



# UNIVERSITY OF WISCONSIN WHITEWATER

ACADEMIC ASSESSMENT

## PHYSICS EDUCATION

### MISSION STATEMENT

The Department of Physics, as a member of the College of Letters and Sciences, strives to:

- Create an environment that supports learning and research,
- Improve students' ability to analyze problems and develop appropriate solutions; and
- Create a community of scholars and students who aspire to high standards of achievement.

As a science department, we regard our mission to include:

- Teaching students systematic methods for evaluating evidence and information by helping them build and test physical hypotheses and theories; and
- Fostering students' critical thinking skills, such as drawing conclusions, inferring relationships, solving problems and making predictions about the natural world.

As a department of physics we are committed to providing:

- A rigorous and effective curriculum for physics majors and minors, with depth of study for those students who desire to pursue a career in, or further study of, physics, astronomy, engineering, technology or science education;
- Effective and engaging courses for students who choose to take physics or astronomy courses either as part of the breadth of a liberal arts education or whose majors or career goals require them;
- Educational experiences in physics and astronomy through public outreach, with emphasis on the UW - Whitewater service area; and
- Opportunities for students and faculty to engage in research.

## STUDENT LEARNING OUTCOMES

*Student learning outcomes (SLOs) are statements of what a student will know or be able to do when they have completed a program. They represent the knowledge and skills a program has determined are most important for students to gain from that program. The most useful SLOs are specific and measurable so the program can accurately assess the degree to which students have achieved each outcome, and they align with college and institution mission and values. Data on achievement of SLOs is used to make improvements in the program and increase student success.*

Physics Department student learning outcomes:

- **[Theoretical calculations]** Students will be able to demonstrate the ability to perform theoretical calculations in basic areas of physics (Mechanics, Electricity & Magnetism, and Modern Physics) as evidenced through performance on homework or other assignments, reports, exams, or other activities.
- **[Problem solving skills]** Students will be able to demonstrate quantitative and qualitative analysis of physical problems as evidenced through performance on homework or other assignments, reports, exams, or other activities.
- **[Laboratory Techniques]** Students will gain proficiency with equipment and procedures used to acquire and analyze data of physical phenomena through performance in laboratory activities.
- **[Data Analysis]** Students will be able to perform analysis and calculations based on experimental data, draw and present valid conclusions, and process and visualize their data.
- **[Written Presentations]** Students will be able to report in written format the results of their calculations, research projects, and reading of technical literature.
- **[Oral Presentations]** Students should be able to create and effectively present on oral report on the results of their calculations, research projects, and reading of technical literature.
- **[Career Learning]** Students should know about their career options, what skills and experiences are required for those careers, and be able to develop a resume that advances them towards their career goals.
- **[Community Outreach]** Physics majors are strongly encouraged to join the Society of Physics Students where they will engage in extra-curricular activities relating to physics.
- **[Independent Projects]** Physics Majors are strongly encouraged to participate in undergraduate research with a faculty mentor, a summer Research Experience for Undergraduates (REU) programs, or an outside internship with participating companies.

In addition to the student learning outcomes for Physics, students who major in Physics Education will also meet the following education standards from the Interstate New Teacher Assessment and Support Consortium (INTASC):

- **[Standard 1: Content Pedagogy]** He or she must understand the central concept and structure of discipline and it must be created in such a way that students can learn from it effectively.
- **[Standard 2: Student Development]** The teacher must be able to understand the student's ability to grasp things and must come up with the methods that can offer better personality development of the students.
- **[Standard 3: Diverse Learners]** The teacher must know that the students have different capabilities of learning and based on that must train them.
- **[Standard 4: Multiple Instructional Strategies]** The teacher must be able to understand and use a variety of instructional strategies so that they are able to solve problems, think critically and show better performance.

- **[Standard 5: Management and Motivation]** The teacher must be able to understand individuals and create a learning environment to encourage positive social interactions, self-motivation and active learning engagement.
- **[Standard 6: Technology and Communication]** The teacher should use verbal, non-verbal and media communication to impart knowledge in the students for their better understanding of the subject matter.
- **[Standard 7: Planning]** It is highly recommended that the teacher must be able to plan various things for students such as curriculum, community and students, and knowledge of subject matter.
- **[Standard 8: Assessment]** The teacher assesses the students formally or informally to evaluate the social, intellectual and physical development of the students.
- **[Standard 9: Reflective Practice: Professional Development]** The teacher is considered a reflective practitioner who can evaluate the effects of the choices and actions on others and prepares students to face the world professionally as well.
- **[Standard 10: School and community Involvement]** The last standard of [INTASC standards](#) is to develop the relationship amongst students, colleagues, society, parents and various other agencies to support learning and well-being.