JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY
SCHOOL OF HEALTH SCIENCES
UNIVERSITY EXAMINATION FOR BACHELORS IN COMMUNITY HEALTH AND DEVELOPMENT
4TH YEAR 1ST SEMESTER 2023/2024 ACADEMIC YEAR
KISUMU CAMPUS

COURSE CODE: **SBB 1409**
COURSE TITLE: **BIOSTATISTICS II**
EXAM VENUE:
DATE: **EXAMINATION SESSION:**
TIME: **2 HOURS**

Instructions:

1. **Answer all the questions in Section A and ANY other 2 TWO questions in Section B.**
2. **Each question carries a different weight of marks.**
3. **Candidates are advised not to write on the question paper.**
4. **Candidates MUST hand in their answer booklets to the invigilator while in the examination room.**
5. **Use of Scientific Calculators is allowed**
6. **Start each Question on a fresh page.**
7. **Students to have <u>standard tables</u> without any writing on them.**

Question 1

Define and explain ~~the four~~FOUR levels of measurement: nominal, ordinal, interval, and ratio. Provid~~eing~~ an example for each level of measurement.   **[5 Marks]**

Question 2: Grouped Data Analysis   **[8 Marks]**

        a. Define and explain the concept of grouped data.

        b. Describe the process of calculating the mode of grouped data.

        c. Describe the process of calculating the median of grouped data.

        d. Explain when it is appropriate to use the mode and median instead of the mean in statistical analysis.

Question 3

Discuss two types of probability distributions commonly encountered in biostatistics giving characteristics and applications of each distribution.   **[4 Marks]**

Question 4: Selection of Appropriate Statistical Tests   **[6 Marks]**

        a. Explain the importance of selecting appropriate statistical tests in research.

        b. Discuss factors to consider when selecting a statistical test.

        c. Provide an example scenario and explain which statistical test would be most appropriate and why.

Question 5

Define hypothesis testing and its significance in statistical analysis.   **[3 Marks]**

Question 6

Explain the difference between a parametric and non-parametric statistical test. When would you choose to use each type of test?   **[4 Marks]**

Question 7.

    a. Choose one of the following statistical tests and explain the steps involved in performing it:

        1. Wilcoxon signed-rank test
        2. Independent samples t-test
        3. Paired samples t-test
        4. Mann-Whitney U test
        5. Pearson correlation test
        6. Spearman's rank correlation test
        7. Logistic regression
        8. Linear regression
        9. Multiple logistic regression
        10. Multiple linear regression

    b. Apply the statistical test you chose in question 1 to the following data:

Group	Variable 1	Variable 2
A	10	20
A	15	25
A	20	30
B	5	10
B	10	15
B	15	20

Interpret the results of your analysis

Question 8.

a. Choose a research scenario that requires hypothesis testing and regression analysis.
b. Clearly state the research question and hypotheses.
c. Describe the appropriate statistical test(s) and regression analysis technique(s) to answer the research question.
d. Provide a step-by-step explanation of how to perform the chosen statistical test(s) and regression analysis.
e. Interpret and discuss the results obtained from the analysis.

Question 9.

Explain the process of selecting an appropriate statistical test for a given research scenario. Discuss the factors that influence the choice of statistical tests, such as the research question, data type, and assumptions.

Question 10.

a. Define and explain the concept of hypothesis testing. Provide a step-by-step explanation of how to conduct a Wilcoxon signed-rank test.

b. Apply the Wilcoxon signed-rank test to a hypothetical health-related research scenario, providing the necessary calculations and interpretation of results.

Question 11.
a. Define and explain the concept of logistic regression. Discuss when and why logistic regression is used in biostatistical analysis.

b. Using a hypothetical dataset, perform a logistic regression analysis on a health-related outcome variable. Interpret the results, including the odds ratios and significance levels.