Department of Bitechnology
Biostatistics BT2023
Fall semester Aug-Dec 2023
Assignment 1

Maximum Marks: 20

If required, justify the method used in finding the answer and its limitation

Due date : 8 September 2023

1. What is central tendency and dispersion in the statistics. What are the measure of central tendency and dispersion.

2. The cell death rate due to a virus infection measured in four different experiments is 10^4, 5.3×10^3, 2.3×10^4 and 1.9×10^4 cells/per hour while the duration of the respective experiments was 2.5, 4, 3.4, 2 hours. Find out the average rate of the cell death.

3. The systolic blood pressures of a group of women were measured (in mmHg) after administration of a newly developed oral contraceptive.

   127, 128, 140, 119, 145, 160, 148, 135, 129, 137, 128,
   133, 139, 121, 137, 131, 140, 155, 137, 127, 138, 122
   140, 147, 119, 137, 155, 120, 125, 107, 147, 138, 132

   Find out the **mean, mode, median, standard deviation and interquartile range** in the blood pressure values. Compute the Pearson's moment coefficient of Skewness and Kurtosis of the data of blood pressure. Is the data positively or negatively skewed. Is the data leptokurtic and platykurtic.

4. Generate a figure having histograms for the **Age** and **Physical Activity** of the patients in the give database in the **assignment1** folder of the github repository. Also show the mean and standard deviation in the **Age** and **Physical activity**.

5. Find out the area between the function e^{-x^2} and x-axis from -∞ and +∞ using the analytical integration. Also write a python program to find the same integral as correct as you can get.

6. Plot the function f(x) known as Gamma distribution for $\alpha = 1, 2, 3, 4, 5$ and $\beta = 1$ values in one graph.

$$\frac{\beta^\alpha}{\Gamma\alpha}\, e^{-x} x^{\alpha-1} \tag{1}$$

7. How to estimate of the number of bins in a histogram ? What is the difference between histogram and bar plot, explain using an example.

8. Compute the average burned calories alongwith the **standard deviation** for the following data set and find out the coefficient of the skewness and kurtosis.

kcal	100-129	130-159	160-189	190-219	220 -249	250-279	280 -309	
Frequency	5	4	12	11	6	3	2	1