# MERU UNIVERSITY OF SCIENCE AND TECHNOLOGY

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**University Examinations 2024/2025**

FIRST YEAR, FIRST SEMESTER EXAMINATION FOR THE DEGREE OF MASTERS IN EPIDEMIOLOGY

**HPE 7115: EPIDEMIOLOGIC METHODS FOR THE STUDY OF INFECTIOUS DISEASES**

**DATE: DECEMBER 2024** **TIME: 3 HOURS**

**INSTRUCTIONS:**
**A**nswer Question one and any other three Questions

**QUESTION ONE (30 MARKS)**

a) Briefly describe how interrupted time series analysis can be used to evaluate the effectiveness of an infectious disease control intervention (4 marks)
b) Outline the key challenges in integrating social and behavioral data into infectious disease surveillance (4 Marks)
c) Describe four best practices for communicating epidemiological data to policymakers (4 Marks)
d) Describe in brief how real-time data integration improve the management of infectious disease outbreaks (6 Marks)
e) Describe how storytelling techniques in epidemiology communicate the urgency of an outbreak to the general public (4 Marks)
f) Discus briefly how genomic data be used (o understand the transmission dynamics of infectious diseases (4 Marks)
g) Describe the role of predictive modeling in early outbreak detection (4 Marks).

**QUESTION TWO (15 MARKS)**

a) Describe the process of designing a mathematical model to understand the spread of an infectious diseases (4 marks)
b) Outline key factors that should be considered, and how you would you use the model in (a) above to predict future outbreaks (5marks)

**QUESTION THREE (15 MARKS)**

a) Describe how real-time surveillance systems and data integration techniques can improve the monitoring and control of infectious disease outbreaks (10 Marks).

b) Outline the benefits and challenges associated with using these systems (5 Marks)

**QUESTION FOUR (15 MARKS)**

a) Evaluate the use of propensity score matching in observational studies of infectious disease interventions.
b) Describe the strengths and limitations of this method, and how it can be used to confounding biases?