



REPORT

The GIS/RS Course
(module 5 of the Peatwise curriculum)
development
at

Universiti Malaysia Sarawak

(UNIMAS)

By

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Contents

- 1. Introduction**
- 2. The Work Program**
- 3. The Preparation of the Course Material**
- 4. The Peatwise RS/GIS Module Course**
- 5. Conclusion**

Appendix A: Course overview

Appendix B: Assignment Questions

1 Introduction:

This report is a short description of the course GRS/RS course development at UNIMAS in the period November 2005 – february 2006 . This development has been realized by Mr. Danny de Roo (MGI student of Wageningen UR). The focus of the project was dedicated to the conversion of the Wageningen UR Masters in IGI course GRS 10304 “Introduction to Geo-Information Science course” in such a way that it could be implemented for use in the Peatwise program at UNIMAS and UNIPAR.

2. The Work Program (November 2005 – February 2005)

The work program consisted of two parts as follows:

2.1 Material Preparation

After a meeting with Dr. Harwant Singh and Prof. Wang of FCSIT, the assignment was split into four parts.

1. Getting and updating the GIS Exercises from the Wageningen UR - GRS 10304 course (with IGI data) for the Peatwise program
2. Getting and updating the Remote Sensing (RS) Exercises from the Wageningen UR - GRS 10304 course (with IGI data) for the Peatwise program
3. Creating new RS exercises, referred to as Repetition Exercises, using Local data for the Peatwise program.
4. Creating new GIS exercises, referred to as Repetition Exercises, using Local data for the Peatwise program.

In carrying out the above

1. The task in the first part was to convert the Wageningen UR - GRS 10304 Exercises, based on ArcView, to be used with ArcGis (ArcMap).
2. The task in the second part was to also convert the remote sensing exercises, making use of the software package IDRISI.
3. The third and fourth parts where focused on, if possible, making exercises on local data of the area around Kuching.
 - (a) For the GIS part this meant creating so called Repetition Exercises, found at the end of almost each G.I.S. Practical Module and are a sort of summary assignment for the entire chapter with local data.
 - (b) For the RS Exercises a similar type of exercises where to be created with local data.

2.2 The Peatwise RS/GIS Module Course

The RS/GIS Module was started at the 13th of January 2006, to be given over two extended weekends. The first was a three days stretch, focused on the remote sensing part of the module. The second was of 4 days focused on the GIS part of the module. Compared to the original course (GRS 10304), this is a very short period of time to conduct the course. On the other hand, the objective of this course only was to give the students an understanding of the possibilities of RS and GIS, and the concepts behind it.

3. The Preparation of the Course Material

3.1 Requirements

The items needed for the preparation of the course materials with the PC where as follows:

1. Internet connection
2. Software (ArcView, ArcGIS, IDRISI)
3. Data (Local)

3.2 The Results of Tasks

(a) Part 1

Part 1 required the downloading of the Geo-data from the Wageningen UR IGI site www.geo-informatie.nl/courses/grs10306. I encountered much difficulty in doing this, due to a very slow internet connection at the Unimas. A lot of times the site was not able to load, and when it did, downloading files from the site was very time-consuming. Also bigger files are not downloadable at all which presented a big problem, because of the essential need to download the Geo-data from this site, as without this data I would not be able to carry out the assignments. I solved this problem by downloading the data in a Cybercafe (Internet café) in Kuching and storing it on my USB-stick (pen-drive).

The existing IGI exercises designed for use with ArcView 3.2 were upgraded for use within ArcGIS 9 (ArcMap). The biggest difficulties encountered here where due to the differences between the two software packages, but these didn't lead to any major problems which I could not solve.

(b) Part 2

This part was focused on the retrieval of the Remote Sensing exercises from the Wageningen UR IGI site. Again much difficulty was encountered due to a very slow internet connection, which made it at times impossible to even open the IGI site, and therefore to proceed with this assignment. This, needless to say, made this assignment very time consuming.

Due to this unreliable *internet* connection it was decided to adapt these exercises and make them available to be done offline by being installed on the hard drive of each individual PC to be used during the course. Therefore as most of the exercises in the

original IGI course are *internet* based, I converted these exercises to be performed in a local environment (offline).

(c) Part 3 & Part 4

New Remote Sensing exercises to be done with IDRISI were created, as well as, five repetition exercises for GIS assignments.

For the GIS exercises data of an area (approx 24 x 20 km) located approx. 40 km west of Kuching around the town Lundu and containing the following datasets was used:

- Landuse (polygon)
- Roads (line)
- Rivers (line)
- Test Locations (point, self created)

For the first IDRISI exercise an area encompassing Kuching and an adjoining area to its east was used. This area had a better usable diversity for this exercise than the area used in the GIS exercise. The data used came from LandsatTM and consisted of all 7 bands. A smaller assignment focused on an area of peat east of Kuching was created within this exercise.

For all the exercises described above, see the **GIS and RS** folder on the accompanying CD.

4. The Peatwise RS/GIS Module Course

The RS part of the course was carried out between the 13-15.1.2006 (Friday-Sunday) and the GIS part between the 19-22.1.2006 (Thursday-Sunday). An overview on the course is given in appendix A. Not all the students who started the course completed it but in the end there were 8 students who finished the course. The exercises were conducted in pairs (4 groups in total).

Because there was a lot of material to cover by the students, and not a lot of time, especially in the GIS part, only the modules mentioned in the overview were covered. Even then on numerous occasions the students were not able to complete the modules. However, these parts were explained to the students when at the end of the session the entire module was discussed. The entire course is worth 100 marks, where 50 marks are located to the exam, and the other 50 to the Final Assignment. The students do have to fulfill a take home Final Assignment. Contribution to the Final Assignment is given in appendix B. These were adapted and added to the Final Assignments.

5. Conclusions

1. The Post graduate Diploma is in on

2. The first Module to be completed was Module 5 GIS and Remote Sensing

It was held from 13-15.1.2006 and 19-22.1.2006

The assignments have been given out and will be collected on the 18.2.2006

The examination will be held on the 18.2.2006

3. In view of this there is no need for an extension for the Module 5

4. The distance learning set up (eg. feedback, upgrade and collaboration) of this course isn't realize yet.

**Appendix A:
Course overview**

RS MODULE

	<i>13.1.2006</i>	<i>14.1.2006</i>	<i>15.1.2006</i>	
<i>9-12.30 pm</i>	<p>Theory <i>(MAIT LAB)</i></p> <p>Unit 1: <i>What Is Remote Sensing?</i></p> <p>Unit 2: <i>Spectral Signatures</i></p> <p>Unit 3: <i>Aerial Photography</i></p>	<p>Theory <i>(LAB 9)</i></p> <p>Unit 4: <i>Introduction to Visual Image Interpretation</i></p> <p>Unit 5: <i>Multispectral Scanning</i></p> <p>Unit 6: <i>Introduction to Digital Image Processing</i></p>	<p>Practical <i>(MAIT LAB)</i></p> <p>Exercise: <i>"Digital Image Processing"</i></p>	
<i>2-5 pm</i>	<p>Practical <i>(MAIT LAB)</i></p> <p>Exercise: <i>Current and Future Missions for Earth Observation</i></p> <p>Exercise: <i>"Determining reflectances and spectral signatures with the Cropscan"</i></p>	<p>Practical <i>(LAB 9)</i></p> <p>Exercise: <i>The derivation of reflectances from aerial photographs</i></p> <p>Exercise: <i>Interpretation Of Optical Remote Sensing Images</i></p> <p>Exercise: <i>Introduction digital image processing</i></p>	<p>Practical <i>(MAIT LAB)</i></p> <p>Exercise: <i>"Digital Image Classification"</i></p>	

GIS MODULE

	<i>19.1.2006</i>	<i>20.1.2006</i>	<i>21.1.2006</i>	<i>22.1.2006</i>
<i>9-12.30 pm</i>	<p>Practical <i>(MAIT LAB)</i></p> <p>Exercise</p>	<p>Practical <i>(MAIT LAB)</i></p> <p>Exercise</p>	<p>Practical <i>(LAB 9)</i></p> <p>Exercise</p>	<p>Practical <i>(LAB 9)</i></p> <p>Exercise</p>

	Module1: <i>Introduction to ArcView</i>	Module 1: <i>Datastructure and digitizing</i>	Module 3: <i>Transformations</i>	Module 8: <i>Operations 1</i>
<i>2-5 pm</i>	Theory <i>(DANCED THEATER)</i> Unit 1: <i>Introduction to GIS</i> Unit 2: <i>Data Integration 1: Data Handling, Data-Action Model And Querying</i> Unit 3: <i>Data Integration 2: Transforming And Processing</i>	Practical <i>(MAIT LAB)</i> Exercise Module 2: <i>Datastructure and digitizing</i>	Practical <i>(LAB 9)</i> Exercise Module 4: <i>Queries</i>	Practical <i>(LAB 9)</i> Exercise Module 9: <i>Operations 2</i>

Appendix B

RS assignment:

Question:

Create a graph that shows the relation between a sensor's spatial resolution (the size per pixel) and the area the sensor can cover per swath.

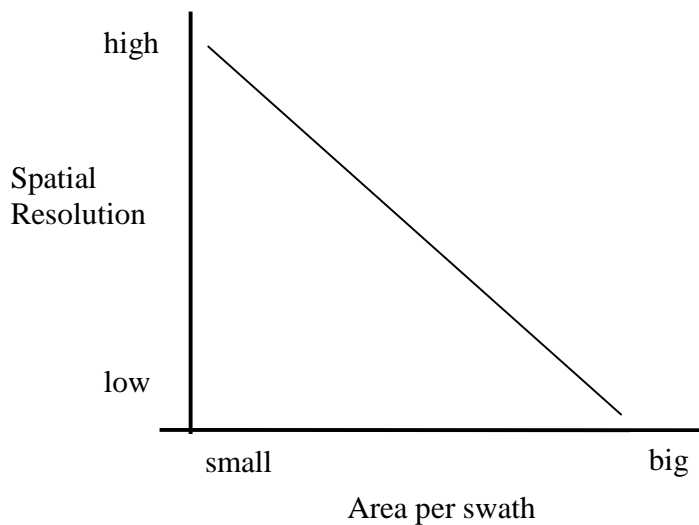
Fill in the blanks in the sentences below, which may help creating an answer.

Quickbird has a spatial resolution of 2.44 m (high) in the multi spectral bands and can cover 16.5 km per swath.

Landsat TM has a spatial resolution of 30 m (low) but can cover up to 185 km per swath

Use: www.infoterra-global.com/satellite.htm

Answer:



GIS assignment

Replace the numbers with the correct word or sentence.

(A)

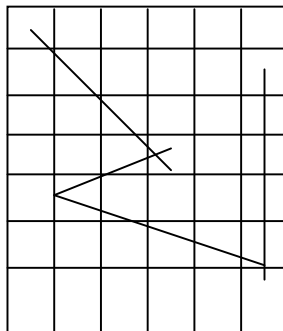
ArcView is a (1) software program. Within ArcView, the user works in a (2), which contains (3) where the user can add, work on and visualize the (4).

(B)

The data structure in GIS can be (5) or (6) based. One of these consist of three data types, which are (7), (8) and (9). Within the attribute table of such a theme, there is always a (10) attribute or field to describe the data type. The attribute table of a theme of the other data structure always contains a (11) and a (12) attribute, where the first describes the value a group of cells has and the second means the amount of cells with that certain value.

(C)

When you select features based on the certain attribute values, you are conducting a (13). To convert a theme from one data type to the other is called a (14). Do it for the example below (by hand).



Answers:

- 1 GIS
- 2 project
- 3 views
- 4 data / themes
- 5 vector
- 6 raster
- 7 points
- 8 (poly)lines
- 9 polygons
- 10 shape
- 11 value
- 12 count
- 13 query
- 14 transformation
- 15

