ENVIRONMENTAL STUDIES 74

Lighting Systems

HOMEWORK #2

Name: _____

As you already know from class, there are three distinct parts to the Lighting Retrofit Process. Your assignment is to perform the first two parts on a residence or commercial establishment (survey and engineering—the third part is construction). You will examine a minimum of three different room types (e.g. kitchen, bedroom, living room for a house) and identify a total of at least five different fixture types. (e.g. downlight, fluorescent 2x4, task light, etc.) Remember to list all assumptions.

1. The first step is to identify the existing conditions. Describe everything you can about this space. How are the rooms used? Does the space have windows? What color are the walls and ceilings? What is the ceiling height? What color is the light? Are the lighting levels adequate or too high? How are the lights controlled? Don't leave anything out that may impact the occupants of that space.

2. Identify the number of fixtures, watts- per- fixture, and hours-of-operation for the "before" conditions. If you are unable to safely open a fixture you may assume fixture wattages. The article on T8 lamps has information on several ballast/lamp combinations. Use the spreadsheet provided in class or your own survey forms to track the information.

3. Using the same format as question #2, make recommendations that reduce the energy consumption while maintaining or improving lighting quality. Fixture and lighting control information including costs are available on the internet. Include support materials where possible. Show both the kW and kWh reduced.

4. Show the simple payback for your recommendation "package."

5. Identify at least one change that you would **not** recommend and explain why.

Extra credit

6. If you have access to utility bills for your survey site, estimate the percentage that lighting represents of the whole electric bill. (This is a good way to verify that the assumptions made during the survey are correct.)
7. In addition to answering the simple payback question in #4, estimate the life cycle cost savings (you should be able to do this if you have taken ES70).

Information sources:

a) Lecture notes
b) Reading assignment
c) Knowledge gained from earlier courses
d) Outside sources such as product literature, catalogs, web sites, etc. are encouraged Including http://www.energystar.gov
e) Assume $0.177/kWh for the cost of energy
f) Show your assumptions for labor rate, inflation, etc.

Submitting Assignments: Include this assignment with your journal. Please complete this and other assignments one week after the last class.