**ME332 Project 2 Fall 2016 Rubric**

Note that all values that will be subtracted in each section only apply to that individual section

Approach grade:

Anything missing will be -1 to 10 points, depeding on the severity.

* Determine all geometries and properties
  + Determine velocity and Re of coolant
* Determine overall heat transfer q
* Determine mass flow rate of coolant based on dp/dx
  + Derived properties including velocity and Re
* Determine outlet temperature of coolant and log mean temperature difference
* Determine h factors of coolant and solution per unit length
* Determine if conductivity needs to be taken into account
  + This is only going to be -1 if they don’t have it.
* Find the length of the heat exchanger
* Find the cost and other parameters required based on all the information found above
* Should state whenever something was based on the hydraulic diameter, etc.
* Should have something reasonable for a way to improve this HX
  + Minus 10 points if they don’t have this at all.
  + Minus a small number of points if they come up with something that wouldn’t do much.
  + Best way to do this, by far, would be to turbulate the solution. Even if they found it’s something with an Re that’s above 2300 and into the transition regime, it’s still not very turbulent in a smooth pipe and increasing Re would have a big impact on improving efficiency.
  + Using a better coolant than air is also a very good solution.

Will subtract points for -

* Totally wrong approach will range from -50 to -30, depending on a number of factors. Will be very merciful here and will try hard not to fail anyone unless they really botched it.
* Bad assumptions
  + -5 points each.
* Not explaining an important part but still finding it
  + -5 points each

Will not take off points for not having referenced the 50 hours. This was confusing in the instructions.

Solution grade:

Most points will likely be taken off in this section. Will be much harsher here because it’s only worth 20% of the grade, so if their report is professional and they describe a great approach, they’ll still get an 80% even if every answer is completely bogus.

Will subtract points for -

* Said that parallel flow will be more efficient than counterflow
  + -20 points
* Wrong value of minimum radius for optimal HX
  + -2.5 points if it’s off 0.005, -5 if it’s off by more, -7.5 to 10 if it’s way off
  + -20 points for this section if they state that for some lengths parallel flow works and counterflow doesn’t
* Sensible value for length
  + Anywhere from ~10 ft to ~100 feet is considered to be correct. I will admit that most students got somewhere around 10 feet for an optimal length, while my solution of ~50-75 feet doesn’t match any of them. Huge degree of leeway in the solution here.
  + -5 if it’s one order of magnitude off (i.e. 150 or 5)
  + -10 if it’s two orders of magnitude off (i.e. 1500 or 1)
  + -15 if they say that the heat exchanger works for one value, but doesn’t work for the next larger radius
  + -20 points if the values are all imaginary, etc.
* Correct coolant mdot for each length
  + - 2.5 point only if it’s a conversion between kg/hr and kg/s, that’s my bad mostly. No points taken off if they recognize it.
  + -10 points if it’s something that doesn’t make sense, i.e. would cause dp/dx to be too high or if it’s way too low.
* No points will be deducted if diameter is used instead of radius, unless they specifically say one thing and then use another, or if they mix them.
  + Saying one thing then using another is -5.
  + Mixing r and d is -10
* Cost is way too high or too low.
  + -10 points. This will be judged based on whatever length that they came up with. If they just had incorrect geometry (i.e. outer tube), then it’s only -2.5
* Their answers do not match their approach in some obvious manner
  + -20 points
  + If they have a wrong approach but their solution is suspiciously similar to other groups… this will be investigated further.
* Wrong UAs
  + - 10 points

Report:

* - 10 points off if it looks sloppy or is hard to read
* - 10 points if there’s excessive grammar errors
* - 10 if I really just can’t understand it
* - 20 points if they missed an important section
* Really this 30% of the grade should be a freebie. Points will only be taken off if it’s something that stands out bad.
* Will occasionally make fun of bizarre fonts, excessively formal things, the weird binder covers that various overachievers like to use, etc., but won’t take off any points. Comic sans, papyrus, and unreadable or unprofessional fonts will be -5, unless it’s clear that they’re trying to mess with us.
* Will give brownie points for artistry or humorous things.