ENGR 120 **Homework 11**

NOTE: Use non-engineering format for all problems. For both problems, provide properly formatted printouts from your Excel spreadsheets.

1. A student has the following grades in ENGR 120:

Assignment	Grade
Exam 1	78
Exam 2	80
Quiz 1	90
Quiz 2	70
Homework	88
Attendance at Student Meetings	0
Service Project	0
Pump Project	91
Robot Competition: Sketch & Effort	95
Robot Competition Performance	90

a. Build a table in Excel to display these grades. Be sure to use proper formatting techniques (titles/headings, shading, borders, etc. … make it look good!).

b. Look up the ENGR 120 syllabus to determine the weight of each grade in the class. Add the weight in a separate column for each grade.
NOTE for standard sections: *The quizzes count as 9% total, such that each of the two quizzes carries a weight of 4.5%.*
NOTE for honors sections: *The quizzes count as 6% total, such that each of the two quizzes carries a weight of 3%.*

c. In another column, compute the points earned for each item using …

$$points = \frac{grade}{100} * weight$$

d. Sum all of the points to determine the student's overall grade in the course.

e. How does the student's overall course grade change when all required student meetings are attended (i.e., student gets 100% on Attendance at Student Meetings)?

NOTE: See the sample table below. Some values in blue to help you check your build your table and check your answers. You do not have to use the same format as the table below.

Assignment	Grade	Weight (%)	Points
Exam 1	75	30	22.5
Exam 2	80		
Quiz 1	90		
Quiz 2	70		
Homework	88	10	8.8
Attendance at Student Meetings	0		
Service Project	0		
Pump Project	82		
Robot Competition: Sketch & Effort	95	3	2.85
Robot Competition Performance	90		
		Overall Grade in Course:	*Compute this!*

2. The data in the table below was collected from http://population.us/la/ruston/.

Year	Population
1890	767
1910	3377
1940	7107
1950	10372
1980	20585
1990	20741
2010	21859
2014	22301
2017	22287

Use Excel to …

a. Build a table with proper formatting (headings, units, shading, borders, etc.)
b. Plot Population versus Year
c. Use the least squares linear regression formulas discussed in class to find the slope (m) and the y-intercept (b). m=186.578 and b=-352580
d. Write an equation for a line of best fit using m and b from part c.
e. Plug the "Year" data from the table above into the best fit equation from part d to mathematically estimate population. For example, for the year 1890, Population=186.578*1890-352580. Then, plot the resulting population estimates on the same plot as the data from the table; be sure to use dots (or some marker shape) for the raw data and a line without markers for the best fit line.

3. ***REMINDER IMPELLER DUE:*** You can find a tutorial on drawing impellers with SolidWorks on the class downloads page under Class 9.

- **Individual:** Design and draw your own centrifugal pump impeller using SolidWorks.
- **Individual:** Save the file as a part file (SLDPRT) and as a STL file (.stl) using the following naming convention:

    a. first initial, underscore, last name .SLDPRT example: **j_doe.SLDPRT**
    b. first initial, underscore, last name .STL example: **j_doe.STL**

    *To save the .STL file, you will need to go to **File > Save As > Save as type:** and choose "**STL (*.stl)**. Then click on **Options**, and enter **0.001 in** for the "Deviation" tolerance and **2.000deg** for the "Angle" tolerance. This will ensure that your STL file produces a "smooth" part when it prints. Print out a picture of your impeller and turn it in with your homework.*

- **Groups of Two:** Choose one impeller (only one impeller can be submitted per group of two) to submit for printing.
- **Groups of Two:** Email your instructor the SLDPRT and STL files for printing.
- *NOTE: Be sure to exit SolidWorks before sending your file. The instructors have had trouble in the past reading SolidWorks files; we believe that sending a file that has not been properly closed may render it unreadable.*