Lab Report Guidelines

Lab reports should be typed using a word processor. Equations may be hand-written, if necessary. The line spacing should be 1.5, and the font size should be 12-point. One-inch margins should be used throughout. Figures should be printed on a laser printer, and a white background (if possible, to reduce wasting toner) should be used for model drawings and results. Black and white contour plots (on white background) are acceptable.

Assume that the reader is familiar with the finite element method and basic structural mechanics, but does not know the details of the particular problem being described in this report.

The lab report format should follow loosely 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. The total length of the report should not exceed eight (8) pages, not counting the cover page. Additional figures and plots can be included in an Appendix, if they are referenced in the main body of the report.

Cover Page (1 page)

Title
Author
Date

Executive Summary (1/2 to 1 page)
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 is read by management, so it should be written very well. This summary should include the objectives, the approach, and the key results.

1. Introduction (1/4 to 1 page)
Introduce the problem and its background, including the motivation for solving the problem. Why is this problem important?

2. Goals and Objectives (1/4 to 1/2 page)
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.” If optimization was performed, clearly state the optimization problem statement.

3. Anticipated Results (1/4 to 1 page)
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)
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.

5. Solution Procedure and Key Results (1/2 to 1 page)
   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, if applicable. Present the key results in tabular and/or graphical form. Explain the significance of these results. If optimization was performed, present the results and discuss convergence.

6. Interpretations and Validation (1/2 to 2 pages)
   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)
   Summarize the work that was performed and the important results. This is essentially a rewriting of the executive summary in a different form. You may also include pertinent recommendations here.

NOTES:

(1) Reports must be written independently. This is not a group project.

(2) Accuracy of the results is key. Double check all results for typos or model errors.

(3) Units must always be presented.

(4) Reports are due on the date and time listed on each assignment. Late reports will be penalized 10% for each day late.