National University of Lesotho

Faculty of Agriculture

Department of Soil Science & Resource Conservation

SSR 601: Biometrics I Final Examination

May 2019 **100 Marks** **3 hours**

Instruction: Answer all Questions

Question 1 (20 marks)

a) Define the following statistical concepts (1 mark each)

i) Observations
ii) Variables
iii) Dependent variable
iv) Independent variable
v) Random variable
vi) Population
vii) Sample
viii) Quantitative variable
ix) Qualitative variable
x) Factor

b) **Classify the following variables into quantitative, qualitative, Continuous & discrete (10 marks)**

Variable	Quantitative	Qualitative	Continuous	Discrete
Eye Colour				
Insect Counts				
Number of errors per pupil in a spelling test				
Tyre kilometres to first puncture				
Possible yields of corn from a given field				

Question 2 (20 marks)

a) **Prof. Makoala V. Marake asked the girls in his class to estimate his weight in kilograms. Their responses were: 190, 230, 105, 180, 130, 160 and 170 kg.**

i) Compute the sample mean. (4 marks)
ii) What is the sample median? (4 marks)

b) **From the data given in (a) above**

i) Compute the sample variance (4 marks)
ii) Compute the sample standard deviation (4 marks)
iii) Compute the Coefficient of variation (4 marks)

Question 3 (30 marks)

a) Identify the following statistical concepts (1 mark each)

i) Process which leads to well-defined results call outcomes
ii) The result of a single trial of a probability experiment
iii) Set of all possible outcomes of a probability experiment
iv) One or more outcomes of a probability experiment
v) Uses the sample space to determine the numerical probability that an event will happen. Also called theoretical probability.
vi) Events which have the same probability of occurring.
vii) All the events in the sample space except the given events.
viii) Uses probability values based on an educated guess or estimate.
ix) It employs opinions and inexact information.
x) Two events which cannot happen at the same time.

b) Draw a table to illustrate the sample space obtained by rolling two dice. (10 marks)

c) Use the data in the sample space derived in (b) above to construct a probability distribution showing the sum of the dice, frequency of the sum and the relative frequency of each sum. (10 marks)

Question 4 (30 marks) Reconstruct the whole question

a) Give a detailed explanation or discussion of your Msc Project (10 marks) ***(At least provide a case study)***
b) From the description of your Msc. Project, clearly identify and /or explain the following statistical concepts:
   i) Observations (5 marks)
   ii) Response variables (5 marks)
   iii) Independent variables (5 marks)

c) Clearly show the structure of your data set to be collected or collected. (10 marks)
d) Clearly explain how you will derive the data to calculate the means from your study. (5 marks)
e) Briefly discuss the statistical tools you intend to use in the analysis of our data sets when you have completed the study. (5 marks)
f) Briefly discuss the value of your research in terms of how useful the results you will be to the nation and the scientific community. (5 marks)