**JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY**

**SCHOOL OF SPATIAL PLANNING AND NATURAL RESOURCE MANAGEMENT**

**UNIVERSITY EXAMINATION FOR DEGREE OF BACHELOR OF ARTS IN SPATIAL PLANNING**

**3RD YEAR 1ST SEMESTER 2013/2014 ACADEMIC YEAR**

# BUSIA LEARNING CENTRE

**COURSE CODE: PSP 3313**

**COURSE TITLE: SPATIAL DATA ANALYSIS IN PLANNING**

**EXAM VENUE:**                                    **STREAM: Spatial Planning)**

**DATE: 15/04/14**                          **EXAM SESSION: 2.00 – 4.00 PM**

**TIME: 2.00 HOURS**

**Instructions:**

1. **Answer question 1(Compulsory) and ANY other 2 questions**

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
a. Explain the term  network as used in spatial analysis                                    (2 marks)
b. Describe how you would utilize the following network analysis layers in the planning and administration of health services in Busia County
    i. Service Area                                                                                 (3 marks)
    ii. Location-Allocation                                                                    (3 marks)
    iii. The Closest Facility                                                                  (3 marks)

a. Using graphical illustrations explain your understanding of the following terms as used in the semi variogram; Sill, Partial Sill, Range, Nugget                       (7 marks)

b. A group of students from Jaramogi Oginga Odinga University went out to study the spatial patterns of malaria infected households in Busia Town. They collected point data of the spatial locations of the households in town and plotted the results in Arc Map. Explain clearly how they would use the following spatial analysis tools to analyze their data.
    i. The Central Feature                                                                    (3 marks)
    ii. The standard Distance                                                              (3 marks)
    iii. Standard Ellipsis Distance                                                       (3 marks)
    iv. The Mean Centre                                                                    (3 marks)

## QUESTION TWO
a. State Tobbler's First Law of Geography                                                 (3 marks)
b. State and explain the advantages and disadvantages of Empirical Bayesian Kriging Interpolation                                                                                (8 Marks)
c. Briefly explain the characteristics of the following kriging methods.
    i. Simple Kriging                                                                          (3 marks)
    ii. Ordinary Kriging                                                                      (3 marks)
    iii. Anisotropic Kriging                                                                 (3 marks)

## QUESTION THREE
a. As a health professional investigating the spatial distribution of polio outbreak amongst young children in Busia region you have been requested to design an interpolation model based on point statistic about the disease prevalence in the region. You intend to create a prediction map from the statistics (attribute data) you have just collected through a survey. You are also interested in creating an error map for ascertaining the degree of accuracy of your estimation. Briefly clarify the main steps you would undertake to design a successful interpolation map for the area                                      (15 Marks)

b. Explain the significance of Cross Validation in interpolation process             (5 Marks)

**QUESTION FOUR**

a. State and explain FOUR Exploratory Spatial Data Analysis techniques    (8 marks)
b. Differentiate Kriging and Co-Kriging    (6 marks)
c. Explain briefly THREE ways of Creating Surfaces based on spatial data    (6 Marks)

**QUESTION FIVE**

a. Elaborate deterministic and geostatistical methods of interpolation. Give an in each case
    (6 marks)
b. Use graphical illustrations to explain FOUR semivariogram models used in surface creation    (9 marks)
c. Explain the term spatial autocorrelation    (5 marks)

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