

Assignment L3

(The Capstone Design Project)

Situation Description

High school students do not know enough information about manufacturing and design processes. This is a big disadvantage especially for students who decide to pursue engineering as a career. They join engineering schools where education is highly theoretical and emphasizes math and science. This emphasis is based primarily on the assumption that engineers are likely to learn the more applied portion of their field on the job while they are unlikely to learn math and science on the job. Although senior design projects provide students with design experience they are narrowly specialized and hardly address real-life problems where the “big picture” is as important as the solution to the specific technical problem.

The Project Learning Objectives

There are many Learning Objectives that can be accomplished and demonstrated as you work on this project. Not all of these objectives can be achieved in each of the project assignments but by the end of the project your team should have achieved (and demonstrated achievement) for all of the following objectives:

1. Prepare students for engineering practice through the curriculum culminating in a **real-life** design experience based on the knowledge and skills acquired in earlier course work and incorporating engineering standards and realistic constraints that include most of the following considerations: economic; environmental; sustainability; manufacturability; ethical; health and safety; social; and political
2. Demonstrate the ability to form and interact with an industry **Advisory Committee** which will serve as consultants who help students achieve the project’s objectives.
3. Achieve some knowledge about how a real engineered product works
4. Achieve some awareness about how a real engineered product is manufactured
5. Help Junior / Senior High School Students learn something about engineering as a possible career
6. Demonstrate the ability to Define a Problem, Generate Solutions, make criteria-based Decisions, and Plan
7. Demonstrate ability to create and document a process
8. Demonstrate ability to function as a productive team
9. Demonstrate ability to manage a project
10. Demonstrate ability to create and maintain a Design Notebook
11. Demonstrate ability to assess the quality of work in a Design Notebook

Project Assignment Details

Following are the assignment details for each of the five parts of this project (Problem Definition, Idea Generation, Artifact Selection, Implementation, and Testing an Assembly Plan). For each assignment you will find:

- **The Assignment** section where the specifics of the problem are given,
- **The Work In The Notebook** section where the expected organization of the work in the notebook is discussed, and

The Assessment section where you are told which notebook checklist will be used to assess the work. In addition, the capstone design and project master checklists must be filled by the student teams and placed at the beginning of the Design Notebook.