

# Physics

## Program Level Student Learning Outcomes

1. Applying Relevant Principles: Upon completion of their course of study in the Physics Department, students will be able to understand physical principles in order to correctly answer conceptual questions.

2. Solving Physics Problems: Upon completion of their course of study in the Physics Department, students will be able to identify and apply the laws of physics along with the necessary mathematics to successfully solve a physics problem.

3. Data Collection & Analysis: Upon completion of their course of study in the Physics Department, students will be able to use appropriate instruments in order to collect data. Students will be able to interpret and analyze that data, including error analysis.

## Course Level Student Learning Outcomes

**PHYS 1A Mechanics of Solids: SLO #1** Students can recognize the basic physical principles in order to correction answer conceptual questions.

**PHYS 1A Mechanics of Solids: SLO# 2** Students can identify and apply the applicable laws of mechanics along with the necessary mathematics to successfully solve a mechanics problem.

**PHYS 1A Mechanics of Solids: SLO #3** Students can read and record, with appropriate units and uncertainties, measurements taken from a Vernier caliper and a micrometer caliper. Students can interpret and analyze that data, including error analysis.

**PHYS 1B Fluids, Heat, and Sound: SLO #1** Students can recognize the basic physical principles which are relevant in a given physical situation involving heat, fluids or sound and describe how these principles are manifested in, and influence the behavior of that physical situation.

**PHYS 1B Fluids, Heat, and Sound: SLO #2** Students can identify and apply the laws of physics along with the necessary mathematics to successfully solve a problem dealing with heat, fluids or sound.

**PHYS 1B Fluids, Heat, and Sound: SLO #3** Students can read and record, with appropriate units and uncertainties, measurements taken from an instrument used to measure temperatures, densities or pressures. Students can interpret and analyze that data, including error analysis.

**PHYS 1C Electricity and Magnetism: SLO #1** Students can read and record, with appropriate units and uncertainties, measurements taken from a multimeter and a voltmeter. Students can interpret and analyze that data, including error analysis.

**PHYS 1C Electricity and Magnetism: SLO #2** Students can recognize the basic physical principles which are relevant in a given physical situation involving electricity, magnetism or electromagnetism and describe how these principles are manifested in, and influence the behavior of that physical situation.

**PHYS 1C Electricity and Magnetism: SLO #3** Students can identify and apply the applicable laws of physics along with the necessary mathematics to successfully solve a problem dealing with electricity, magnetism or electromagnetism in order to answer a conceptual question.

**PHYS 1D Optic and Modern Physics: SLO #1** Students can recognize the basic physical principles which are relevant in a given physical situation involving optics or modern physics and describe how these principles are manifested in, and influence the behavior of that physical situation.

**PHYS 1D Optic and Modern Physics: SLO #2** Students can identify and apply the applicable laws of physics along with the necessary mathematics to successfully solve a problem dealing with optics or modern physics

**PHYS 1D Optic and Modern Physics: SLO #3** Students can read and record, with appropriate units and uncertainties, measurements taken from an instrument used in an optics lab.. Students can interpret and analyze that data, including error analysis.

**PHYS 2A General Physics: SLO #1** Students will demonstrate ability to correctly read and record, with appropriate units and uncertainties, measurements taken from a vernier caliper and a micrometer caliper by measuring the lengths and diameters of several cylindrical objects. Students will be asked to perform mathematical operations using the measured quantities in order to calculate results from those measurements, and to record those results with appropriate units and uncertainties.

**PHYS 2A General Physics: SLO #2** Students can identify the physical principles which are relevant in a given physical situation involving mechanics, heat, fluids or sound and describe how these principles are manifested in, and influence the behavior of that physical situation.

**PHYS 2A General Physics: SLO #3** Students can identify and apply the applicable laws of physics along with the necessary mathematics to successfully solve a mechanics problem.

**PHYS 2B General Physics:**

**SLO #1** Students can read and record, with appropriate units and uncertainties, measurements taken from a multimeter. Students can interpret and analyze that data, including error analysis.

**SLO #2** Students can identify the physical principles which are relevant in a given physical situation involving electricity, magnetism, electromagnetism, optics or modern physics and describe how these principles are manifested in, and influence the behavior of that physical situation.

**SLO #3** Students can identify and apply the applicable laws of physics along with the necessary mathematics to successfully solve a problem dealing with electricity, magnetism, electromagnetism, optics or modern physics.

**PHYS 3A General Physics with Calculus: SLO #1** Students can identify the physical principles which are relevant in a given physical situation involving mechanics, heat, fluids or sound in order to answer conceptual questions.

**PHYS 3A General Physics with Calculus: SLO #2** Students can identify and apply the applicable laws of physics along with the necessary mathematics to successfully solve a mechanics problem.

**PHYS 3A General Physics with Calculus: SLO #3** Students can read and record, with appropriate units and uncertainties, measurements taken from a Vernier caliper and a micrometer caliper. Students can interpret and analyze that data, including error analysis.

**PHYS 3B General Physics with Calculus: SLO #1** Students can read and record, with appropriate units and uncertainties, measurements taken from a multimeter. Students can interpret and analyze that data, including error analysis.

**PHYS 3B General Physics with Calculus: SLO #2** Students can recognize the physical principles of which are relevant in a given physical situation involving electricity, magnetism, electromagnetism, optics or modern physics in order to correctly answer conceptual questions.

**PHYS 3B General Physics with Calculus: SLO #3** Students can identify and apply the laws of physics along with the necessary mathematics to successfully solve a problem dealing with electricity, magnetism, electromagnetism, optics or modern physics.

**PHYS 11 Descriptive Introduction to Physics:** Given a description of a physical situation (floating ice cube, falling body,...) the student should be able to recognize the basic physical principles involved in order to correctly answer conceptual questions

**PHYS 12 Laboratory for Introductory Physics:** Students can read and record, with appropriate units and uncertainties, measurements taken from a ruler a vernier and a protractor. Students can interpret and analyze that data, including error analysis.

**PHYS 13 Quantitative Aspects of Elementary Physics:** Students can identify and apply the applicable laws of physics along with the necessary mathematics to successfully solve a problem involving mechanics, fluids or heat.

**PSCI 25 Exploring Physical Science:** Students can identify the physical principles which are relevant in a given physical situation (floating object, falling object...) and explain how these principles are manifested in, and influence the behavior of a described physical situation.