University: Mohamed Khider University of Biskra
Faculty: Faculty of Exact Sciences
Department: Department of SM
Academic Year: 2026/2027
Prepared by: Dr OUAAR Fatima

Module: Scientific Programming
Level: 2nd Year LMD
Specialty: Physics/MCPC
Session: Practical Work N°9
Subject: Simple Descriptive Statistics

SESSION 9
Simple Descriptive Statistics

LEARNING GOALS

- Understand mean, median and standard deviation.
- Calculate them directly in Python without a statistics library.
- Apply the formulas to a small data set.
- Interpret the results at a basic level.

SHORT THEORY

For values $x_1, \ldots, x_n$, the mean is

$$\bar{x} = \frac{x_1 + \cdots + x_n}{n}.$$

The median is the middle value after sorting the data. The standard deviation measures the spread of the observations around the mean.

1. Mean

LET'S TRY

```
values = [10, 12, 13, 15, 20]

mean = sum(values) / len(values)
print(mean)

```

2. Median

GUIDED PRACTICE

For a short list, sort the values and identify the middle value. For an even number of values, use the average of the two middle values.

3. Standard deviation

LET'S TRY

```
values = [10, 12, 13, 15, 20]
mean = sum(values) / len(values)

s = 0
for x in values:
s = s + (x - mean)**2

std = (s / len(values))**0.5
print(std)

```

Guided practice

GUIDED PRACTICE

Use the measurements

$$12,\ 13,\ 13,\ 14,\ 15.$$

Calculate the mean, determine the median, and calculate the standard deviation using the direct formulas.

PHYSICS CONNECTION

In an experiment, the mean gives a central value while the standard deviation gives information about the spread of repeated measurements. The goal here is descriptive statistics, not advanced statistical inference.

TRY IT YOURSELF – NO SOLUTION

1. Calculate the mean of a given list without a statistics library.
2. Determine its median.
3. Calculate the standard deviation using the formula.
4. Give a one-sentence interpretation of the spread.

TRY IT YOURSELF – NO SOLUTION

1. For $[4, 6, 8, 8, 9, 10]$, calculate the mean.
2. Determine the median.
3. Calculate the standard deviation.
4. Repeat with a second measurement set and compare the spreads.