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Sentrum vir Geografiese Analise • Centre for Geographical Analysis

Introduction to GIS short course

This introductory course is aimed at **GIS beginners** who need instruction in basic GIS functions such as map production, data capture, editing and manipulation. Participants will also be exposed to more advanced applications of GIS such as spatial analysis and modelling. Upon completion, participants will understand the basic principles of cartography, map projections, data models, and other GIS concepts and will apply these concepts in ArcGIS.

Course structure

Option 1: Accredited option @ R 8 000

The course duration is a total of **8 weeks**. The first **4 weeks** students receive access to lectures and practical exercises requiring about 8 to 10 hours of effort per week. At the end of the 5th week students are required to write an examination. This is followed by a final 3 weeks during which students' complete assignments. Students will be assisted during the course by having access to forums and weekly online q & a sessions. A preliminary course schedule is provided below.

Option 2: Attend-only option @ R 6 000

Students who are not interested in being assessed may choose to **register for the first 4 weeks only** (i.e. only get access to the lectures and exercises and not write the exam or complete any assignments). Students choosing this option will receive a certificate of attendance.

Students need not be on campus during the duration of this course but need access to a computer loaded with **ArcGIS Pro** software. An ArcGIS Pro temporary licence (valid for two months) can be supplied if necessary.

Standard course fees are reduced by 20% for Stellenbosch University students and staff members if paid via an internal university cost point.

Accreditation

This course is accredited by Stellenbosch University, an accredited higher education provider. The course also complies with the following Geographical Information Science (GISc) unit standards registered with the South African Qualifications Authority (SAQA) (see <http://allqs.saqa.org.za/showQualification.php?id=63689>):

Theme	Learning hours*	Unit Standard Link
Context of GI Science	40	http://allqs.saqa.org.za/showUnitStandard.php?id=258657
The basic principles of spatial data	15	http://allqs.saqa.org.za/showUnitStandard.php?id=258659
Map projections	5	http://allqs.saqa.org.za/showUnitStandard.php?id=258658
Spatial and hybrid queries	10	http://allqs.saqa.org.za/showUnitStandard.php?id=258644
Data capture from secondary data sources	10	http://allqs.saqa.org.za/showUnitStandard.php?id=258740
GPS	5	http://allqs.saqa.org.za/showUnitStandard.php?id=258800

* The number of learning hours associated with each of these unit standards within this course

By complying with these unit standards, the course will be recognized as prior learning during the South African Council for Professional and Technical Surveyors (SAGC) registration process of GISc practitioners. Upon successful completion of both the contact and assessment components, an official Stellenbosch University certificate of competence will be awarded.

Outcomes

Students who complete the full course will be able to:

1. Demonstrate a generic understanding of what GIS is.
2. Demonstrate an appreciation of the specialist knowledge needed to build a proper GI system.
3. Demonstrate an understanding of how GIS can be used in different industries.
4. Demonstrate an understanding of the functionality available from a GIS.
5. Demonstrate an understanding of models of the real world.
6. Demonstrate a basic understanding of the vector data model.
7. Demonstrate a basic understanding of the raster data model.
8. Understand the concept of attribute extractions from real world entities.
9. Explain components of a reference system.
10. Identify an appropriate map projection for a specific task.
11. Convert from one projection and or reference system to another.
12. Include fundamental elements on a new map.
13. Include symbology reference on the map.
14. Create and execute a simple vector spatial query under supervision.
15. Create and execute a simple raster spatial query under supervision.

Prescribed reading

In preparation for the course, participants can read Chapters 1-9 of Chang (2019). The full reference is:

Chang, K., 2019: Introduction to geographic information systems. 9th ed. McGraw Hill.

A copy of this book can be ordered at an additional cost (please contact the short course manager for availability and costing).

Software requirements

Students need not be on campus during the duration of this course but need access to a computer loaded with **ArcGIS Pro** software. An ArcGIS Pro temporary licence (valid for two months) can be supplied if necessary. To make sure your system meets the minimum requirements to run ArcGIS Pro click [here](#). To check your computer's ability to run ArcGIS Pro, click [here](#).

Assessments

Students who register for the full course will write an exam at the end of the 5th week of the course. The test will count towards 50% of the final course mark and will contain questions relating to the lectures, exercises, and the prescribed reading. An assignment will have to be completed within the 3 weeks following the exam. The assignment will be a practical task and will count towards 50% of the final course mark.

Course fees and registration

The course fees are R 8 000 per student (R 6 000 if registering for the attendance only option). Standard course fees may be reduced by 20% for Stellenbosch University students and staff members when paying via a university cost point.

To register for this short course:

1. Go to <http://www.shortcourses.sun.ac.za/courses.html> and click "Environmental; Agri & Natural Sciences".
2. Choose the relevant course and proceed with the registration.
3. Make sure to choose the correct Option (i.e. 1: Attendance vs 2: Competence).

Please forward any queries to:

Ms Jessica Eichhoff
Email: eichhoffj@sun.ac.za
Fax: 021 808 3109
Web: www.sun.ac.za/cga

Registrations for the course close two week prior to the start date and all payments must be made in full before the commencement of the course. Please enquire about the availability of seats before paying.

PRELIMINARY COURSE CONTENT AND SCHEDULE:

Week 1
Welcome and course orientation
Lecture 1: Maps and Cartography
Practical exercise: Map reading and use
Lecture 2: Setting the context of GI Science
Lecture 3: GIS Software
Practical exercise: Introduction to ArcGIS
Week 2
Lecture 4: Nature of Geographical Information & Data models
Practical exercise: Data models
Practical exercise: Data models, continue
Lecture 5: Map projections and coordinate systems
Practical exercise: Map projections and coordinate systems
Week 3
Lecture 6: Data input
Lecture 7: GPS
Practical exercise: Capturing primary & secondary data using a GPS
Lecture 8: Data management
Practical exercise: Data editing
Week 4
Lecture 9: Spatial and hybrid queries
Practical exercise: Spatial and hybrid queries
Lecture 10: Data manipulation & spatial analysis
Practical exercise: Spatial analysis
Week 5
Theory exam
Week 6 - 8
Assignment