# 2. General Description

This software is a desktop application designed to facilitate the research on the thin films by saving the researchers from a lot of manual work. The software can directly take the inputs from the devices namely a temperature controller and a high resistance meter at given temperature differences thus reducing the chances of errors. The software will store these values and finally, after completion of the experiment show the graph plotted by these values.The software can also plot the graph from values given by the user. The software is easy to use and self-sustained.

## 2.1 Product Perspective

Laboratory Virtual Instrument Engineering Workbench (**LabVIEW**) is a system-design platform and development environment for a visual programming language from National Instruments. This software will run on a PC.

The software mentioned in this SRS is designed in LabVIEW which is supported by Windows. The devices will be connected to the PC by a KUSB-488a, GPIB cable. We will also need some device drivers to connect and use the devices in our software. The temperature controller and high resistance meter are connected to each other by a IEEE cable.

## 2.2 Product Functions

The software will be connected to the devices (a high resistance meter and a temperature controller). The high resistance meter is basically a two probe device which supplies a constant current to the material under test and measures the voltage across the endpoints. The temperature controller changes the temperature around the material under testing. The software will take voltage and current readings from the high resistance meter for temperatures differing by a value given by the user. The temperature control cools the material from 300 K to 7 K and then heats it back to 300 K. Readings will be taken in both cooling and heating phase. The readings will be stored in an excel sheet and from those readings, the software will calculate resistance and resistivity. The area and length of the sample will be entered by the user at the beginning of the experiment. The software will also plot a graph between resistivity and temperature for both heating and cooling part so that they can compare the material behavior in both processes.

The software can also draw the graph for any set of values given by the user dynamically. User can also specify the scale for the graph but the software can determine the scale and other details once given the discrete values.

## 2.3 User Characteristics

There is only one type of user for this software, they will be the researchers. Before the experiment begins the user will have to enter the basic data in the system. They will be

1. the current given to the sample
2. name of the sample
3. length and area of the test piece
4. the intervals of temperature for recording values
5. The maximum and minimum temperature

The experiment will be started. The user will get the value of resistivity and point on the graph as soon as the software reads the value from the devices. The software will also plot that point in the graph. All the values will be stored for future use.

## 2.4 General Constraint

There are a number of constraints which the system must abide by during development. The system must be developed within their bounds. These constraints dictate a number of the functional and nonfunctional requirements specified by this document. Others are because of a requirement specified to us by our customer.

1. Setup must not be disturbed during the experiment.
2. The readings must be stored in the excel sheet at the same time it is taken. This means the file must be modified regularly.
3. The software should be built using LabVIEW only.
4. The drivers that are available for the devices exclusively support IEEE ports.
5. Sometimes the temperature controller doesn’t show perfect gradient. It may skip the discrete values. In those cases, readings must be taken for the closest temperature achieved.