



457.309 Hydraulics & Laboratory

.02 Laboratory Report



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_0. Intro

- Functions of lab-report
 - A tool to exchange new knowledge.
 - The permanent records for the future use.
 - In reality: the only way to get grade.
- To be good report
 - Bringing assessment and analysis of the information
 - Satisfying the necessary components for the efficient communication of the knowledge.
 - Simultaneously, considering readers and audiences in the objectives, length, format etc.
 - Knowledge-ing the information!!!



_0. intro

- Requirements for the lab-report (in this class)
 - Contents: objectives, methods, results and discussion.
 - Audience: Not only lecturer for grading but general audience.
 - Therefore, don't assume that I can understand. Not too detailed, but should be kind enough for me not to waste time to read again text book (Sometimes, my daughter will grade.....).
 - Reference and citation!!! If you don't do it appropriately, then your report will be in plagiarism and report will be failed.



_0. Organization



- The basic format of the class lab-report.
- You should follow the above format.
- Freedom means failure...



_1. Title Page

- Title for explaining what you want to say.
 - Your names.
 - Lecture # and when you did experiment (how long).
 - Submission date.
 - T.A.'s name
- ❖ Each item is 1 of 100 points.



_2. Introduction

- Approximately 1 page and 20points.
- Background and importance of experiments
- Objectives
 - Objectives can be the validation of the present theory, achieving empirical formulae or critical values, deep understanding the particular processes.
 - Write why you are doing this work and what you try to explain and **what readers can expect from the results.**



_2. Introduction

■ Background

- Clearly declare the assumptions which an experiment is based on!
- Discuss validation of the application the assumption to this experiments with limitations.
- Describe the governing equations.
- Explain variables and parameters.
- If necessary, explain the physical meanings of the nondimensional number etc.
- When you want to include derivations of formulae, then use the APPENDIX chapter.



_3. Methods

- Approximately 1 page and 15 points.
- Explain the facilities and equipments in detail.
 - Length, width, specific parts, power, capacity etc.
 - Include schematic drawings or blue print etc.
 - Photo is acceptable, but CAD or other type design tools are recommended.
- Replicability
 - Other's can reproduce the results following your experimental setups and method from your report.
 - Don't copy my guidance of lab-manual!
 - Describe what you should care at each step!
- *Do not miss the uncertainty analysis of your experiments !!! (-10 points)*



_4. Results and Discussion

- Approximately two pages, and 35 points
- Most important part as you expected
- **Summarize** data with plot, figures, and drawings, and table and discuss with the **references, assumption and theory** which you discussed in the previous section. **Never bring new reference or theory here.**
- Figure and table
 - Axis, label, units and scale etc. (missing -> loss points)
 - Use markers for the discretized data.
 - Denote error bound which comes from the uncertainty analysis.
 - ***Never include table or figure without discussion.*** (If you include table, figures, drawings without discussion, then you will lose points a lot.)



_4. Results and Discussion

- Results should be abstracted and summarized into tables and figures and discussion should be based on them.
- Discussion explains figures and tables and also interconnects them each other to efficiently reach the objectives (or main questions).
- Of course, when you discuss your data, you should discuss the uncertainty and how you reduce the number of data. In other words, explain the data analysis method in detail (in your case, average, linear regression, FFT, wavelets, POD etc.)
- I always emphasize the importance of uncertainty. You should include accuracy and reliability of your data. Therefore, *you should do at least three sets of experiments to get one data point* for the statistical analysis.



_4. Results and Discussion

- You may need to spend your time on this part but without clear description in parts (2) and (3), you cannot bring the good results and discussions on your writing.
 - From section (2), introduced theory should be applied to your results and show the difference and similarity between experiment and theory.
 - If difference is observed then, the assumptions and limitations from section (3) are discussed here to validate your experiment.
 - Of course, assumptions which you discussed and measurement uncertainty need to be reviewed to achieve comprehensive conclusion.



_4. Results and Discussion

- Never use such expression as “limits of observer, human eyes, equipment's malfunction etc.” They are not scientific word. (If describe in this way, you will lose points.
- Such description should be quantified by *uncertainty analysis* scientifically.
 - If you use too qualitative expression, it will make your results too unreliable. So, never use poetic description in your lab-report.



_5. Conclusions and Recommendations

- Approximately 1 page, 10 points.
- Clearly deliver what you learn newly here in the general view points.
- You interconnect your results and discussion here with the previous assumption and objectives here concisely.
- Maybe, you can recommend what kinds of experiment can be done more if you have extra time and money along with importance of your suggestions.
- Final 20 points, will be awarded based on the overall format, clearness of writing and L.T.A.'s evaluations etc.

