

ETME 310 Lab Report Format

The following is an outline and template of the reports for both the turning and milling projects. Each report should have the same sections and sub-sections listed with the appropriate amount of information under each.

Writing is a critical part of the engineering field. Being able to produce high quality reports, summaries, and memos will be a major portion of your job. Knowing how to structure each and what information is required will assist you in future courses and in your working life as well. This lab will require writing formal reports, lab summaries, and lab memos to help you to understand how to write each.

Each experiment (turning and milling) during this lab will require a formal lab report of the experiment performed. Two formal reports will be required. All formal reports and summaries need to be printed **single sided, double spaced** and using a **size 11 font**. Spelling and proper grammar needs to be utilized so make sure to proof read your material before submitting it to the instructor.

The formal lab reports for the experiments will be due no later than the end of the semester, but early submissions are **VERY WELCOMED!!** These need to be VERY DETAILED and contain everything that was required to complete the experiment. In a formal lab report there needs to be enough information so the reader could conduct the experiment as you did and produce the same results. The majority of the information will be contained in the process and procedure section and there is no limit on the length.

Cover Page

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

- Name
- Submitted to:
- 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. For the 2 labs that you will be writing a formal report for, this part should be 2 – 4 pages of information. Don't write this in one big paragraph. Use bullets or numbered lines for each sequence of the process.
 - The best method for these experiments is to first construct a process for each operation that was performed. Here, you will in **DETAIL** explain what was done for **EVERY** step performed on the machine. An example is listed below for facing a piece of stock in a lathe:

Facing Operation

The cutting tool was first centered using the live center in the tail stock. The cutting tool needs to be as close to cutting on the center line of the work piece for all lathe operations.

Next the stock was loaded into the universal chuck leaving about 1 – 1 ½ inches protruding out. The cutting tool was then adjusted to the face of the work piece so that there was about a 2 – 3 degree angle away from the face of the work piece. The tool was then brought away from the work piece and the lathe was set to XXX RPM's and turned on. The cutting tool was brought into contact with the rotating work piece on the outside edge. The tool was advanced into the work piece in the “Z” axis and slowly turned into the center with the “X” axis. If the face of the work piece did not completely clean up, and second or third cut was required.

This type of detailed explanation is required for ALL operations preformed.

- The remainder of the report can list what was performed first, second, third, etc. for every component fabricated.
- Milling example: Squaring the Block, Cutting the Block to Size, Laying out the Block, Rough Cutting the Block, Edge Finding, “Z” axis Locating, Finish Cutting to Size, Slot Cutting, Drilling, Tapping, Etc. Each of those mentioned requires a ***DETAILED EXPLANATION FIRST.***

Findings

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.

Interpretation & Results

This section will use the findings and conclude the results. Here from the findings listed in the previous section, the overall results of the experiment are discussed. Also, the writer will offer their interpretations of the results concluded. These are YOUR interpretations for the results achieved during the experiment. This section should be between 2 – 4 paragraphs in length.

- What happened and what you found: Discuss the results based on the experiment and what your personal interpretations are for achieving the results.

Conclusions & Recommendations

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?

Attachments

Here, any information that supports the body of the report is included. This may include the items listed below or any other information which the writer feels would add value to the report. Remember, if information is listed as an attachment, it needs to be numbered. Also, if in the body of the report an attachment is required to supply information, the writer MUST reference the attachment number in the body.

- **YOUR PART PRINTS!!!!**
- Calculations: Any figures that needed to be derived in performing the experiment. These may be performed to find expected values or to determine values from the experimental data.
- Data Sheets: A data sheet is either the original or a copy of the information that was written down during the experiment. This shows the exact information that was collected from the experiment and provides the reader the opportunity to view what the writer considered important at the time the experiment was being conducted. These do not have to be neat and orderly. Copies from your lab notebook are fine.
- Figures & Graphs: In some experiments, charting data that was either collected or calculated may be important. Charting provides the reader a visual understanding of what happened during the experiment.
- Drawings, Sketches & Pictures: These provide the reader the visual understanding as figures and charts do. Digital pictures can help explain a lot when used in conjunction with the body of a report. The same can be said for note book sketches and CAD drawings. The old saying that a picture is worth a 1,000 words has a lot of merit to it.

However, there still needs to be enough written information in the body of the report to explain what the picture or drawing is showing.

- Reference Materials: If any information is utilized to complete the lab which comes from any outside source it needs to be listed. This may be from the ME 255 text book, other reference book, or web based information. For this lab, just referencing the book, technical manual, or web site is sufficient.
- Anything Else Important