Annual Program Assessment Report

Assessment reports are to be submitted annually by program/s. The report deadline is September 15th .

The use of this template is optional, however, any assessment report submitted must contain the required information provided in template.

Academic Year: AY17-18

Department:Department of Physics

Program(s) Assessed: Undergraduate

Indicate all majors, minors, certificates and/or options that are included in this assessment:

Majors/Minors/Certificate	Options
B.S. in Physics	**Professional option**
B.S. in Physics	**Interdisciplinary option**
B.S. in Physics	**Teaching option**
Physics Minor	**Non-teaching**

Annual Assessment Process

1. Data are collected as defined by Assessment Plan
2. Population or unbiased samples of collected assignments are scored by at least two faculty members using scoring rubrics to ensure inter-rater reliability.
3. Areas where the acceptable performance threshold has not been met are highlighted.
4. The scores are presented at a program/unit faculty meeting for assessment.
5. The faculty reviews the assessment results, and responds accordingly.
    a. If an acceptable performance threshold **has not been met**, possible responses:
        - Gather additional data to verify or refute the result.
        - Identify potential curriculum changes to try to address the problem
        - Change the acceptable performance threshold, reassess
        - Choose a different assignment to assess the outcome
    b. If acceptable performance threshold **has been met**, possible responses:
        - Faculty may reconsider thresholds
        - Evaluate the rubric to assure outcomes meet student skill level (example – classes with differing learning outcomes based on student level)
        - Use Bloom's Taxonomy to consider stronger learning outcomes
        - Choose a different assignment to assess the outcome
6. **Demonstrate the impact of the assessment response in next assessment cycle.**
7. Submit Assessment reports annually to report assessment activities and results by program. The report deadline is September 15th.

1. What Was Done

Based on our assessment plan, we evaluated program learning outcomes 3 and 5 this year.

3. Communication skills: Graduates are expected to have the ability to present the results of their work in oral and written form, as well as the ability to communicate with members of scientific teams, supervisors, and clients.

5. Experimental design skills: Students will complete Capstone projects that integrate their physics knowledge and problem-solving skills, including basic electronics, data acquisition, data analysis, and experimental design as appropriate to the research topic.

Curriculum Map: Where assessment data will be collected

Number	Course Title	Credits	Outcomes 1	2	3	4	5	6
224	Thermo/Modern Phys III	4	x					
261	Lab Electronics I	2			x		x	
262	Lab Electronics II	2			x		x	
301	Intro Theoretical Phys	3	x			x		
305	Holography	3		x			x	x
320	Classical Mechanics	4	x					
331	Computational Phys	1				x		
343	Modern Physics	3	x					
371	Solar Astronomy	4		x				x
373	Stars/Galaxy/Universe	4		x				x
423	Elect & Magnetism I	3	x					
425	Elect & Magnetism II	3	x					
427	Advanced Optics	3		x				x
435	Astrophysics	3		x				x
437	Laser Applications	3		x				x
441	Solid State Phys	3		x				x
444	Advanced Lab	4			x		x	
446	Thermo/Statis Phys	3		x				x
451	Particle Physics	3		x				x
461	Quant Mech I	3	x					
462	Quant Mech II	3	x					
490	UG Research	1-3			x		x	
499	Sen Cap Pres	1			x		x	

Assessment Schedules

	Year					
Outcome	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
1		x			x	
2			x			x
3	x			x		
4			x			x
5	x			x		
6		x			x	

2. What Data Were Collected

Assessment data were collected from the instructors of PHSX 261 (Electronics lab 1), PHSX 262 (Electronics lab 2), PHSX 444 (Advanced Lab), PHSX 490 (UG Research), and PHSX 499 (Senior Capstone presentation). Assessment data for communication skills include course pass-rates, final grades, examples of written reports and lab notebooks, and instructor comments on classroom discussions. Assessment data for research and experimental laboratory skills include course pass-rates, final grades, examples of written reports and lab notebooks, and instructor comments student's ability to conduct lab procedures.

Communication Skills: Assessment of communication skills is an on-going process during coursework in physics. Students are expected to submit written work in each course and to participate actively in classroom discussions and presentations. Laboratory courses require increasingly complex written reports. These assessments are the responsibility of the instructors of the courses who grade projects using the rubrics given below.

Research and Experimental laboratory skills: Assessment of research and laboratory skills is through observation of lab procedures and the submission of written laboratory reports. These assessments are the responsibility of the instructors of the courses. When appropriate, additional faculty will help critique laboratory projects. Students will complete senior projects that integrate their physics knowledge and problem-solving skills. Their research skills will be continually assessed by their research advisors.

3. Explain how Data Were Analyzed

The departmental Undergraduate Curriculum Committee is tasked with performing the undergraduate assessment. They discussed the data collected and had discussions with the instructors. The committee's evaluation focused on the prescribed outcomes and specifically used the scoring rubrics given below.

Scoring Rubrics:

Exceptional (4) – The work is fully correct and complete, with correct responses and proper application of concepts to solve problems correctly with only minor mistakes; indicates originality of thinking.

Exceeds expectations (3) – The work is typically correct and complete, with only occasional errors in responses and applications of concepts to solve problems.

Acceptable (2) – The work contains incorrect responses less than half the time and problem solutions are often missing important steps or are incomplete.

Below expectations (1) – Responses to questions are frequently incorrect and problem solutions show little progress toward completion or are regularly incorrect.

Unacceptable (0) – Responses to questions are missing or not attempted. Exam or homework problems are regularly not started or not submitted.

4. What Was Learned

The overall average score for all courses is a 3.1 (well above acceptable and exceeds expectations). Each course was individually above acceptable and some were above exceeds expectations. Of exceptional note was PHSX 499 (senior capstone presentations) which received a 3.7
b) Describe how results were communicated to the department and used to develop plans for improvement.

5. How We Responded

No changes are needed in PHSX 261 (Electronics lab 1), PHSX 262 (Electronics lab 2), PHSX 444 (Advanced Lab), PHSX 490 (UG Research), and PHSX 499 (Senior Capstone presentation). Similar to last year, the committee observed that our courses are not adequately meeting the computational needs of the students. Insufficient time was spent on coding in Mathematica compared to other program languages and programming in PASCAL is absent. As a result of this, changes in PHSX 261, PHSX 262, and PHSX 444 will be made to more adequately incorporate PASCAL (these changes have been initiated in 2017 and will be reviewed both in 2019-20 and in 2023-24. The latter date is when learning outcomes 3 and 5 are again reviewed.

5. Closing the Loop

In last year's assessment we determined that modifications in PHSX 331 were required to also more adequately reflect the computational needs of the students, that insufficient time was spent on coding in Mathematica compared to other program languages, and that a review of what other coding languages are needed should be made. This assessment concurs and represents the review of other coding needs. PHSX 331 has been changed to include PASCAL as the programming language.