Faculty of Engineering
Department of Biomedical Engineering

03
Measurement and Data

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BME 312
Biomedical Instrumentation II

Significant Figure

- You are buying some watermelon, 1kg for 0.5TL.
- You are buying some pistachio, 1kg for 80TL.

- The seller weighs them.

- Watermelon weighs 15.2 kg and he is saying 15 kg of it.
- Pistachio weighs 15.2 kg and he is saying 15.2 kg of it.

- 0.2 kg of watermelon is not significant for the seller, but same amount of pistachio is significant.

Significant Figure

- When you say 15 kg it means it can be between 14 kg and 16 kg

- When you say 15.0 kg it means it can be between 14.9 and 15.1 kg.

Significant Figure Example

23.50	**4 sig figs**
402	**3 sig figs**
5280	**3 sig figs**
0.080	**2 sig figs**

Scientific Notation

How do you write numbers in scientific notation?

Error

- Difference between measured value and true value.

Statistics – Variance

- Standard deviation of the mean (standard error of the mean (SEM))

    – Averaged squared deviation from the mean of the population.

Average

- Assume you have measurements

$$10, 10, 10, 11, 13, 13, 14, 14, 45$$

What is the average?

Average

10, 11, 11, 11, 13, 13, 14, 15, 45

Average Mean: is the usual average

(10 + 11 + 11 + 11 + 13 + 13 + 14 + 15 + 50) / 9 = **16.44**

Average Median: is the middle value

10, 11, 11, 11, **13**, 13, 14, 15, 45

Average Mode: is the number that is repeated more often than any other

10, **11, 11, 11**, 13, 13, 14, 15, 45