MAEC

MASTER OF ARTS

(ECONOMICS)

ASSIGNMENTS 2025-26

Fourth Semester Courses

(For learners appearing in term-end exams in June 2026 and December 2026 Sessions)

SCHOOL OF SOCIAL SCIENCES
INDIRA GANDHI NATIONAL OPEN UNIVERSITY
MAIDAN GARHI-110068

Master of Arts (Economics)

(TMA)

(2025-26)

Dear Student,

As explained in the programme guide for MAEC, assignments carry 30 per cent weightage in a course and it is mandatory that you must secure at least 40 per cent marks in assignments to complete a course successfully. Note that you must submit the assignments before appearing in Term End Examination of a course.

Before attempting the assignments, please read the instructions provided in the programme guide sent to you separately. In this booklet, we have included the assignments for all the courses pertaining to the **Fourth semester.** In each course there is a Tutor Marked Assignment (TMA). You must do the assignment for those courses for which you have registered. **Do remember that you must prepare and submit the assignments separately for each course.** Make sure that you submit the assignments well in time for those courses in which you plan to appear in the Term End Examination.

It is important that you write the answers to all the TMA questions in your own words. Your answers should be within the approximate range of the word-limit set for a particular section.

As mentioned in the Programme Guide, you need to submit all the assignments within the stipulated time for being eligible to appear in the term-end examination to the **coordinator of your study centre**. This assignment is valid for two admission cycles (**July 2025** and **January 2026**).

The assignments should be submitted to the Coordinator of your Study Centre:

1. **By 31st March 2026,** for the students willing to appear in **June 2026 term-end examination**.
2. **By 30th September 2026,** for the students willing to appear in **December 2026 term end examination.**

You must obtain a receipt from the Study Centre for the assignments submitted and retain it. If possible, keep a xerox copy of the assignments with you.

The Study Centre will have to return the assignments to you after they are evaluated. Please insist on this. The Study Centre has to send the marks to the Student Evaluation Division at IGNOU, New Delhi.

We expect you to answer each question as per guidelines for each category as mentioned in the assignment. You will find it useful to keep the following points in mind:

1) **Planning:** Read the assignments carefully, go through the Units on which they are based. Make some points regarding each question and then rearrange them in a logical order.

2) **Organisation:** Be a little selective and analytic before drawing up a rough outline of your answer. Give adequate attention to your introduction and conclusion.

   Make sure that your answer:
   a) is logical and coherent;
   b) has clear connections between sentences and paragraphs, and
   c) is written correctly giving adequate consideration to your expression, style and presentation.

3) **Presentation:** Once you are satisfied with your answer, you can write down the final version for submission, writing each answer neatly and underlining the points you wish to emphasize. Make sure that the answer is within the stipulated word limit.

MCS-226: Data Science & Big Data Number
Tutor Marked Assignment

Course Code: MCS 226
Asst. Code: MCS 226 / AST/2025-2026
Total Marks: 100

Note: Answer all questions. Each question carries 10 marks. You may use illustrations and diagrams to enhance the explanations.

Q1: Define the term *Data Science*. Explain the role of *data sampling* in Data Science. Differentiate between **descriptive**, **inferential**, and **causal** data analysis with suitable examples.

Q2: What is *Correlation* in statistics? Explain the difference between **positive correlation** and **negative correlation** with examples. Discuss how the **Central Limit Theorem** is applied in Data Science projects.

Q3: Discuss the **data cleaning** process in detail. Explain *missing value imputation* techniques and the impact of data quality on predictive model performance.

Q4: What are the **Four Vs of Big Data**? Give real-world examples for each. Compare **Big Data systems** with **traditional data warehouses** in terms of architecture and functionality.

Q5: Explain the **Hadoop Distributed File System (HDFS)** architecture with a diagram. Describe the role of **NameNode** and **DataNodes** in storing and retrieving large-scale datasets.

Q6: Compare **MapReduce** and **Apache Spark** with respect to data processing speed, fault tolerance, and ease of use. Provide a real-world use case where Spark is more beneficial than MapReduce.

Q7: What are **Column-based**, **Document-based**, and **Graph-based** NoSQL databases? For each type, give an example and explain a real-world use case where it is most suitable.

Q8: Explain **Cosine Similarity** and **Jaccard Similarity** with examples. How are these measures used in **recommendation systems** and **document similarity** analysis?

Q9: What is the **Flajolet–Martin algorithm**? Explain its steps for estimating the number of unique elements in a data stream. Compare it with the use of a **Bloom Filter**.

Q10: Write an **R program** to:

a. Create a **Decision Tree classifier** for a sample dataset. Display the results visually using appropriate R plotting functions. Explain the outputs obtained.
b. Apply **K-Means clustering** to group similar data points. Display the results visually using appropriate R plotting functions. Explain the outputs obtained.