

## PHYSICS & ASTONOMY ASSESSMENT PLAN

Department/Program: Physics and Astronomy

### Student Learning Objectives (SLO) for MAJORS

Students majoring in physics will:

1. acquire problem-solving skills that involve conceptual and logical understanding and appropriate mathematical manipulation.
2. acquire skills that allow them to design experimental protocols, collect relevant data, interpret the results using data reduction and error analysis methods, while using appropriate software tools.
3. acquire a general knowledge of physics and astronomy.
4. acquire scientific and technical oral and written communication skills.
5. acquire the ability to formulate scientific questions and problems, use bibliographic resources to review the professional literature, and work collaboratively with other students and faculty.

Outcome Measure	SLO's	Description of Departmental Use of Data
A. Standardized pre/post test on Newtonian mechanics given in fall semester intro physics courses	1, 3	Data are reported to department and discussed at annual assessment meeting(s). Department encourages instructors to make pedagogical improvements, takes appropriate department-level actions, and reports outcomes to Dean and other bodies that have resources to address problems. Data are reviewed and reported as part of program review process every 5 years
B. Student evaluation of computational physics instruction	1	Instructor report results to department, which takes action as above.
C. Explicit instructor evaluation of students in required senior independent research project	2, 4, 5	Senior project instructor shares data with department, which takes action as above
D. Standardized survey of summer research students to measure benefits of research experiences	2, 4, 5	Data are reviewed annually by department, which takes action as above
E. Exit survey for all graduating seniors	1, 2, 3, 4, 5	Data are reviewed annually by department, which takes action as above

1. **Results**—Briefly discuss assessment activities and findings during this cycle and describe what recent programmatic changes, if any, were made in response to the findings? Reference the SLO #.

<p><b>This year we assessed SLO(s)...</b> (list each SLO in its own row)</p>	<p><b>...using Outcome Measure(s) (OMs).</b> (See Report Instructions for description and example)  Direct OM(s):A, B, C  Indirect OM(s):D, E</p>	<p><b>Findings:</b> <b>program-performance for these SLOs, as indicated by these OMs, is:</b> <b>Excellent/Satisfactory/Needs Improvement</b> (See Report Instructions for description and example)</p>	<p><b>Strategies for Improvement</b>  <b>(in selected areas):</b> (See Report Instructions for description and example)</p>
<p>SLO1 (acquire problem-solving skills that involve conceptual and logical understanding and appropriate mathematical manipulation)</p>	<p>Direct: A Indirect: E</p>		
<p>SLO2 (acquire skills that allow them to design experimental protocols, collect relevant data, interpret the results using data reduction and error analysis methods, while using appropriate software tools)</p>	<p>Direct: C Indirect: D, E</p>		
<p>SLO3 (acquire a general knowledge of physics and astronomy)</p>	<p>Direct: A Indirect: E</p>		
<p>SLO4 (acquire scientific and technical oral and written communication skills)</p>	<p>Direct: C Indirect: D, E</p>		
<p>SLO5 (acquire the ability to formulate scientific questions and problems, use bibliographic resources to review the professional literature, and work collaboratively with other students and faculty)</p>	<p>Direct: C Indirect: D, E</p>		

2. What **revisions**, if any, to current SLOs and/or outcome measures did you make from previous plan?

3. **Plans**- What learning objectives will you be assessing in the next cycle?

Map II: Map Courses, Experiences and Activities to current Program/Department SLOs

**Physics & Astronomy Program/ Department SLOs-**

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3. acquire a general knowledge of physics and astronomy.
4. acquire scientific and technical oral and written communication skills.
5. acquire the ability to formulate scientific questions and problems, use bibliographic resources to review the literature, and work collaboratively with other students

*Instructions*

Mark the courses/events/experiences/activities that currently address either Program SLOs or VU/Gen Ed SLOs for Gen Ed courses

Enter an **I** to indicate students are introduced to the SLO

**R** indicates the SLO is reinforced and students afforded opportunities to practice

**M** indicates that students have had sufficient practice and can now demonstrate mastery appropriate for the degree level

**A** indicates where evidence is collected and evaluated for program-level assessment as specified in the Departmental Assessment Plan

Course/ Experience	Program/Department SLOs				
	#1	#2	#3	#4	#5
P111	I,A		I,A		
P111L		I		I	I
P112	I		I		
P112L		I		I	I
P141/151	I,A		I,A		
P141L		I		I	I
P142/152	I		I		
P142L		I		I	I

P190			I		
P243	R		R		
P245		R		R	R
P246		R			
P250	R		R		
P281	R		R		
P281L		R		R	R
Course/	<b>Program/Department SLOs</b>				
Experience	<b>#1</b>	<b>#2</b>	<b>#3</b>	<b>#4</b>	<b>#5</b>
P345		M		M	M
P360	M		M		
P371	M		M		
P372	M		M		
P381	M		M		
P421	M		M		
P422	M		M		
P430	M		M		
P430L		M		M	M
P440	M		M		
P445		M,A		M,A	M,A
P490			R	R	
P492	M		M		
P499			I,R		
A101	I,A		I,A		
A101L		I		I	I
A221		R		R	R

A252	R		R		
A253	R		R		
A445		M,A		M,A	M,A