

Assignments. Select **one** of the options below for assessment of one or more outcomes

Written assignment(s) that addresses/address outcome(s). Include outcome #, title and description for each assignment.

Outcome #: 5 Title: Physical Laws of Electricity and Magnetism

Description of assignment: See page at end of this document. It is possible that not all questions will be used each semester.

Essay question(s). Provide the question(s) and outcome(s) below.

- 1. Outcome #: _____ Essay Question: _____
- 2. Outcome #: _____ Essay Question: _____
- 3. Outcome #: _____ Essay Question: _____
- 4. Outcome #: _____ Essay Question: _____

Pilot asynchronous written discussion that addresses outcome(s). Provide the outcome # and question(s).

- 1. Outcome #: _____ Discussion Question: _____
- 2. Outcome #: _____ Discussion Question: _____
- 3. Outcome #: _____ Discussion Question: _____

Multiple Choice or T/F Marker questions – 3 to 4 questions per outcome. List the outcome and question numbers. A rubric is not used for Marker questions. "All the above" should not be used as the correct answer more than once. **Courses that are IW or SRV/SRVI must use written assignments for those attributes.** Complete the benchmark: We expect _____% of students to answer _____% of the question(s) correctly.

- 1. Outcome #: _____
 - a) Question: _____
 - b) Question: _____
 - c) Question: _____
 - d) Question: _____
- 2. Outcome #: _____
 - a) Question: _____
 - b) Question: _____
 - c) Question: _____
 - d) Question: _____
- 3. Outcome #: _____
 - a) Question: _____
 - b) Question: _____
 - c) Question: _____
 - d) Question: _____

Collecting and submitting the student assignment(s)

_____ Will upload assignment(s) to Pilot _____ Will give access to assignment(s) on Pilot

Other: __ Will hand out paper version during class or exam time _____

Rubric Selection (A, B). Select the items you feel best match your assignment(s) in the rubric(s) on the next pages. Please highlight in yellow. **If this course has an IW attribute, please also see section B.**

A. Element 6 Rubric. Select the item(s) you will use in your rubric by highlighting in yellow the item(s). You may select one or more of them. As there is overlap, choose the items that best fit the assignment you select for assessment. The items below are taken from the Association of American Colleges and Universities (AACU) Value Rubrics for Critical Thinking and Inquiry and Analysis.

IF YOU ARE USING MARKER QUESTIONS FOR THE OUTCOME, DO NOT USE THIS RUBRIC.

Item	Mastery 4	Partial Mastery 3	Progressing 2	Emerging 1
AACU Critical Thinking VALUE Rubric Items				
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence <i>Selecting and using information to investigate a point of view or conclusion</i>	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.

Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.
Item	Mastery 4	Partial Mastery 3	Progressing 2	Emerging 1
AACU <u>Inquiry and Analysis</u> VALUE Rubric Items				
Topic selection	Identifies a creative, focused, and manageable topic that addresses potentially significant yet previously less-explored aspects of the topic.	Identifies a focused and manageable/ doable topic that appropriately addresses relevant aspects of the topic.	Identifies a topic that while manageable/ doable, is too narrowly focused and leaves out relevant aspects of the topic.	Identifies a topic that is far too general and wide-ranging as to be manageable and doable.
Existing Knowledge, Research, and/or Views	Synthesizes in-depth information from relevant sources representing various points of view/ approaches.	Presents in-depth information from relevant sources representing various points of view/ approaches.	Presents information from relevant sources representing limited points of view/ approaches.	Presents information from irrelevant sources representing limited points of view/ approaches.

Design Process	All elements of the methodology or theoretical framework are skillfully developed. Appropriate methodology or theoretical frameworks may be synthesized from across disciplines or from relevant sub disciplines.	Critical elements of the methodology or theoretical framework are appropriately developed, however, more subtle elements are ignored or unaccounted for.	Critical elements of the methodology or theoretical framework are missing, incorrectly developed, or unfocused.	Inquiry design demonstrates a misunderstanding of the methodology or theoretical framework.
Analysis	Organizes and synthesizes evidence to reveal insightful patterns, differences, or similarities related to focus.	Organizes evidence to reveal important patterns, differences, or similarities related to focus.	Organizes evidence, but the organization is not effective in revealing important patterns, differences, or similarities.	Lists evidence, but it is not organized and/ or is unrelated to focus.
Conclusions	States a conclusion that is a logical extrapolation from the inquiry findings.	States a conclusion focused solely on the inquiry findings. The conclusion arises specifically from and responds specifically to the inquiry findings.	States a general conclusion that, because it is so general, also applies beyond the scope of the inquiry findings.	States an ambiguous, illogical, or unsupported conclusion from inquiry findings.
Limitations and Implications	Insightfully discusses in detail relevant and supported limitations and implications.	Discusses relevant and supported limitations and implications.	Presents relevant and supported limitations and implications.	Presents limitations and implications, but they are possibly irrelevant and unsupported.

B. If this is an IW course, you will use the items on this page. You may select one or more of them. Please highlight in yellow.

Item	Mastery 4	Partial Mastery 3	Progressing 2	Emerging 1
Includes considerations of audience, purpose, and the circumstances surrounding the writing task(s).	Demonstrates a thorough understanding of context, audience, and purpose that is responsive to the assigned task(s) and focuses all elements of the work.	Demonstrates adequate consideration of context, audience, and purpose and a clear focus on the assigned task(s) (e.g., the task aligns with audience, purpose, and context).	Demonstrates awareness of context, audience, purpose, and to the assigned tasks(s) (e.g., begins to show awareness of audience's perceptions and assumptions).	Demonstrates minimal attention to context, audience, purpose, and to the assigned tasks(s) (e.g., expectation of instructor or self as audience).
Content Development	Uses appropriate, relevant, and compelling content to illustrate mastery of the subject, conveying the writer's understanding, and shaping the whole work.	Uses appropriate, relevant, and compelling content to explore ideas within the context of the discipline and shape the whole work.	Uses appropriate and relevant content to develop and explore ideas through most of the work.	Uses appropriate and relevant content to develop simple ideas in some parts of the work.
Formal and informal rules inherent in the expectations for writing in particular forms and/or academic fields (please see glossary).	Demonstrates detailed attention to and successful execution of a wide range of conventions particular to a specific discipline and/or writing task (s) including organization, content, presentation, formatting, and stylistic choices	Demonstrates consistent use of important conventions particular to a specific discipline and/or writing task(s), including organization, content, presentation, and stylistic choices	Follows expectations appropriate to a specific discipline and/or writing task(s) for basic organization, content, and presentation	Attempts to use a consistent system for basic organization and presentation.
Sources and Evidence	Demonstrates skillful use of high-quality, credible, relevant sources to develop ideas that are appropriate for the discipline and genre of the writing	Demonstrates consistent use of credible, relevant sources to support ideas that are situated within the discipline and genre of the writing.	Demonstrates an attempt to use credible and/or relevant sources to support ideas that are appropriate for the discipline and genre of the writing.	Demonstrates an attempt to use sources to support ideas in the writing.
Control of Syntax and Mechanics	Uses graceful language that skillfully communicates meaning to readers with clarity and fluency, and is virtually error-free.	Uses straightforward language that generally conveys meaning to readers. The language in the portfolio has few errors.	Uses language that generally conveys meaning to readers with clarity, although writing may include some errors.	Uses language that sometimes impedes meaning because of errors in usage.

SECTION 3: UCRC COMMITTEE REVIEW ONLY. DO NOT delete this section.

Item	Complete / NA / Revision Requested	Comments
Learning Outcomes for Element 6 Natural Science	XX	
Assignments matched to Element 6 LOs	XX	
Rubric for LOs	XX	
Rubric for IW Attribute	N/A	
Assigned Approved Reviewers	XX	

Committee Review Completed

Committee Chair Signature Dr. Anne M. Bowling Date December 2019

Assessment Questions for Phy 2410

1. One of the foundational theories of Electrostatics is contained in Gauss's Law, stated here as

$$\oint \vec{E} \cdot d\vec{A} = \frac{q_{enclosed}}{\epsilon_0}$$

- In your words, what is the significance of this law? (What does it tell us?)
- This law can be used to extract the electric field in space easily for several charge distributions. List as many of these charge distribution as you can.
- Picking one of the charge distributions in part b, Find the electric field due to the charge distribution you identify giving all arguments in extracting the electric field.

2. One of the foundational theories of Magnetostatics is contained in Ampere's Law, stated here as:

$$\oint \vec{B} \cdot d\vec{\ell} = \mu_0 I_{enclosed}$$

- In your words, what is the significance of this law? (What does it tell us?)
- This law can be used to extract the magnetic field in space easily for several current configurations. List as many of these configurations as you can.
- Picking one of the current configurations in part b, Find the magnetic field due to the current configuration you identify giving all arguments to extract the magnetic field.

3. One of the foundational theories of time dependent E&M fields is that of magnetic induction by Faraday. His theory can be expressed by:

$$EMF = \oint \vec{E} \cdot d\vec{\ell} = -\frac{d\Phi_B}{dt}$$

- In your words, what is the significance of this law? (What does it tell us?)
- The minus sign in the above expression is known as Lenz's Law, in your words describe the meaning of this sign.
- This law can be used to explain an electric generator. Derive the expression for the voltage of an AC generator by rotating a fixed loop of wire at angular frequency (ω) in uniform magnetic field.

4. The foundation of geometrical optics is based on two empirical laws, the law of reflection and the law of refraction. The laws allow the understanding of object-image formation using mirrors and lenses. Consider and object placed 12 cm in front of concave mirror of radius of curvature of 10cm. Draw the sketch of the optical image formation using principal rays and identify the image formed as real/virtual, upright/inverted, and its magnification.

PHY 2410 Core Assessment Element 6 Report

A separate report needs to be submitted for each assessment plan approved by the Undergraduate Core Oversight Committee (UCOC).

This report must be uploaded to the Pilot course called Element 6 Core Course Assessment 2018-19 (continuous year) by Tuesday, October 1, 2019. The Final Report Dropbox link can be accessed via Content > Dropbox (Plans, Reports) > Final Report Dropbox.

Date Report Submitted: 01 October 2019

Element: Core Element 6 – Natural Science

Academic Year: 2018-2019

Course and Sections Assessed: PHY 2410, Sections 01 and 04

Assessment Plan:

The course must address all 5 outcomes but must assess a minimum of 1 outcome. Highlight in yellow the outcome(s) you will assess. If you have modified the outcomes, please insert here in place of standard outcomes.

1. Understand the nature of scientific inquiry;
2. Critically apply knowledge of scientific theory and methods of inquiry to evaluate information from a variety of sources;
3. Distinguish between science and technology and recognize their roles in society;
4. Demonstrate an awareness of theoretical, practical, creative and cultural dimensions of scientific inquiry; and
5. Discuss fundamental theories underlying modern science.

Written assignment(s) that addresses/address outcome(s). Include outcome #, title and description for each assignment.

1 to 4 scientific questions, not multiple choice.

Rubric used:

Item	Mastery 4	Partial Mastery 3	Progressing 2	Emerging 1
Analysis	Organizes and synthesizes evidence to reveal insightful patterns, differences, or similarities related to focus.	Organizes evidence to reveal important patterns, differences, or similarities related to focus.	Organizes evidence, but the organization is not effective in revealing important patterns, differences, or similarities.	Lists evidence, but it is not organized and/or is unrelated to focus.
Conclusions	States a conclusion that is a logical extrapolation from the inquiry findings.	States a conclusion focused solely on the inquiry findings. The conclusion arises specifically from and responds specifically to the inquiry findings.	States a general conclusion that, because it is so general, also applies beyond the scope of the inquiry findings.	States an ambiguous, illogical, or unsupported conclusion from inquiry findings.
Limitations and Implications	Insightfully discusses in detail relevant and supported limitations and implications.	Discusses relevant and supported limitations and implications.	Presents relevant and supported limitations and implications.	Presents limitations and implications, but they are possibly irrelevant and unsupported.

The assessment plan is summarized above. In section 01, the students were offered 3 of the possible questions and the students chose 2 of them to answer. In section 04, only one of the four possible questions was offered.

Assessment Data Collection:

In the section 01, 57 students underwent assessment. Each question was again worth 12 points, but the score from each of the two answered questions was averaged so the total assessment score was again 12 points. In section 04, 12 students underwent assessment. The question had 3 parts, and 4 points were assigned per part for a total of 12 pts.

**Assessment Results:
Section 01**

score	Number of students with score
12	5
11	1
10	8
9	5
8	3
7	1
6	5
5	1
4	1
3	3
2	11
1	8
0	5
average score	5.350877193
average per part	1.783625731

indicates less than "progressing", a source of concern

The “average per part” can be related to the rubric scale of 1 to 4.

Section 04

score	Number of students with score
12	0
11	2
10	3
9	1
8	3
7	1
6	2
5	0
4	0
	104
average score	8.666666667
avg per part	2.888888889

indicates just under partial mastery

Assessment Feedback:

These results have not been shared with instructors. They are shared with the department chair via this report.

No changes are planned for the course at this time. The department plans to discuss changes to the assessment procedure. For section 01, the assessment was part of the final exam. For section 04, the assessment was given during an open laboratory section. This difference in assessment procedure probably contributed to the results.

These results will be shared with the undergraduate curriculum committee at a Fall 2019 undergraduate curriculum committee meeting.

Assessment Administration Feedback

No recommended changes.

UCOC Report Review

Item	Complete/NA	Revision Requested	Comments
Identified Outcome Assessed	XX		
Identified Procedure for Assessment	XX		
Summary of Results	XX		
Results Shared with Instructor, Dept Curriculum Committee, etc.	XX		
Plan for Improvements	XX		

Committee Review Completed XXX

Committee Chair Signature Dr. Anne M. Bowling Date 10/7/2022