

Abstract Submitted
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Advanced Laboratory at Texas State University: Error Analysis, Experimental Design, and Research Experience for Undergraduates
CARL VENTRICE, Texas State University — Physics is an experimental science. In other words, all physical laws are based on experimentally observable phenomena. Therefore, it is important that all physics students have an understanding of the limitations of certain experimental techniques and the associated errors associated with a particular measurement. The students in the Advanced Laboratory class at Texas State perform three detailed laboratory experiments during the semester and give an oral presentation at the end of the semester on a scientific topic of their choosing. The laboratory reports are written in the format of a “Physical Review” journal article. The experiments are chosen to give the students a detailed background in error analysis and experimental design. For instance, the first experiment performed in the spring 2009 semester is entitled *Measurement of the local acceleration due to gravity in the RFM Technology and Physics Building*. The goal of this experiment is to design and construct an instrument that is to be used to measure the local gravitational field in the Physics Building to an accuracy of $\pm 0.005 \text{ m/s}^2$. In addition, at least one of the experiments chosen each semester involves the use of the research facilities within the physics department (*e.g.*, microfabrication clean room, surface science lab, thin films lab, etc.), which gives the students experience working in a research environment.

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