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

Option1: Four days (Attend-only option) @R 6 000
Students who are not interested in being assessed may choose to **register for the first 4 days only** (i.e. only attend the lectures and exercises and not write the exam or complete any assignments). Students choosing this option will receive a certificate of attendance.

Option2: Five days (including exam and two week assessment component) @ R 8 000
Includes a **5-day period** during which students attend contact sessions (i.e. lectures and practical exercises) and write tests. Contact sessions run from 08h30-16h00 daily from Monday to Thursday. An exam is taken on the afternoon of day 5 (Friday).
Assignments are completed in the student's own time (during the week following the contact period) and are submitted electronically. A preliminary course schedule is provided below.
Students need not be on campus during the assessment period, but need access to a computer loaded with ArcGIS 10 software. The ArcGIS 10 Student Edition Licence (valid for one year) can be supplied at an additional cost (please contact the short course manager for availability and costing).

The **course fees are R 8 000** per student (R 6 000 if registering for the first 4 days only). Standard course fees may be reduced by 20% for Stellenbosch University students and staff members when paying via a 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). All course notes will be provided in PDF format. A two-hour theory exam is scheduled for 14h30 on the fifth day of the course (only for students who have registered for the full course).

Assessments

Students who register for the full course will write an exam (2 hours in duration) on day 5 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. Two assignments will have to be completed within the two weeks following the contact period. The first assignment will be an essay on a prescribed topic (to be announced on day 5 of the course) and will count towards 20% of the final course mark. The second assignment will be a practical task and will count towards 30% 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 first 4 days only). Standard course fees are reduced by 20% for Stellenbosch University students and staff members.

To register for this short course:

1. Go to http://www.shortcourses.sun.ac.za/courses.html and search under "**I**" for the relevant course

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 one week prior to the start date. Please enquire about the availability of seats before paying.

Location information

A map of campus can be downloaded from http://academic.sun.ac.za/cga/documents/map_to_cga.pdf. The Geology building is shown as number 58 on the map. Use the northern entrance and go to room 1005.

Accommodation information

For a list of accommodation providers in Stellenbosch please visit http://www.stellenbosch.travel/stay

PRELIMINARY COURSE CONTENT AND SCHEDULE:

Monday:

TIME	ACTIVITY	Room
8h30-09h00	Registration	Chamber of Mines Building
09h00-09h25	Welcome and course orientation [Gretha Groeneveld]	4018, Wilcox Building
09h30-10h25	**Lecture 1: Maps and Cartography** [Gretha Groeneveld]	4018
10h30-10h45	Refreshment Break - Chamber of Mines Building	
10h50-11h55	Practical exercise: Map reading and use [Theo Pauw, Johans van Wyk, Dean van den Heever]	4018
12h00-12h45	**Lecture 2: Setting the context of GI Science** [Gretha Groeneveld]	4018
12h45-13h40	Lunch	
13h45-14h15	**Lecture 3: GIS Software** [Nitesh Poona]	4018
14h15-16h15	Practical exercise: Introduction to ArcGIS [Theo Pauw, Johans van Wyk, Dean van den Heever]	4018

Tuesday:

TIME	ACTIVITY	
09h00-09h45	**Lecture 4: Nature of Geographical Information & Data models** (Vector, Raster, including Data Structures: Raster coding &, Topology) [Gretha Groeneveld]	4018
09h45-10h30	Practical exercise: Data models [Theo Pauw, Johans van Wyk, Dean van den Heever]	4018
10h30-11h00	Refreshment Break - Chamber of Mines Building, CGA	
11h00-11h45	**Lecture 5: Map projections and coordinate systems** [Gretha Groeneveld]	4018
11h45-13h00	Practical exercise: Map projections and coordinate systems [Theo Pauw, Johans van Wyk, Dean van den Heever] (Part 1)	4018
13h00-14h00	Lunch	
14h00-15h30	Practical exercise: Map projections and coordinate systems [Theo Pauw, Johans van Wyk, Dean van den Heever] (Part 2: Advanced)	4018
15h30-16h15	**Lecture 6: Data input, data management & data analysis: An overview** [Gretha Groeneveld]	4018

Wednesday:

TIME	ACTIVITY	
09h00-09h45	**Lecture 7: Data input (including metadata, data sources & custodians)** [Adriaan van Niekerk]	4018
09h45-10h15	**Lecture 8: GPS** [Adriaan van Niekerk]	4018
10h20-10h50	Refreshment Break - Chamber of Mines Building	
10h50-13h00	Practical exercise: Capturing primary & secondary data using a GPS [Theo Pauw, Johans van Wyk, Dean van den Heever]	4018
13h00-13h45	Lunch	
13h45-14h30	**Lecture 9: Data management** [Gretha Groeneveld]	4018
14h30-16h15	Practical exercise: Data editing [Johans van Wyk, Dean van den Heever]	4018

Thursday:		
TIME	**ACTIVITY**	
09h00-09h40	**Lecture 10: Spatial and hybrid queries** [Nitesh Poona]	4018
09h45-10h25	Practical exercise: Spatial and hybrid queries [Theo Pauw, Johans van Wyk, Dean van den Heever]	4018
10h30-10h45	Refreshment Break - Chamber of Mines Building, CGA	
10h50-11h15	Practical exercise: Spatial and hybrid queries [Theo Pauw, Johans van Wyk, Dean van den Heever]	4018
11h20-12h10	**Lecture 11: Data manipulation & spatial analysis** [Gretha Groeneveld]	4018
12h15-13h00	Practical exercise: Spatial analysis [Theo Pauw, Johans van Wyk, Dean van den Heever]	4018
13h00-13h45	Lunch	
13h50-16h15	Practical exercise: Spatial analysis [Theo Pauw, Johans van Wyk, Dean van den Heever]	4018
Friday: (only for those doing full course)		
TIME	**ACTIVITY**	
13h30-13h45	Assignments briefing and closure [Gretha Groeneveld]	4018
13h45-15h45	Theory exam	4018

2 weeks post: Carry out assignments & Submit assignments