Design Considerations for Capstone Projects

All project plans and final design reports (updated since the project plan if required) must include a "Design Consideration" table. It must include the following elements (environmental, social, etc.) and briefly explain within the table how they affected the design. For the final design report in ME482, the table should refer to the most relevant sections of the report. The table does not have to incorporate every aspect of design, but reflect the fact that your design required you to consider multiple constraints.

Design Considerations (NOT Design Criteria)

The following list has been created to assist the students with establishing appropriate design criteria. The best designs are often a compromise of multiple competing criteria. It is up to the engineer to make judgments weighing the costs and benefits of each decision. Discussion of these design considerations is required in the Design Proposal (ME 481) and Project Report (ME 482). *All of these should be considered when establishing criteria.* ***These are NOT criteria themselves,*** *these are design considerations:*

- Performance – How is the design to function? What need is it filling? What does it have to do? Is it reliable?
- Serviceability – Is maintenance or repair a concern? If so, can it be easily performed?
- Economic – Is the production and/or use costs considered?
- Environmental – Does this have positive or negative impact to the environment? Are there any environmental effects due to the production, use or end-of-use of the design? Are appropriate materials selected?
- Environmental Sustainability – *(Sustainability refers to the practice of having minimal impact on the environment. Completely sustainable practices do not deplete or degrade the environment.)* Does the design consider recycling, and using sustainable materials and manufacturing methods? Are renewable energy sources used (such as solar)? Does the product promote sustainable practices?
- Manufacturability – Can the design be economically produced? Can critical elements be inspected?
- Ethical – Has the student followed the code of ethics established by professional organizations such as ASME? Does the design benefit humanity? Have appropriate standards been applied? Are the design documents accurate with claims not overstated?
- Health and safety – Have appropriate codes and standards been applied to prevent harm? Does the design mitigate harmful effects of failure to prevent injury? Does the design directly improve the health and safety of users?
- Social – Does it benefit society? Are there societal implications of the product?
- Political – Are there political implications of the project? What materials or parts would need to be imported? Would this be exported or imported?

Example of a Design Consideration Table for the final report. The Project Plan requires a similar table, but the third column will be excluded and use appropriate tense (not *past* tense):

Design Consideration	**Project application**	**Relevant location in report**
Performance	Several performance requirements were established	Multiple locations
Serviceability	Wings were designed to be easily replaced if damaged	Sect 5.2
Economic	A less-than ideal control unit was selected due to economic limitations. Spars were hand cut rather than laser cut due to economic reasons.	Appendix III Sect 4.4
Environmental	The plane will produce loud noise, but noise levels were not a design criterion.	N/A
Environmental Sustainability	Small quantities of materials such as balsa wood were used, but sustainability was not a design criterion.	N/A
Manufacturability	Being able to construct a flying airplane was a serious design consideration. Manufacturability affected material selection and spar geometry most significantly	Sect 4.1-4.9
Ethical	We did not knowingly violate any competition rules and believe the final product, an RC airplane, will provide hours of valuable recreation for its users.	N/A
Health and safety	This did not affect design, but we had to be aware of safety concerns associated with flying a propeller driven RC airplane.	N/A
Social	RC airplanes provide a fun and interesting leisure activity, but this did not affect design.	N/A
Political	Did not affect design	N/A