Research Reports

Research Reports

Overview

Research teams are required to submit a research report approximately every other week, or as noted on the syllabus. The exercise is not intended to add extra work, but rather facilitate a joint team effort of learning and reflection.

Target Audience

This document should make sense to a senior engineer at Cornell who is unconnected to AguaClara.

Expectations

A research report is a written document that reflects the high level of effort and professionalism expected in the engineering profession. Spelling and grammatical errors should be eliminated. Your team is expected to follow the formatting guidelines dictated on this page and utilize your best judgment when writing these reports. Your reports should always have a designated Report Proofreader; this individual is responsible for ensuring that there are no spelling, grammatical, and formatting errors. Different individuals on your team can hold this role over the course of the semester, but be sure to note who holds that role in each report that you submit.

These reports should take significant effort, time and thought. We anticipate that each team member on average should spend about an hour every two weeks with writing or editing. Supporting data and/or code will be uploaded as separate documents later on in the semester, but the report itself should be easily understood without having to look at the supporting documents.

The report should include the following sections with some flexibility based on the scope of your project:

- Abstract Summarize the purpose, methods, results, and conclusions of your subteam. 100 words max.
- Introduction Explain how your completion of your challenge will affect AguaClara and our mission of providing safe drinking water (or sustainable wastewater treatment!). If this is a continuing team, how will your contribution build upon previous research? What needs to be further discovered or defined? If this is a new team, what prompted the inclusion of this team?
- Literature Review Discuss what is already known about your research area. Connect your objectives with what is already known and explain what additional contribution you intend to make.
- Previous Work Discuss what is already known about your research area based on the work of AguaClara subteams. Connect your objectives
 with what past teams discovered and explain what additional contribution you intend to make. Make sure to add APA formatted in text citations.
- Methods Explain the techniques you have used to acquire additional data and insights. The techniques should be described in sufficient detail so that another researcher could duplicate your work.
- Experimental Apparatus Explain your apparatus setup using enough detail such that future teams can recreate your apparatus.
- Procedure Discuss your experimental procedure to explain how you ran your experiment, what you were testing, and the values of relevant parameters.
- Results and Analysis Connect your work to fundamental physics/chemistry/statics/fluid mechanics or whatever field is appropriate. Analyze
 your results and compare with theoretical expectations or if you have not yet done the experiments, describe your expectations based on
 established knowledge. Include implications of your results. How will your results influence the design of AguaClara plants? If possible provide
 clear recommendations for design changes that should be adopted.
- Conclusions Explain what you have learned and how that influences your next steps. Make sure that you defend your conclusions. (this is conclusions, not opinions!)
- Future work Describe your plan of action for the next several weeks of research.
- References Cite all references your team used here.
- Task Map and Task List You should keep and update your detailed task list from the first assignment in each of your reports. Denote
- completed tasks and modify your deadlines to reflect your most recently completed progress and any delays.
- Manual Provide all of the guidance that would be necessary for future teams to pick your work up where you left off.

It is too easy to create a report that is full of opinions and unsubstantiated conclusions. Defend your conclusions using your engineering skills. If you have an opinion (hypothesis) that you wish to include, explain how you will test your hypothesis.

Formatting

Research reports will be written in Overleaf. The final submission at the end of the semester will be a PDF of the report and a read-only link to the Overleaf Project uploaded to the subteam wiki page.

Starting with Overleaf

- Research Report Template Use this template to build your reports
- Overleaf Training

The file name shall be "Report < team name> < semester> < year>". For example, the StaRS Filter Theory report name would be "Report StaRS Filter Theory Spring 2016"

If for some reason you need to switch to a new Overleaf document or the template changed significantly, copy and paste relevant source code from the old report to the new report (this keeps all comments)

All formatting should follow Grammar Guidelines for Reports.

Each report should include the team name, team member names, and date. You will also identify primary responsibilities/roles and who is fulfilling which role in these two weeks (i.e. data analysis, experimental operation). To help facilitate knowledge transfer and learning, these roles should rotate throughout the semester so that every person does not just have experience, but is competent with all aspects of team success.

Process Controller Method Files and Experimental Setup

If your experimental setup uses Process Controller to run experiments, there should be a detailed explanation of the method file used and which file you have used that produced final data. Provide a thorough explanation so that an incoming team will be able to understand why certain set points were chosen, what rules govern switching between states, etc.

Research Writing

We have also provided guiding questions that are vaguely related to assist you in your writing.

Stand-alone Document

The report must be a stand-alone document. Important equations must be documented and explained. Variables used in equations must also be labeled. Include visual figures of theoretical and experimental results whenever possible with accompanying explanations of how these are related to your research or design.

Submission

By the end of the night on Friday (by 11:59 PM), e-mail your advisor and cc all of your group members with the

link to your report

Due dates for these reports can be found on the current semester syllabus. Late reports will be penalized 10% each day that they are not turned in.

Posting Files on the Wiki

Your team should post only the final version of the report at the end of the semester to the wiki. See the wiki organization guide for directions on how to post documents. Note that all team submissions will have the same file name and will be posted as such to the wiki.

Revision Process

Each submission of the reflection report is cumulative and must be a revision (with **track changes** turned on) of the previously submission. All comments from the reviewer must be left in the document and the team should address all comments by either making changes to the report or by adding comments. The reviewer will accept changes and delete comments that have been addressed so the report doesn't get too messy with the track changes function. Save a new version of the overleaf document every time you submit the report.

Grading

The following rubric breaks down how all reports are calculated. Your advisor will include this table and your team's score in each category for each report.

Detailed Rubric

Section	Percent
Style	15%
Abstract	5%
Introduction	5%
Literature Review	5%
Previous Work	5%
Methods	20%
Results	15%
Analysis	15%
Conclusions	5%
Future Work	5%
Manual	5%
Total	100%