# Natural Sciences
## Institutional (ILO), Program (PLO), and Course (SLO) Alignment

| **Program: Physics** | **Number of Courses: 12** | **Date Updated 11.02.13** | **Submitted by** T. James Noyes Ext. 3356 |
|---|---|---|---|

| **Institutional SLOs** | I. Content Knowledge | II. Critical, Creative, and Analytical Thinking | III. Communication and Comprehension | IV. Professional and Personal Growth | V. Community and Collaboration | VI. Information and Technology Literacy |
|---|---|---|---|---|---|---|
| **Program Rating** | 4 | 4 | 3 | 3 | 2 | 2 |

| **Program Level SLOS** | **ILOs to PLOs Alignment** (Rate 1-4) | | | | | |
|---|---|---|---|---|---|---|
| | **I** | **II** | **III** | **IV** | **V** | **VI** |
| **PLO #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. | 4 | 4 | 3 | 2 | 2 | 2 |
| **PLO #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. | 4 | 4 | 2 | 2 | 2 | 2 |
| **PLO #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. | 4 | 4 | 2 | 2 | 2 | 2 |

| **Course Level SLOs** | **Course to Program SLO Alignment** Mark with an X | | | **ILOs to Course SLOs Alignment** (Rate 1-4) | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **P1** | **P2** | **P3** | **I** | **II** | **III** | **IV** | **V** | **VI** |
| **PHYS 1A Mechanics of Solids: SLO #1. Applying Relevant Principles** Students can recognize the basic physical principles which are relevant in a given physical situation involving mechanics in order to correctly answer conceptual questions. | X | | | 4 | 4 | 3 | 2 | 2 | 2 |
| **PHYS 1A Mechanics of Solids: SLO# 2. Solving Physics Problems** Students can identify and apply the relevant laws of physics along with the necessary mathematics to successfully solve a mechanics problem. | | X | | 4 | 4 | 2 | 2 | 2 | 2 |
| **PHYS 1A Mechanics of Solids: SLO #3. Data Collection & Analysis** 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 the collected data, including error analysis. | | | X | 4 | 4 | 2 | 2 | 2 | 2 |

| Course Level SLOs | Course to Program SLO Alignment Mark with an X | | | ILOs to Course SLOs Alignment (Rate 1-4) | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | P1 | P2 | P3 | I | II | III | IV | V | VI |
| **PHYS 1B Fluids, Heat, and Sound: SLO #1. Applying Relevant Principles** Students can recognize the basic physical principles which are relevant in a given physical situation involving heat, fluids or sound in order to correctly answer conceptual questions. | X | | | 4 | 4 | 3 | 2 | 2 | 2 |
| **PHYS 1B Fluids, Heat, and Sound: SLO #2. Solving Physics Problems** 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. | | X | | 4 | 4 | 2 | 2 | 2 | 2 |
| **PHYS 1B Fluids, Heat, and Sound: SLO #3. Data Collection & Analysis** 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. | | | X | 4 | 4 | 2 | 2 | 2 | 2 |
| **PHYS 1C Electricity and Magnetism: SLO #1. Applying Relevant Principles** Students can recognize the basic physical principles which are relevant in a given physical situation involving electricity, magnetism or electromagnetism in order to correctly answer conceptual questions. | X | | | 4 | 4 | 3 | 2 | 2 | 2 |
| **PHYS 1C Electricity and Magnetism: SLO #2. Solving Physics Problems** Students can identify and apply the relevant laws of physics along with the necessary mathematics to successfully solve a problem dealing with electricity, magnetism or electromagnetism. | | X | | 4 | 4 | 2 | 2 | 2 | 2 |
| **PHYS 1C Electricity and Magnetism: SLO #3. Data Collection & Analysis** 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. | | | X | 4 | 4 | 2 | 2 | 2 | 2 |
| **PHYS 1D Optic and Modern Physics: SLO #1. Applying Relevant Principles** Students can recognize the basic physical principles which are relevant in a given physical situation involving optics or modern physics in order to correctly answer conceptual questions. | X | | | 4 | 4 | 3 | 2 | 2 | 2 |
| **PHYS 1D Optic and Modern Physics: SLO #2. Solving Physics Problems** Students can identify and apply the relevant laws of physics along with the necessary mathematics to successfully solve a problem dealing with optics or modern physics. | | X | | 4 | 4 | 2 | 2 | 2 | 2 |
| **PHYS 1D Optic and Modern Physics: SLO #3. Data Collection & Analysis** 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 the collected data, including error analysis. | | | X | 4 | 4 | 2 | 2 | 2 | 2 |

| Course Level SLOs | Course to Program SLO Alignment Mark with an X | | | ILOs to Course SLOs Alignment (Rate 1-4) | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | P1 | P2 | P3 | I | II | III | IV | V | VI |
| **PHYS 2A General Physics: SLO #1. Applying Relevant Principles** Students can identify the physical principles which are relevant in a given physical situation involving mechanics, heat, fluids or sound in order to correctly answer conceptual questions. | X | | | 4 | 4 | 3 | 2 | 2 | 2 |
| **PHYS 2A General Physics: SLO #2. Solving Physics Problems** Students can identify and apply the relevant laws of physics along with the necessary mathematics to successfully solve a mechanics problem. | | X | | 4 | 4 | 2 | 2 | 2 | 2 |
| **PHYS 2A General Physics: SLO #3. Data Collection & Analysis** Students demonstrate ability to correctly read and record, with appropriate units and uncertainties, measurements taken from a vernier caliper and a micrometer caliper. Students can interpret and analyze the collected data, including error analysis. | | | X | 4 | 4 | 2 | 2 | 2 | 2 |
| **PHYS 2B General Physics: SLO #1. Applying Relevant Principles** Students can identify the physical principles which are relevant in a given physical situation involving electricity, magnetism, electromagnetism, optics or modern physics in order to correctly answer conceptual questions. | X | | | 4 | 4 | 3 | 2 | 2 | 2 |
| **PHYS 2B General Physics: SLO #2. Solving Physics Problems** Students can identify and apply the relevant laws of physics along with the necessary mathematics to successfully solve a problem dealing with electricity, magnetism, electromagnetism, optics or modern physics. | | X | | 4 | 4 | 2 | 2 | 2 | 2 |
| **PHYS 2B General Physics: SLO #3. Data Collection & Analysis** 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. | | | X | 4 | 4 | 2 | 2 | 2 | 2 |

| Course Level SLOs | Course to Program SLO Alignment Mark with an X | | | ILOs to Course SLOs Alignment (Rate 1-4) | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | P1 | P2 | P3 | I | II | III | IV | V | VI |
| **PHYS 3A General Physics with Calculus: SLO #1. Applying Relevant Principles** Students can identify the physical principles which are relevant in a given physical situation involving mechanics, heat, fluids or sound in order to correctly answer conceptual questions. | X | | | 4 | 4 | 3 | 2 | 2 | 2 |
| **PHYS 3A General Physics with Calculus: SLO #2. Solving Physics Problems** Students can identify and apply the relevant laws of physics along with the necessary mathematics to successfully solve a mechanics problem. | | X | | 4 | 4 | 2 | 2 | 2 | 2 |
| **PHYS 3A General Physics with Calculus: SLO #3. Data Collection & Analysis** 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. | | | X | 4 | 4 | 2 | 2 | 2 | 2 |
| **PHYS 3B General Physics with Calculus: SLO #1. Applying Relevant Principles** 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. | X | | | 4 | 4 | 3 | 2 | 2 | 2 |
| **PHYS 3B General Physics with Calculus: SLO #2. Solving Physics Problems** 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. | | X | | 4 | 4 | 2 | 2 | 2 | 2 |
| **PHYS 3B General Physics with Calculus: SLO #3. Data Collection & Analysis** 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. | | | X | 4 | 4 | 2 | 2 | 2 | 2 |
| **PHYS 11 Descriptive Introduction to Physics: SLO#1. Applying Relevant Principles** Given a description of a physical situation (floating ice cube, falling body,...) students will be able to recognize the basic physical principles involved in order to correctly answer conceptual questions. | X | | | 4 | 4 | 3 | 2 | 2 | 2 |
| **PHYS 12 Laboratory for Introductory Physics: SLO#1. Data Collection & Analysis** 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. | | | X | 4 | 4 | 2 | 2 | 2 | 2 |
| **PSCI 25 Exploring Physical Science: SLO#1. Applying Relevant Principles** 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. | X | | | 4 | 4 | 4 | 2 | 2 | 2 |