Lab Report Guideline

1. General Directions

- Lab reports should be typed using a word processor, then convert to a .pdf file.
- Equations may be written with Mathcad, Latex, or similar software. Hand-written only if necessary.
- The line spacing should be single, Arial type and the font size should be 11-point.
- One-inch margins should be used throughout (Moderate).
- Figures should be printed with good quality, and a white background should be used for model drawings and results. Black and white contour plots (on white background) are acceptable.
- The lab report format should follow the steps in a good analysis, with the addition of an executive summary and a conclusion. More details are provided below. The typical length of each section is provided. These are recommendations, not limits. Further, these page length recommendations do not include figures and tables.

2. Lab Report Format

Analysis Title
Author(s)
Period (Spring, Summer or Fall), Date

Executive Summary (1/2 to 1 page) **(10 pts)**

The Executive Summary is just what it sounds like – a summary of the entire project that is short and to the point so that even an executive manager will have time to read it. Usually this is all that gets read by management, so it should be written very well.

1. Introduction (1/4 to 1 page) **(10 pts)**

Introduce the problem and its background, including the motivation for solving the problem. For academic FEA lab projects, the usual motivation is to learn aspects of the finite element method. This section should discuss the new techniques or applications learned during the project and describe the mechanics of the problem to be solved.

2. Goals and Objectives (1/4 to 1/2 page) **(10 pts)**

Clearly state the objectives of the analysis. For example, “The primary goal of the present analysis is to determine the first three natural frequencies of the space frame structure.”

3. Anticipated Results (1/4 to 1 page) **(10 pts)**

State the anticipated physical behavior of the structure or system being analyzed. Discuss the resulting assumptions that can be made about the behavior.

4. Mathematical Idealization (1/2 to 2 pages) **(15 pts)**

a. Mathematical Representation

Classify each component in the system and justify this selection.

b. Geometrical Representation

Discuss the geometrical model used and justify any approximations or defeaturing. If all details are included in the model, then explain why they are important.

c. Boundary Conditions

Describe the boundary conditions. If symmetry is used, then justify its use. If

symmetry is present but not used, then explain why.

d. Material Model

Describe the material model. In this class, it will usually be linearly elastic and isotropic, mainly.

5. Solution Procedure (1/2 to 1 page) **(10 pts)**

Describe the solution procedure and any difficulties that were encountered during the analyses. If the finite element method was used, then discuss and show the mesh(es) that were used in the analyses. Discuss convergence of the solution.

6. Interpretations and Validation (1/2 to 2 pages) **(15 pts)**

Discuss the results with respect to the anticipated results described above in Section 3. Show the details of the analyses and tests that were performed to validate the solutions.

7. Conclusions (1/2 page) **(10 pts)**

Summarize the work that was performed and the important results. This is essentially a rewriting of the executive summary in a different form.

8. References (1/2 to 1 page) **(10 pts)**

List of the references used through the analysis, use the research format, here a brief example.

[1] "Number of cyclists/bike riders," Statista, [Online]. Available: http://www.statista.com/statistics/227415/number-of-cyclists-and-bike-riders-usa/. [Accessed 21 September 2015].

[2] "Total population (in number of people)," World Bank, [Online]. Available: http://data.worldbank.org/indicator/SP.POP.TOTL. [Accessed 21 September 2015].

[3] D. Arola, P. Reinhall, M. Jenkins and S. Iverson, "An Experimental Analysis of a Hybrid Bicycle Frame," *Techniques,* pp. 21-24, May/June 1999.