%	1, 2009-20 LEVEL 2 2.4%	23 (156 Stu LEVEL 3 18.2%	dents) LEVEL 4 79.0%	TOTAL 97.28	. > 3		
Analysis of Results	CUMULATIVE DATA FOR	156 LEVEL 1 0.3% 1.0%	LEVEL 2 2.4% 3.8%	23 (156 Stu LEVEL 3 18.2% 24.0%	dents) LEVEL 4 79.0% 69.6%	TOTAL 97.28 93.54	. > 3 8% 4%		
Analysis of Results	CUMULATIVE DATA FOR CUMULATIVE 2009-2023 SKILL I	156 LEVEL 1 0.3%	1, 2009-20 LEVEL 2 2.4%	23 (156 Stu LEVEL 3 18.2%	dents) LEVEL 4 79.0%	TOTAL 97.28	- > 3 8% 4% 9%		
Analysis of Results	CUMULATIVE DATA FOR CUMULATIVE 2009-2023 SKILL I II	156 LEVEL 1 0.3% 1.0% 2.3% 2.3% R OUTCOM	LEVEL 2 2.4% 3.8% 5.0% 10.1% JE 1, 2023-2	23 (156 Stu LEVEL 3 18.2% 24.0% 27.3% 31.1%	dents) LEVEL 4 79.0% 69.6% 64.2% 54.1%	TOTAL 97.28 93.54 91.49	- > 3 8% 4% 9%		
Analysis of Results	CUMULATIVE DATA FOR CUMULATIVE 2009-2023 SKILL I II III IV COMPARATIVE DATA FO	156 LEVEL 1 0.3% 1.0% 2.3% 2.3% R OUTCOM	LEVEL 2 2.4% 3.8% 5.0% 10.1% JE 1, 2023-2	23 (156 Stu LEVEL 3 18.2% 24.0% 27.3% 31.1%	dents) LEVEL 4 79.0% 69.6% 64.2% 54.1%	TOTAL 97.28 93.54 91.49	-> 3 8% 4% 9%		
Analysis of Results	CUMULATIVE DATA FOR CUMULATIVE 2009-2023 SKILL I II III IV COMPARATIVE DATA FO	156 LEVEL 1 0.3% 1.0% 2.3% 2.3% R OUTCOM	LEVEL 2 2.4% 3.8% 5.0% 10.1% E 1, 2023-2	23 (156 Stu LEVEL 3 18.2% 24.0% 27.3% 31.1% 024 vs. 200	dents) LEVEL 4 79.0% 69.6% 64.2% 54.1% 9-2023	70TAL 97.28 93.54 91.49 85.21	->3 8% 44% 99% 11%		
Analysis of Results	CUMULATIVE DATA FOR CUMULATIVE 2009-2023 SKILL I II III IV COMPARATIVE DATA FO	156 LEVEL 1 0.3% 1.0% 2.3% 2.3% R OUTCOM	LEVEL 2 2.4% 3.8% 5.0% 10.1% E 1, 2023-2	23 (156 Stu LEVEL 3 18.2% 24.0% 27.3% 31.1% 024 vs. 200	dents) LEVEL 4 79.0% 69.6% 64.2% 54.1% 9-2023	TOTAL 97.28 93.54 91.49 85.21	->3 8% 44% 99% 11%		
Analysis of Results	CUMULATIVE DATA FOR CUMULATIVE 2009-2023 SKILL I II III IV COMPARATIVE DATA FO COMPARATIVE 2023-2024 SKILL I	156 LEVEL 1 0.3% 1.0% 2.3% 2.3% R OUTCOM VS 2009-202 LEVEL 1 -0.34%	LEVEL 2 2.4% 3.8% 5.0% 10.1% E 1, 2023-2	23 (156 Stu LEVEL 3 18.2% 24.0% 27.3% 31.1% 024 vs. 200 LEVEL 3 -18.24%	dents) LEVEL 4 79.0% 69.6% 64.2% 54.1% 9-2023 LEVEL 4 20.96%	TOTAL 97.28 93.54 91.49 85.21	->3 8% 4% 99% 11%		

ACT	Improvement Plan for 2024-2025	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 AY2023-2024 as all targets were met the previous AY. 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 AY2023-AY2024 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, like 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 AY2023-2024. *PHYS 4480 was not offered in AY2023-2024, so the data only consists of PHYS 4320 and PHYS 4370 students. While we met all our targets in AY 2023-2024, we will discuss additional plans with Physics faculty in Fall of 2024 and raise our goals for upcoming academic year for continued improvement. These plans will be revealed in our Action Plan in Fall 2024.

		Degree: 2023-2024 Assessment Plan
S	tudent Learning Outcome #2	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.
PLAN A	Assessment Method(s)	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: 1. Attaching the correct meaning to the given information with proper units. 11. Identifying for what the physics problem is asking. 111. Identifying the physics relationships that need to be used. 112. Correct application of mathematics and reaching the correct numerical solution. 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. *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.

	Proficiency	We will use a 4-po	oint rubric	to assess S	SLO #1. Th	ne minimu	ım accepta	e score is 3 out of 4.	
DO	Benchmark	We aim at 86% of s	tudents sco	ring at or a	bove skill l	evel 3.			
	Results of Assessment	The following table il	lustrates the	results of ou	ır analysis fo	or the 2023	-2024 AY:		
		SKILL	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	TOTAL > 3		
		1	0.00%	0.00%	0.00%	100.00%	100.00%		
		II	0.00%	0.00%	0.00%	100.00%	100.00%		
		III	0.00%	0.00%	5.56%	94.44%	100.00%		
		IV	0.00%	0.00%	16.67%	83.33%	100.00%		
		Based on the above of	data, we reacl	ned our goa	l of 86% cur	nulative thr	eshold at or a	ove Level #3 for all skills I	-IV.
		Thus, we consider the	at Outcome 2 pare this year	is met. Sind 's results (co	ce every yea ombined) w	r we test a	relatively sma	ove Level #3 for all skills I number of students, it is If the past few years. Suc	
S	Analysis of Results	Thus, we consider the more helpful to comp	at Outcome 2 pare this year nd combined	is met. Sinc 's results (co results are a	ce every yea ombined) w s follows:	r we test a ith the cum	relatively sma	number of students, it is	
Т	Analysis of Results	Thus, we consider the more helpful to comp cumulative results ar	at Outcome 2 pare this year nd combined OR OUTCOMI	is met. Sinc 's results (co results are a	ce every yea ombined) w s follows:	r we test a ith the cum	relatively sma	number of students, it is	
T U	Analysis of Results	Thus, we consider the more helpful to comp cumulative results an CUMULATIVE DATA F	at Outcome 2 pare this year nd combined OR OUTCOMI	is met. Sinc 's results (co results are a	ce every yea ombined) w s follows:	r we test a ith the cum	relatively sma	number of students, it is	
T U D	Analysis of Results	Thus, we consider the more helpful to comp cumulative results an CUMULATIVE DATA FOR CUMULATIVE 2009-202	at Outcome 2 pare this year ad combined of	is met. Since 's results (content of the content of	ce every yea ombined) w s follows: 123 (166 Stu	r we test a ith the cum dents)	relatively sma	number of students, it is	
T U	Analysis of Results	Thus, we consider the more helpful to comp cumulative results an CUMULATIVE DATA FOR CUMULATIVE 2009-202	at Outcome 2 pare this year ad combined OR OUTCOMI 23 166 LEVEL 1	is met. Sind 's results (coresults are a E 2, 2009-20	ce every year ombined) w s follows: 023 (166 Stu	dents)	relatively smaulative result	number of students, it is	
T U D	Analysis of Results	Thus, we consider the more helpful to comp cumulative results an CUMULATIVE DATA FOR CUMULATIVE 2009-202 SKILL	at Outcome 2 pare this year and combined of OR OUTCOMI 23 166 LEVEL 1 0.00%	is met. Since is results (coresults are a second se	ce every year ombined) w s follows: 023 (166 Stu LEVEL 3 13.77%	dents)	relatively sma ulative result TOTAL > 3 95.25%	number of students, it is	

COMPARATIVE 2023-	2024 VS 2009-20	23			
SKILL	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	TOTAL > 3
1	0.00%	-3.17%	-13.77%	18.52%	4.75%
II	-0.32%	-4.54%	-28.89%	33.51%	4.62%
III	-0.32%	-5.42%	-23.38%	28.91%	5.53%
IV	-0.32%	-6.23%	-8.98%	16.30%	7.33%

The comparative data reveals an incremental improvement as shown in the last column, but due to poor statistics, this cannot be relied upon. We will continue to monitor comparative statistics for tracking purposes.

ACT	Improvement Plan for 2024-2025

		Degree: 2023-2024 Assessment Plan
	Student Learning Outcome #3	SLO#3: Communicating Physics processes in writing.
		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). These courses are used to assess SLO #3.
PLAN	Assessment Method(s)	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:
		 Attaching the correct meaning to the given information with proper units. II. Identifying for what the physics problem is asking. III. Identifying the physics relationships that need to be used. IV. Correct application of mathematics and reaching the correct numerical solution.
		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.
		*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.
	Proficiency	We will use a 4-point rubric to assess SLO #1. The minimum acceptable score is 3 out of 4.

DO Benchm	ark	We aim at 86% of stud	dents scori	ing at or ab	ove skill lev	/el 3.		
Results	of Assessment	COMBINED DATA FOR OUTCOME 3*, 2023-2024 (3 students) The following table illustrates the results of our analysis for the 2023-2024 AY:						
		SKILL	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	TOTAL > 3	
		1	0.00%	0.00%	0.00%	100.00%	100.00%	
		П	0.00%	0.00%	0.00%	100.00%	100.00%	
		III	0.00%	0.00%	11.11%	88.89%	100.00%	
		IV	0.00%	0.00%	33.33%	66.67%	100.00%	
		helpful to compare this results and combined re	•	•	d) with the o	cumulative r	esults of the	
S Analysis	of Results	results and combined re	outs are as	follows:			esults of the	
S Analysis T	of Results	CUMULATIVE DATA FOR	OUTCOME	follows: 3, 2009-202	3 (213 Stud	ents)		
T	of Results	results and combined re	OUTCOME 213 LEVEL 1	3, 2009-202	3 (213 Stud	ents)	TOTAL > 3	
T U	of Results	CUMULATIVE DATA FOR CUMULATIVE 2009-2023 SKILL I	OUTCOME 213 LEVEL 1 0.56%	3, 2009-202 LEVEL 2 4.16%	3 (213 Students) LEVEL 3 20.14%	ents) LEVEL 4 72.82%	TOTAL > 3 92.96%	
T U D	of Results	CUMULATIVE DATA FOR CUMULATIVE 2009-2023 SKILL I	OUTCOME 213 LEVEL 1 0.56% 0.25%	3, 2009-202 LEVEL 2 4.16% 4.54%	3 (213 Students) LEVEL 3 20.14% 28.05%	LEVEL 4 72.82% 63.48%	TOTAL > 3 92.96% 91.53%	
T U D	of Results	CUMULATIVE DATA FOR CUMULATIVE 2009-2023 SKILL I II III	OUTCOME 213 LEVEL 1 0.56% 0.25% 0.25%	3, 2009-202 LEVEL 2 4.16% 4.54% 5.91%	3 (213 Stude LEVEL 3 20.14% 28.05% 32.79%	LEVEL 4 72.82% 63.48% 58.73%	TOTAL > 3 92.96% 91.53% 91.52%	
T U D	of Results	CUMULATIVE DATA FOR CUMULATIVE 2009-2023 SKILL I	OUTCOME 213 LEVEL 1 0.56% 0.25%	3, 2009-202 LEVEL 2 4.16% 4.54%	3 (213 Students) LEVEL 3 20.14% 28.05%	LEVEL 4 72.82% 63.48%	TOTAL > 3 92.96% 91.53%	
T U D	of Results	CUMULATIVE DATA FOR CUMULATIVE 2009-2023 SKILL I II III	OUTCOME 213 LEVEL 1 0.56% 0.25% 0.41%	3, 2009-202 LEVEL 2 4.16% 4.54% 5.91% 7.76%	3 (213 Stude LEVEL 3 20.14% 28.05% 32.79% 38.33%	LEVEL 4 72.82% 63.48% 58.73% 51.18%	TOTAL > 3 92.96% 91.53% 91.52%	
T U D	of Results	CUMULATIVE DATA FOR CUMULATIVE 2009-2023 SKILL I II III IV	OUTCOME 213 LEVEL 1 0.56% 0.25% 0.41% R OUTCOM	3, 2009-202 LEVEL 2 4.16% 4.54% 5.91% 7.76% E 3, 2023-20	3 (213 Stude LEVEL 3 20.14% 28.05% 32.79% 38.33%	LEVEL 4 72.82% 63.48% 58.73% 51.18%	TOTAL > 3 92.96% 91.53% 91.52%	
T U D	of Results	CUMULATIVE DATA FOR CUMULATIVE 2009-2023 SKILL I II III IV COMPARATIVE DATA FOR	OUTCOME 213 LEVEL 1 0.56% 0.25% 0.25% 0.41% R OUTCOM VS 2009-202 LEVEL 1	3, 2009-202 LEVEL 2 4.16% 4.54% 5.91% 7.76% E 3, 2023-20	3 (213 Stude LEVEL 3 20.14% 28.05% 32.79% 38.33% 24 vs. 2009 LEVEL 3	EVEL 4 72.82% 63.48% 58.73% 51.18%	TOTAL > 3 92.96% 91.53% 91.52%	
T U D	of Results	CUMULATIVE DATA FOR CUMULATIVE 2009-2023 SKILL I II III IV COMPARATIVE DATA FOR COMPARATIVE 2022-2023	OUTCOME 213 LEVEL 1 0.56% 0.25% 0.41% R OUTCOM VS 2009-202	3, 2009-202 LEVEL 2 4.16% 4.54% 5.91% 7.76% E 3, 2023-20	3 (213 Stude LEVEL 3 20.14% 28.05% 32.79% 38.33% 24 vs. 2009	EVEL 4 72.82% 63.48% 58.73% 51.18%	TOTAL > 3 92.96% 91.53% 91.52% 89.52%	
T U D	of Results	CUMULATIVE DATA FOR CUMULATIVE 2009-2023 SKILL I II III IV COMPARATIVE DATA FOR COMPARATIVE 2022-2023	213 LEVEL 1 0.56% 0.25% 0.41% R OUTCOM VS 2009-202 LEVEL 1 -0.56% -0.25%	3, 2009-202 LEVEL 2 4.16% 4.54% 5.91% 7.76% E 3, 2023-20 LEVEL 2 -4.16% -4.54%	3 (213 Stude LEVEL 3 20.14% 28.05% 32.79% 38.33% 24 vs. 2009 LEVEL 3 -20.14% -28.05%	EVEL 4 72.82% 63.48% 58.73% 51.18% -2023 LEVEL 4 27.18% 36.52%	TOTAL > 3 92.96% 91.53% 91.52% 89.52% TOTAL > 3 7.04% 8.47%	
T U D	of Results	CUMULATIVE DATA FOR CUMULATIVE 2009-2023 SKILL I II III IV COMPARATIVE DATA FOR COMPARATIVE 2022-2023 SKILL I	213 LEVEL 1 0.56% 0.25% 0.41% R OUTCOM VS 2009-207 LEVEL 1 -0.56%	3, 2009-202 LEVEL 2 4.16% 4.54% 5.91% 7.76% E 3, 2023-20 LEVEL 2 -4.16%	3 (213 Stude LEVEL 3 20.14% 28.05% 32.79% 38.33% 24 vs. 2009 LEVEL 3 -20.14%	EVEL 4 72.82% 63.48% 58.73% 51.18% -2023 LEVEL 4 27.18%	TOTAL > 3 92.96% 91.53% 91.52% 89.52% TOTAL > 3 7.04%	

	The comparative data reveals an incremental improvement as shown in the last column, but due to poor statistics, this cannot be relied upon. We will continue to monitor comparative statistics for tracking purposes.
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