UNIVERSITY OF JOHANNESBURG

DEPARTMENT OF GEOGRAPHY, ENVIRONMENTAL MANAGEMENT AND ENERGY STUDIES

CERTIFICATE COURSE IN GEO-INFORMATICS 1 (S2GISQ1)

2021

THE COURSE:

The **Geo-Informatics 1** course is an **introduction** to the theory and practice of GIS as seen from a geographical point of view. The course aims to introduce students to the world of computer assisted spatial research by addressing aspects such as data types and structures; where and how this data can be accessed, manipulated, updated, and generally managed; and also the production of quality end products (maps, tables, graphs, etc.).

SCHEDULE:

The course is presented during the first semester of each year, with registration starting in January. The first lecture commences on **February 16, 2021 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.**

ACADEMIC QUALIFICATION AND REQUIREMENTS:

The course forms part of the full honours course in Geography and Environmental Management where it can be taken as one of several specialisation courses, or 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, or 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.

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

FEES:

It is preferred that the course is delivered face-to-face, considering the technical contents involved in it. However the COVID-19 pandemic has forced us to minimise face-to-face sessions and instead use remote method of learning and teaching. Given the need for internet data to run the course uncertainty of delivery method of the course, the course fee has been reduced to **R8500.00 (Eight thousand and five hundred rand only) for 2021** 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 discontinue a percentage of this fee can be refunded depending on the date of discontinuation).

Please take note that if your place of employment is going to pay the fees that <u>all</u> arrangements for these payments must be made by yourself and that if the employer pays the amount in via a bank transfer it must be accompanied with a letter to the Finance department of UJ stating that the payment was made to the benefit of your <u>student number</u>.

As part of the formal Honours degree, the specified university fee applies.

APPLICATION:

Applications to attend the course during the **first semester** must reach the course coordinator by **February 10, 2021 for 2021**. Applications can be made by e-mail or fax, in which the following must be stated:

Name, I. D. number, address, telephone number, highest academic qualification and place acquired, work experience, and current occupation as well as relevant institution. **Include a copy of your previous study record**. Kindly note that you may be asked to provide a motivation letter for taking the course, if necessary.

Please take notice of the fact that the university might charge a further administrative fee towards new students not previously enrolled at this university towards the process of input of personal data onto the computer system. This amounted to an extra R350 in the past.

Fill in the attached form for enrolment purposes and submit it via in person, e-mail or fax to the address given below. Successful applicants will then start the registration process once they are notified within few days of application.

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

Tel. No. (011) 559-3927
Fax. No (011) 559-2430
E-mail: sgtesfamichael@uj.ac.za

TAKE NOTE OF THE FOLLOWING ARRANGEMENTS FOR 2021.

ENROLMENT:

Enrolment starts in the Department of Geography, Environmental Management and Energy Studies as specified below.

- **Place: D2 LAB 344H**
- **Date: 11/02/2021 – 16/02/2021**
- **Time: 9:00 – 12:30**

You will then be guided through the University's registration processes, including capturing of your details in the institution's database and payment that must be made at registration for the course. Please note that the registration process can be finalised via e-mail communications, if possible.

FIRST LECTURE:

Date: February 16, 2021 Time: 13:00 Place: D3 LAB 332

UNIVERSITY OF JOHANNESBURG
DEPARTMENT OF GEOGRAPHY,
ENVIRONMENTAL MANAGEMENT AND ENERGY STUDIES

REGISTRATION FORM FOR GEO-INFORMATICS 1 (S2GISQ1)
FOR CERTIFICATE PURPOSES IN 2021 (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: (____) _____

FAX NO: (____) _____

I, _____, hereby declare that I will adhere to the general university regulations and the specific regulations of the Department of Geography, Environmental Management and Energy Studies especially those applicable to the computers and software, and undertake to pay the course fee of R8500.00 in full at registration for the course. Payment must be made at the UJ CASHIER and only after an official student number has been allocated to you.

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

_____ _____
SIGNATURE (Student) **DATE**

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