

# Probability and Statistics (ECE 3710)

Instructor: Dr. Mohammad Shekaramiz

## HW 1

Submission type: Online, Canvas

Reading: **Chapter 1** of our textbook, presentation slides and lecture notes on Canvas.

Each question has 25 points.

**Q1. (25 Points)** Use MATLAB/PYTHON/OCTAVE/JULIA and provide a copy of your code as well as the results. 16 students measured the circumference of a tennis ball using the four following methods.

Method A: Estimate the circumference by eye.

Method B: Measure the diameter with a ruler, and then compute the circumference.

Method A	Method B
18.0	18.6
18.0	18.9
19.0	19.2
20.0	19.6
21.0	20.1
22.0	20.3
22.5	20.4
23.3	20.4
24.0	20.5
24.0	20.6
24.5	21.2
25.0	22.0
25.0	22.0
25.4	22.3
26.2	22.5
26.4	23.6

- Compute the mean of the measurements for each method.
- Compute the median of the measurements for each method.
- Compute the first and third quartiles for each method.
- Compute the standard deviation of the measurements for each method.

**Q2. (25 Points)** Given the following 23 samples:

2099	528	2030	1350	1018	384	1499	1265	375	424
789	810	522	513	488	200	215	486	257	557
260	461	500							

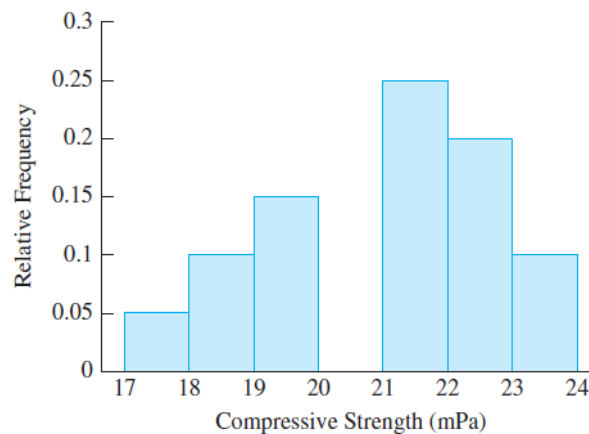
- Construct and plot the **boxplot**. Which of the points, if any, are outliers?
- Construct and plot the **histogram** and then plot the **normalized histogram**.

**Q3. (25 Points)** A sample of 100 adult women was taken, and each was asked how many children she had. The results were as follows:

<i>Children</i>	<i>0</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
<i>Number of Women</i>	27	22	30	12	7	2

- Find the sample mean of the number of children.
- Find the sample standard deviation of the number of children.
- Find the sample median of the number of children.
- What is the first quartile of the number of children?

**Q4. (25 Points)** The histogram below presents the compressive strengths of a sample of concrete blocks hardened for 28 days. One rectangle from the histogram is missing. What is its height? Explain.



**Good luck.**