

# **Assignment MST-011**

for

**M.Sc. (Applied Statistics)  
(MSCAST)**

**Valid from January 2025 to December 2025**

**SCHOOL OF SCIENCES**

Indira Gandhi National Open University  
New Delhi - 110068

**Dear Learner,**

Welcome to the M.Sc. (Applied Statistics) Programme.

As per the university guidelines, you need to complete the assignment for each theory course. Note that there are no assignments for lab courses in the MSCAST programme, namely, MSTL-011, MSTL-012, MSTL-013, MSTL-014, and MSTL-015. You should remember that writing answers to an assignment's questions will improve your writing skills and prepare you for the term-end examination.

**It is compulsory to submit the assignments within the stipulated time to be eligible to appear in the term-end examination.** You will not be allowed to appear for the term-end examination for a course if you do not submit the assignment for that course by the due date. As per the University guidelines, if you appear in the term-end examination of a course without submitting its assignment, the result of the term-end examination is liable to be cancelled/ withheld.

**The assignments constitute the continuous component of the evaluation process and have 30% weightage in the final grading.**

Before you write the assignments, you are advised to first go through the self-learning material for that course and then prepare the assignments carefully by following the instructions pertaining to the assignments. Your responses should not be a verbatim reproduction of the textual materials provided for self-learning purposes, but it should be in your own words.

If you have any doubts or problems pertaining to the course material and assignments, contact the programme in charge or the academic counsellor at your study centre. If you still have problems related to this assignment, feel free to contact the course coordinator.

Wishing you all the best in successfully completing the programme.

**(Dr. Rajesh)**  
**Course Coordinator, MST-011**  
**Email: [rajesh.sos@ignou.ac.in](mailto:rajesh.sos@ignou.ac.in)**  
**Mob. No. : 9416413104/8860416548**

### Instructions:

- Submit the assignments within the stipulated time. Otherwise, you will not be permitted to appear for the term-end examination.
- Solve the latest assignments uploaded for the current year/session.
- Read the instructions related to the assignments mentioned in the Programme Guide.
- Use only A-4 size paper to write your responses. It is mandatory to write all assignments neatly in your own handwriting. Typed or printed copies of the assignments will not be accepted. Note that you may use the printout only if a question specifically asks for the output of a program in MST-015 and MST-024.
- All questions given in the assignments are compulsory for each course.
- Express your response in your own words. You are advised to restrict your response based on the marks assigned to it. This will also help you to distribute your time in writing or completing your assignments on time.
- Securely fasten multiple pages together (you can staple or tie them) and number them carefully for each assignment separately.
- Do not forget to enclose the assignment question sheet of that course after the cover page of the assignment response (answer sheets). It is not compulsory to write each question separately before answering the question. Mention the question number for each answer.
- The solved assignment must be submitted at the Study Centre allotted to you before the due date set by the University. Please check the IGNOU website for updated information regarding the due date of assignment submission.
- You are advised to mention all information on the first page of the assignment response sheet, given on the next page.
- **Keep a copy of the assignment answer sheets with you before submission for future reference.**

**ASSIGNMENT CODE:** MST-011/TMA/2025

**NAME:** \_\_\_\_\_

**ENROLLMENT NO:** \_\_\_\_\_

**ADMISSION CYCLE:** \_\_\_\_\_

**PROGRAMME CODE:** MSCAST

**COURSE CODE:** MST-011

**COURSE TITLE:** REAL ANALYSIS, CALCULUS AND GEOMETRY

**REGIONAL CENTRE CODE:** \_\_\_\_\_

**STUDY CENTRE CODE:** \_\_\_\_\_

**ADDRESS:** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**CONTACT NUMBER:** \_\_\_\_\_

**EMAIL ID:** \_\_\_\_\_

**DATE OF SUBMISSION:** \_\_\_\_\_



**School of Sciences**

**Indira Gandhi National Open University**

Maidan Garhi, New Delhi-110068 (INDIA)

**TUTOR MARKED ASSIGNMENT**  
**MST-011: Real Analysis, Calculus and Geometry**

Course Code: MST-011

Assignment Code: MST-011/TMA/2025

Maximum Marks: 50

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

1. Solve the following problems.

(a) If  $f$  is a function from set  $X$  to a set  $Y$  then is it possible  $f(3) = 5$ ,  $(3) = -5$ ?

where  $3 \in X$  and  $5, -5 \in Y$

(b) In R we have a built-in data set “trees”. A screenshot of the last four rows together with the R code to obtain it is given as follows. To get more detail about this data set you can run ?trees command on R console.

```
> tail(trees, 4)
      Girth Height Volume
28  17.9      80   58.3
29  18.0      80   51.5
30  18.0      80   51.0
31  20.6      87   77.0
```

Note that all the three variables of this data set are numeric. So, assuming each row of this data set is a point in 3-dimension. Find the distances between the points corresponding to the 28<sup>th</sup> and the 32<sup>st</sup> rows using the Manhattan and Chebyshev distance formula.

(c) Find the equation of a line passing through points  $A(0, 0, 1)$  and  $B(1, 1, 0)$ . Also, find the coordinates of a point on this line which is at a distance of 10 units from point A opposite to the side of point B.

**(2 + 3 + 5)**

2. If  $f : [0, 5] \rightarrow \mathbb{R}$  be a function defined by  $f(x) = 2x^2 + 3x + 5$ ,  $x \in [0, 5]$ . Show that  $f$  is Riemann integrable using both definitions. Also, verify that the results of both definition match. **(20)**

3. (a) Evaluate the integral  $\iint_D e^{4x+5y} dx dy$ , where  $D = \{(x, y) : x \geq 0, y \geq 0, x + y \leq 3\}$ , by considering  $D$  as a region of Type I and then as a region of Type II.

(b) Evaluate the integral  $\int_0^{10} \frac{dx}{\sqrt{10x - x^2}}$  using beta and gamma functions. **(14 + 6)**