



Lab Introduction: ME3013, Manufacturing Processes I Fall 2018

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Introduction

ME3013 labs are designed to provide hands-on experience with a variety of manufacturing processes. Each experiment will be relatively simple in nature, but provide the student with a good understanding of the various processes from more than a theoretical viewpoint. Most of the experiments will show actual results against those calculated and provide the opportunity to examine any differences and conclude what may have happened. Formal lab reports will be the main deliverables for this course.

Planned experiments include casting, rolling, welding, and machining. Manufactured parts will also be characterized by tensile testing, hardness measurements, crystallography, and geometrical inspections.

Each experiments details will be provided to the student on the website. Students are expected to read them before the lab session, and they should conduct the experiments by themselves.

Requirements for Laboratory Write-ups

Obtain a lab notebook to use it throughout the semester. All data from your experiments, as well as all analysis, graphs, and written conclusions, should be recorded using your Laboratory Notebooks. Although most of you will carry out your laboratory measurements within a group, each of you must have a separate write-up, including all raw data as well as all details of the analysis performed. Your write-up should include the name of your partner, but at no place should it refer to the content of your partners laboratory notebook, i.e. yours and your partner's write-ups should be separate and independent. All of your records from the laboratory, as well as all analysis, should be recorded in your notebook. Handwritten entries are encouraged throughout, although they must be legible. If you find that some entry, e.g. the outline of a table, is incorrect, then it's fine just to draw a line through that page and go one to the next page. Don't waste time erasing things (and, in principle, it's better to work in ink than in pencil).

Lab Reports

Grading for the labs will be done according to the lab reports. Each student should prepare it by him/herself although experiments are conducted as a group. **Same lab reports will get 0 score.** The formal lab reports for the experiments will be due 2 weeks after completion of the experiment.



LAB REPORT FORMAT

Cover Page

Separate page in the front of the report. The following information needs to be included on the cover page.

- Student Name, Lastname, ID
- Team Members
- Submitted Date
- Course & Section
- Lab Topic

Introduction

The introduction informs the reader about the experiment that was conducted. For a formal report, this is broken down into the 3 areas listed below.

- Purpose of Experiment: What is the reason for conducting the experiment? Here, the rationale of the experiment is explained to the reader. This should be about a paragraph in length.
- Problem being Addressed: What problems and issues is the experiment addressing? In this section you will be addressing what the obstacles are which will be encountered during the experiment that need to be overcome. This should be about a paragraph in length.
- Scope of Experiment: What does the experiment encompass? Here you will outline exactly what the experiment includes and what is not included. This informs the reader as to the boundaries in which the experiment was conducted. This should be about a paragraph in length.

Test & Evaluation

This should be the largest section of the report. Here you need to include enough detail in the section below so the reader could read the report and have enough information and detail to be able to repeat the experiment that you did and produce the same results.

- Apparatus used: Here a list of EVERYTHING used in the experiment is compiled. Use bullets to list them.
- Process / Procedure / Sequence of Events: This will be the largest part of the report. There has to be enough detail here so a person could read it, understand what was done and how, and be able to repeat the experiment with no questions. Use bullets or numbered lines for each sequence of the process.

Results

Here you will be listing what the actual findings of the experiment are. These could be dimensions, visual observations, process observations, calculated information, etc. A detailed list of everything found during the experiment should be contained in this section. Data Gathered: List everything that you found during the experiment. A diagram of the apparatus



should be included here *only if needed to define some dimension or angle of the apparatus*. Within each subsection you should list your results for that part of

the lab, including raw data along with other sketches, diagrams, or explanatory information about the data or the experimental procedure. Estimate of errors should be provided here along with an explanation of how those estimates are arrived at.

- Also, this section will contain the analysis (data reduction, error analysis, graphs, etc.) leading to the final conclusions for each part of the lab.

Conclusions & Recommendations (one page maximum)

These sections close the report. They need to also add value to the report and not just be something written at the end. In the conclusion, a recap of the experiment is given to allow the reader to have a summary of what was performed and the results found. For recommendations, this should outline what would be performed differently if the same experiment were to be repeated. Both the conclusion and recommendation section needs to be 2 – 4 paragraphs in length.

- What is YOUR conclusion of the experiment: What is your personal summary of the experiment discussing the process and results obtained? Also, what was learned during conducting the experiment?
- What do YOU recommend if the experiment were to be repeated: What would you perform differently if this experiment were to be repeated? What suggestions would you make to improve the experiment?

Bibliography – this is only needed if your write-up utilizes some formula or other information that is not available in the lab description that was distributed in class. Number items sequentially, and refer to them in the text as "[1]" or "Ref. [1]".