SCHOOL OF ADVANCED SCIENCES

DEPARTMENT OF MATHEMATICS

WINTER SEMESTER - 2024-25

PMDS503P – Statistical Inference

LAB – Programming with R

LAB ASSIGNMENT Date: 24.03.2025

1. The last date for submission of the E-record for the assignment is 24th March 2025.
2. Mention the Register Number, Name, Slot details, course code and Course Title on the first page of the document.

Assignment No. 4

1. Printed circuit cards are placed in a functional test after being populated with semiconductor chips. A lot contains 140 cards, and 20 are selected without replacement for functional testing.

   (a) If 20 cards are defective, what is the probability that at least 1 defective card is in the sample?

   (b) If 5 cards are defective, what is the probability that at least 1 defective card appears in the sample?

2. The number of failures of a testing instrument from contamination particles on the product is a Poisson random variable with a mean of 0.02 failure per hour.

   (a) What is the probability that the instrument does not fail in an 8-hour shift?

   (b) What is the probability of at least one failure in a 24-hour day?

3. The thickness of a laminated covering for a wood surface is normally distributed with a mean of 5 millimeters and a standard deviation of 0.2 millimeter.

   (a) What is the probability that a covering thickness is greater than 5.5 millimeters?

   (b) If the specifications require the thickness to be between 4.5 and 5.5 millimeters, what proportion of coverings do not meet specifications?

   (c) The covering thickness of 95% of samples is below what value?

4. The time between calls is exponentially distributed with a mean time between calls of 10 minutes.

   (a) What is the probability that the time until the first call is less than 5 minutes?

   (b) What is the probability that the time until the first call is between 5 and 15 minutes?

   (c) Determine the length of an interval of time such that the probability of at least one call in the interval is 0.90.