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|                      |                                    | Which align with the course level SLO(s) being measured? | • For each SLO, the two lab reports were selected and assessed based on the stated SLOs.  
• Students are required to completed lab experiments by assembling, calibrating, using equipment provided. Data must be collected during these performance activities and subsequently analyzed on computer using statistical analysis. Lab reports are written and returned the following week.  
• Successful completion of lab SLO is based on 80% of the class achieving B or higher on the component of the report directly related to the SLO.  
• Performance based assessment on these reports are judged by the percent error achieved in the data reduction. | • The statistical software packages used (Logger Pro and Graphical Analysis) are valuable tools in giving students efficient command of the reduction of large sets of data. In some cases, this also provides them immediate feedback in determining whether the initial data collection was insufficient and subsequent data collection required.  
• The inventory of physics equipment insufficient to accommodate a full class of 20 students with two students assigned per lab station. As a results, lab teams normally group in triplets, and at times quadruplets or quintuplets per lab station. This long-outstanding deficiency is more pronounced in the PHYS 152L than in the PHYS 151L. Steps are slowly being made to correct this situation with supplemental funds for the purchase of some additional physics equipment.  
• The physics lab is fully integrated with the associated lecture section. Students have commented in their course assessments at the end of each semester that this integration is extremely valuable in their applying the concepts on the material presented in lecture PHYS 152. | • Purchase new equipment  
• Provide more students with more hands-on experience with actual laboratory equipment. | - This proposed action requires a minimum of $50,000 over two years to initiate the required change. Subsequent years will require allocations of from $5,000 annually over the next 5 years to complete the inventory demands for PHYS 152L.  
- Allocation of $25,000 was approved in May 2010. This was to purchase new or replacement equipment for physics and astronomy labs.  
- A subsequent allocation of $25,000 was approved in May 2011. This will also be used to purchase equipment for physics and astronomy labs. |
| III, VI, X          | AA1                                 | 1. Apply the scientific method to physical science systems involving fields of thermodynamics, electricity, magnetism, waves, optics, and modern physics. | Lab 3 Buoyancy Properties  
Lab 6 Simple Harmonic Motion | 11 of 11 (100%) achieved B or higher  
10 of 11 (91%) achieved B or higher |                                  |                                            |
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|  | II, III, IV | AA2, AA3, AA5 | 2. Collect, report and analyze data obtained in a laboratory setting in a manner exhibiting organization, proper documentation and critical thinking.  
Lab 1 Density Measurements  
Lab 5 Perfect Gas Law Derivation  
11 of 11 (100%) achieved B or higher  
9 of 11 (82%) achieved B or higher |
|   | III, IV | AA3 | 3. Manipulate data and apply quantitative techniques, such as graphing and statistical analysis  
Lab 4 Heat Transfer  
Lab 11 Reflectance Spectrometry  
11 of 11 (100%) achieved B or higher  
11 of 11 (100%) achieved B or higher |
|   | IV | AA9 | 4. Demonstrate a basic understanding of the standard instruments used in physics.  
Lab 2 Thermal Expansion  
Lab 7 Circuit Analysis  
8 of 11 (73%) achieved B or higher  
7 of 11 (64%) achieved B or higher |
|   | II, III, X | AA2, AA4, AA9 | 5. Identify environmental factors, which affect the outcome of an experiment or observation and apply basic error analyses techniques.  
Lab 8 Ohm Law  
Lab 12 Geometric Optics  
9 of 11 (82%) achieved B or higher  
10 of 11 (91%) achieved B or higher |

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Appendix A. Sample Assessment Tools

- After setting up the apparatus inform the instructor for assessment of correct assembly

• Determine the coefficient of linear expansion for the various metal rods provided.
• Compare with the accepted coefficient of linear expansion to compute the percent error
• Identify at least two (2) sources of error.
• Application problem: During the heat of mid-afternoon, when the desert temperature reaches 37.5°C, a steel rail measures 24.8 m long. What will its length be after sunset, when the temperature drops to 12.7°C?

Appendix B. Additional Analysis of Assessment

SLOs 1, 2, 3 and 5 achieved the minimum criteria for success on both selected lab reports.

SLO 4 (Demonstrate a basic understanding of the standard instruments used in physics) failed to achieve the minimum criteria for success on both of the selected lab reports. Observations during the lab setup along with discussions with the students during the actual use of the lab equipment indicated that some students were not adequately familiar with apparatus they were using. This is understandable, since the lack of sufficient physics equipment forces students to team in groups of four and sometimes five rather than in standard groups of two. This prevents some students from acquiring sufficient hands-on time with the apparatus.