Report Writing Outline and Timeline

1. **Title Page: (All reports)**
   a. Title of the project
   b. Team membership
   c. Instructor/Advisor
   d. Course number (e.g., ME195A or ME195B)
   e. Department name, University name
   f. Date

2. **Abstract (ME195B Final Report)**
   a. What you have done (one sentence)
   b. Why you do it – state the significance/impact of your work (one or two sentences)
   c. How you do it – state what challenges you were facing and how did you solved the problems in which methods/technologies. State the unique part of your work (one paragraph)
   d. Major/important results – state the most significant results and findings.

   Keep in mind that the purpose of the abstract is to give a reader a general idea of your work without reading through the entire report. Most students don’t know how to write a proper abstract – they either talk about too much background, or didn’t show any important results in the abstract.

3. **Acknowledgement (ME195B Final Report)**
   a. Sponsor(s)
   b. Professors, technicians, staff, other students, friends and relatives, etc.

4. **Tables of Contents (ME195B Final Report)**

5. **Chapter 1 Introduction (ME195A Report# 1)**
   a. Motivation of the project (or needs)
      e.g., market needs, community needs, new technology needs, automation needs, energy saving needs, environmental protection needs.
   b. Current status (literature review)
      - How other people solve this problem in the past or currently
      - Which technologies they used
      - What kinds of results they have achieved
      - What issues or disadvantages of their methods
      Please don’t forget to put the reference/source when listing each work
   c. Project objectives and specifications
      - How would you tackle the problem differently from the existing methods
      - Which technologies or principles or methodologies you are proposing?
      - What specifications and results to be expected (e.g., including materials you choose, geometry, accuracy, speed, weight, capacity, constrains)
   d. Significance of your project and its uniqueness and challenges
   e. Team work
      - Indicate the responsibility of each team member on the project
How does he/she conduct the task(s)/project. It would be ideal to have a multi-disciplinary team (e.g., the first member is in design, the second member is in mechatronics, and the third one is in thermal and fluid area).

g. Gantt Chart

A Gantt chart is a type of bar chart, developed by Henry Gantt, to illustrates a project schedule from the start date to finish date. Terminal elements and summary elements comprise the work breakdown structure of the project.

6. Chapter 2 Theoretical Background (ME195A Report# 2)
a. State the theoretical background and engineering principles behind the project

7. Chapter 3 Prototype Design (ME195A Report# 2-3)
a. Illustrate how many design concepts and options the team had come up at the early stage of ME 195A, and how the team selected the most optimal solution through:
   - Analysis of pros and cons of all the available options, and/or
   - preliminary experiments, and/or
   - computer simulation and/or FEA, and/or
   - theoretical calculation
b. Compare and show the results that support the selection of the optimal solution in (a)
c. Show your finalized design

8. Chapter 4 Microcontrollers and Electronic System Interface (if applicable) (ME195A Report# 2-3)
a. Show how you design or use the commercially available electronics circuit and programming to control your device
b. Show the features of your microcontroller, electronic components, circuit
c. Draw a block diagram to show how your electronic system functions
d. Show how you interface your prototype to the electronic system, what data acquisition system (DAQ) you used and what kind of software you used for data analyses.

9. Chapter 5 Fabrication and Assembly (ME195B Report# 1-2)
a. Show how you made the prototype
   - Fabricated parts
   - Purchased parts
   - What challenges on making parts
b. Show the final assembly of your prototype

10. Chapter 6 Testing Results and Analyses (ME195B Report# 2-3)
a. Show the overall of your experimental setup
b. Show your data under different operating conditions

c. Analyze your data using computer (e.g., Fast Fourier Transformation, LabVIEW, Matlab, etc.)

d. Show the testing results in figures and/or tables. Indicate what does each curve or plot means, how do they indicate the functions of your prototype

e. How do these results match your specification, as well as meet your design criteria.

f. Indicate whether or not the developed prototype meets the safety requirements.

g. Show the cost (economic) effectiveness of your prototype and its benefits to society

11. Chapter 7 Conclusions and Future Work (ME195B Final Report)
   a. Draw conclusions from your design, calculations, and simulations
   b. Draw conclusions from your experimental results; whether or not they meet your specifications.
   c. Draw conclusions from your team work
   d. Draw conclusions from cost analyses
   e. State the future improvements.

12. Reference (All Reports)
   a. List all resources/references for your project work.

13. Appendix (Add to your report as needed)
   a. Show the detailed calculations here.
   b. Include the detailed simulation results and computer programming codes here
   c. Given the detailed design drawings, dimensions, and materials features
   d. Attach all datasheets of your purchased components here