MY ENGINEERING DESIGN REPORT TEMPLATE

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(Note: Each of the above sections in your report should begin on a new page.)
PROJECT REPORT

“TITLE”

By

Your Name

Date

TEAMS Academy
UMASS LOWELL
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1.0 THE ENGINEERING PROBLEM

(Your Introduction goes here.)

Help

- This section should give the reader enough background to help them understand your report, if done properly it should inform the reader in such a way so that later sections of the report will require little additional background explanation.
- Inform the reader about the engineering problem you face, your performance objectives or goals, and the limitations imposed due to materials, tools or other constraints. Use graphics or images as appropriate, keep it simple and direct.
- Describe your engineering design process, using the engineering design cycle to guide your discussion, but do not include the below graphic in your report!

The Engineering design Cycle

- Finally, briefly summarize your leading design choices, how you made your final design choice, how your design (prototype) performed, what you learned, and what design changes you would make and why.
2.0 EVALUATION OF ALTERNATIVE DESIGNS

(This section should provide a clear identification of the key dependent (or performance) variables, your quantitative objectives or goals for these variables, and most importantly, the identification of the key independent design variables and their relationship, or play-through, to the dependent (performance) variables. And to the best of you understand how these two sets of variables are connected to each other, and to your design considerations.)

Help

• The leading designs considered, any issues taken into account such as controllability (or lack thereof) of the design variables, performance variable sensitivity to errors, etc., based on modeling analysis or fabrication experience, should be brought into the discussion. Be specific about how you got to your particular Design Plan (next section), the winnowing down process, making use of output from model calculations, any experience you have from previous prototype efforts, or other considerations that you used. Make sure to be concrete, account for your performance objectives in terms of the Baseball Science and design variables choices in terms of your understanding of the bat design process.

• While you should make specific reference to your model based evaluations of the different design options, showing output in the form of data tables or graphs, etc., and make mention of any limitations or risks associated with the tools, or the fabrication process for that matter, nevertheless a detailed description of your models should not be given here, but rather should provided in an appendix.

DEPENDENT OR PERFORMANCE VARIABLES:

- MOI
- CM
- Mass (or Weight)

INDEPENDENT OF DESIGN VARIABLES:

- Braid Layers
- Braid Angles by Region
- Epoxy or Resin Density
- Overall Length
- Transition Lengths
- End-Cap and Resin Mass (or Weight)
- Knob and Resin Mass (or Weight)

(Note: The independent variables can and should be modeled into your density function \( \lambda(x) \), and employed in your finite element model, as well as an analytical model.)
3.0 THE DESIGN

(A description of your selected design goes here:)

Help

- You should provide a sketch or sketches of your design highlighting features and design choices of note, and most importantly, provide an overview discussion of the key design choices you’ve made, and why you believe those choices will help your design to meet the performance objectives.
- Your design description should describe all elemental components and sub-assemblies completely, their dimensions, materials used, any out of the ordinary assembly processing or finishing needed to meet your design objectives.
- You should write this section as if someone else were going to be tasked with fabricating your prototype for you, in your absence, using this design specification, and that your grade will dependent on how well they achieved the product you intended.
4.0 PROTOTYPE

(Describe your Prototype here.)

Help

The Prototype as fabricated is described using sketches or pictures, written description, graphs, data tables or other data formats:

- Sketches of the sub-assemblies and fully assembled prototype, or pictures, and a general characterization of the prototype versus the intended designed product.
- As assembled dimensions reported, and any dimensional deviations from the design plan should be noted and detailed.
- Any as fabricated subassembly, as assembled, data should be reported here along with its relevance.
- Any changes to the prototype design made as a result of assembly and sub-assembly intermediate testing should be noted.
- Finally an outline description of the fabrication process should be provided with areas of design to prototype risk noted and expanded upon.
5.0 TEST DATA

(Your TEST DATA goes here.)

Help

The Test Data plan and resulting Data presented in the appropriate form are presented here, for example in the form of tables, graphs, pictures, etc. There should be enough description with the data that the reader can understand how the data relates to the previous sections, particularly the Performance Objectives section.

• **Units**
  All data should have units either at the tops of data columns, on axes of graphs or next to values that are standing alone.
6.0 ANALYSIS AND CONCLUSIONS

(Your Analysis and Conclusions go here.)

• Your Analysis should explain in detail, by means of calculations and specific discussion of the test data results, what you can conclude about how well your design performed with respect to your objectives.
• What are the likely limitations in the science and engineering of designing, prototype fabrication, or testing that may have led to any shortfall.
• How would you improve the design, the design process, or the fabrication process, and what technical justification can you provide for the proposed changes.
7.0 REFERENCES

(Your References here.)

Help

Any books, articles, website that you used to get information that helped you perform this work, or would help the reader get some background information so they could better understand the work you’ve done, should be listed here.

NOTE: Useful Websites

http://engineering.dartmouth.edu/teps/default_what.is.eps.html#EPSCycle
Engineering Design and Problem Solving at Thayer School of Engineering

http://fie.engrng.pitt.edu/fie95/4d2/4d25/4d25.htm
Overview of a dozen or more introductory engineering programs & philosophies.