ME 195 A & B Report Writing Outline

- 1. Title Page:
 - 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 of submission
- 2. Abstract

Answer these questions precisely and specifically:

- a) What did you do? (one sentence)
- b) How did you do it? state how you did the project (one or two sentences)
- c) What was the result? state the major findings and conclusions (one paragraph)

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. Make sure that your abstract is a standalone component and is succinct. Typically, abstract is the last component of the report that you write.

3. Acknowledgement

Express your appreciation for those who were instrumental in your success. Be specific for what they did to help you:

- a) Sponsor(s)
- b) Professors, technicians, staff, other students, friends and relatives, etc.
- 4. Table of Contents
 - Includes titles of each section, subsection, and page numbers. Appears after Acknowledgements and before the List of Figures. It must be nicely formatted.
- 5. List of Figures
 - a) Must include the title of each figure and page number on which the figure appears in the text.
- 6. List of Tables
 - a) Must include the title of each table and page number on which the table appears in the text.
- 7. Chapter 1 Introduction
 - a) Problem Definition
 - Describe the motivation and background for the problem that you solved. e.g., market needs, community needs, new technology needs, automation needs, energy saving needs, environmental protection needs. Describe the significance of your project and its uniqueness and challenges

- b) Project objectives
 - State the specific objectives (your measurable goals) that you set for your team to accomplish in the project
 - Explain how you tackled the problem differently from prior work
 - Explain which technologies, principles, or methodologies you are proposing to apply?
- c) Project specifications
 - What specifications (quantified design targets) did you set for your project? For example, materials, geometry, accuracy, speed, weight, capacity, constraints, etc.)
- d) Literature and State-of-the-Art Review
 - How have other people solved this problem in the past or currently?
 - Which technologies did they use?
 - What results did they achieve?
 - What issues or disadvantages arose in prior work on the problem? (Don't forget to cite references/sources when listing prior work and including the full citation in your References section)
- e) Team work
 - Indicate the responsibilities of each team member on the project
 - Explain how team members carried out their tasks for the project.
- f) 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.
- 8. Chapter 2 Theoretical Background
 - a) State the theoretical background and engineering principles behind the project
- 9. Chapter 3 Design Concepts
 - a) Describes the prime design concept and its key features
 - b) Discusses additional design concepts that were considered, and how the team selected the most optimal solution through:
 - Analysis of pros and cons of all the available options, and/or
 - preliminary experiments (if any),and/or
 - computer simulation and/or FEA, and/or
 - theoretical calculations

(If there are many additional concepts, consider placing them in a separate Appendix, and refer to the Appendix in this chapter)

- c) (If the project includes Mechatronics), explain, discuss, and justify the use of microcontrollers and electronic components.
- d) (If the project includes Mechatronics), include a block diagram of electronic circuits used.

- 10. Chapter 4 Analysis & Design Documentation of the prime design concept
 - a) Compare and show the results that support the selection of the optimal solution
 - b) Show your finalized design
 - c) CAD part drawings and assembly drawingsshould be included in a separate Appendix, but referred to in this section
 - d) (If your project includes Mechatronics) Show how you interface your prototype to the electronic system, what data acquisition system (DAQ) did you use, and what kind of software did you use for data analysis?
- 11. Chapter 5 Fabrication and Assembly
 - a) Bill of Materials and Cost Analysis
 - Include a bill of materials and table showing all costs
 - Discuss how component choices are reasonable to reduce costs.
 - Explain how costs would be impacted if your design goes into production.
 - b) Show how you made the prototype
 - Fabricated parts
 - Purchased parts
 - What challenges did you encounter in making the parts?
 - c) Show the final assembly of your prototype
- 12. Chapter 6 Testing Results and Analyses
 - a) Show the overall testing setup
 - b) Show your testing procedure
 - c) Show the testing results in figures and/or tables. Explain what each data plot means, and how they indicate the functions of your final design
 - d) How well do the results meet your specifications and design criteria.
 - e) Indicate whether or not the final design meets the safety requirements.
 - f) Discuss the global, social, environmental, political and/or health and safety issues, including issues leading to a need for the project and the results of the project
- 13. Chapter 7 Social Impacts
 - a. Discuss the global, social, environmental, political and/or health and safety issues surrounding your project, and the implications based on the results of the project.
- 14. Chapter 8 Conclusions and Future Work
 - a) Draw conclusions from your design, analytical calculations, and prototyping
 - b) Comment on the degree to which your project met its specifications. If a specification was not met, why not?
 - c) Draw conclusions from your team work
 - d) Draw conclusions from your cost analyses
 - e) State what can be done to improve the results if the project were to continue in the future.
- 15. References
 - a) List all resources/references for your project work. Consistently apply an accepted format for citation and bibliographic references, such as APA or IEEE formats.

16. Appendices

- a) Include detailed calculations here.
- b) Include detailed simulation results and computer programming codes here
- c) Include detail design drawings here. Dimensioning should be done according to the ANSI Y14.5 standard (GD&T)
- d) Include excerpts from datasheets of components here
- e) Include any detailed information that would be helpful for a team following in your footsteps that would be helpful in their design process, but that is too detailed or that would detract from the description of your design in the main body of the report.