INTERNATIONAL UNIVERSITY OF EAST AFRICA
'Learning to Succeed'

FACULTY OF SCIENCE AND TECHNOLOGY

END OF SEMESTER EXAMINATIONS - AUGUST 2025

PROGRAMME: BSEM
YEAR/SEM: YEAR 1/SEMESTER 1
COURSE CODE: BSE1105
NAME: FUNDAMENTALS OF ECOLOGY

DATE:
TIME:

INSTRUCTIONS TO CANDIDATES:

SECTION A

Answer all questions in this section (compulsory)

Question 1:

a) Differentiate between a food chain and a food web (3 marks)

b) Using a diagram, illustrate a food web involving grass, lion, Hawk, frog, grasshopper, warms, squirrel and a fox (8 marks)

c) Discuss the role of microorganisms in the nitrogen cycle (6 marks)

d) Identify the advantages of in-situ conservation (7 marks)

e) Define the following concepts as used in ecology (6 marks)

i) Species

ii) population

iii) Community

f) How does energy enter in ecosystem and what role do primary producers play in the process? (5 marks)

g) What role does ecological succession play in maintaining ecosystem stability and resilience? (5 marks)

Question 2:

a) Differentiate between population ecology and community ecology.(5 marks)

b) Briefly describe any two practical applications of ecology in environmental management. (5 marks)

c) Identify three biotic and three abiotic components. (5 marks)

d) Describe how one abiotic factor influences the structure of the ecosystem. (5 marks)

e) Construct a simple food web for a freshwater ecosystem. (5 marks)

f) What would be the ecological consequence of removing a top predator from this system? (5 marks)

g) Discuss the role of decomposers in an ecosystem. (5 marks)

h) How do decomposers contribute to nutrient cycling? (5 marks)

SECTION B

Attempt only three (3) questions from this section

Question 1:

a) Discuss the role of biodiversity conservation in the economic development of your country. (10 marks)

b) What are the threats to forest ecosystems in Africa (10 marks)

Question 2:

a) With the aid of an illustration, describe the nitrogen cycle. (10 marks)

b) How do agricultural practices affect the nitrogen cycle? (10 marks)

Question 3:

a) Discuss the biological and environmental factors that drive ecological succession. (12 marks)

b) Use examples to explain how pioneer species contribute to the early stages of succession. (08 marks)

Question 4:

Discuss the different trophic levels in an ecosystem and how energy is transferred from on level to another. (20 marks)

Question 5:

a) Define ecosystem resilience. (2 marks)

b) Explain the factors that contribute to an ecosystem's ability to withstand and recover from disturbances. (12 marks)

c) How do these factors interact to determine overall resilience? (06 marks)

Question 6:

a) Choose a specific ecosystem (e.g., a forest, a lake, a desert) and discuss its structure and function (10 marks)

b) Explain the interactions between biotic and abiotic components. (10 marks)

Question 7:

a) Define the concept of ecological succession (4 marks).

b) Discuss the stages involved in ecological succession (8 marks).

c) Explain the factors that affect ecological succession (8 marks)

Question 8:

a) What is biodiversity conservation (4 marks).

b) How effective is ex-situ conservation over in-situ as approaches of preserving

endangered species (8 marks).

c) Discuss the threats to biodiversity conservation in Africa (8 marks).

Question 9:

Using an illustration, discuss the nitrogen cycle and discuss its role in an ecosystem

(20 marks)

Question 10:

a) Analyze the potential impact on energy if primary producers in an aquatic ecosystem were significantly reduced. (10 marks).

b) In a given ecosystem, if a producer generates 10,000kcal of energy, calculate how much energy would be available to a tertiary

consumer, assuming 10% transfer rate between each trophic level. (10 marks).

Question 11:

a) Explain five human activities that can disrupt ecological balance. (10 marks)
b) Suggest five strategies for restoring or maintaining ecological stability in degraded ecosystems. (10 marks)

Question 12:

Using diagrams, write short notes on the following; (20 marks)

i) Pyramid of numbers

ii) Energy pyramid

iii) Mass pyramid