DEPARTMENT OF GEOGRAPHY, ENVIRONMENTAL MANAGEMENT AND ENERGY STUDIES

FACULTY OF SCIENCE
UNIVERSITY OF JOHANNESBURG

CERTIFICATE COURSE IN GEO-INFORMATICS 1: GIS (S2GISQ)

(A SAQA registered course)

FIRST SEMESTER – 2023

Module / Course Title: Geo-Informatics 1: Geographic Information Systems

Qualification: Certificate in Geo- Informatics 1: Geographic Information Systems

Module / Course Code: S2GISQ

Module / Course Credit Value: 30

National Qualifications Framework (NQF) Level: 7

Name of Lecturer: Prof. S.G. Tesfamichael

Name of Module / Course Coordinator: Prof. S.G. Tesfamichael

1. THE COURSE

The **Geo-Informatics 1: GIS** course is an NQF Level 7 module that runs for a full semester (14 weeks). The course aims to introduce students to the world of computer assisted spatial analysis by addressing aspects such as geospatial data types and structures; where and how those data can be accessed, manipulated, updated, and managed; and also the production of quality end products (maps, tables, graphs, etc.).

2. SCHEDULE

The course is presented during the first semester of each year, with registration starting in January. The first lecture commences on **February 14, 2023 at 13:00**. The last lecture takes place in May (normally 14 contact periods), with an examination starting at the beginning of June. The course can be extended into a separate Geo- Informatics 2 course (this second course focusses on remote sensing and image processing) during the second semester. Applicants who enrol for non-graduate purposes will receive a certificate **on successful completion of the course.**

3. ACADEMIC QUALIFICATION AND REQUIREMENTS

The course forms part of the honours degree programme in Geography or can be taken as a non-graduate course leading to a certificate. As part of the formal honours course, candidates must comply with the formal admittance requirements (Geography III passed with 65% or more).

If taken for a non-graduate purpose in order to acquire a **Certificate in Geo-Informatics,** candidates **must have a university degree**. An acceptable diploma with several years of experience in a related field of work **might** also be considered favourably, depending on the type of work experience and type and level of diploma. Computer literacy and Geography as an undergraduate course is highly recommended.

4. COURSE CONTENT

The course consists of the following themes which will be covered both through theory and practical sessions. Please note that the course uses Environmental Systems Research Institute's (ESRI®) ArcGIS computing software to run all practical exercises.

1. Introducing GIS

2. Coordinate systems
   - Geographic coordinate system
   - Map projections
   - Projected coordinate systems

3. Spatial data models
   - Vector data model
   - Raster data model

4. Spatial data acquisition
   - Data availability
   - Conversion of existing data
   - Creating new data

5. Geometric transformations
   - Geometric transformation
   - Root Mean Square (RMS) Error
   - Resampling of pixel values

6. Spatial data accuracy
   - Location errors
   - Topological errors
   - Topological editing
   - Non-topological editing

7. Attribute data and management
   - Attribute data in GIS
   - Attribute data entry
   - Attribute data manipulation

8. GIS data display and cartography
   - Cartographic symbolisation
   - Types of maps
   - Typography
   - Map design
   - Map production

9. Data exploration
   - Map-based data manipulation
   - Attribute data query
   - Spatial data query
   - Raster data query

10. Vector data analysis
   - Buffering
   - Overlay
   - Feature manipulation

11. Raster data analysis
   - Local operations
   - Neighbourhood operations
   - Zonal operations
   - Map algebra

12. Terrain mapping and analysis
   - Terrain mapping and analysis
   - Slope and aspect
   - Viewshed analysis
   - Applications of viewshed analysis
   - Watershed analysis
   - Applications of watershed analysis

13. Spatial interpolation
   - Elements of spatial interpolation
   - Global methods
   - Local methods

- Kriging

14. GIS Modeling
    - Types of GIS models
    - Modelling process
    - The role of GIS in modelling

5. FEES

The fee for Geo-Informatics 1: GIS is **R11825.00 for 2023** when taken as a non-graduate course. Furthermore, students need to arrange their own computers to take the course, should it become necessary to run the course remotely. The course fee is payable **in advance** during registration (If a student discontinues, a percentage of this fee can be refunded depending on the date of discontinuation).

Once you have been notified of acceptance to the course, please contact our Faculty Officer Mrs Tsholanang Nyoka at the following address for assistance in the registration process and to obtain invoice.

- E-mail: tshulin@uj.ac.za
- Phone: +27 11 559 2459
- Office: C-Ring 201

6. APPLICATION

The application form to enrol for the course is attached at the last page of this document. Applications to attend the course in the first semester must reach the course coordinator before or on **February 3, 2023 for 2023**. Applications can be made by e-mail given below and must be accompanied by certified copies of previous academic records. *You will then receive a notification on the success of your application*.

To submit an application for enrolment to the course or for further information, contact:

Prof Solomon G. Tesfamichael
Course coordinator
Dept. of Geography, Environmental Management and Energy Studies
University of Johannesburg
P.O. Box 524
Auckland Park
2006

Tel. No. (011) 559-3927
E-mail: sgtesfamichael@uj.ac.za (preferred method)

TAKE NOTE OF THE FOLLOWING ARRANGEMENTS FOR 2023.

Enrolment:

Enrolment for accepted applicants takes place as follows:

- Department: Geography, Environmental Management and Energy Studies.
- Place: D2 LAB 344H
- Date: February 10 and 13, 2023
- Time: 9H30 – 12H30

For students not previously enrolled at UJ, the enrolment will be faster if you fill in the institution's online application form in advance and get a student number.

First lecture:

- Date: February 14, 2023
- Time: 13H00
- Place: D3 LAB 332

Mode of lecture:

- Lectures and practical sessions will take place in-person offered on campus considering the nature of the course.

DEPARTMENT OF GEOGRAPHY,
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REGISTRATION FORM FOR GEO-INFORMATICS 1: GIS (S2GISQ1)
FOR CERTIFICATE PURPOSES IN 2023 (First Semester, Part Time)

SURNAME: _____ **ID NUMBER:** _____

NAMES: _____

Courses previously done at UJ? Yes/No_____**UJ Student Number:** _____

Name(s) of course(s) and date: _____

ACADEMIC QUALIFICATIONS (PLACE THE NAME OF THE INSTITUTION AT THE END IN BRACKETS):

_____

_____

HOME ADDRESS: _____|

_____|

_____|

TEL. NO: (____) _____

(PROVIDE POSTAL ADDRESS IF IT IS DIFFERENT FROM HOME ADDRESS)

_____

_____

WORK ADDRESS: _____

_____

TEL. NO: (____) _____

I, _____, hereby declare that I will adhere to the regulations of the university and the Department of Geography, Environmental Management and Energy Studies. I also declare to pay the required course fee in full at registration after I have been accepted and an official student number has been allocated to me.

NB!! All payments must be made with reference towards your student number.

_____ _____
SIGNATURE (Student) **DATE**

_____ _____
SIGNATURE **DATE**
(Prof S.G. Tesfamichael: COURSE COORDINATOR)