UNIVERSITY OF SWAZILAND

DEPARTMENT OF GEOGRAPHY, ENVIRONMENTAL SCIENCE AND PLANNING

FINAL EXAMINATION, MAY 2012

B.A., BSc., BASS, B. Ed.

TITLE OF PAPER: INTRODUCTION TO REMOTE SENSING

COURSE NUMBER: GEP 313

TIME ALLOWED: THREE (3) HOURS

INSTRUCTIONS: 1. ANSWER THREE QUESTIONS
                           2. QUESTION 1 IS COMPULSORY
                           3. ILLUSTRATE YOUR ANSWERS WITH
                           EXAMPLES AND CLEARLY DRAWN DIAGRAMS
                           WHERE APPROPRIATE

ALLOCATION OF MARKS: QUESTION 1 (COMPULSORY) CARRIES
                                40 MARKS WHILE THE REST CARRY 30
                                MARKS EACH

THIS PAPER SHOULD NOT BE OPENED UNTIL PERMISSION IS GRANTED
BY THE INVIGILATOR

GEP 313: INTRODUCTION TO REMOTE SENSING – MAY 2012

SECTION A: COMPULSORY

Question 1

Swaziland is currently faced with the challenge of invasion by alien plant species into rangelands and croplands which has resulted in them being unsuitable for livestock, wildlife and cultivation. The most common species are *Lantana camara* and *Chromolaena odorata*. Recent studies have shown that water run-off into water bodies from infested hillsides and watercourses has drastically been reduced, thus a decline in river flows. Moreover, the limited run-off that reaches water bodies has been found to reduce water quality, thus leading to various socio-economic challenges.

As an intervention, the Government of Swaziland, through the Ministry of Agriculture and Cooperatives has employed you, as a remote sensing expert, to monitor the spread of these alien plant species in the country, as well as assess any impact on the rangelands, croplands and watercourses over several years. Describe the process you would follow to reach your conclusion including, but not limited to, the methods of interpreting your data, and choice of platforms. **[40 Marks]**

SECTION B: ANSWER ANY TWO QUESTIONS

Question 2

a) With specific examples, outline the use of image interpretation keys in remote sensing.
(15 marks)
b) Explain the main procedures in aerial photographic interpretation. (15 marks)
[30 Marks]

Question 3

a) Describe how the concepts of error matrix and overall accuracy can be used to assess the accuracy of a digital image classification. (15 marks)
b) Describe the methods one can employ to obtain 'ground truth' for the assessment of an image classification. (15 marks)
[30 Marks]

Question 4

a) Using examples, describe how the Normalised Difference Vegetative Index (NDVI) is used to distinguish various earth surface features. (15 marks)
b) With appropriate examples, describe spectral and spatial resolution and show how each is applied in environmental remote sensing. (15 marks)
[30 Marks]

Question 5

Using specific examples and illustrations, discuss the elements of image interpretation in remote sensing. **[30 Marks]**