Project 1

Due Monday, June 8th

The purpose of this project is to get you looking at the world around you for the results of engineering. Most of the projects ask you to go out and take pictures. If you do not have a camera, a disposable camera can be purchased and a roll of film developed for less than $10. If this expense presents a problem, please let me know immediately.

It is not acceptable to download pictures off the Internet for this assignment. You must actually go out into the "real world" and find these things yourself.

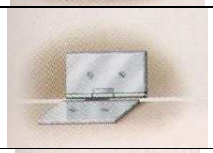
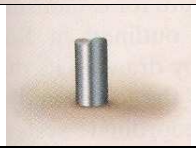
Choose one of the following project options. Each option is designed to focus on different engineering fields. You only have to complete one option. ***Inform me of your choice by the end of class on Tuesday, June 2nd.***

There are six options:

- Option 1: Mechanical Engineering
- Option 2: Computer Engineering
- Option 3: Electrical Engineering
- Option 4: Systems Engineering
- Option 5: Materials Engineering
- Option 6: Industrial Engineering

Your project should be bound (a staple in the corner is fine). Font should be 12 pt, double spaced, with 1" margins. Each project should have a cover page which must include your name, the class name and number, the date the assignment is due, and the text "Project 1: Option _____" (insert which option you are completing).

Option 1: Mechanical Engineering. Search for the joints described below in the "real world." Take a picture of each joint where you find it. When you turn in your project you can use either digital images or developed photos. Put one picture on each page and label each picture with the type of joint it is by centering the text under each picture. Also indicate where the photograph was taken. If you are using developed photos, you can print the name of the joint in ink. If you are using digital photos, the joint name should be typed and centered under the image.

Type of Connection	Example
cable	
roller	
ball and socket	
single smooth pin	
single hinge	
fixed support	

Option 2: Computer Engineering. Take a picture of the back of a computer (a computer, not a laptop). Identify the name of every port, hole, opening, connector, etc., on the back of the machine and list what type of device may be connected via that opening. Use letters A, B, C, D, etc., on the picture and type up a table that provides the requested info. An example of the labeling system is given below.

Reference	Name	Purpose
A	System Clock	Displays the current time
B	Play button	Starts the video
C	Channel buttons	Allows user to increase or decrease channel

Instead of the above table, however, column titles on your table should look like this:

Reference	Name	Example Device

Option 3: Electrical Engineering. Find an old piece of electronics equipment and open it up. (Use one that no one is ever going to need again, in case you can't get it back together!) Find a circuit board and take a picture of it. Identify every component on it (resistor, transistor, capacitor, etc.). Hint: anything that "sticks out" from the circuit board is a component. Label each component and what it does (in general, not necessarily for that particular piece of equipment). See the example from Option 2. Your table should look like this:

Reference	Name	Function

Option 4: Systems Engineering. Pick an item you are interested in purchasing. Follow the steps below to choose the best item that meets your requirements.

1. Identify 5 requirements that you have for that item.

2. Rate the importance of each requirement on a scale from 1 (least important) to 10 (most important).

Requirement	Importance (1 – 10)

3. Find three different brands or version of the item.

4. Grade each item on how it meets each requirement on a scale from 1 (doesn't meet requirement) to 10 (meets the requirement perfectly).

Item	Req. 1 Grade	Req. 2 Grade	Req. 3 Grade	Req. 4 Grade	Req. 5 Grade

5. Multiply each grade by the importance of the requirement and add them together to get a total score for each item. For example:

   Item #1 = *Requirement 1 Grade* x *Requirement 1 Importance* +
   Requirement 2 Grade x *Requirement 2 Importance* +
   Requirement 3 Grade x *Requirement 3 Importance* +
   Requirement 4 Grade x *Requirement 4 Importance* +
   Requirement 5 Grade x *Requirement 5 Importance*

6. Compare the scores for each item. Which item ranked the highest? In theory, this should be the item that you buy, since it had the highest score. Now that you have completed the analysis, do you agree with the solution?

When you turn in this project, write a paragraph on the item you are looking to buy and the three options you are comparing. Then, use the tables like the two above to organize your data and scores. Next, show the calculations where you compute the scores of each item. Finally, write a paragraph where you discuss the issues from Question 6.

Option 5: Materials Engineering. Identify an item made of each of the materials described below in the "real world." Take a picture of each item where you find it. When you turn in your project you can use either digital images or developed photos. Put one picture on each page and label each picture with the type of material it is made of by centering the text under each picture. Also indicate where the photograph was taken. If you are using developed photos, you can print the label in ink. If you are using digital photos, the material type should be typed and centered under the image.

For a good reference on these materials, visit http://www.engr.sjsu.edu/wofmate/. The definitions given in the table below come from that website and its associated links.

Material	Description
Metals	If there is a *typical* engineering material that is associated in the public's mind with modern engineering practice, it is structural steel. This versatile construction material has several characteristics, or properties, that we consider metallic: strength, ductility, luster, electrical conductor. Other examples are gold, platinum, lead and tin.
Alloys	An alloy is a metal composed of more than one element. Engineering alloys include the cast-irons and steels, aluminum alloys, magnesium alloys, titanium alloys, nickel alloys, zinc alloys and copper alloys. For example, brass is an alloy of copper and zinc.
Ceramics	Ceramic materials are inorganic, nonmetallic materials. Most ceramics are compounds between metallic and nonmetallic elements for which the interatomic bonds are either totally ionic or predominantly ionic but having some covalent character.
Polymers	The word polymer literally means "many parts." A polymeric solid material may be considered to be one that contains many chemically bonded parts or units which themselves are bonded together to form a solid. Two industrially important polymeric materials are plastics and elastomers.
Composites	Composites are materials, usually man-made, that are a three-dimensional combination of at least two chemically distinct materials, with a distinct interface separating the components, created to obtain properties that cannot be achieved by any of the components acting alone.

Option 6: Industrial Engineering. Find 10 different warning signs and 10 different information signs in the "real world." Take a picture of each sign where you find it. Write a sentence or two for each picture about where you found the sign and why that sign is there. Also indicate whether or not you think the sign was in an appropriate location. When you turn in your project you can use either digital images or developed photos. Put one picture on each page and write your sentences under each picture. If you are using developed photos, you can print your sentences in ink.