

School of Computer Science Engineering and Technology

Course- B.Tech.	Type- Core
Course Code- CSET240	Course Name- Probability and Statistics
Year- 2024	Semester- Odd
Date- 16/09/2024 - 20/09/2024	Batch- 2023-2026

CO-Mapping

	CO1	CO2	CO3
Q1			✓
Q2		✓	
Q3			✓

Objectives

1. Students will be able to implement real life problems based on Uniform distribution.
2. Students will be able to implement real life problems based on Normal distribution.
3. Students will be able to implement real life problems based on Geometric distribution.

Lab (Week -8)

Question1:

Buses arrive at a specified stop at 15-minute intervals starting at 7 A.M. That is, they arrive at 7, 7:15, 7:30, 7:45, and so on. If a passenger arrives at the stop at a time that is uniformly distributed between 7 and 7:30, find the probability that he waits

- (a) less than 5 minutes for a bus;
- (b) at least 12 minutes for a bus.

Question 2:

You have been provided with a dataset in the form of a table containing a set of values. The dataset represents a continuous random variable following a uniform distribution between a specified interval. Below is the table containing the data:

Data Points	Value
1	0.25
2	0.65
3	0.10
4	0.50
5	0.80
6	0.30
7	0.70
8	0.40

9	0.20
10	0.60

. Using this dataset, answer the following questions related to the uniform distribution:

1. Determine the interval (minimum and maximum values) of the uniform distribution that best fits this dataset.
2. Calculate the probability density function (PDF) for this uniform distribution.
3. Calculate the cumulative distribution function (CDF) for the uniform distribution.
4. Find the probability that a randomly selected value from this dataset falls within the interval [0.4, 0.7].
5. Determine the expected value (mean) of this uniform distribution.
6. Calculate the variance of this uniform distribution.
7. Verify if any values in the dataset are outside the specified uniform distribution interval, and if so, identify them.

Please show your calculations and provide explanations for each question.

Question 3. Sample 8500 random numbers from a normal distribution with mean 12 and standard deviation 19. Convert these numbers to standard normal Random Variables. Check the percentage of numbers between

- (i.) $\mu - 0.325 \times \sigma$ and $\mu + 0.325 \times \sigma$,
- (ii.) $\mu - 0.5 \times \sigma$ and $\mu + 0.5 \times \sigma$,
- (iii.) $\mu - 0.275 \times \sigma$ and $\mu + 0.275 \times \sigma$.

Test Case:1 -seed=150,

Test case:2- seed=40

Note:- Truncate the result upto 3 decimal places.