UNIVERSITY OF SWAZILAND

DEPARTMENT OF GEOGRAPHY, ENVIRONMENTAL SCIENCE AND PLANNING

SUPPLEMENTARY EXAMINATION PAPER JULY 2013

B.A., BASS, B.ED & B.Sc.

TITLE OF PAPER : **INTRODUCTION TO REMOTE SENSING**

COURSE NUMBER : **GEP 313**

TIME ALLOWED : **THREE HOURS**

INSTRUCTIONS : **1.**Section A carries 40 marks and is **COMPULSORY.**

2. Choose any **TWO** questions from Section B, each of which carries 30 marks.

3. Remember to use appropriate terminology and Illustrations.

THIS PAPER IS NOT TO BE OPENED UNTIL PERMISSION HAS BEEN GRANTED BY THE INVIGILATOR.

SECTION A: COMPULSORY QUESTION

QUESTION 1

a) Explain the process that causes a clear sky to appear blue and sunset/sunrises to appear red. (8 marks)

b) Compare and contrast supervised and unsupervised image classification. (10 marks)

c) Draw a spectral curve and label the "red edge." What factors might make this edge shift towards the longer or shorter wavelengths? (10 marks)

d) Design and describe a simple algorithm that could be used to characterize and map vegetation with a multispectral scanner that has only two bands: (1) visible red light (6000-700nm) and (2) near reflected infrared radiation (700-900nm).

(12 marks)
[40 MARKS]

SECTION B: ANSWER ANY TWO QUESTIONS

QUESTION 2

a) Define penetration depth in remote sensing. (2 marks)

b) Define radiometric resolution. (2 marks)

c) State the meaning of a dispersive medium. (2 marks)

d) Compare and contrast supervised and unsupervised image classification and discuss the advantages of unsupervised classification. (24 marks)
[30 MARKS]

QUESTION 3

a) Describe one of the several radiometric correction techniques used to minimize clouds/haze in an image. (6 marks)

b) Discuss both geostationary and synchronous orbits and highlight the advantages and disadvantages of each system. (16 marks)

c) Define emissivity. (2 marks)

d) What common material on the earth's surface has an emissivity close to 1.0? (2 mark)

e) With the aid of an appropriate diagram, differentiate between a diffuse reflector and specular reflector surface as a function of wavelength. (4 marks)

[30 MARKS]

QUESTION 4

a) Explain the factors that determine the spatial resolution of radar data. (16 marks)

b) Discuss the colour additive theory. (8 marks)

c) Compare and contrast kinetic temperature and radiant temperature. (6 marks)

[30 MARKS]

QUESTION 5

a) Identify the key interpretive elements that are utilised to describe specific features on remotely sensed images and comment on their respective use. (16 marks)

b) Define an atmospheric window. (2 marks)

c) Explain the significance of atmospheric windows to satellite remote sensing. (4 marks)

d) Define the four types of resolution used in describing images. (8 marks)

[30 MARKS]