

NOTE: Use non-engineering format for this assignment (except for problem 6).

Group Assignment:

1. Please bring your pump to class next time. Turn the pump into your professor so it can be used in the fishtank system in ENGR 121. Write your names on the pump; it's possible that you will get the pump that you made again in ENGR 121.
2. The fabrication and testing of your pump were group assignments. The pump fabrication was completed in groups of two students, and pump testing was completed by groups of two to four students (two pump fabrication teams typically combine to test the better of two pumps). So, it is common for four students to share the same raw data from pump testing.

Individual Assignment: The pump project counts as a significant percentage of your overall grade, and the work that you submit for this grade must be your own. Please be aware that this assignment is not a "regular" homework assignment. You are allowed to discuss your work with other students, but no direct copying of work and no sharing of computer files is allowed; please enter the raw data collected into Excel yourself. You may share photographs of your group taken during fabrication and testing.

This assignment should include the following items:

1. A title page (signed with pledge statement)
2. A concise, well-written executive summary that includes . . .
 - a. A couple of introductory sentences describing the project
 - b. The maximum pump head (meters)
 - c. The peak flow rate (liters per minute)
 - d. Typical voltage (V) and current measurements (A)
 - e. The peak efficiency (%) and the head (meters) at which the peak efficiency occurs
3. Assembly and exploded views of your SolidWorks drawings for your pump
4. Photos of you and your partner(s) during pump fabrication and testing
5. An Excel spreadsheet containing the raw data and computed values
6. A detailed hand calculation using engineering format showing all calculations for a data point in your Excel spreadsheet (include units!!)
7. A plot of **pump head (meters) versus flow rate (liters per minute)** with appropriate trendline (display equation and r^2 value on plot)
8. A plot of **pump efficiency (%) versus pump head (meters)** with appropriate trendline (display equation and r^2 value on plot)

Be sure to put the items in the order listed (1, 2, 3, . . . 7), and do a "clean" job of presenting your work. Your grade will be partially based on how well your executive summary is written. Don't forget to use units in your table, calculations and plots.

Reminder: The robot challenge will be held during Class 19. Refer to Class 8 for information about the Robot Challenge. Remember the Robot Challenge comprises 6% of your grade: 3% for performance and 3% sketch and effort. For sketch and effort, instructors will be looking for the following:

- Code written for each challenge
- Comments describing the code

Please make your sketch easy to follow; labelling different sections with comments can help your instructor follow what you have written.