



**NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY**

**FACULTY OF ENVIRONMENTAL SCIENCE**

**DEPARTMENT OF GEOSPATIAL SCIENCE**

**BACHELOR OF SCIENCE (HONOURS) DEGREE IN GEOGRAPHICAL INFORMATION SYSTEMS (GIS) AND  
REMOTE SENSING IN NATURAL RESOURCES MANAGEMENT**

**EARTH COORDINATE SYSTEMS AND GLOBAL POSITIONING SYSTEM**

**EGR 1203**

**Regular Examination Paper**

**November 2024**

This examination paper consists of 2 pages

**Time Allowed: 3 hours**

**Total Marks: 100**

**Examiner's Name: Mr Bukhosi Ngqabutho Khumalo**

**INSTRUCTIONS**

1. Answer QUESTION **ONE** AND ANY **THREE** OTHERS
2. Each question carries 25 marks

**MARK ALLOCATION**

| <b>QUESTION</b> | <b>MARKS</b> |
|-----------------|--------------|
| 1.              | 25           |
| 2.              | 25           |
| 3.              | 25           |
| 4.              | 25           |
| 5.              | 25           |
| 6               | 25           |
| <b>TOTAL</b>    | <b>100</b>   |

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**EGR 2103**

1. Define the following terms:

- a) Geoid and Ellipsoid **(5 marks)**
- b) Oblate Spheroid and Prolate spheroid **(5 marks)**
- c) Vertical Datum and Horizontal Datum **(5 marks)**
- d) Geographical Coordinate System and Cartesian Coordinate Systems. **(5 marks)**
- e) Latitude and Longitude **(5 marks)**

2. Discuss the Universal Transverse Mercator and how it is used to determine location of any point in Zimbabwe.

3. Describe and explain the various ways in which map projections can be classified?

4(a) Explain the concept of georeferencing in GIS. **(10 marks)**

(b) Discuss the importance of Root Mean Square Error (RMSE) in evaluating georeferencing Accuracy. **(15 marks)**

5(a) Trace the evolution of GPS systems, highlighting key milestones and developments that have shaped modern GPS technology. **(13 marks)**

(b) Describe the following Global Navigation Satellite Systems:

- i. Glonass **(3 marks)**
- ii. Galileo **(3 marks)**
- iii. BeiDou **(3 marks)**
- iv. QZSS **(3 marks)**

6(a) Describe the different components of GPS **(6 marks)**

(b) Identify and explain common GPS errors **(10 marks)**

(c) Discuss the various applications of GPS technology in Agriculture **(9 marks)**