**Lab Introduction: ME4001, Mechanical Engineering Laboratory**

**Spring 2021**

Prof. Dr. Emre ALPMAN

**Introduction**

 ME4001 labs are designed to provide hands-on experience with a variety of engineering 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.

 Each experiments details will be provided to the student on the website (Edmodo). Students are expected to read them before the lab session.

**Lab Reports**

 Grading for the labs will be done according to the lab reports. They must be uploaded by the leader of the group for each experiment. **Same lab reports** will get **0 score**. The formal lab reports for the experiments will be due 1 week after completion of the experiment.

**LAB REPORT FORMAT**

**Cover Page**

Separate page in front of the report (The first page). 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 rational 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.

**Theoretical Background**

Here you need to include enough detail and theoretical background 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.

**Experimental Setup**

This section must contain the information below:

* Apparatus used: Here a list of EVERYTHING used in the experiment is compiled. Use bullets to list them.
* Process / Procedure / Sequence of Events: 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.
* A diagram of the apparatus should be included here.

**Calculation**

This section has to include all the calculations and the raw data gathered from them. These could be dimensions, visual observations, process observations, calculated information, etc. Also, this section will contain the analysis (data reduction, error analysis, graphs, etc.)

**Results & Disscussion**

A detailed list of everything found during the experiment should be contained in this section. Within each subsection you should list your results for that part of the lab, including 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.

Results must be discussed and evaluated within the frame of the experiment.

**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?

**References** – 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]".