Supporting an Introductory EM Lab Redesign with the E-CLASS and AAPT Lab Guidelines

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Supporting an Introductory EM Lab Redesign with the E-CLASS and AAPT Lab Guidelines

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Resources
The AAPT Undergraduate Lab Curriculum Focus Areas
from the AAPT Recommendations for the Undergraduate Laboratory Curriculum

1. Constructing Knowledge
2. Modeling
3. Designing Experiments
4. Developing Technical and Practical Lab Skills
5. Analyzing and Visualizing Data
6. Communicating Physics

Context
Features of the university and the lab course

Private, Non-PhD Granting institution
STEM and Business Students
Primarily Considered an Engineering School
Two 11-Week Academic Terms per Year
Two 11-Week Co-Op Terms per Year

New Course Objectives
During this laboratory course, successful students will:
• Ask and answer scientific questions through experimental design and implementation.
• Develop technical and practical laboratory skills.
• Generate, analyze, and interpret data.
• Incorporate uncertainty in measured values, calculated values, and graphical representations.
• Write effective technical reports which includes
  • Articulating the reasoning that connects theoretical models to laboratory activities
  • Using appropriate style and voice

Current Lab
Nine weekly labs with a lab exam/practical.
Lab notebook suggested, but not required.

Proposed Change
Four one-week training activities.
Three challenge labs (each two weeks).
Lab notebook required

E-CLASS results
For one quarter (Fall 2018) of the original lab course

The Colorado Learning Attitudes about Science Survey for Experimental Physics (E-CLASS)

E-CLASS results

Pre-Post results point to room for improvement
(Not all 30 questions included here)