

# Physics 1114 - General Physics I

## Lab Notes

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**Overview:** It is the intent of each physics lab to experimentally investigate fundamental physical laws which we accept in our every day lives – mainly through experimentation first, and through developed theory second.

**Description of Procedure:** Each lab can be broken down into specific components, which we describe as follows.

- Reason for experiment: There must be a physical law/behaviour of nature that we wish to explore. These laws/behaviours are usually observed in everyday life, and taken for granted. It is the main goal of a scientific experiment to quantify and qualify these laws. The reason for the experiment also should include what you hope to discover about the physical law.

- Background of the experiment: Each experiment must be conducted in a scientific manner, and as such, there must be some underlying physical and mathematical structure to what you wish to observe. In this portion, the mathematical/physical framework for your experiment should be discussed.

- Setting up the experiment: Once you have the mathematical/physical framework built up, you now need to design your physical experiment, using your theoretical framework as a guide. A well designed experiment is one where the actual physical experiment allows for precise observations, accurate calculations, both of which form the data to be used in the framework previously devised. The definitions of precise and accurate should also be addressed at this point, as well as the limitations of all materials to be used in the experiment.

- Running the experiment and data collecting: The experiment should be run in accordance with the physical setup and theoretical framework. Data should be collected in as precise a manner as possible, and the experiment, if possible, should be run a number of times. The amount of times each experiment should be run depends on many factors, not limited to, but including: length of experiment, time to collect data, accuracy of collected data, and desired precision of final result.

- Interpreting data: The data collected should be used within the theoretical framework to determine the validity of the physical law in question, or the value of a physical quantity sought after. Calculations with the data should be made with respect to accuracy, and the results must be interpreted with precision in mind. Interpretations of both the results and the error in the calculations should be clearly discussed.

- Conclusions: Summarize your entire experiment, be sure to refer back to the original reason for the experiment and tie it in to your results.

**Report:** Taking thorough notes on every step of the above process will allow you to write up your experiment in a report. A well written laboratory report should tell an orderly story of your experiment, touching each of the items in the **Description of Procedure** section. Extra information, including diagrams of the experimental setup and theoretical framework, tables of data recorded, included error bounds, descriptions of all equipment used and anything else that comes to mind.