

Assignment #5: Propulsion

due 10/20/2021 before midnight via Learning Suite

ME 415

50 possible points

Note: Items that say “Group” are done together and can have one shared write-up. Items that say “Individual” mean that you should perform your own analysis/write-up for those sections (though you can of course still help each other out just like you do with regular homework, you just need to do your own work, and they do not need to be the same analysis for everyone in the group).

5.1 Choose a motor(s), propeller(s), electronic speed controller(s), and batteries (I recommend two so you have a backup) for your aircraft. Even if you decide not to purchase electronics for your aircraft, design appropriate options as if you were. On our [Resources](#) page under Components there is additional guidance to help you. The [UIUC Propeller Data Site](#) is a good place to start your propeller search as it has a lot of tabulated performance data. Use the `motorprop.m` simulation tool I provided to characterize the efficiency of your motor/propeller/battery combination as a function of rotation speed and as a function of flight speed for level flight. Don’t order any components until you receive approval from the TA. Submit the following:

- Individual: Thoroughly analyze your system with good plots and clear discussion on how you made these design decisions. If your group decided to analyze different configurations independently just provide a write-up on the system you analyzed whether or not it was the final system selected by the group.
- Group: Provide a list of components you would like to order including names, short descriptions, urls, prices. Again, do this whether or not you are going to actually order.

5.2 Get started on building. If some redesign is happening concurrently there are still aspects you can prototype or practice on. I’d recommend splitting up building tasks (probably 1–2 people per task). For example: assemble the wing, learn how to build hinges for control surfaces, prototype a fuselage, etc. Under our resources page see “Adhesives” and “Hinges”.

Describe in detail what you accomplished and any lessons learned.

Midterm 1 Rework:

This is not part of the homework, but just a reminder. For any problem that you missed on the midterm you can earn back half of the points missed by figuring out what mistakes you made and reworking the problem correctly. Explain what you missed and show your work for the correct solution.