JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY
SCHOOL OF BIOLOGICAL, PHYSICAL, MATHEMATICS AND ACTUARIAL SCIENCES
UNIVERSITY ASSESSMENT FOR CBET DIPLOMA IN APPLIED STATISTICS

2nd Year 1st SEMESTER 2023/2024 ACADEMIC YEAR
MAIN REGULAR

COURSE CODE: WAB 2217
COURSE TITLE: Designing Research Experiment
EXAM VENUE: **STREAM: (Dip. Applied Statistics)**

DATE: **EXAM SESSION: Sep-Dec 2023**

TIME: 3.00 HOURS

<u>**Instructions:**</u>

1. **Answer ALL questions in section A (compulsory) and any other two questions in section B.**

2. **Candidates are advised not to write on the question paper.**

3. **Candidates must hand in their answer booklets to the invigilator while in the examination room.**

QUESTION ONE(40 MARKS)

a)   Define the problem statement and state its components.

b)   Differentiate between treatment and outcome variables with an example.

c)   Define the following terms as used in the research experimental design.

   i.   Experimentation
  ii.   Objective
 iii.   Hypothesis

d) Differentiate between the null and alternative hypotheses as used in designing research experiments.

e)   Describe with an example what "control experiment" means.

f)   Describe any 3 tools used in collecting primary data.

g)   . Let's assume you're working in a marketing department and have identified a decrease in website traffic and a corresponding drop in online sales. Develop a statement of the problem.

h)   Describe the two types of errors that are associated with the hypothesis testing.

SECTION B (60 marks)
QUESTION TWO(20 marks)

Experimental designs help researchers and practitioners systematically gather data, identify important factors, assess interactions, and make informed decisions.Describe 5 common applications of experimental design in various fields.

QUESTION THREE(20 marks)

In experimental research, the independent variable is a critical component. To design a meaningful experiment, you need to specify the factors, levels, and ranges associated with the independent variable. Discuss the following components with examples;

a) Factors
b) Levels
c) Ranges

QUESTION FOUR(20 marks)

The history of statistical designs is intertwined with the development of statisticsas a field of study and its application to various disciplines. Provide abrief overview of key milestones in the history of statistical designs.

QUESTION FIVE(20 marks)

The principles of experimental design help researchers minimize bias, control variables, and draw meaningful conclusions from their experiments. Describe with examples the following principles of experimental designs;
a) Randomization
b) Replication
c) Blocking

d) QUESTION SIX(20 marks)

Describe the basic structure for formulating a hypothesis