- explain in a few paragraphs what course or which you will use this assignment;

this will be used in HAC 154 -Installation and Service...where we teach air conditioning students how to install, maintain, service, troubleshoot air conditioners and also customer relations. I thought this would be an ideal place to put this.
<="" span="">

- summarize how the assignment will be used in relation to that particular unit or subject within your course;

Students will learn the importance of making pricing a project to accommodate their needed profit margin and also to accommodate the customers needs. In addition, the students will learn the importance of offering air conditioning equipment that gives better efficiencies and where that technology is applicable.

- summarize why it relates to either social justice or the green economy;

Students will learn that the pricing of projects can have some flexibility, allowing for the installation of higher efficiency air conditioners into houses that might not normally receive them, as long as the increased costs are made up somewhere else.

- note when you will use this assignment;

This assignment will be used in HAC 154 Installation and Service, towards the end of the semester, as a Lab assignment.

- the name of this workshop;

Air Conditioning Operational Cost Analysis and Customer Selection

- your name, course name and number;

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- a title;

Lab #12: Air Conditioning Operational Cost Analysis and Customer Selection

- list the learning outcomes covered in your course by this assignment;

Students will learn: Simple Payback, How to Job Cost, Customer Evaluation, Selection of Equipment to fit Customer Needs, Calculate Operational Costs of Air Conditioning Equipment, Climate and Energy Data for Chicago, Seasonally Adjusted Energy Efficiency Ratios

- list the learning outcomes of the assignment;

See above

- utilize critical thinking skills (an important part of teaching our students about sustainability);

Students will be forced to make judgment value decisions based on empirical data, and to support those decisions.

- be relevant to the lives of the students.;

The students will meet many diverse people in their jobs, from diverse backgrounds and diverse incomes. Students must learn to decide how to best fit customer needs to the equipment offered

- show the actual assignment;

See the document I turned in.

- include your method of assessment (be explicit in how you are going to provide a grade to the student).

See the last part of the assignment where I explain the grading.

HAC 154 -170 Installation and Service   Program Code: 1215

LAB #_____: Air Conditioning Operational Cost Analysis and Customer Selection

NAME:_____   DATE:_____

Residential AC OP Cost Calculator with Pay Back for Various Efficiencies

Given :

Chicago = 600 Air Conditioning Operating Hours

Electrical costs $.14 per KwH

Formulas Used:

Energy Consumed Watts = Equipment Size BTU's/SEER

Energy Consumed Kw = Energy Consumed Watts/1000

Cost = Energy Consumed Kw x 600hours x Electrical Cost

Example of 3 ton 13 SEER unit versus 3 ton 20 SEER unit

13 SEER Op Cost

36000btu/13SEER = 2769 watts

2769 watts/1000 = 2.77 Kw

2.77kw x 600 op hours x $.14/KwH = $233 per season

20 SEER Op Cost

36000/20SEER = 1800 watts

1800/1000 = 1.8 kw

1.8 Kw x 600 hours x $.14/Kwh = $151 per season

Operating Cost Savings of a 20 SEER unit compared to 13 SEER unit = $82 per season

Simple Payback

If a conventional 13 SEER unit costs the homeowner $1,400 ($600 contractor cost x 2 x 10 % round up); and a 20 SEER cost the homeowner $2,400 ($1000 contractor cost x 2 plus 10% round up), that difference is $1000 in installed cost.

If the higher SEER system saves the owner $82 per season, then it will take roughly 12 years to pay back the owner for the additional cost.

LAB Problem:

Given that a (3) ton 13 SER air conditioner costs $1,400 installed, 15 SEER costs $2,100 installed and a 21 SEER costs $3,000 installed.

Given the houses listed below and their locations and occupancy types:

A. New wood frame house in Tinley Park; young married couple, no children; couples first home; husband and wife both work. Husband takes bus to work, wife drives Hyundai to work.
B. Old brick and plaster house in Palos Park; retired couple; children grown and moved away; Coupe has late model Toyota Camry that they drive.
C. New brick and plaster house in Barrington; married couple with 2 children; father is options trader in Chicago; mother is on charity and civic boards throughout the day; driveway has 2 Mercedes S class cars.

LAB Activity:

1. Calculate the Operating cost's for the 3 different efficiencies of air conditioners.
2. Realizing that Federal Regulations state 13 SEER efficiency is the MINIMUM that can be installed; calculate the simple payback in terms of years, for the 15 and 21 SEER units compared to the 13 SEER unit.
3. Construct a matrix showing the different SEER air conditioning units, their estimated operating costs, their estimated simple payback compared to the 13 SEER unit, and which of the houses get which SEER units. Then write a reason for your selection of that unit for that house.

4. Be prepared to discuss in class your selections and the reasons for them.

Grading:

A 100% is given to those answers <u>that can be defended</u>, that show the maximum efficiency of air conditioning unit being installed in all the houses.

A 90% is given to those answers <u>that can be defended</u>, that show the highest efficiency unit being installed in 2 of the 3 houses.

A 80% is given to those answers that show a low to high spread of air conditioning units for low to high income levels.

A 70% is given to those answers that can be defended that show a minimum of air conditioner efficiency for each house.

Have fun, be creative, you are allowed and encouraged to bend the rules…..but not break them.