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# **Designing a Lab Project** to Fit Educational Objectives

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#### **Purpose:**

*Note:* While this is not technically an experiment, this article shows philosophy behind the design of a project, and what the students and educators should expect out of the project.

### **Engineering Design:**

According to ABET, engineering design is the process of devising a system, component or process to meet desired needs. It is a decision making process in which the basic sciences, mathematics and engineering sciences are applied to optimally convert resources to meet a stated objective.

The fundamental elements of a design process are:

- the establishment of objectives
- synthesis
- analysis
- fabrication
- testing

The engineering design component of a curriculum must include at least some of the following features:

- · development of creativity among students
- · use of open-ended problems
- · development and use of design methodology
- · formulation of design problem statements and specifications
- consideration of alternative solutions
- feasibility considerations
- detailed systems descriptions ٠

It is also essential to include a variety of realistic constraints such as:

- economics factors
- safety
- reliability
- aesthetics
- ethics
- social impact



Educator's Corner

This three-hour course has a 1.0 hour engineering design component. The primary intent of this course requirement is for the student to learn the criteria and procedures involved in a design project. A secondary purpose is to develop a topic covered in class to greater depth utilizing the concepts of engineering design. The following tasks are required for the successful completion of a project:

- Task 1.Obtain an analytical model of the system10% of the
- Task 2. Obtain a simulation model of the system
- Task 3.Construct the prototype
- Task 4. Experimental verification of physical system parameters
- Task 5.Demonstrate the project (create date)
- Task 6.Submit a written report (create date)

The project report will contain:

- Cover sheet with the title and the name of the student
- Abstract
- Design equations
- Computer listings
- Experimental results
- Conclusion





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