



JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF AGRICULTURAL AND FOOD SCIENCES

**FOURTH YEAR UNIVERSITY EXAMINATION FOR THE DEGREE OF BACHELOR OF
SCIENCE IN SOIL SCIENCE**

4TH YEAR 1ST YEAR 2017/2018 ACADEMIC YEAR

REGULAR

COURSE CODE: ALS 3415

COURSE TITLE: SOIL LANDSCAPE MODELING

EXAM VENUE: LR 1

STREAM: BSc. (Soil Science)

DATE: 19/12/17

EXAM SESSION: 2.00 – 4.00 PM

TIME: 2 HOURS

Instructions:

- 1. Answer ALL questions in section A and ANY other 2 Questions in section B.**
- 2. Candidates are advised not to write on question paper.**
- 3. Candidates must hand in their answer booklets to the invigilator while in the examination room.**

SECTION A [30 MARKS]

Answer ALL questions from this Section.

1. Define the following terms:
 - a. Landscape (2 Marks)
 - b. Landscape modeling (2 Marks)
 - c. Pedometrics (2 Marks)
 - d. Topographic maps (2 Marks)
2. State five ways through which soil landscape can be defined (5 Marks)
3. a. Briefly describe the two spatial discretization methods (4 Marks)
 - i. Crisp soil map unit model
 - ii. Continuous-field model
b. Describe the following types of topographical (3 Marks)
 - i. Slope maps
 - ii. Aspect maps
 - iii. Curvature maps
4. Briefly describe the different criteria that impact on the soil-landscape modeling process (10 Marks)

SECTION B [40 MARKS]

Answer ANY TWO questions from this Section.

5. Discuss the following current sustainable land management practices in Kenya: (20 Marks)
 - a. Jenny's soil formation model
 - b. Catena model
 - c. Geospatial models
 - d. Space-time models
 - e. Soil classification models
6. Discuss the following emerging soil-landscape mapping technologies (20 Marks)
 - a. Global positioning systems
 - b. Electromagnetic induction
 - c. Ground penetrating radar
 - d. Sensors
7. a. Define the following basics of fuzzy set theory;
 - i. Set and crisp set (3 Marks)
 - ii. Fuzzy set (3 Marks)
b. Give a brief historical perspective of soil-landscape modeling (10 Marks)
c. Describe the fuzzy representation of soils (4 Marks)