

ASSIGNMENT BOOKLET

Post Graduate Diploma in Applied Statistics (Specialisations in Industrial Statistics/Biostatistics)

MSTE-004: Biostatistics-II

(Valid from 1st January 2026 to 31st December, 2026)

It is compulsory to submit the assignment before filling the Examination Form. Candidates should submit the latest assignment for the courses for which they filled the examination form. Only Work books/Lab Record Books are needed to be submitted for the Lab Courses.



**School of Sciences
Indira Gandhi National Open University
Maidan Garhi, New Delhi-110068
(2026)**

Dear Student,

Please read the information on assignments in the Programme Guide that we have sent you after your enrolment. A weightage of 30%, as you are aware, has been earmarked for continuous evaluation, **which would consist of one tutor-marked assignment** for this course. The assignment for the theory course MSTE-004 has been given.

Instructions for Formatting Your Assignments

Before attempting the assignment, please read the following instructions carefully:

- 1) On top of the first page of your answer sheet, please write the details exactly in the following format:

ENROLLMENT NO :

NAME :

ADDRESS :

.....

.....

PROGRAMME CODE: PGDAST

COURSE CODE: MST-001

COURSE TITLE: FOUNDATION IN MATHEMATICS AND STATISTICS

STUDY CENTRE: DATE:

PLEASE FOLLOW THE ABOVE FORMAT STRICTLY TO FACILITATE EVALUATION AND TO AVOID DELAY.

- 2) Use only foolscap size writing paper (but not of very thin variety) for writing your answers.
- 3) Leave 4 cm margin on the left, top and bottom of your answer sheet.
- 4) Your answers should be precise.
- 5) This assignment is to be submitted at the Study Centre.

We strongly suggest that you should retain a copy of your answer sheets.

- 6) This assignment is valid from January 1st, 2026 up to December 31, 2026.
- 7) The latest assignments should be submitted by the candidate.
- 8) **You cannot fill the Exam Form for this course** till you have submitted this assignment. So solve it and **submit it to your study centre at the earliest**. If you wish to appear in the **TEE, June 2026**, you should submit your TMAs by **March 31, 2026**. Similarly, If you wish to appear in the **TEE, December 2026**, you should submit your TMAs by **September 30, 2026**.

We wish you good luck.

TUTOR MARKED ASSIGNMENT

MSTE-004: Biostatistics-II

Course Code: MSTE-004

Assignment Code: MSTE-004/TMA/2026

Maximum Marks: 100

Note: All questions are compulsory. Answer in your own words.

1. State whether the following statements are **True** or **False**. Give reason in support of your answer: (2×5=10)
 - (a) If there are 170 true positive cases out of 200 diseased cases, the sensitivity of the test will be 0.85.
 - (b) A multiple regression model with three regressor variables was fitted on 15 observations, and the following values were obtained:
 $SS_{Res} = 15$ and $SST = 500$.
Then, the adjusted R^2 will be 0.9618.
 - (c) The method of least squares is used for fitting the logistic model.
 - (d) The survival function is the probability of an individual surviving less than a specified time t .
 - (e) If the relative risk for a clinical trial is 35%, the relative risk reduction will be 65%.
2. A study was conducted to compare two diagnostic methods, say, Method-I and Method-II. The following table shows the classification of the presence of infection on a 5-point Likert Scale (none, mild, moderate, severe and extreme):

Method-II	Method-I				
	None	Mild	Moderate	Severe	Extreme
None	89	5	16	2	4
Mild	36	3	15	6	2
Moderate	20	4	22	6	1
Severe	14	2	37	18	16
Extreme	4	1	16	23	50

Compute simple and weighted Kappa Statistic(s) to compare both methods. (10)

3. To study the relationship between age (in years) and cholesterol level (in mg/dL) of two groups of patients, the following data were recorded:

Group 1

Age	46	52	39	65	54	49	76	71
Cholesterol	185	218	182	220	224	193	232	228

Group 2

Age	20	33	78	51	43	44	63
Cholesterol	180	238	275	244	242	268	260

- (i) Fit the multiple regression model.
- (ii) Obtain the regression models for each group separately.
- (iii) Test the significance of the fitted model at 5% level of significance. **(8+4+8)**
4. The amount of dose (x_i), total number of patients who received medicine (n_i) and number of cured patients (y_i) are recorded in the following table:

S. No.	x_i	y_i	n_i
1	5	24	60
2	10	18	48
3	15	12	40
4	20	20	80
5	25	26	104

- (i) Fit a logistic model considering initial values of $\hat{\beta}_0 = -0.2$ and $\hat{\beta}_1 = -0.04$ up to only one iteration.
- (ii) Test the significance of the fitted model using the Hosmer-Lemeshow test at 5% level of significance. **(12+8)**
- 5(a). Explain the Kaplan and Meier method of estimation with an example.
- (b) A hypothetical study was conducted on ten participants who were followed up for the development of coronary heart disease (CHD) over a period of 10 years. The recorded data are given as follows:

Participant ID	CHD Time
P1	5
P2	8
P3	2
P4	6+
P5	9
P6	6
P7	10+
P8	4
P9	8
P10	4+

Estimate the survival function using the K-M method.

(8+12)

6. Differentiate the following with an example:

- (a)** Left and Right censoring
- (b)** Chi-square test and McNemar's test.
- (c)** Coefficient of determination and adjusted coefficient of determination.
- (d)** Probit model and Complementary log-log model.

(5+5+5+5)