Lab 5. Error in Measurement-Graphical Calculations

Name-Surname : **Date :**

Student No. : **Group :**

Tools

ATTENTION! – You must bring your Digital Multimeter. Other equipment and samples will be given during the experiment.

- **Vernier Caliper:** Vernier caliper is a slide type caliper consists of a main scale and a vernier scale. It is used to perform length, depth, inside and outside measurements (Figure 1).

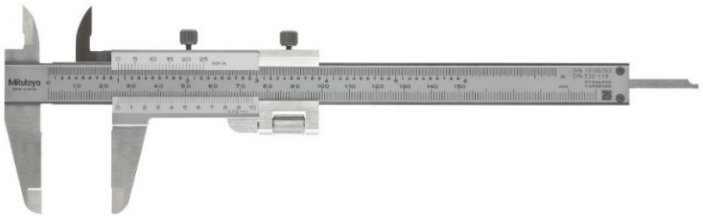
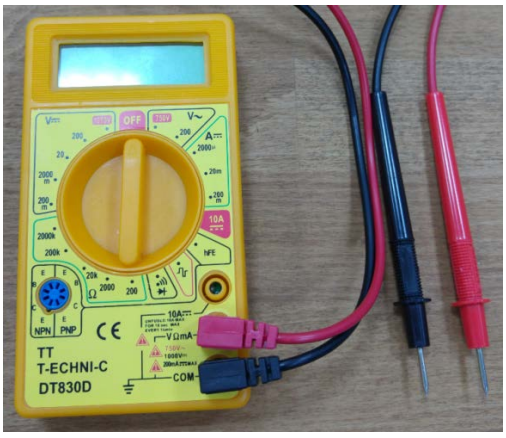


Figure 1. A vernier caliper.

- **Micrometer:** Micrometer provides more accurate measurements (in microns) for small lengths. Figure 2 shows a micrometer caliper with 0.01 mm precision.

Figure 2. A micrometer.

- **Digital Multimeter:** Digital Multimeter is an electronic measuring instrument that can combine several measurement functions in a unit. Ohmmeter function will be used in the scope of this experiment. Red probe is connected to "V/Ω/mA" terminal and black probe is connected to "com" terminal as shown in Figure 3a. In order to measure resistance, switch is configured to ohmmeter section (marked with Ω) as shown in Figure 3b. Ohmmeter section includes a resistance value range. Before measurement, suitable resistance value is selected from value range in ohmmeter section.



(a)

(b)

Figure 3. a) Connection of probes, b) Configuration of ohmmeter.

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- **Plain Washer and Spherical Ball**

(a)

(b)

Figure 4. a) Plain washers, b) Spherical Balls

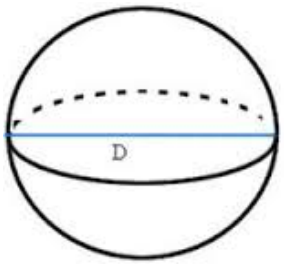
Instructions

1. Measure the resistance value of resistors given to you as a batch. Write down the measured values.

2. Measure the inner and outer diameter of plain washers given to you as a batch with vernier caliper. Write down the measured values.

3. Make ten measurement for the diameter of the spherical ball first with micrometer. Then, fill the table with your results.

No.	Micrometer (mm)
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	



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4. Draw a stem and leaf plot for two data sets below.

Data Set 1: 9, 13, 16, 16, 20, 21, 21, 25.

Data Set 2: 16, 18, 20, 20, 24, 29.

5. For the below stem and leaf plot, what is the mode and median value?

Stem	Leaf
1	1 2 5 7
2	0 1 3 4 8
3	2 9
4	3 3 5 6 8
5	0 1 6

Homeworks

1. In introduction section, briefly describe purpose of the experiment.
2. In method section, briefly describe the used materials and measurement procedures.
3. In results section, provide the set of values that you measured for all cases in tables.
4. In results section, draw a histogram for resistance measurement at Instruction 1.
5. In results section, calculate the mode and median value for resistance measurement at Instruction 1 from both data set and histogram plot.
6. In results section, draw a probability histogram for inner diameter measurement of plain washers at Instruction 2.
7. In results section, calculate the mode and median value for inner diameter measurement of plain washers at Instruction 2.
8. In results section, draw a probability histogram for outer diameter measurement of plain washers at Instruction 2.
9. In results section, calculate the mode and median value for outer diameter measurement of plain washers at Instruction 2.
10. In results section, draw a stem and leaf plot for diameter measurement of spherical ball at Instruction 3.
11. In results section, include your answers at Instruction 4 and 5.
12. In conclusion section, compare stem and leaf plots and histograms. Which is more favorable for evaluating data sets?

* *You can access report format from website lcetin.github.io*