Assignment 4 – Design Concept Analysis (Individual Assignment) (/70 points)

Due date: See CANVAS for submission deadline and instructions

Objective: The goal of this assignment is to conduct "back-of-the-envelope" engineering analysis on a preliminary design concept generated in Assignment 3 to determine if the design concept will be feasible. This is an individual assignment.

1. Pick a design concept from Assignment 3 to use for your analysis. Each person on your team must pick a different concept to analyze or a different design aspect of the same concept (i.e. no two people on your team should be doing the exact same analysis).
2. Decide what engineering calculations are important to determine whether your chosen design concept will "work" (i.e. fulfill your design objectives according to the metrics you developed in Assignment 2).
3. Complete your engineering analysis by performing "back-of-the-envelope" type calculations. You will likely need to make simplifying assumptions and approximations. Expected level-of-effort is 1-2 pages of handwritten, Excel, or Matlab calculations.
4. Write a paragraph summarizing your analysis (~ ½ page) (/20 points). This paragraph should include the following information:
    - What is the design concept you have chosen to analyze?
    - What is the goal of your analysis? (i.e. what calculations are important to determine whether your chosen design concept will "work"?) (/5 points)
    - What is your analysis approach? (/5 points)
    - What assumptions did you have to make in your analysis? Why are these assumptions valid? (/5 points)
    - What is the conclusion of your analysis? Is this design concept feasible based on your preliminary calculations? If not, what changes are required? (/5 points)
5. Provide a professionally organized, clearly annotated summary of your engineering calculations (see course reader examples, Chapters 9 and 10). This summary should clearly explain your calculations to the reader. **Must be typed.** (/50 points). Points will be allocated as follows:
    - Quality of engineering analysis (/30 points)
        i. Appropriate assumptions (/10 points)
        ii. Calculations are technically correct (/10 points)
        iii. Appropriate level-of-detail and effort for preliminary design (/10 points)
    - Calculation presentation (/20 points)
        i. Spreadsheet documentation (title, name, date, Version #) (/4 points)
        ii. Clearly labeled units (/4 points)
        iii. Clearly labeled inputs, calculated values, assumed values (/4 points)
        iv. Supporting diagrams that illustrate parameters included in calculation (/4 points)
        v. Annotated explanations of each calculation (/4 points)