



UNIGIS Amsterdam

Postgraduate Certificate, Diploma &
Master of Science Programme in
Geographical Information Sciences

Study Guide
(2016-2017)

vrije Universiteit amsterdam



Educating GIS Professionals Worldwide

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Colophon

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* This Master's programme is officially registered under the name Geographical Information Sciences (crohocode 75040) at the Faculty of Earth and Life Sciences

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0. Welcome!

Welcome to the UNIGIS Amsterdam study programme! This Study Guide provides the information needed to successfully study at UNIGIS. Every student is advised to read this document carefully. The document is updated annually to ensure you are provided with the latest information. The Guide comprises three parts: Part 1: General Information for Students; Part 2: UNIGIS Programme; Appendices: Assessment forms.

1. General information for Students

1.1. UNIGIS at Vrije Universiteit Amsterdam

1.1.1. *UNIGIS: an international network of collaborating universities*

UNIGIS was founded in 1990. The original idea for the UNIGIS distance-learning programme was developed at the University of Salford in the United Kingdom. Its first phase of development was funded by a grant from the University Funding Council. At an early stage, however, it was realised that collaboration would be necessary. The skills and knowledge needed to develop a comprehensive GIS course and optimally support students needed resources from more than one university. GIS specialists in each institution are too few to support independently the administrative and academic inputs to a complete course, but together they represent a strong team with wide-ranging and complementary skills. As a result, a joint course has been set up in order to provide the breadth of experience and knowledge necessary to run a course that has a full and logical structure. Subsequently, a partnership was formed by five universities, now the founding members:

- The University of Huddersfield, Department of Geographical and Environmental Sciences, United Kingdom
- The Manchester Metropolitan University, Department of Environmental and Geographical Studies, United Kingdom
- The University of Salford, Department of Geography, United Kingdom
- The Universität Salzburg, Department of Geography, Austria
- Vrije Universiteit Amsterdam, Department of Spatial Economics, the Netherlands.

Not long afterwards other universities joined the UNIGIS network. At present, the UNIGIS network includes 12 universities and 13 study centres and is still growing. The universities that collaborate in the UNIGIS network are listed at www.unigis.net. Each site works independently, but strong collaboration exists in the development of course materials and student support. The network also provides opportunities for organising international summer and winter schools, making agreements with software vendors, obtaining European accreditation, etc.

On 28 June 2002 the UNIGIS International Association was officially established to create a legal framework for the activities of the network. According to the statutes, the aim of the association is to promote education and interest in GIS at the highest level, both in national and international context, and to represent in the broadest sense of the word the interests of its members in that area. Each two years a new International Course Board is chosen.

Each UNIGIS institution has its own curriculum committee to monitor the operation of the local organisation as it affects that institution and as each UNIGIS institution has to comply with national rules and regulations. The curriculum committee is responsible for the day-to-day operation of the course and carries out monitoring and evaluation procedures within the framework set by the International Course Board.

The UNIGIS International network universities collaborate to deliver innovative courses presented to professional standards. These meet the needs of industry and commerce and provide an understanding of the conceptual, technical and organisational aspects of GIS. Industry standard software is used to give appropriate practical experience. The UNIGIS International Association provides the broad skills and knowledge essential to deliver a

comprehensive course.

1.1.2. *UNIGIS Amsterdam and the SPINlab*

In January 1990 Vrije Universiteit Amsterdam established a chair in Spatial Informatics. This chair was allocated to the Department of Spatial Economics at the Faculty of Economics and Business Administration. The GIS-group that was formed as a result of the establishment of the chair has been very successful in delivering (PhD) research and providing education for students of the Department. In 1993 UNIGIS Amsterdam was established by the GIS group.

In the year 2000 the GIS activities at Vrije Universiteit Amsterdam were expanded with the establishment of the Spatial Information Laboratory (SPINlab). The SPINlab was set up as an interfaculty centre supported by the Faculty of Economics and Business Administration and the Faculty of Earth and Life Sciences. Currently, the SPINlab resides solely at the Faculty of Economics and Business Administration but its staff is active across the VU campus. The SPINlab provides technical expertise, research and education competences, a web-enabled spatial infrastructure, data resources, and a helpdesk. The SPINlab also initiates innovative research and education on spatial information subjects. The location of GIS within several departments at VU University emphasizes the interdisciplinary character of GIS. Co-ordination by the SPINlab means that several resources (people, hardware, software) are available to all users of GIS.

Since the foundation of the SPINlab, UNIGIS Amsterdam has become the most important educational activity of the SPINlab. For more information on the SPINlab, its staff members and current research activities, visit www.spinlab.vu.nl. UNIGIS is organised by the SPINlab in close co-operation with the Department of Spatial Economics, <http://www.feweb.vu.nl/nl/afdelingen-en-instituten/spatial-economics/>

1.2. Studying at UNIGIS & Student Facilities

Correspondence address UNIGIS Amsterdam Office¹:

Vrije Universiteit Amsterdam
FEWEB-RE
Attn. UNIGIS Amsterdam
De Boelelaan 1105
1081 HV Amsterdam - The Netherlands

Email: info@unigis.nl
Website: www.unigis.nl
Tel: +31 20 598 6099/ 6125
Fax: +31 20 598 6004 (attn. UNIGIS)

Visiting address UNIGIS Amsterdam Office and the SPINlab:

Department of Spatial Economics
Main Building, room 9a89, please call the office telephone number above upon reaching the 9th floor.
For general information about Vrije Universiteit Amsterdam and its facilities, www.vu.nl.

1.2.1. *Study material*

A range of learning strategies is employed with an emphasis on student centred learning. These include study pack notes, continuous and periodic self-assessed exercises, tutor assessed work, computer based exercises, contact with tutors and fellow students through a dedicated online discussion forum, online tutorials and campus-based workshops, and access to (digital) academic literature.

Modules will contain module notes supported by directed reading and references to develop independent learning skills. Students will be encouraged to research topics beyond the scope of any prescribed references but the packs provide all necessary material for the module.

¹ For all UNIGIS Amsterdam matters (assignments, emails, registrations, etc.), please only use the UNIGIS addresses as mentioned above.

Workshop I – which is organised either as a campus based event or online meetings – will give an introduction to the UNIGIS study materials and teaching platforms.

1.2.2. *Books and Literature*

UNIGIS Amsterdam recommends these textbooks. Earlier editions are available free of charge as e-books through the University Library (www.ubvu.vu.nl).

Title: Geographic Information System and Science

Author: Longley, P.A, Goodchild, M.F., Maguire, D.J. and Rhind, D.W.

Paper back | John Wiley & Sons, Chichester, UK | 4th Edition, 2015

ISBN: 978-1-11-867695-0

Price: approximately € 150

Direct e-book link:

<http://web.b.ebscohost.com/ehost/detail/detail?sid=4f3e5044-6ef9-4b11-80b4-6f694e1421ad%40sessionmgr110&vid=0&hid=124&bdata=JnNpdGU9ZWZWhvc3QtGjZlZGZQ%3d%3d#AN=141691&db=nlebk>

Title: The handbook of geographic information science

Author: Wilson, J.P. and Fotheringham, A.S.

Hardcover | Blackwell Publishers, Malden MA, USA | 2008

Price: approx. € 70

Direct e-book link:

<http://web.a.ebscohost.com/ehost/detail/detail?sid=80d84435-2eeb-485f-b3bf-8a8614d54abc%40sessionmgr4003&vid=0&hid=4112&bdata=JnNpdGU9ZWZWhvc3QtGjZlZGZQ%3d%3d#AN=209562&db=nlebk>

Tip: If your bookshop does not have a title, you can order it through Amazon.com (outside the Netherlands) or Bol.com (Netherlands), for instance.

Please refer to Blackboard page of the specific modules for recommended additional books and articles. Many of these are available as e-resources via the Vrije Universiteit Amsterdam library (see below).

1.2.3. *Quality control of study material*

For the course to be successful, it is essential that the study packs are of a consistently high quality. If you have any comments on the study materials, please share them with the UNIGIS staff using the module's discussion forum. Completed assessments, and other student responses, will be retained and used for module and course review purposes. The UNIGIS course material undergoes regular quality checking within the UNIGIS International Network.

1.2.4. *Support from the Tutor and Collaborative learning*

Students have several possibilities to obtain help if they have a problem or do not understand something in a module.

Each module has a **module tutor**. The name and email address of the tutor can be found in the Study Guide and on the module's blackboard page. If you have any questions regarding the contents of the module, you can contact the tutor preferably via the discussion forum (see below). Please do not call, as not all tutors work full-time at the UNIGIS office and answers cannot always be given instantly. The module tutor will answer as soon as possible, depending on the urgency of the question, but usually in one or two days.

Secondly, students should be aware that we have a **dedicated UNIGIS discussion forum**, forum.unigis.nl; membership is open, but you need to sign up for an account; the UNIGIS office will be notified and confirm your account. For all the modules, we expect (and encourage) that students use the forum as an open discussion and collaboration platform in order to co-create knowledge with fellow students and staff.

Nowadays, knowledge is shared and created by groups using online platforms (e.g. Wikipedia, Quora, OpenStreetMap, gis.stackexchange.com). We expect that this forum can facilitate internal discussion within our UNIGIS community. In this way, we can share information resources and personal reflection on challenges and findings. You are encouraged to reflect on (and appropriate) the information and experiences shared: co-creation of knowledge. This is a very important 21st century skill: to share, filter and amalgamate online information with a critical and analytical perspective. Naturally, everyone should achieve the individual learning outcomes of each module and the assignment reports are the primary means to demonstrate your achievement and for us to evaluate you individually. Therefore, please be cautious with sharing assignment report drafts unless specifically instructed to do so by your module tutor (e.g. in the case of Module 1: Advanced GIS, TAA1).

1.2.5. VU Library

Every UNIGIS student is member of the extensive University Library of Vrije Universiteit Amsterdam. After registration at Vrije Universiteit Amsterdam, through registration at UNIGIS, each student will receive a VU Net ID, which provides access to numerous peer-reviewed journals and e-books. You can access the e-library through vunet.vu.nl. You can also obtain a library card for borrowing books at the library.

1.2.6. Hardware & Software

To complete the course you must have:

- Unrestricted access to a PC with *Windows* operating system for the duration of the course. *Specifications vary according to the software adopted – see below;*
- Reliable (preferably Broadband) Internet access to e-mail and the World Wide Web.

An important part of the taught course is acquiring skills in using GIS software. All our modules have exercises and assignments, many of which require you to use GIS software.

UNIGIS currently supports three GIS software products. These products give you the opportunity to use software appropriate to your needs and to your educational objectives.

ArcGIS 10 (ESRI)

- Costs
Students can obtain a *free* one-year student license of the latest version of ArcGIS Desktop or Professional plus extensions. You are entitled to a free license as long as you are registered as UNIGIS student. ArcGIS is a dominant desktop GIS package in the market and with its many extensions it provides a powerful suite of GIS functions. Please contact the unigis office, info@unigis.nl, to obtain a user license code.
- Hardware specifications and more information
See: www.esri.com/software/arcgis

IDRISI (Clark labs)

- Costs
IDRISI from Clark Laboratories is a leading raster GIS widely used in education and environmental applications. UNIGIS students who undertake remote sensing related tasks may wish to purchase IDRISI which is available at a special educational discounted rate. Please email clarklabs@clarku.edu with unigis office, info@unigis.nl in the cc: to confirm your student status. Once confirmed, you can obtain a license <https://clarklabs.org/buy/>; please put UNIGIS student status confirmed with Clark Labs in the comments box.
There are extensive training materials and a wide network of educational users especially in the environmental field. IDRISI has a wide range of *raster* functionality for GIS and image processing and a unique set of functions for decision support. It is designed for small project and educational use and is a good entry level GIS.
The costs for both a one-year license of IDRISI and an eternal license are adapted annually, the exact numbers for this academic year are not known yet, but they normally range from about \$50 to \$150.
- Hardware specifications and more information

See: www.clarklabs.org

ERDAS

If you wish to obtain a free or discounted rate student copy of ERDAS, please email Jasper Dekkers, j.dekkers@vu.nl, for a license code.

You can download ERDAS from here:

- ERDAS Foundation 2014 (<http://download.intergraph.com/downloads/erdas-foundation-2014>)
 - ERDAS IMAGINE / Photogrammetry 2014 (64-bit) (<http://download.intergraph.com/downloads/erdas-imagine-2014-%2864-bit%29>)
 - ERDAS IMAGINE 2014 v.14.1 (64-bit) (http://downloada.erdas.com/software/2014/IMAGINE_2014_64bit/MR1/IMAGINE_x64_Patch.zip)
 - [Hardware specifications](#)
- See <http://www.hexagongeospatial.com/>

What does the UNIGIS Programme Board recommend?

Since most of our tutors use ArcGIS themselves, we advise you to obtain the one year licensed copy of ArcGIS. This way you can get the best support and you have a package that can handle both vector and raster data. Also, the SPINlab can give you access to ArcGIS on-line courses at ESRI Virtual Campus *for free*.

Next to ArcGIS, IDRISI, Erdas and Quantum GIS are packages that are widely used in education and environmental applications. For some modules in the second year one of these packages may be preferred.

1.2.8. Summer Schools, Winter Schools and other GIS meetings

UNIGIS International organises Summer Schools and Winter Schools. These can take place at any of the UNIGIS sites. In past years, these workshops took place in among others Austria, Hungary and Spain. The Summer Schools and Winter Schools are organised around a theme, such as 'European Data Sets', 'Land Administration' or 'Location Based Services'. These workshops are optional in the UNIGIS course, though in some cases they can replace an elective module in your study programme. Details on each workshop will be announced separately on the UNIGIS website and by email.

Occasionally, UNIGIS Amsterdam also (co-) organises other events and study days, such as the international study trip with ESRI and an e-learning showcase at Hewlett Packard Amstelveen. UNIGIS strongly supports initiatives of students and alumni to organise study events at their work place, such as the field trip to Rijkswaterstaat (2009) and the excursion to Dutch Cadastre (2011). Please contact the unigis office, info@unigis.nl, if you wish to (help) organise an event!

1.2.9. Staying in touch with UNIGIS Amsterdam & UNIGIS Int. network

We have two **LinkedIn Groups** for all our students and alumni: "UNIGIS Amsterdam and "UNIGIS Alumni & Students Worldwide". The purpose is more to share news within the network and to support each other in career progression. Please request permission to join the linkedin groups.

In addition, follow **UNIGIS Amsterdam on Twitter**, @unigisamsterdam, to stay informed on news and events in UNIGIS Amsterdam and the SPINlab.

Please sign up for our **UNIGIS Amsterdam monthly newsletters** to keep up to date! <http://unigis.us9.list-manage1.com/subscribe?u=bc52d9347dd984b84ca877993&id=fe7b9e2cef>.

1.3. Course fees

For the postgraduate UNIGIS **Certificate** Course (one year - Modules 1 through 4 and Workshops I and II), the fee is **€3,600.-**.

For the postgraduate UNIGIS **Diploma** Course (two years - Modules 1 through 8 and Workshops I, II and III), the fee is:

- €6,200.- for people who have *not* obtained the UNIGIS Certificate yet, and
- €2,600.- for people who have already obtained the UNIGIS Certificate.

The **Master of Science in GIS** programme takes three years and involves the entire Diploma programme plus an additional third year in which you carry out an MSc. research project and you write a thesis. If you want to register for the **Master of Science in GIS**, you must have obtained the UNIGIS Diploma already. The fee is:

- €8,800.- for people who have not obtained the UNIGIS Diploma yet, and
- €2,600.- for people who have already obtained the UNIGIS Diploma.

Premaster programme

In some cases you may need to take additional course to bring you up to entry level. The costs for bringing you up to entry level depend on whether or not you have to follow the *complete* Premaster programme *or only part of it*. The complete Premaster programme, consisting of two 6 ECTS courses, costs €1,000.-. If you only need to take one course, this costs €500.-.

Write-up fee related to maximum length and registration for the UNIGIS course

The table below shows the minimum and maximum length of the PgC, PgD, and MSc courses in years. If the maximum lengths are not met, an additional write-up fee must be paid. The write-up fee is €350.- and will increase with a second and third prolongation: a second write-up fee is €425.-, a third write-up fee is €500.-. After three prolongations, the write-up fee remains at an annual €500.-.

	<i>Norm</i>	<i>Maximum</i>
PgC	1	2
PgD (incl. PgC)	2	3
MSc (incl. PgD)	3	4

To give an example: Suppose you started your PgC-studies on 1-9-2015. You then normally finish your Certificate studies by 31-8-2016, but you may take until 31-8-2017 to complete it without paying a write-up fee. If you have not finished the PgC programme by then, you have to pay the write-up fee.

Fees include payment for:

- Most learning materials (with the exception of additional reading material and some additional software), course notes, selected texts and readings (e-books), computer based learning software, data, help line support, assessment, feedback and certificates;
- ArcGIS Desktop and Professional;
- Student facilities provided by Vrije Universiteit Amsterdam;
- Free access to the ESRI Virtual Campus;
- Discount when buying IDRISI software;
- Free subscription to Geo-Informatics, GIS Magazine with discount;
- Workshops and selected events.

NOT included are: Hardware, Internet connection (preferably broadband), workshop expenses (such as travel and accommodation), and other study-related travel expenses (such as meetings with tutors or other UNIGIS staff at Vrije Universiteit Amsterdam).

1.3.1. Payment & refunds

Premaster

The total fee is paid after confirmation of acceptance, before commencement of the programme.

PgC, PgD and MSc

You can either pay the required fee at once, or in instalments. Information about instalments can be found on the applications forms for the different programmes, see <http://www.unigis.nl/contents/downloads/forms.asp>.

Applicants will receive a bill with the exact information on how to transfer the money. The applicant has the responsibility to ensure the payment(s) is (are) made; this responsibility will remain at all times. Access to modules can be restricted if fees have not been paid. In these cases UNIGIS cannot be held liable for any study delays.

If you are delayed in making the payment(s) due to unexpected events, contact the UNIGIS Amsterdam office a.s.a.p. Please check all details (correct registration and corresponding fee) before making the actual payment.

Refunds

If a student decides to withdraw from the programme, he or she will remain responsible for the fee for the running year of registration. A year runs from February to February or September to September, depending on the intake you are in. No refunds are made for part of a course (PgC, PgD, or MSc).

Additionally, if a student who has enrolled in the Diploma course decides to withdraw from the programme and the student has not yet passed any modules from the Diploma part of the programme (= second year), he or she will at least remain responsible for the entire fee for the Certificate part (= first year).

1.4. Assessment & Rules and Regulations

All formal rules pertaining to teaching and examinations are laid down in the **Classes and Examination Regulations and the Examination Board's Rules and Guidelines**. A short overview of the most important elements is given below.

1.4.1. *Assessment in the UNIGIS course*

Assessment in the PgC and PgD courses takes place primarily through formally assessed assignments and workshop participation. There are no conventional written examinations.

Assessment takes place at the end of each module. To complete a module, official Assignments need to be completed and sent to the UNIGIS Office for assessment by the module tutor. Most assignments involve writing an essay, though other kinds of assignments are also possible. The assignments are often of an 'open' type, which means that the answer is not a matter of yes/no or right/wrong, but requires the presentation of arguments, with the possibility of different correct results. Therefore, the grade is supported by a marking profile, which indicates the strengths and weaknesses of your assignment.

The assignments for the PgC and PgD courses are evaluated by the module tutor and the Programme Director. The module tutor proposes a grade, which can be adjusted by the Programme Director. Both sign the form after evaluating the assignments. Workshops are evaluated by the workshop tutors. Workshops are not graded, but students receive a 'Pass' or 'Fail', based on participation and presentation of results during the workshop. The MSc thesis will be independently assessed by the thesis supervisor and the Programme Coordinator (the latter one in particular for the MSc proposal), who will submit a report to the Programme Director and propose a grade. Together, these three form the Board of Examiners and decide on the final grade of the thesis. Students are also expected to give a presentation on their thesis in front of the examiners (private defence) and others (public defence).

1.4.2. *Module assessment*

In Appendix I you can find the module assessment form. The marking profile explains how the tutors arrive at the grade. To give you an idea about our assessment criteria, some explanation of the elements of the marking profile is given in the appendix as well.

Not all items of the grading scheme are, however, of equal importance. For example, content is more important than form. Also, the meaning and importance of the different items in the marking profile differs somewhat for different types of assignments. For instance, referencing is more important when you write an essay than when you need to produce a map. A single grade is given for all assignments of a module collectively. For this reason, we ask that you submit all the work for one module at one time.

For grading, the Dutch 10 to 1 system is used, where 10 means excellent and 1 means poor. For the final grade, numbers are registered up to one digit behind the comma in the UNIGIS course administration.

You should obtain at least a 5.0 for all exam components, i.e. assignments. **To pass, a 5.5 or higher should be obtained for a module.** It is not necessary to obtain a pass for all items of the marking profile of a module; the final grade determines if you have passed the assignments or not. A cross is placed on the scale line to give an indication of the score on the item in the marking profile. The dotted line indicates the separation between pass and fail.

The assignments aim to test if you have understood the material that has been presented in the module. In general, several types of understanding are tested: 'knowledge' (reproducing course material), 'insight' (linking, associating, and building arguments based on the course material), 'application' (applying the course material to external topics, usually with a fixed answer), and 'thinking' (creative and productive application, often more answers are possible and require argumentation). The term 'course material' includes not only the basic material of the course, but also any relevant reference and further reading appropriate for the topic.

1.4.3. *Link with the ECTS grading scheme*

The European Credit Transfer System is used among others to convert credits and grades between the different national systems of EU member states. The table below gives the conversion for the Dutch system to ECTS. See also:

<http://europa.eu.int/comm/education/socrates/ects.html>

<i>European Credit Transfer System</i>		
Grade according to the Dutch system	ECTS grade	Description
8.1-10.0	A	EXCELLENT - outstanding performance with only minor errors
7.5-8.0	B	VERY GOOD -above the average standard but with some errors
7.0-7.4	C	GOOD -generally sound work with a number of notable errors
6.1-6.9	D	SATISFACTORY- fair but with significant shortcomings
5.5-6.0	E	SUFFICIENT - performance meets the minimum criteria
5.0-5.4	FX	FAIL- some more work required before the credit can be awarded
>5.0	F	FAIL- considerable further work is required

Table 1: ECTS system

1.4.4. *Reassessment*

Students are allowed two resubmissions if they fail a module. At the second resubmission, the max. grade is 6.0. See Article 15.3.d of the Classes and Examination Regulations for more information.

1.4.5. Submitting assignments

Assignments must be submitted via the dedicated Blackboard module "UNIGIS Safe Assignment". Within this module, you will find a folder "Submit Assignments" with the upload links per module. Please also submit a digital copy of your assignments by email to the UNIGIS office, info@unigis.nl.

Please observe the following guidelines when submitting your assignments:

1. Ensure your assignment follows the general *Assignment Requirements* and *Referencing Instructions* applicable to all assignments (included in the "Submit Assignments" folder of the UNIGIS Safe Assignment Blackboard module).
2. Name your file according to this format: Surname_First Name_Module Title_Assignment Number;
3. Submit *all* assignments belonging to the same module at the same time; don't upload/ send them in separately at different time intervals unless specifically instructed to do so in the module's assignment instructions.

1.4.6. Exemptions

The regulations allow students to apply for exemptions for modules (or parts of modules) where they believe they have already covered the material. We can allow credit for prior learning on two grounds:

1. If you have already taken a course which duplicates the material in a module, you are invited to submit the curriculum of the course together with evidence of successful completion. We will then take a decision about whether there is a sufficient comparability between the previous course and the module to allow exemption.
2. If you believe that through your employment you are already entirely familiar with the material contained in a module you might consider asking for exemption on the grounds of prior experience. In these circumstances, we would need to be provided with detailed evidence of the extent and currency of your prior experience so that we can take a judgement about whether an exemption is acceptable.

When you have read through a module and you feel you wish to apply for an exemption, please send a letter or email making your case to the UNIGIS office.

There is a maximum number of credits that can be granted as exemption, see Article 18.4 of the Classes and Examination Regulations. Further, it is not possible to claim more than 10 ECTS in the modules of the PgC and PgD course each (so 2 out of 4 modules in each study year). It is also not possible to obtain an exemption for a Workshop or for Module 1.

1.4.7. *Assessment period*

Assignments will be assessed and returned to students within one month of receipt, provided that the student has submitted the work according to the programme's timetable. This assessment period will be extended to two months in case students submit the module in question after the module deadline as included in the programme's timetable, or when the module is submitted in between 15 June and 31 August, or between 15 December and 1 January. See also Article 15.2 of the Classes and Examination Regulations.

1.4.8. *Other regulations*

Workload and credits

You are expected to complete around 1,680 hours of study for the complete UNIGIS course. For example, to complete the PgD in two years you will need to study approximately 10 to 14 hours per week. Distance learning, however, means that you manage your own time so you can allocate study times to suit yourself. You may find you have a couple of weeks when you can work full time on the course, then several weeks where it is difficult to fit in any work.

The assessment schemes are designed to conform as far as possible to the European Credit Transfer Schemes (ECTS), which universities have in operation. One unit of credit reflects (according to the Dutch Law on Higher Education) approximately 28 hours of learning experience. The overall number of hours required for completion of the course is 1,064 for the Postgraduate Diploma course alone and 1,680 for the entire MSc. programme. The overall length needed to complete the MSc programme is three years. Note, however, that these numbers can vary substantially from student to student.

Study progression

Students and tutors will be expected to maintain regular contacts. In addition to these informal contacts, the UNIGIS office monitors the progress of students and will send reminders should the assessed assignments not have been received after the deadline of the module. Students have, however, also the obligation to inform the UNIGIS office of any delay in their study. If you will not be able to meet the deadlines, you should send a message to the UNIGIS office stating the reason of the delay and the expected date of submission.

Modules and workshops should be studied in the order described in Chapter 2. Students will get access to the next module when the assignments of the current module are received at the UNIGIS office. Some elective modules have prerequisites regarding other modules, see the module description in Section 2.7. Workshop II, for example, requires the completion of modules 1 and 2, while Workshop III requires the completion of the PgC programme and an additional two 5 ECTS modules of the PgD programme.

Interruption of study and delay

In a distance-learning course designed to attract primarily working, mature students, it is likely that some students will find it necessary to temporarily interrupt their studies due to professional or personal circumstances. Accordingly, students will, with the agreement of the Amsterdam UNIGIS Organisation, be allowed to suspend their studies with the limitation that the minimum period of suspension of study will be half a year. It is required to send a written request to the UNIGIS office to apply for suspension. The student will subsequently join the course calendar of a later intake.

Extenuating circumstances – Flexibility in the UNIGIS course

The UNIGIS course offers flexibility in case of extenuating circumstances (illness, family or work-related circumstances, et cetera). In these cases, try to contact the UNIGIS office as early as possible. In consultation with the Programme Director or a representative the effects on the course will be discussed and a solution will be implemented.

Study in excess of the programme

It is not allowed to study more modules or participate in more workshops than required for the PgC or PgD course. If a student wants to do more modules or participate in more workshops, he or she can only do this after approval of the Programme Director and after payment of additional fees.

Language

In principle, the UNIGIS course is an international course taught in English. This means that all study materials are provided in English, that Workshops are held in English, and that the student's work (assignments and thesis) needs to be submitted in English. However, students may decide to submit their work in Dutch and do their thesis in Dutch if they feel more confident in doing so. An exception are the modules taught by foreign tutors, for which the assignments must be submitted in English (tutors announce themselves at the start of a module; if you would like to know if a specific module can be submitted in Dutch please contact the UNIGIS office). Also, workshops will always be fully taught in English if any one of the students or tutors does not speak Dutch.

If a student decides to do his assignments and thesis in Dutch, he must consider the fact that his work will not have international exposure and that international interaction is reduced. Regarding the MSc, some topics can only be chosen if the thesis will be written in English. Note also that a student will not be eligible for qualification 'European Masters in GIS' if the work is carried out in Dutch.

Fraud

See Article 3 of the Examination Board's Rules and Guidelines.

Appeal

If a student does not agree with a decision of the tutor, (s)he can appeal at the Programme Committee.

The first step, however, is for the student to state the complaint to the tutor with the unigis office in cc:. If the tutor and the student cannot come to an agreement, a member of the Programme Board will act as a second supervisor or mediate between the student and the tutor.

If the student is not satisfied with the outcome, (s)he can send an email to the Programme Committee explaining his/her case, unigisPC.feweb@vu.nl. The Programme Committee can then give a (non-binding) advice to the Programme Board whether or not anything should be changed in the programme based upon this case.

Also, if the student is not satisfied with the outcome, the student can contact a student advisor of the Faculty of Economics and Business Administration who can give advice on possibilities of appeal within the legal framework of Vrije Universiteit Amsterdam.

Finally

- Please inform the UNIGIS office in case of a change of your contact information (e-mail, home address, new employer, work address, job function, et cetera);
- For questions relating only to the modules you can contact the module tutors. For all other matters, please contact the UNIGIS office, info@unigis.nl;
- For each student a digital file is kept at the UNIGIS office which holds the registration forms, (copies of) messages, submitted modules, and other information relevant for the course.

The Examination Board grants awards and assesses MSc theses. The Examination Board consists of the following members:

- Prof. dr. Gert-Jan Burgers, Professor in Mediterranean Archaeology, Faculty of Humanities
- Dr. Thomas de Graaf, Assistant Professor, Faculty of Economics and Business Administration
- Dr. Eric Koomen, Associate Professor, Faculty of Economics and Business Administration
- Dr. Niels van Manen (not a member, but secretary), Researcher at the Faculty of Economics and Business Administration and Coordinator of the UNIGIS MSc. in GIS.

Other members will be co-opted into the Examination Board as appropriate.

The Programme Committee consists of:

- Dr. Eveline van Leeuwen, Associate Professor in Spatial Economics
- Maurice de Kleijn is member on behalf of UNIGIS Tutors;
- Two student members, currently being Jonathan Dullemans and Kim Langenberg;
- Dr. Niels van Manen (not a member, but secretary), Researcher at the Faculty of Economics and Business Administration and Coordinator of the UNIGIS MSc. in GIS.

The UNIGIS Programme

The UNIGIS Programme consists of modules, workshops (embedded within the yearly UNIGIS Conference held in the Netherlands) and a thesis (see Figure 2). Altogether, UNIGIS offers seventeen modules and three workshops. Some modules are compulsory (core modules) while others are elective. Two workshops are compulsory as well. Below, the programme structure of the PgC, PgD and MSc phases is described.

1.5. Description of the Programme

Geographical Information Systems are finding increasing application in a broad range of organisations from utilities companies to environmental consultancies. Specialised undergraduate provision is still in its infancy and there are thus a large number of mid-career professionals who are being asked to take on GIS responsibilities but whose backgrounds do not include any GIS experience. For many such professionals, taking a career break in order to obtain a GIS qualification is simply not possible. UNIGIS therefore offers a part-time, distance learning route to postgraduate qualifications in the GIS field suitable for those using GIS in the workplace. The UNIGIS course is designed to provide a deeper and more balanced education in GIS than would be provided by vendor training in GIS software.

The UNIGIS Postgraduate Certificate course (PgC), Postgraduate Diploma (PgD) course and Master of Science programme (MSc) together form a distance learning study programme, which is aimed at middle to senior management, project managers and information technology personnel, though other suitably qualified candidates may be considered. As such, it focuses on the practical knowledge and skills required designing and implementing GIS in real situations from a scientific point-of-view. It covers the necessary theoretical and technical material for all major aspects of the GIS design process. The course is intended to create professionals who understand the breadth of technical issues involved in the design of GIS, who can use their knowledge creatively and who can control the design and implementation of GIS in an organisation. The PgC, PgD and Master of Science (MSc) programmes aim to provide students with an understanding of the technical, geographical and organisational aspects of GIS. In doing so it provides hands-on experience. The need for this academic programme is reflected in the high demand and mobility of individuals with GIS skills, and the rapidly expanding nature of GIS as a professional skill.

The part-time Master of Science programme takes about three years to complete and consists of three stages: a Certificate, then a Diploma, followed by a thesis for a Master of Science title. The Certificate takes one year to complete. The Postgraduate Diploma will take in total two years to complete and is designed to provide students with both an academic and practical appreciation of GIS technology. The emphasis throughout the programme is on the design of GIS strategy. Students are encouraged to link theory and skills training with experience from their own work environment.

Students who complete the Postgraduate Diploma course and have the adequate academic background will be able to continue with the Master of Science part of the programme. The Master of Science will be awarded after the successful completion of an individual research thesis. This part of the programme takes one year to complete.

The study materials are delivered through the Internet and evaluation takes place by assignments and not by exams. Communication between students and tutors mainly takes place using email and interactive websites. However, we recognise that face-to-face contact is also needed for a successful course. Therefore, workshops and seminars will be organised, and

MSc. in Geographical Information Science Programme

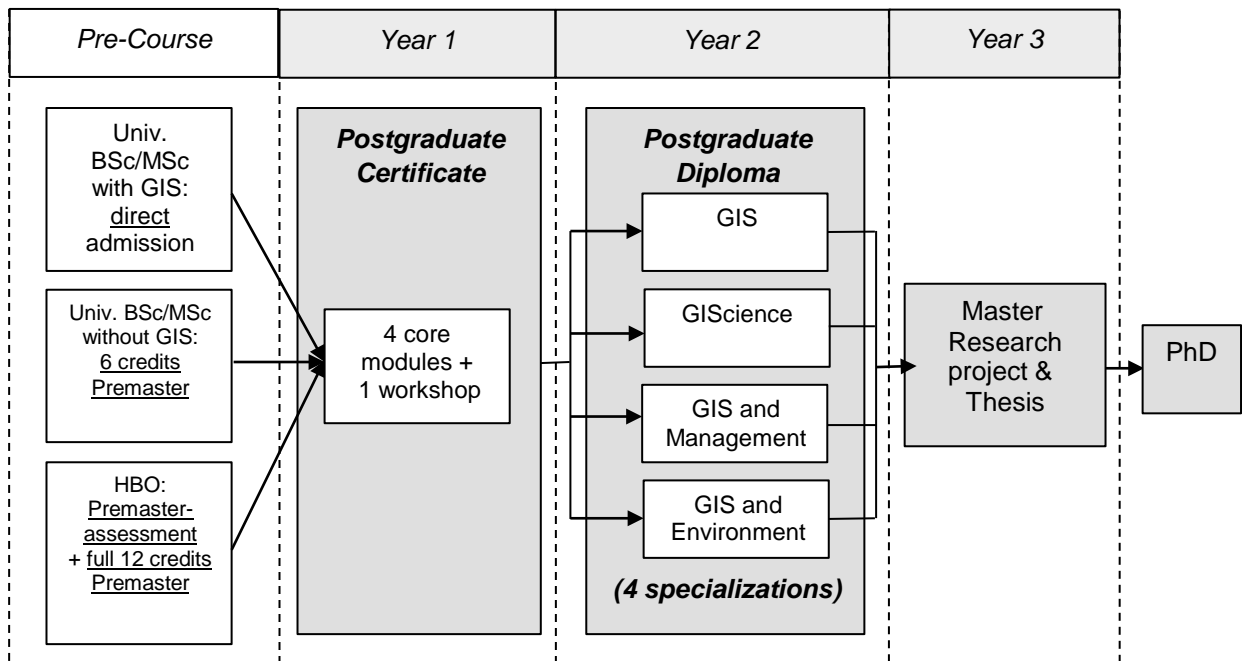


Figure 1: Structure of the UNIGIS curriculum

it is always possible to make an appointment for a personal interview or a chat with tutors at the UNIGIS office at Vrije Universiteit Amsterdam.

Figure 1 visualizes the structure of the part-time curriculum in more detail. The PgC course in year 1 consists of four compulsory modules and one compulsory workshop. The PgD course in year 2 is a one-year continuation of the PgC course. It again consists of four additional modules and one additional workshop. So, to obtain the PgD a total of eight modules (four PgC + four PgD) and two workshops (one PgC + one PgD) should be completed in two years.

During the second year, the student specialises in a certain area (or 'pathway'), which allows a choice of elective units so that an individual programme of study can be designed. Four pathways are available to students (a more elaborate description of the pathways can be found in Section 2.3.2):

1. GIS
2. GIScience
3. GIS and Management
4. GIS and Environment

The aims of the PgC and PgD courses are to develop within students:

1. a knowledge of the technical aspects of GIS detailed enough to allow them to follow the significance of technical debates and to interact confidently with software vendors, technical experts and clients;
2. a thorough understanding of the Geographical aspects of GIS by introducing the topics of spatial reasoning, spatial analysis and spatial presentation;
3. an appreciation of the organizational contexts within which GIS are used sufficient to enable them to enhance the information handling capabilities of their organisation.

These aims will be achieved by enabling and encouraging students to:

- identify the linkages between core technology, data, methods and organisations in the use of GIS;
- develop competence in data representation and the use of spatial analysis techniques;
- gain experience in the design, implementation and analysis of databases;

- communicate analyses effectively and coherently in writing;
- apply the knowledge and understanding acquired within organisational contexts.

With a PgD it is possible to enrol for the MSc part of the programme (if the other admission requirements are also met). The additional aims and objectives of the MSc part are:

4. develop the ability to critically evaluate relevant research to a higher level;
5. extend problem solving skills in the GIS area by reference to current literature;
6. provide, by means of a thesis, a vehicle to enable the student to develop and demonstrate practical and theoretical expertise in an appropriate field.

The PgC, PgD and MSc are designed to be free standing, but complementary, courses presented to professional standards. They will satisfy the requirements of a wide range of employers for the training and development of information technology personnel and middle management. They will satisfy also the needs of individuals for professional development to increase job mobility and to enhance career prospects.

The materials have been adopted by the international UNIGIS network of universities as the core materials in their programme for advanced GIS education.

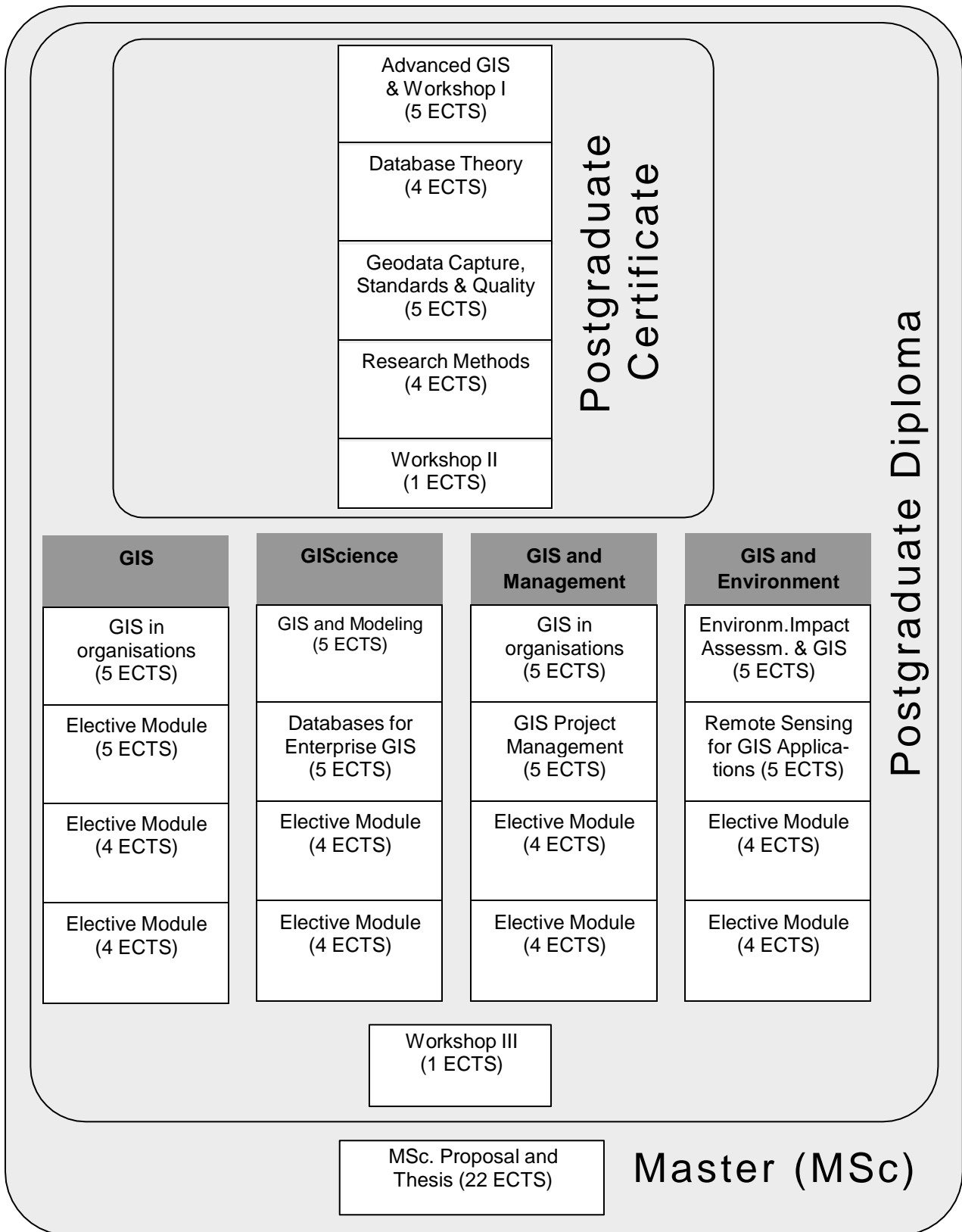


Figure 2: Modules and Workshops in the UNIGIS course.

1.6. Structure of the Programme

1.6.1. *The Postgraduate Certificate Course*

The PgC course is made up of four compulsory modules and two workshops. The first introductory workshop is part of the first module and serves as an introduction to GIS and the UNIGIS Programme. The workshop includes a session on course organisation and objectives, and is designed to create the tight control necessary for distance learning. It may include initial training for the course software, but above all it provides an opportunity for getting to know staff and fellow students. Although the workshop is not compulsory, the Programme Board strongly recommends attendance. The second workshop, which is compulsory, will be held at the end of the PgC course and is for consolidation and application of the course material, for hands-on experience, and for personal contact. You will attend this workshop during the Annual UNIGIS Conference in Amsterdam.

Modules are progressive and, although self-contained in terms of academic content, will use material developed in earlier parts of the course. The course progresses from module to module in numbered sequence.

Awarding of the PgC

Although the majority of students will wish to pursue their studies at least to the Diploma level, some students may decide to terminate their studies at an earlier stage. Students who successfully complete four Modules and Workshop II will be eligible for the award of Postgraduate Certificate in GIS. The Postgraduate Certificate is awarded by the Examination Board.

1.6.2. *The Postgraduate Diploma Course*

To obtain the award for the PgD course, a student must study eight modules and successfully complete workshops I and II. When entering the PgD course, a student needs to select one of the four pathways. Each pathway contains a number of core (compulsory) modules and one or more elective modules. UNIGIS Amsterdam offers the following four pathways:

Pathway 1: Geographical Information Systems

Philosophy: This course is aimed at team leaders/managers with a need for general GIS training or specialists who require a broad coverage of the field. It is a broadly based postgraduate qualification in the field of GIS which focuses on the principles of design in relation to systems, human computer interfaces and applications. There is a strong emphasis on the linkage between technology, data organisation and methods. It will support career development or career change. By providing a broad coverage of GIS field, it will support professionals seeking to extend and consolidate more focussed knowledge.

Aims:

- a) provide a broadly based postgraduate qualification in the field of GIS for professionals;
- b) cover the whole field of GIS;
- c) emphasise the linkage between technology, data, organisations and methods;
- d) focus on the principles of analysis and design at systems level, human computer interface level and applications level;
- e) provide experience of the use of software products of different types including setting up, data entry, functionality and applications.

Structure: In addition to the PgC, the student needs to complete one core module, three elective modules and workshop III. The compulsory core module is Module GIS in Organisations. The other three modules can be selected from the available optional module list below.

Pathway 2: Geographical Information Science

Philosophy: This course is aimed at people who want to develop careers in the technical and scientific areas of GIS or applications developers who want to specialise in GIS. Emphasis is placed upon design and organisational issues in the context of applications development. Experience in the use of software products and of applications development forms an important part of the course.

Aims:

- a) provide a consolidated view of the linkage between technology, data, methods and organisations in GIS;
- b) focus on computing methods and computing algorithms;
- c) focus on databases and architecture of GIS systems;
- d) provide experience in the use of different software products and of applications development;
- e) emphasise applications development in the contexts of design and organisational issues.

Structure: In addition to the PgC, the student needs to complete two compulsory modules, two elective modules, and workshop III. The compulsory modules are:

- Module GIS and Modelling
- Module Database for Enterprise GIS

The third and fourth modules are electives.

Pathway 3: Geographical Information Systems and Management

Philosophy: This course is aimed at established managers who have new or extended responsibility for GIS projects or at those seeking career development into more managerial roles and who need to develop knowledge and skills of management in a GIS context.

Aims:

- a) provide a consolidated view of the linkage between technology, data, methods and organisations;
- b) focus on GIS in organisations;
- c) cover analysis and design methods with an emphasis on management.
- e) emphasise applications development in the contexts of design and organisational issues.

Structure: In addition to the PgC, the students need to complete two compulsory modules, two elective modules, and workshop III. The compulsory modules are:

- Module GIS in Organisations
- Module GIS Project Management

The elective modules can be selected from the list below.

Pathway 4: Geographical Information Systems and Environment

Philosophy: This course is aimed at specialists in the area of environmental applications or project management who wish to enter the GIS field or GIS developers and managers who wish to enter the environment field

Aims:

- a) provide a consolidated view of the linkage between technology, data, methods and organisations;
- b) cover the technical and systems background for developing environmental applications;
- c) focus on the procedural and methodological requirements for environmental analysis;
- d) emphasise environmental applications and the theory and methods of environmental modelling;
- e) provide experience in the use of different software products and of applications development.

Structure: In addition to the PgC, the students need to complete two compulsory modules, two elective modules, and workshop III. The compulsory modules are:

- Module Environmental Impact Assessment & GIS
- Module Remote Sensing for GIS Applications

The elective modules can be selected from the list below.

The list below gives an overview of all modules and workshops in the UNIGIS programme. A description of each module and workshop from the PgC and PgD programme can be found in Section 2.7. The Summer and Winter Schools are organised by UNIGIS International and may not be given each year. In some cases, a Summer School or a Winter School may be taken as an elective module. This usually requires following the workshop and doing some additional assignments. Details are announced at the UNIGIS website in due course.

<i>Code</i>	<i>Elective modules</i>	<i>Credits</i>
P2-EM5/Sy1Mt1	GIS in Organisations	5 ECTS
P2-EM5/Sc1	GIS and Modelling	5 ECTS
P2-EM5/Sc2	Databases for Enterprise GIS	5 ECTS
P2-EM5/Mt2	GIS Project Management	5 ECTS
P2-EM5/En1	Environmental Impact Assessment & GIS	5 ECTS
P2-EM5/En2	Remote Sensing for GIS Applications	5 ECTS
P2-EM51	Programming in GIS (available through UNIGIS Salzburg)	5 ECTS
P2-EM5EU	European Aspects of GIS	5 ECTS
P2-EM44	Visualisation for GIS	4 ECTS
P2-EM45	Internet GIS	4 ECTS

Table 2: List of optional modules (ex. Article 9 Classes and Examination Regulations)

Award of the PgD

The PgD will be awarded if the student has passed eight modules with a sufficient grade and if he or she has successfully passed workshops II and III.

1.6.3. The Master of Science Course

When you have decided that you would like to continue in the Unigis programme to complete an MSc, contact our administration to make an appointment to discuss your plans with the Programme Coordinator. Perhaps you already have a research topic in mind, perhaps you have several possibilities, or maybe you are in need of some inspiration, but you need to talk about your future topic and what the MSc entails. You must also be sure that you qualify to start on the MSc programme.

The MSc is thus seen as a continuation of the PgD course, which permits good students to pursue a research topic of their choosing. The student in conjunction with the Programme Board will select the research topic. The student will conduct her/his research independently; with distance coaching from the supervisors when needed. The resulting thesis will subsequently be submitted for assessment. The Programme Board will encourage students to begin to prepare thesis proposals during the later stages of their PgD.

Planning and Duration

Formal registration for the MSc will normally take place once a year, although students who wish to do so will be encouraged to begin to work on their theses immediately after their PgD results are published. At an early stage, students will be required to submit MSc Proposal following the UNGIIS MSc template instructions. This proposal will be assessed by either the Programme Coordinator or the appointed thesis supervisor and will account for 10% of the MSc mark. If a sufficient number of students are starting with their thesis simultaneously, the proposals are discussed during an MSc workshop at Vrije Universiteit Amsterdam. The proposal will provide a clear basis for the remainder of the MSc project and should include: a summary of the main purposes of the thesis; chapter structures; draft introductory chapters; an assessment of data sources; draft questionnaires; annotated bibliographies; program specifications; and action plans. The UNIGIS office will place a copy of each student's project

outline, and the supervisors' comments, on file for later inspection.

The normal period in which a student will be allowed to complete a thesis will be one year. Students will therefore be able to complete their MSc studies in three years (two years for the PgD plus one for the thesis). It is expected that most students will progress immediately to the MSc upon completion of their PgD. Students who receive their PgD will be permitted to register as MSc students provided they do so within four years of the date of their initial PgD registration. Students who elect to study for an MSc but who do not complete within the registration period will retain their entitlement for a PgD award. The Examination Board will have the right to extend the registration periods of students where it believes this to be appropriate. Except where the Examination Board deems an extension to be appropriate, the maximum period of registration for the MSc will be five years from the date of initial registration.

Student Workload Requirements

According to the Dutch Law on Higher Education, an MSc degree is expected to be a minimum of 60 credits (ECTS) of 28 hours, which equates 1680 hours of study, though normally it is about 1800 hours or 65 credits. Students will already have accumulated 38 credits from their PgD studies and will be expected to devote a minimum of 616 hours or 22 credits to producing their MSc theses.

Topics

Dissertation topics will be drawn from within the broad area of GIS research. The Programme Board will advise students about the acceptability of topics and will help them to develop thesis proposals. Students will be allowed, indeed, encouraged to develop MSc theses from work based projects. Where this is the case, however, the Programme Board will need to be persuaded that the additional work which the student proposes is of appropriate academic level to merit the award of an MSc. Staff will give advice about the conversion and extension of work-based materials into MSc theses. Material that has previously been submitted for an academic award will not be accepted. Students will be required to provide evidence that they have access to appropriate resources.

Length

Dissertations will not normally exceed 20,000 words in length. Where a thesis contains a substantial technical element, such as the development of a computer application, theses substantially shorter than 20,000 will be accepted.

Supervision

Each student will be allocated one supervisor. The supervisor will be allocated on the basis of topic supervision. Supervisors who do not teach on the UNIGIS course may be appointed to supervise MSc topics where appropriate. Supervision will be primarily by distance methods, although students will be encouraged to make visits to Vrije Universiteit Amsterdam and, if needed, to make use of the facilities of the SPINlab. The Programme coordinator oversees the MSc programme and organises the MSc Workshop.

Dissertation Assessment

The first step in the dissertation assessment is the independent assessment of two supervisors: the thesis supervisor and a second Unigis tutor. After they agree that the thesis is of sufficient quality, they will each report their findings and propose a grade. The two reports will be submitted to the Programme Director. He will assess the thesis and, together with the two supervisors, determine the grade.

The student is required to defend his/her thesis before an audience (public defence) and before the Board of Examiners (private defence). Theses will be assessed on the following criteria (in random order):

- Critical evaluation of ideas and appreciation of the field of study
- Practical technique and approach
- Discussion of results
- Oral presentation

More information on the MSc course can be found in the MSc handbook, available in the Library-section of the UNIGIS Amsterdam website.

Award of the MSc

For more information about specific award classifications that may be granted to the degree, see Article 9 of the Examination Board's Rules and Guidelines.

1.7. European MSc in GIS Programme

1.7.1. General

This 'EuroMaster' is not a degree in its own right, but requires graduation in a GIS Programme at Master level from a participating university, one of which is Vrije Universiteit Amsterdam. So, if you successfully complete our MSc in GIS programme, either part-time or full-time, you may also be eligible for the European Master's degree in GIS (EMGISc), but you have to fulfil certain requirements along the way. This section explains more about the how and what of the EuroMaster and how to qualify for this special MSc degree.

1.7.2. Genesis of the EMGISc Programme

UNIGIS is also active in the European Masters programme. This European joint curriculum at advanced level for GIScience is focused on the objective of one standardized, pan-European post-graduate qualification for professionals active in the field of Geographic Information. Beyond that, EuroMasterGI alumni will be specifically competent in dealing with the European dimension of Geographical Information: this extends to European organisations, data sets, standards and issues as well as trans-national and multi-lingual projects.

EuroMasterGI brings academic institutions from many European countries together in offering a unified curriculum and a strong international perspective on GI. Based on institutions' degree programmes the European Master offers a specifically international add-on qualification recognising students' efforts for a wider European perspective.

Alumni will be proficient in up-to-date Geographical Information Processing / Geographical Information Science as well as in a full range of Europe-wide issues, therefore being highly qualified for leading and active roles in agencies, enterprises and academia dealing with spatial view and any kind of spatial information.

More information can be found at www.euromastergi.org.

1.7.3. Examination Components EMGISc Programme

As a student of UNIGIS Amsterdam, your qualification will be designated as conforming to the "European Masters in GIScience" specifications if the following requirements are met:

1. You have completed the UNIGIS Amsterdam postgraduate Diploma programme
2. Compulsory curriculum topics are covered (this is provided by the UNIGIS course)
3. The master's thesis is written in English language
4. The module European Aspects of GIS (5 ECTS) has been successfully completed

5. An international learning experience (e.g. Summer School) with a minimum of 4 ECTS has been successfully completed (only non-virtual courses, eLearning does not qualify)

For some of the above requirements the board has agreed to grant exceptions if students submit well-argued applications through their institution. Exceptions require that the general EMGISc objectives are met. For more information on the European Masters in GI Science see <http://www.euromastergi.org>.

1.8. Teaching

The UNIGIS curriculum is a distance learning course. This means very few contact hours with actual teaching are given during the course. The workshops, the UNIGIS Conference, some elective workshops and the summer-and winter schools are par excellence moments at which student can meet the tutors and at which actual lectures are given.

In order to support the distance learning student in his/her study activities, the digital learning environment Blackboard is used and staff is equipped with webcams and microphones to support virtual contact (one-on-one and group). Also, one or more MSc seminars will be organized when needed. Furthermore, a description of the study load and planning and a timetable for the whole curriculum is included below.

1.8.1. *MSc Seminar*

If we have a group of students starting on the MSc programme at around the same time, we shall try to organize an MSc Seminar. This will bring students and some staff together, and each student will make a short presentation of the research work he/she plans to undertake. On the staff side, we shall explain as much as possible about the MSc programme and we shall try to draw attention to the important issues involved in doing research and writing a dissertation. Questions and discussions will be encouraged, so that everyone should go home with a clearer idea of what is involved, and how different people are tackling their own project. Within the Blackboard environment there is a protected area for part-time MSc students, where each student links his/her own web page with information about his/her own research project and how it is progressing.

1.8.2. *Study load and planning*

The UNIGIS part-time distance learning course (PgC, PgD, and MSc) totals 1,680 hours of study: The first two years require 1,064 hours (38 ECTS) while the MSc requires approximately 616 hours (22 ECTS). The PgC & PgD course will run for two years beginning February and September each year. The course calendar provides module dispatch and assessment completion dates (see timetable below). This calendar allows some flexibility, which is required for a distance-learning course that is designed for postgraduate, working students, though it also retains the necessary degree of control to ensure efficient course management. Modules each take two or two-and-a-half months to complete depending whether they are worth 4 or 5 ECTS. Upon delivery of the tutor-assessed assignments the student will get access to the next module through the personalised study centre on the Internet.

Although it is strongly advised to follow the course schedule, it is possible to have some flexibility in the schedule. This flexibility must be agreed between the student and the supervisor. Late submission of assignments can be allowed if external circumstances, such as pressures of work or personal life, mean that the strict assignment deadlines cannot be met. It is also possible to agree on a 'faster' schedule if the student has more time to spend on the study. The timetable below gives the deadlines at which all assignments of a module have to be submitted. Students will only be allowed to carry assignments across a deadline with specific permission of the Amsterdam UNIGIS Organisation. Workshop dates are fixed, so please include them in your year planning.

The timetable supposes that you study 14 hours per week during the academic year (which is 10 months long). Distance learning means, however, that you manage your own time so you can allocate study times to suit yourself, depending on your workload and other activities, as long as you comply with the deadlines.

The MSc part of the programme covers one year. The student and the tutor will make a planning at the beginning of the programme. More information is provided in the MSc Study Guide (Study Guide part III) and optionally an MSc information session.

1.9. Examination Components part-time Programme

Please note that the ASSESSMENT CRITERIA FOR UNIT/ELEMENTS OF ASSESSMENT in the module descriptions below may change throughout a study year since module tutors regularly update the assignments. Therefore, always be sure to check the online module to see what the current assessment criteria or elements of assessment are for a specific module.

1.9.1. Postgraduate Certificate (PgC)

UNIT CODE NUMBER AND TITLE	P1-01 Advanced GI Science and Systems		
HOME PROGRAMME	PgC/PgD/MSc by Distance Learning GIS Network		
HOME DEPARTMENT	Spatial Information Laboratory (SPINlab), Department of Spatial Economics, Faculty of Economics and Business Administration, VU		
UNIT LEADER(S)	Niels van Manen (Assignment 1), Eduardo Dias (Assignment 2)		
CREDIT VALUE (ECTS)	5	STUDENT EFFORT (HOURS)	140
UNIT STATUS	MANDATORY CORE: PgC/PgD/MSc GIS; PgD/MSc GIS and Management; PgD/MSc GIS and Environment; PgD/MSc GIScience.		
PRE-REQUISITES	None		
UNIT LEARNING OUTCOMES			
<p>On completion of this unit students should be able to:</p> <ul style="list-style-type: none"> analyse how GIS technology has transformed from an automated map making technology in the 1960s to a ubiquitous, highly significant spatial decision making tool in the 21st century evaluate the different components of GIS/GIScience and their linkages, and develop critiques of the different approaches to contemporary GIS and GIScience analyse how spatial data models are used in the representation of geographical phenomena and evaluate the appropriateness of such models in particular applications explain the purpose, techniques and algorithms of basic spatial operations used in GIS and evaluate the constraints placed on their use by particular data types and models use GIS software effectively and be able to implement appropriate analysis procedures for any given application 			
CURRICULUM OUTLINE			
<p>This unit aims to provide students with a deep understanding of the concepts and principles of GIS and be able to effectively employ GIS techniques in a real world context.</p> <p>GIS as a field of study - History and continuing evolution of concepts, issues and technologies in GIS. The components of GIS: Technology, Data, method, organisation and bodies of knowledge.</p> <p>Spatial data modelling - Spatial entities and geographical representation, ontology and semantic modelling, raster and vector encoding, object-oriented modelling, multi-dimensionality and representation in GIS.</p> <p>Spatial operations - Single and multiple layer operations and their algorithms, spatial interpolation and generation of continuous surfaces, applications and methods of network analysis, cartographic modelling.</p> <p>Practical experience with GIS - Introduction to desktop GIS software ArcGIS, or open-source alternative of the student's choice, using problem based learning. Raster and vector application exercises. Implementation of different spatial operations and analytical procedures.</p>			

TEACHING AND LEARNING STRATEGIES

The learning and teaching strategies are student centred. They aim to encourage a deep-learning approach by using reflection and self-evaluation. A written Directed Reader will be provided on-line, which will provide the essential background, the framework for study and essential detail. It will include self-assessment exercises. Each section of this Reader will be framed with a context setting introduction, clearly identified learning outcomes and additional reading within the academic and professional literature. Students will be required to reflect on their learning as part of the self-assessment exercises and the summative assignments.

Opportunities for students to discuss issues with staff and fellow students will be provided via an online discussion form.

Next to the Directed Reader, students will meet online with their tutor to discuss some module components and to monitor the progress on the individual assignments.

ASSESSMENT STRATEGIES

Assessment is by coursework. There will be two assignments of equal weighting, the first assesses their defining of the field GIS by essay and the second assess the use of GIS by practical exercises.

ASSESSMENT CRITERIA FOR UNIT/ELEMENTS OF ASSESSMENT

Assessment 1 – Essay (50%) (2,000 words)

The essay will concern a fundamental issue in the field of GIS related to its development, use and components. This assignment will allow students to demonstrate learning outcomes related to topic knowledge and the use of skills such as literature searching, development of a coherent argument, academic writing, and citation/referencing.

Assessment 2 – Practical GIS assignment (50%)

A software exercise concerning spatial modelling and spatial operations. The exercise will test software competency, and will be accompanied by critical commentary which will demonstrate learning outcomes related to spatial modelling and operations in addition to report writing skills.

INDICATIVE STUDENT LEARNING RESOURCES

The primary resource will be the Directed Reader supplemented by a mixture of academic journal and professional references.

See the online module for more information on the recommended reading material.

ADDITIONAL NOTES
AND COMMENTS

UNIT CODE NUMBER AND TITLE	P1-02 Database Theory		
HOME PROGRAMME	PgC/PgD/MSc by Distance Learning GIS Network		
HOME DEPARTMENT	Department of Informatics, University of Huddersfield		
UNIT LEADER(S)	Simeon Nedkov		
CREDIT VALUE (ECTS)	4	STUDENT EFFORT (HOURS)	112
UNIT STATUS	MANDATORY CORE: PgC/PgD/MSc GIS; PgD/MSc GIS and Management; PgD/MSc GIS and Environment; PgD/MSc GI Science.		
PRE-REQUISITES	None		
UNIT LEARNING OUTCOMES			
<p>On completion of this unit, students should be able to:</p> <ul style="list-style-type: none"> design well-formed database models, using appropriate design techniques, and be able to implement such designs using relational database software; use SQL to establish and interrogate databases; critically assess the limitations of conventional database structures as a means of storing spatial data; critically assess current advances in database design for geographical applications. 			
CURRICULUM OUTLINE			
<p>This unit aims to provide students with the practical skills to design, implement and interrogate relational databases together with the requisite knowledge to critically assess both current database models and developments of those models for geospatial data.</p> <p>The Database Approach - What is an information system? What is a database? Why are they necessary – generally and specifically for GIS? Database models; Reference architectures; Attribute data and spatial data.</p> <p>The Relational Model - Origins of the Relational model; Requirements of the Relational Model; Normalisation; EAR modelling; EAR/UML modelling(introduction only); SLQ-99.</p> <p>Implementing a database - Designing and implementing a database; tutorial exercises.</p> <p>GIS and DBMS – current issues: A typology of GIS database architectures; limitations of the relational model for spatial data; the impact of OODBMS and ORDBMS; Universal servers; impact of web/web services; XML/GML. The ambition here is to provide a ‘management’ overview of current technology developments.</p>			
TEACHING AND LEARNING STRATEGIES			
<p>The learning and teaching strategies are student centred. They aim to encourage a deep-learning approach by using reflection and self-evaluation. A written Directed Reader will be provided on-line, which will provide the essential background, the framework for study and essential detail. It will include self-assessment exercises. Each section of this Reader will be framed with a context setting introduction, clearly identified learning outcomes and additional reading within the academic and professional literature. Students will be required to reflect on their learning as part of the self-assessment exercises and the summative assignments. Opportunities for students to discuss issues with staff and fellow students will be provided via an online bulletin board.</p> <p>Finally, the course tutor will give one or more online lectures to explain the course material in more detail and to offer students the opportunity to ask questions and to discuss the material with each other.</p>			

ASSESSMENT STRATEGIES

Assessment is by coursework. There will be two assignments of equal weighting, the first assesses practical skills in designing and implementing a database and the second assesses the student's critique of limitations/current advances in database technologies.

ASSESSMENT CRITERIA FOR UNIT/ELEMENTS OF ASSESSMENT

Assessment 1 Design and implementation of a database (50%) (n/a words)

Students will be required to design, implement and document a database using an appropriate database package. This assignment tests the relation of the theory of database design – relational model, normal form, integrity constraints, EAR modelling, etc.; to the practice of database implementation. Students will be required not only to implement an efficient database but also to evaluate in their reports how they arrived at their designs.

Assessment 2 Paper (50%) (3000 words)

Students will be required to write a paper examining aspects of the (in)adequacy of conventional databases to store and retrieve spatial data efficiently. This assignment will differ from year to year but the purpose will always be to require the student to reflect upon what they have learnt about conventional databases and to consider what additional facilities might be needed to accommodate spatial data successfully.

INDICATIVE STUDENT LEARNING RESOURCES

The primary resource will be the Directed Reader supplemented by a mixture of academic journal and professional references.

See the online module for more information on the primary and recommended reading material.

ADDITIONAL NOTES
AND COMMENTS

A survey of current developments will be provided, so that students on all pathways will have an overview of emerging spatial database issues. Those students who wish to explore in greater technical depth may take the 'Databases for Enterprise GIS' unit.

UNIT CODE NUMBER AND TITLE	P1-03 Geodata Capture, Standards and Quality		
HOME PROGRAMME	PgC/PgD/MSc by Distance Learning GIS Network		
HOME DEPARTMENT	School of Environment and Life Sciences, University of Salford		
UNIT LEADER(S)	Jasper Dekkers		
CREDIT VALUE (ECTS)	5	STUDENT EFFORT (HOURS)	140
UNIT STATUS	MANDATORY CORE: PgC/PgD/MSc GIS; PgD/MSc GIS and Management; PgD/MSc GIS and Environment; PgD/MSc GI Science.		
PRE-REQUISITES	None		
LEARNING OUTCOMES			
<p>On successful completion of this unit students will be able to have attained or demonstrated:</p> <ol style="list-style-type: none"> 1. a knowledge and understanding of the key characteristics of different types of spatial data, 2. the ability to assess the impact of national and international data infrastructures and standards on the sourcing and availability of spatial data, 3. the practical skills to design and implement an informed strategy for capturing or sourcing spatial data and associated metadata, 4. the ability critically evaluate the potential impacts of errors on spatial data quality, 5. the knowledge to specify fitness for purpose criteria and apply them to the critical evaluation of spatial data for specific applications. 			
CURRICULUM OUTLINE			
<p>This unit aims to provide students with the requisite knowledge and practical skills to source and evaluate, against recognised quality standards, data for use in Geographical Information-based projects and assess the quality of information output from those projects.</p> <p>Sourcing spatial data – focussing on how to identify sources of spatial data using discovery metadata, how to capture spatial data into a GIS and how to design a data capture strategy</p> <p>Data standards – identify the range of national and international data standards, introduce case studies on specific standards, assessment the impact standards have on the development of Spatial Data Frameworks at national and international levels.</p> <p>Data quality - define the different measures of data quality and how they might be assessed, introduce the concepts of spatial uncertainty, identify the sources of error in spatial data and how they might propagate when data is combined, and consider the impact of data quality on spatial analysis.</p> <p>Evaluating fitness for purpose – the process by which the suitability of data for a specific application can be determined, the management of data quality within an organisation.</p>			
TEACHING AND LEARNING STRATEGIES			
<p>The learning and teaching strategies are student centred. They aim to encourage a deep-learning approach by using reflection and self-evaluation. A written Directed Reader will be provided on-line, which will provide the essential background, the framework for study and essential detail. It will include self-assessment exercises. Each section of this Reader will be framed with a context setting introduction, clearly identified learning outcomes and additional reading within the academic and professional literature. Students will be required to reflect on their learning as part of the self-assessment exercises and the summative assignments. Opportunities for students to discuss issues with staff and fellow students will be provided via an online bulletin board.</p>			

ASSESSMENT STRATEGIES

Assessment is by coursework. There will be two assignments of equal weighting, the first assesses the student's evaluation of data strategies and the implications of data standards; the second assesses their evaluation of data quality for a particular application.

ASSESSMENT CRITERIA FOR UNIT/ELEMENTS OF ASSESSMENT

Assessment 1 Data sourcing analysis (50%) (3000 words)

Students will identify and evaluate issues relating to the sourcing of spatial data and in particular the impact of data standards and spatial data infrastructure initiatives.

Assessment 2 Data quality evaluation (50%) (3000 words)

Students will evaluate the quality of data being used for a particular application. This evaluation will involve an assessment of the requirements of the project and the identification of relevant data quality issues.

INDICATIVE STUDENT LEARNING RESOURCES

The primary resource will be the Directed Reader supplemented by a mixture of academic journal and professional references.

See the online module for more information on the primary and recommended reading material.

ADDITIONAL NOTES
AND COMMENTS

The unit will make extensive use of internet resources, reflecting the very rapid changes in the subject.

UNIT CODE NUMBER AND TITLE	P1-04 Research Methods		
HOME PROGRAMME	PgC/PgD/MSc by Distance Learning GIS Network		
HOME DEPARTMENT	Department of Environmental and Geographical Sciences, MMU		
UNIT LEADER(S)	Niels van Manen		
CREDIT VALUE (ECTS)	4	STUDENT EFFORT (HOURS)	112
UNIT STATUS	MANDATORY CORE: PgD/MSc GIS; PgD/MSc GIS and Management; PgD/MSc GIS and Environment; PgD/MSc GI Science.		
PRE-REQUISITES	None		
UNIT LEARNING OUTCOMES			
<p>On completion of this unit, students will be able to:</p> <ul style="list-style-type: none"> • assess the way in which issues relevant to GIS are researched and the results presented to the community; • discuss, critically, the range and appropriateness of research methods in GIS and the strengths and weaknesses of the data that they generate; • interpret data critically; • apply an integrating approach, including ethical and professional practice considerations, to designing a GIS based research project. 			
CURRICULUM OUTLINE			
<p>This unit aims to develop critical awareness of research design, data interpretation and presentation. It aims to achieve this through an understanding of the research methods of the natural and social sciences and the interactions between them in GIS applications.</p> <p>Research Design: problem statement, purposes and benefits. Theory, assumptions, validity and background literature. Variables and hypotheses. Data collection including ethical and professional practice considerations. Reporting results and outcomes: conclusions, interpretations and recommendation.</p> <p>Qualitative and Quantitative Techniques: Qualitative research, sampling, surveys, questionnaires, other methods, ethical issues. Critical appreciation of quantitative techniques such as univariate data analysis / statistics, bivariate statistics, tests for significance, correlation and regression. Data interpretation: natural / physical science data, social science data, secondary data, trend analysis, data mining, data quality and metadata.</p>			
TEACHING AND LEARNING STRATEGIES			
<p>The learning and teaching strategies are student centred. They aim to encourage a deep-learning approach by using reflection and self-evaluation. A written Directed Reader will be provided on-line, which will provide the essential background, the framework for study and essential detail. It will include self-assessment exercises. Each section of this Reader will be framed with a context setting introduction, clearly identified learning outcomes and additional reading within the academic and professional literature. Students will be required to reflect on their learning as part of the self-assessment exercises and the summative assignments. Opportunities for students to discuss issues with staff and fellow students will be provided via an online bulletin board.</p>			

ASSESSMENT STRATEGIES

Assessment is by coursework. There will be two assignments of equal weighting, the precise content may vary year by year but will typically include one based upon research design and a second based upon quantitative or qualitative methods of data interpretation and analysis.

ASSESSMENT CRITERIA FOR UNIT/ELEMENTS OF ASSESSMENT

Assessment 1 Research Design (50% (1500 words))

Students will be assessed on their critical appraisal of a research design at postgraduate level.

Assessment 2 Data interpretation and Analysis (50%) (n/a words)

This will be case study based and students will be assessed on their critical evaluation of either a qualitative or quantitative data analysis/ interpretation study.

INDICATIVE STUDENT LEARNING RESOURCES

The primary resource will be the Directed Reader supplemented by a mixture of academic journal and professional references.

See the online module for more information on the primary and recommended reading material.

ADDITIONAL NOTES
AND COMMENTS

UNIT CODE NUMBER AND TITLE	P1-W2 Workshop II: Spatial Analysis			
TUTOR	Niels van Manen, Eduardo Dias			
CONTRIBUTING DEPARTMENT	SPINlab Vrije Universiteit Amsterdam			
PREREQUISITES	modules P1-01 and P1-02 and, preferably, P1-03			
AIMS	<ul style="list-style-type: none"> - Application of the theory from modules 1 to 4 in a co-ordinated team exercise - Obtain practical experience with desktop GIS software - Discuss broader and actual issues from the field of study - Foster student contact 			
INTENDED LEARNING OUTCOMES	<p>On completion of this unit students should be able to:</p> <ul style="list-style-type: none"> - apply the materials from modules P1-01, P1-02 and P1-03 - use GIS software effectively and be able to implement appropriate analysis procedures for any given application - analyse how spatial data models are used in the representation of geographical phenomena and evaluate the appropriateness of such models in particular applications - design appropriate geovisualisations to support spatial decision making - present orally the process and outcomes of a spatial analysis 			
WORKSHOP CONTENTS	<ul style="list-style-type: none"> - pre-workshop preparation - workshop exercise (approximately 15 hrs.) - lectures - presentation by guest speakers - presentation of workshop exercise by students 			
INDICATIVE TEACHING AND LEARNING ACTIVITIES (Hours for the Unit):				
Directed Reading:	Practical/ Fieldwork:	Seminar/ Tutorial:	Student Centred Learning:	Total Student effort:
6	15	8		28
ADDITIONAL NOTES AND COMMENTS	This workshop is part of the UNIGIS Annual Conference			

1.9.2. Postgraduate Diploma (PgD)

UNIT CODE NUMBER AND TITLE	P2-EM5/Sy1 Mt1 GIS in Organisations		
HOME PROGRAMME	PgC/PgD/MSc by Distance Learning GIS Network		
HOME DEPARTMENT	Department of Informatics, University of Huddersfield		
UNIT LEADER(S)	Bart Kusse		
CREDIT VALUE (ECTS)	5	STUDENT EFFORT (HOURS)	140
UNIT STATUS	CORE OPTION: PgD/MSc GIS, PgD/MSc GIS and Management		
PRE-REQUISITES	None		
UNIT LEARNING OUTCOMES			
<p>On completion of this unit, students should be able to:</p> <ul style="list-style-type: none"> critically analyse the importance of organisational issues in Geographical Information Systems development; discuss, critically, the importance of Information Systems Development methods (ISDMs) as a guide to developing successful information systems; use Soft Systems Analysis/Multiview to structure problem situations and analyse information systems requirements; explain the legal, ethical and professional issues that using GIS within and between organisations provoke. 			
CURRICULUM OUTLINE			
<p>This unit aims to provide students with a critical understanding of the issues which arise in deploying GIS within organisations and the practical methodologies used to address these issues.</p> <p>Organisational issues and GIS - <i>From Technocentric to socio-technical computing</i>: why systems fail; the declining significance of technical failure; the rise of socio-technical approaches to Information Systems (IS) development. <i>IS within Organisations</i>: IS planning within modern organisations; distinction between IS requirements and IT requirements; the roles of IS at different levels of organisations; generic benefits; where GIS fit into corporate planning.</p> <p>ISDMs - <i>A 'generic' GIS methodology</i>: the 'waterfall' model; feasibility studies; user needs requirements; pilot studies; Cost-Benefit-Analyses; risk analysis; limitations of pragmatic approaches. <i>Alternative ISDMs</i>: the variety of alternative ISDMs; the importance of the socio-technical tradition; Soft Systems Analysis; the Multiview Methodology.</p> <p>Peopleware: the importance of organisational context; the impact of individuals upon projects; the impact of corporate cultures; the importance of organisational politics; legal and ethical frameworks.</p> <p>GIS beyond organisations: the 'human' challenges on inter-organisational GIS; GIS for the public – Public Participation GIS(PPGIS) and community GIS.</p>			
TEACHING AND LEARNING STRATEGIES			
<p>The learning and teaching strategies are student centred. They aim to encourage a deep-learning approach by using reflection and self-evaluation. A written Directed Reader will be provided on-line, which will provide the essential background, the framework for study and</p>			

essential detail. It will include self-assessment exercises. Each section of this Reader will be framed with a context setting introduction, clearly identified learning outcomes and additional reading within the academic and professional literature. Students will be required to reflect on their learning as part of the self-assessment exercises and the summative assignments. Opportunities for students to discuss issues with staff and fellow students will be provided via an online bulletin board.

ASSESSMENT STRATEGIES

Assessment is by coursework. There will be two assignments of equal weighting, the first assesses the student's analysis of organisational issues by reflection and the writing of an essay; the second assess the practical application of development methodologies.

ASSESSMENT CRITERIA FOR UNIT/ELEMENTS OF ASSESSMENT

Assessment 1. Essay assignment (50%) (3000 words)

An assignment will be set which will require students to reflect upon the importance of aspects of the 'human/organisational' environment within which GIS operate. Likely topics include:- 'GIS and Ethics'; 'Legal issues in GIS'; 'GIS and the public'; etc.

Assessment 2. Soft-systems/Multiview analysis (50%) (n/a words)

This assignment will be offered in two formats (students undertake one):-

(i)Distance-learning assignment: a Soft Systems exercise, based upon a case study, work-based system.

(ii)An optional workshop project: Students who elect to attend a workshop will be asked to form project teams and to use Soft Systems/Multiview to analyse the information needs within a prepared case-study and to make recommendations about IS technologies that may be required to meet such needs.

INDICATIVE STUDENT LEARNING RESOURCES

The primary resource will be the Directed Reader supplemented by a mixture of academic journal and professional references.

See the online module for more information on the primary and recommended reading material.

ADDITIONAL NOTES AND COMMENTS

UNIT CODE NUMBER AND TITLE	P2-EM5/Sc1 GIS and Modelling		
HOME PROGRAMME	PgC/PgD/MSc by Distance Learning GIS Network		
HOME DEPARTMENT	Department of Environmental and Geographical Sciences, MMU		
UNIT LEADER(S)	Alfred Wagtendonk		
CREDIT VALUE (ECTS)	5	STUDENT EFFORT (HOURS)	140
UNIT STATUS	CORE OPTION: PgD/MSc GI Science. <i>ELECTIVE: PgD/MSc GIS</i>		
PRE-REQUISITES	None		
UNIT LEARNING OUTCOMES			
<p>On completion of this unit students should be able to:</p> <ul style="list-style-type: none"> • Explain and critically evaluate methodologies for spatial modelling • Design, implement and test spatial models • Use GIS to undertake a range of modelling techniques and critically evaluate outputs from the application of those techniques • Understand, use and evaluate dynamic models linked to GIS 			
CURRICULUM OUTLINE			
<p>This unit aims to provide students with a critical understanding of the issues involved in designing and implementing software and GI based models. In addition it aims to enable students to write small scale GIS applications and design GIS based models.</p> <p>Models and modelling – the concept of models in science and operations. Strategies and design, rule-based/simple logic models, empirical/statistical, dynamical models.</p> <p>GIS-Model interaction – data model, updating and automation, visualisation, systems approach, issues in GIS hosted modelling: interpolation, thresholds, hybrid systems and component failure/system reliability.</p>			
TEACHING AND LEARNING STRATEGIES			
<p>The learning and teaching strategies are student centred. They aim to encourage a deep-learning approach by using reflection and self-evaluation. A written Directed Reader will be provided on-line, which will provide the essential background, the framework for study and essential detail. It will include self-assessment exercises. Each section of this Reader will be framed with a context setting introduction, clearly identified learning outcomes and additional reading within the academic and professional literature. Opportunities for students to discuss issues with staff and fellow students will be provided via an online bulletin board.</p>			
ASSESSMENT STRATEGIES			
<p>Assessment is by coursework. There will be two assignments of equal weighting.</p>			
ASSESSMENT CRITERIA FOR UNIT/ELEMENTS OF ASSESSMENT			
<p><i>Assessment 1</i> Implementing a Forest Fire Detection System with a GIS (50%) (n/a words)</p>			

Assessment 2 *The use of GIS in an environmental modelling tool (50%) (n/a words)*

INDICATIVE STUDENT LEARNING RESOURCES

The primary resource will be the Directed Reader supplemented by a mixture of academic journal and professional references.

See the online module for more information on the primary and recommended reading material.

ADDITIONAL NOTES
AND COMMENTS

UNIT CODE NUMBER AND TITLE	P2-EM5/Sc2 Databases for Enterprise GIS		
HOME PROGRAMME	PgC/PgD/MSc by Distance Learning GIS Network		
HOME DEPARTMENT	Department of Informatics, University of Huddersfield		
UNIT LEADER(S)	Simeon Nedkov		
CREDIT VALUE (ECTS)	5	STUDENT EFFORT (HOURS)	140
UNIT STATUS	CORE OPTION: PgD/MSc GI Science. <i>ELECTIVE: PgD/MSc GIS</i>		
PRE-REQUISITES	None		
UNIT LEARNING OUTCOMES			
On completion of this unit students should be able to:			
<ul style="list-style-type: none"> critically assess the organisational benefits and challenges of developing 'Enterprise GIS' systems; evaluate the advantages and disadvantages of holding geographical data in ORDBMS; critically discuss the importance of OGC and SQL99 spatial/MM; implement a simple geo-database, using a spatial extended ORDBMS. 			
CURRICULUM OUTLINE			
<p>This unit aims to provide students with a critical understanding of the issues in building GIS databases for Enterprise GIS together with the necessary skills to implement a small geo-database using current standards/technologies.</p> <p>From desk-top to Enterprise GIS: The organisational advantages and dangers of adopting Enterprise GIS strategies. Limitations of Desk-top technologies. Limitations of Relational databases. Alternative enterprise strategies -universal storage vs. universal access. Spatial Information Management.</p> <p>The technologies that underpin EnterpriseGIS: The promise and limitations of Object Oriented databases. Failure in the market. The rise of Universal servers (ORDBMS). Requirements for a spatially extended ORDBMS. Passive and active servers.</p> <p>The standards that underpin EnterpriseGIS: Limitations of vendor specific spatial extensions. The role of standards bodies – e.g. OGC. SQL99 – the Object Relational Standard. SQL99 MM/Spatial – the standard for spatial servers. The XML/GML standard. XDBMS.</p> <p>A Spatial ORDBMS tutorial: Experience of establishing and interrogating a spatially extended database.</p>			
TEACHING AND LEARNING STRATEGIES			
<p>The learning and teaching strategies are student centred. They aim to encourage a deep-learning approach by using reflection and self-evaluation. A written Directed Reader will be provided on-line, which will provide the essential background, the framework for study and essential detail. It will include self-assessment exercises. Each section of this Reader will be framed with a context setting introduction, clearly identified learning outcomes and additional reading within the academic and professional literature. Students will be required to reflect on their learning as part of the self-assessment exercises and the summative assignments. Opportunities for students to discuss issues with staff and fellow students will be provided via an</p>			

online bulletin board.	
ASSESSMENT STRATEGIES	
<p>Assessment is by coursework. There will be two assignments of equal weighting, one will assesses the student's analysis of key issues – benefits/challenges of enterprise GIS, ORDBS evaluation -by requiring answers to set of targeted questions to be written up as a workbook; the other will assess practical skills and the understanding of concepts by requiring the development of a working geo-database.</p>	
ASSESSMENT CRITERIA FOR UNIT/ELEMENTS OF ASSESSMENT	
<p><i>Assessment 1 – Workbook (50%) (n/a words)</i></p> <p>Students will answer a series of targeted questions on the organisational benefits and challenges of developing Enterprise GIS. Critical assessment of the advantages/disadvantages of ORDBMS for Geodata will be assessed.</p> <p><i>Assessment 2 – Geo-database design and implementation (50%) (n/a words)</i></p> <p>Students will be assessed on their application of principles in designing a Geo-database, and effectiveness in implement their design using an spatially extended RDBMS.</p>	
INDICATIVE STUDENT LEARNING RESOURCES	
<p>The primary resource will be the Directed Reader supplemented by a mixture of academic journal and professional references.</p> <p>See the online module for more information on the primary and recommended reading material.</p>	
ADDITIONAL NOTES AND COMMENTS	

UNIT CODE NUMBER AND TITLE	P2-EM5/Mt2 GIS Project Management		
HOME PROGRAMME	PgC/PgD/MSc by Distance Learning GIS Network		
HOME DEPARTMENT	Environmental and Geographical Sciences, MMU		
UNIT LEADER(S)	Bart Kusse		
CREDIT VALUE (ECTS)	5	STUDENT EFFORT (HOURS)	140
UNIT STATUS	CORE OPTION: PgD/MSc GIS and Management. <i>ELECTIVE: PgD/MSc GIS</i>		
PRE-REQUISITES	None		
UNIT LEARNING OUTCOMES			
<p>On completion of this unit, students will be able to:</p> <ul style="list-style-type: none"> • identify and critically analyse the issues involved in organising, planning, monitoring and controlling a GIS project; • initiate a small scale GIS project, by developing project plans and financial budgets, assessing project costs and benefits, developing investment appraisal methods and using authorisation, monitoring and controlling processes; • discuss the role, significance and impact of people in a project management setting and evaluate and implement strategies for managing people in projects; • review current GIS Project Management methodologies and appraise their effectiveness and adaptation to managing different types of GIS projects. 			
CURRICULUM OUTLINE			
<p>The unit aims to develop project management skills through a critical understanding of the concepts, principles and use of project management tools.</p> <p>Issues in GIS project management – strategy, project environment, the investment process, appraisal methods and justification. Project constraints, influencing factors and project risk analysis. GIS project life cycle, project scope, objectives, plans, and budgets, requests for change, risk analysis, and contract tendering.</p> <p>Running a GIS project - fundamentals and levels of control, monitoring and control, control techniques, business and technical integrity, time and financial controls, earned value analysis, progress reporting, project meetings, exception plans and project closure.</p> <p>People issues - highlighting issues centred on people in projects, project leadership, team building, motivation and development of team members.</p> <p>Methodologies - overview of current GIS Project Management Methodologies.</p>			
TEACHING AND LEARNING STRATEGIES			
<p>The learning and teaching strategies are student centred. They aim to encourage a deep-learning approach by using reflection and self-evaluation. A written Directed Reader will be provided on-line, which will provide the essential background, the framework for study and essential detail. It will include self-assessment exercises. Each section of this Reader will be framed with a context setting introduction, clearly identified learning outcomes and additional reading within the academic and professional literature. Students will be required to reflect on their learning as part of the self-assessment exercises and the summative assignments. Opportunities for students to discuss issues with staff and fellow students will be provided via an online bulletin board.</p>			

ASSESSMENT STRATEGIES

Assessment is by coursework. There will be two assignments of equal weighting based on case studies, the first assesses the student's analysis of project management issues via a critical report; the second will assess project management skills by requiring the development of project plans - for example resource plans and these will include people issues.

ASSESSMENT CRITERIA FOR UNIT/ELEMENTS OF ASSESSMENT

Assessment 1 – Critical Report (50%) (3000 words)

- the critical analysis of project management issues and methodologies;
- the analysis of 'people in project' issues, their influencing factors, project politics and communication issues.

Assessment 2 – Project Plans (50%) (n/a words)

- the effective utilisation of project management monitoring control techniques, financial appraisal and risk analysis;

the appropriateness of the project resource and financial plans and reports.

INDICATIVE STUDENT LEARNING RESOURCES

The primary resource will be the Directed Reader supplemented by a mixture of academic journal and professional references.

See the online module for more information on the primary and recommended reading material.

ADDITIONAL NOTES AND COMMENTS

The Directed Reader is written by a professional practitioner and the unit includes case studies derived from professional experience.

UNIT CODE NUMBER AND TITLE	P2-EM5/En1 Environmental Impact Assessment & GIS		
HOME PROGRAMME	PgC/PgD/MSc by Distance Learning GIS Network		
HOME DEPARTMENT	School of Environmental and Life Sciences, University of Salford		
UNIT LEADER(S)	Eric Koomen		
CREDIT VALUE (ECTS)	5	STUDENT EFFORT (HOURS)	140
UNIT STATUS	CORE OPTION: PgD/MSc GIS and Environment. <i>ELECTIVE: PgD/MSc GIS</i>		
PRE-REQUISITES	None		
UNIT LEARNING OUTCOMES			
<p>On completion of this unit, students will be able to:</p> <ul style="list-style-type: none"> • define, describe and critically analyse the EIA process; • demonstrate a competent knowledge of the critical parameters that contribute to a successful EIA; • identify the interaction and integration of social and environmental assessments; • evaluate recent trends and future prospects for the application of GIS in social and environmental assessments. 			
CURRICULUM OUTLINE			
<p>This unit aims to provide a historic and contemporary planning background to EIA, a knowledge of the concepts and techniques utilized in the EIA process, and assessment as related to specific environmental parameters.</p> <p>EIA – the need for EIA, history, planning background, concepts and definitions for EIA, EIA procedure vs. EIA process, case study.</p> <p>Critical parameters – highlighting the critical parameters that contribute to a successful EIA.</p> <p>Integration of elements – introduction to the integration of social and environmental assessments.</p> <p>Recent trends – highlighting the application of GIS in social and environmental assessments.</p>			
TEACHING AND LEARNING STRATEGIES			
<p>The learning and teaching strategies are student centred. They aim to encourage a deep-learning approach by using reflection and self-evaluation. A written Directed Reader will be provided on-line, which will provide the essential background, the framework for study and essential detail. It will include self-assessment exercises. Each section of this Reader will be framed with a context setting introduction, clearly identified learning outcomes and additional reading within the academic and professional literature. Students will be required to reflect on their learning as part of the self-assessment exercises and the summative assignments. Opportunities for students to discuss issues with staff and fellow students will be provided via an online bulletin board.</p>			

ASSESSMENT STRATEGIES

Assessment is by coursework. There will be two assignments of equal weighting, the precise content may vary year by year but will typically include a case study based analysis of the impacts and a design/examination of a design for GIS support of EIA.

ASSESSMENT CRITERIA FOR UNIT/ELEMENTS OF ASSESSMENT

Assessment 1 – Analysis (50%) (3000 words)

- critical assessment of the EIA process;
- identification of the critical parameters in the process.

Assessment 2 – Design (50%) (3000 words)

- critical discussion of the social impact assessment process;
- critical evaluation of the contemporary working of EIA through a case study – including GIS design, environmental model and presentation/participation issues.

INDICATIVE STUDENT LEARNING RESOURCES

The primary resource will be the Directed Reader supplemented by a mixture of academic journal and professional references.

See the online module for more information on the primary and recommended reading material.

ADDITIONAL NOTES
AND COMMENTS

UNIT CODE NUMBER AND TITLE	P2-EM5/En2 Remote Sensing for GIS Applications		
HOME PROGRAMME	PgC/PgD/MSc by Distance Learning GIS Network		
HOME DEPARTMENT	School of Environment and Life Sciences, University of Salford		
UNIT LEADER(S)	Marieke Eleveld		
CREDIT VALUE (ECTS)	5	STUDENT EFFORT (HOURS)	140
UNIT STATUS	CORE OPTION: PgD/MSc GIS and Environment. <i>ELECTIVE: PgD/MSc GIS</i>		
PRE-REQUISITES	None		
UNIT LEARNING OUTCOMES			
<p>On completion of this unit, students will be able to:</p> <ul style="list-style-type: none"> • explain the principles of remote sensing and evaluate the strengths and weakness of data from different remote sensing systems; • discuss, critically, the principles of information extraction from remotely sensed data; • generate environmental information from remotely sensed data and appreciate the importance of selecting data appropriate for a given task; • critically evaluate methods for integrating remotely sensed data with GIS. 			
CURRICULUM OUTLINE			
<p>This unit aims to provide students with a broad insight into the sources, applications and future potential of remote sensing data for GIS applications. The unit comprises four components:</p> <p>Principles of remote sensing - highlighting the principles of remote sensing including interactions between electromagnetic radiation, atmosphere and surface, but with particular emphasis on land surface characteristics.</p> <p>Satellite systems - describing of a range of satellite systems, their spectral, spatial and temporal characteristics and range of applications</p> <p>Quantitative Data - examining the extraction of quantitative data from remotely sensed images including the development and application of image-based data extraction techniques, spectral indices, and application of canopy reflectance models</p> <p>GIS Integration - highlighting the key issues in the integration of remotely sensed data in GIS, addressing issues of spatial scale, data availability and information content.</p>			
TEACHING AND LEARNING STRATEGIES			
<p>The learning and teaching strategies are student centred. They aim to encourage a deep-learning approach by using reflection and self-evaluation. A written Directed Reader will be provided on-line, which will provide the essential background, the framework for study and essential detail. It will include self-assessment exercises. Each section of this Reader will be framed with a context setting introduction, clearly identified learning outcomes and additional reading within the academic and professional literature. Students will be required to reflect on their learning as part of the self-assessment exercises and the summative assignments. Opportunities for students to discuss issues with staff and fellow students will be provided via an online bulletin board.</p>			
ASSESSMENT STRATEGIES			

Assessment is by coursework. There will be two assignments of equal weighting, the precise content may vary year by year but will typically include a piece of work requiring students to carry out practical work with remotely sensed images and a review paper on a particular application of remote sensing.

ASSESSMENT CRITERIA FOR UNIT/ELEMENTS OF ASSESSMENT

Assessment 1 Remotely Sensed Image (50%) (n/a words)

Students will be assessed on the manipulation of, and data extraction from, a remotely sensed image data set, including ancillary data.

Assessment 2 Review Paper (50%) (3000 words)

Students will be assessed on the critical evaluation of the use of remote sensing and integration in GIS in a specific application area.

INDICATIVE STUDENT LEARNING RESOURCES

The primary resource will be the Directed Reader supplemented by a mixture of academic journal and professional references.

See the online module for more information on the primary and recommended reading material.

ADDITIONAL NOTES
AND COMMENTS

UNIT CODE NUMBER AND TITLE	P2-W3 Workshop III: GI(S) and Decision Making			
TUTOR	Eric Koomen, Jasper Dekkers, Henk Scholten, and others			
CONTRIBUTING DEPARTMENT	SPINlab Vrije Universiteit Amsterdam			
PREREQUISITES	Modules P1-01, P1-02, P1-03 and P1-04. Further, both 5 ECTS core-modules from any the Diploma-part of the Programme			
AIMS	<ul style="list-style-type: none"> - Application of parts of the theory from all modules in a coordinated team exercise - To create a better understanding of the role and possibilities of GIS in decision making processes - Develop oral communication and negotiation skills using your GIS knowledge - Foster student contact 			
INTENDED LEARNING OUTCOMES	<p>On completion of this unit students should be able to:</p> <ul style="list-style-type: none"> - apply the materials from all modules followed - apply GIS at a well-considered way - compare various policy alternatives using weighted summation 			
WORKSHOP CONTENTS	<ul style="list-style-type: none"> - Pre-workshop preparation - Lectures - Presentation by guest speakers - Excursion - Exercises - Presentation of workshop exercise by students 			
INDICATIVE TEACHING AND LEARNING ACTIVITIES (Hours for the Unit):				
Directed Reading:	Practical/ Fieldwork:	Seminar/ Tutorial:	Student Centred Learning:	Total Student effort:
6	15	8		28
ADDITIONAL NOTES AND COMMENTS	This workshop is part of the UNIGIS Annual Conference.			

1.9.3. Non-core modules (PgD Electives)

UNIT CODE NUMBER AND TITLE	P2-EM44 Visualisation and GIS		
HOME PROGRAMME	PgC/PgD/MSc by Distance Learning GIS Network		
HOME DEPARTMENT	Department of Environmental and Geographical Sciences		
UNIT LEADER(S)	<i>Maurice de Kleijn</i>		
CREDIT VALUE (ECTS)	4	STUDENT EFFORT (HOURS)	112
UNIT STATUS	ELECTIVE: PgD/MSc GIS; PgD/MSc GIS and Management; PgD/MSc GIS and Environment; PgD/MSc GI Science.		
PRE-REQUISITES	None		
UNIT LEARNING OUTCOMES			
On completion of this unit students should be able to:			
<ul style="list-style-type: none"> critically discuss the visual presentation of spatial data, drawing on the principles of the cognitive-semiotic framework; create and analyse outline designs for GIS visualisations in the context of a multimedia, internet computing environment. 			
CURRICULUM OUTLINE			
This unit aims to provide students with a critical understanding of issues in visual perception, the influence of these on design for GIS visualisation and possibilities for the future.			
<p>Human perception and mapping – the cognitive-semiotic framework - eye, brain, vision and processes of perception. Recognition, discrimination, pattern and form and the role of ideas. Spatial cognition. Spatial information and human interaction with graphic and cartographic objects. Cartographic design.</p> <p>GIS and visualisation - Human computer interaction. Computer graphic systems and design of computer graphics. Representation of 2D and 3D worlds. Animation. GIS, the internet and multimedia.</p>			
TEACHING AND LEARNING STRATEGIES			
The learning and teaching strategies are student centred. They aim to encourage a deep-learning approach by using reflection and self-evaluation. A written Directed Reader will be provided on-line, which will provide the essential background, the framework for study and essential detail. It will include self-assessment exercises. Each section of this Reader will be framed with a context setting introduction, clearly identified learning outcomes and additional reading within the academic and professional literature. Students will be required to reflect on their learning as part of the self-assessment exercises and the summative assignments. Opportunities for students to discuss issues with staff and fellow students will be provided via an online bulletin board.			
ASSESSMENT STRATEGIES			
Assessment is by coursework. There will be one assignment which assesses the student's knowledge of the interaction between perception and mapping by requiring them to design and then critique a GIS visualisation.			
ASSESSMENT CRITERIA FOR UNIT/ELEMENTS OF ASSESSMENT			

Assessment 1 Map Design and Critique (100%) (n/a words)

Students will be assessed on their application of the principles and concepts in geo-visualisation to a design for some particular context. They will also have to provide a critique of the design, within the cognitive-semiotic framework, and may focus on a particular element, e.g. colour use.

INDICATIVE STUDENT LEARNING RESOURCES

The primary resource will be the Directed Reader supplemented by a mixture of academic journal and professional references.

See the online module for more information on the primary and recommended reading material.

ADDITIONAL NOTES
AND COMMENTS

The assignment reports for this module must be written in English.

UNIT CODE NUMBER AND TITLE	P2-EM45 Internet GIS		
HOME PROGRAMME	PgC/PgD/MSc by Distance Learning GIS Network		
HOME DEPARTMENT	Department of Informatics, University of Huddersfield		
UNIT LEADER(S)	Simeon Nedkov		
CREDIT VALUE (ECTS)	4	STUDENT EFFORT (HOURS)	112
UNIT STATUS	ELECTIVE: PgD/MSc GIS; PgD/MSc GIS and Management; PgD/MSc GIS and Environment; PgD/MSc GI Science.		
PRE-REQUISITES	None		
UNIT LEARNING OUTCOMES			
<p>on completion of this unit students should be able to:-</p> <ul style="list-style-type: none"> critically assess the organisational benefits and challenges of developing web and wireless GI systems; evaluate the technologies that underpin Internet GIS; explain the importance of standards, e.g. OGC and GML; implement a simple GML application. 			
CURRICULUM OUTLINE			
<p>g This unit aims to provide students with the knowledge and practical skills to design and implement distributed GIS services according to current industry standards building in concepts such as OpenGIS standards to future proof such implementations.</p> <p>From Desk-top GIS to Distributed GI Services -The demand-pull and technology push behind the development of GI services. Desk-top to enterprise deployment. Universal delivery. GIS leaves the building. Case studies, e.g. public participation GIS; location/mobile services.</p> <p>The technologies that provide Distributed Web Services - The evolution of the web; the technologies that facilitate distributed web-services; the technologies that enable wireless/mobile services.</p> <p>Building the GeoWeb - Evolution of webGIS technologies; client and server solutions; the OpenGIS specification; ISO standards.</p> <p>A GML tutorial - Creating a simple GML application schema and GML application instances.</p>			
TEACHING AND LEARNING STRATEGIES			
<p>The learning and teaching strategies are student centred. They aim to encourage a deep-learning approach by using reflection and self-evaluation. A written Directed Reader will be provided on-line, which will provide the essential background, the framework for study and essential detail. It will include self-assessment exercises. Each section of this Reader will be framed with a context setting introduction, clearly identified learning outcomes and additional reading within the academic and professional literature. Students will be required to reflect on their learning as part of the self-assessment exercises and the summative assignments. Opportunities for students to discuss issues with staff and fellow students will be provided via an online bulletin board.</p>			
ASSESSMENT STRATEGIES			

Assessment is by coursework. There will be two assignments of equal weighting, the first assesses the student's evaluation of the organisational and technological challenges of internet GIS by construction of a workbook in response to a series of targeted questions; the second will assess, via a practical demonstration, their implementation of current standards for distributed GIS.

ASSESSMENT CRITERIA FOR UNIT/ELEMENTS OF ASSESSMENT

Assessment 1. Workbook assignment (50%) (n/a words)

An assignment will be set which will require students answer a series of questions that will assess their knowledge and critique of the technologies involved in web and wireless GI systems.

Assessment 2 – Geo-web schema design and implementation (50%)(n/a words)

Students will be required to create an XML schema and sample instances and will be assessed on their implementation of standards.

INDICATIVE STUDENT LEARNING RESOURCES

The primary resource will be the Directed Reader supplemented by a mixture of academic journal and professional references.

See the online module for more information on the primary and recommended reading material.

ADDITIONAL NOTES AND COMMENTS

UNIT CODE NUMBER AND TITLE	P2-EM5EU European aspects of GIS		
BRIEF SUMMARY	<p>The aim of this unit is:</p> <ul style="list-style-type: none"> To familiarize students with the European dimension of GI To qualify students to successfully work on the European scene <p>The theme of the module is: Towards European Spatial Information Structures.</p>		
HOME PROGRAMME	Distance Learning Postgraduate GIS Network (UNIGIS)		
HOME DEPARTMENT	Department of Spatial Economics, Vrije Universiteit Amsterdam		
UNIT LEADER(S)	Maurice de Kleijn		
CREDIT VALUE (ECTS)	5		
AMOUNT OF STUDENT EFFORT (HOURS)	140	LEARNING OPPORTUNITIES (HOURS)	Directed Reader: 90 hours
			Assessment/ Independent study: 50 hours
UNIT STATUS	ELECTIVE: PgD/MSc GIS, PgD/MSc GIS and Environment, PgD/MSc GIS and Management, PgD/MSc GI Science		
PRE-REQUISITES	None		
<p>UNIT LEARNING OUTCOMES</p> <p>On completion of this unit students should be able to:</p> <ul style="list-style-type: none"> that there is a need for international information at various scales understand the problems associated with crossing borders in European Datasets which European datasets are available and which initiatives are in place to create missing datasets how to locate and combine geographical data in Europe and know about data catalogues, spatial reference systems, metadata and standards which technological developments are taking place in the European GI-field and what their impact on the European GIS community might be what is necessary to set up a Geographical Information Infrastructure (GII) in Europe which problems and issues are faced in setting up a European GII and what has already been done in realizing a common infrastructure how can the GI community make a European GII work. 			
<p>CURRICULUM OUTLINE</p> <p>The European aspects of GI module has a different structure than most other UNIGIS-modules, it consists of a collection of relevant literature and connecting text in the digital learning environment Blackboard. As a pedagogical help the aims and objective of each section will be stressed. Self-assessed assignments are available throughout the module to help students interactively test their knowledge.</p> <p>This learning module is a compulsory unit of the European Masters in GIS program, see http://www.euromastergi.org/.</p>			

TEACHING AND LEARNING STRATEGIES

The learning and teaching strategies are student centred. They aim to encourage a deep-learning approach by using reflection and self-evaluation. A written Directed Reader will be provided on-line, which will provide the essential background, the framework for study and essential detail. It will include self-assessment exercises. Each section of this Reader will be framed with a context setting introduction, clearly identified learning outcomes and additional reading within the academic and professional literature. Students will be required to reflect on their learning as part of the self-assessment exercises and summative assignments. Opportunities for students to discuss issues with staff and fellow students will be provided via an online bulletin board.

ASSESSMENT STRATEGIES

Assessment is by coursework.

ASSESSMENT CRITERIA FOR UNIT/ELEMENTS OF ASSESSMENT

INDICATIVE STUDENT LEARNING RESOURCES

The primary resource will be the Directed Reader supplemented by a mixture of academic journal and professional references.

See the online module for more information on the primary and recommended reading material.

ANY ADDITIONAL
NOTES AND
COMMENTS

This module can be chosen as module 7 or 8 instead of a 4 ECTS elective module in the PgD programmes.

1.9.4. Master of Science in GIS (MSc)

UNIT CODE NUMBER AND TITLE	P3-MSc MSc Proposal and Thesis		
HOME PROGRAMME	PgC/PgD/MSc by Distance Learning GIS Network		
HOME DEPARTMENT	Department of Spatial Economics, Vrije Universiteit Amsterdam		
UNIT LEADER(S)	Niels van Manen		
CREDIT VALUE	22		
STUDENT EFFORT (HOURS)	616	CLASS CONTACT TIME (HOURS)	Directed Learning 8 hrs (Optional Workshop)
UNIT STATUS	MANDATORY CORE: MSc GIS; MSc GI Science; MSc GIS and Management; MSc GIS and Environment.		
PRE-REQUISITES	PgD completed		
UNIT LEARNING OUTCOMES			
<p>On completion of this unit, students should be able to:</p> <ul style="list-style-type: none"> • plan, design and execute an advanced, independent investigation; • undertake data gathering with due regard for safety and risk assessment and ethical standards; • synthesize and interpret results/outcomes in the context of the relevant peer reviewed literature; • present the outcomes in the form of a coherently argued and well-constructed dissertation including critical reflection on the process of undertaking the research project and applying research methodologies. 			
CURRICULUM OUTLINE			
<p>This unit aims to enable students to design and execute an original/ independent study in their field of GIS and in doing so to develop an in-depth knowledge of the relevant GIS literature and research activities in that field.</p> <p>Applicable to the award undertaken – the project outline will demonstrate the appropriateness to the philosophy of the award. Students will be required to consider the planning of their research programme, time management, health and safety and ethical considerations and the project outline will also require evidence of researching the literature. Guidance on the presentation of the dissertation will be provided.</p>			
TEACHING AND LEARNING STRATEGIES			
<p>The MSc project is student directed. The preparative programme/workshop will examine the whole process for the MSc project from problem definition to dissertation writing. This will be integrated with the assessments which will ensure (a) appropriate aims and objectives for the research project; (b) effective literature use and presentation of the project outcomes. An optional workshop covering these issues will be held at the beginning of the MSc stage but all students will be issued with a MSc guide covering this material.</p>			

ASSESSMENT STRATEGIES	
<p>There will be two unequal assessments; a project outline (10%) which examines their research design and the MSc Dissertation (90%) which examines implementation, 'data gathering', analysis and presentation.</p>	
ASSESSMENT CRITERIA FOR UNIT/ELEMENTS OF ASSESSMENT	
<p><i>Assessment 1 Project Outline (10%) (2000 words)</i></p> <p>Students will be assessed on how well formulated the research /problem statement is, including aims and objectives, risk/safety assessments and ethical considerations.</p> <p><i>Assessment 2 MSc Dissertation (90%) (15,000 max words)</i></p> <p>Assessment is based on the critical review of the research question and the literature; implementation, analysis and presentation of research in the dissertation.</p>	
INDICATIVE STUDENT LEARNING RESOURCES	
<p>The primary resources will be the directed student reader covering the undertaking of MSc projects and an MSc workshop (Study Guide part III). These will be supplemented by a mixture of academic journal references, on-line material and texts.</p>	
ADDITIONAL NOTES AND COMMENTS	

Appendix I. Module Assessment Form

UNIGIS postgraduate diploma in GIS

Grade

Student Name:

Intake:

Module
Number Name.....



Assessed by
Supervisor *Prof. dr. H.J. Scholten* Date and signature:

Module tutor Date and signature:

Marking profile

	10 - excellent	poor - 1	
UNIT			Remarks
Learning outcomes	●	●	
FORM			
Structure and organisation	●	●	
Style and grammar	●	●	
Visual presentation	●	●	
Referencing	●	●	
CONTENT			
Correct answers to the assignments	●	●	
Analytical approach	●	●	
Critical and balanced treatment of subject	●	●	
Originality	●	●	
Coherent conclusion			
Adequate use of sources			

Notes

Form

Structure and organisation: A good assignment contains an introduction, middle part, and conclusion. The text is structured in sections and paragraphs that correspond with the structure of the arguments. Think further about correct titles, logical order of items, and relevance of items.

Style and grammar: For good style and grammar it is not necessary to be an English novel writer, but your assignments should be clear, readable, and neat. Remember to use your computer spell check (and grammar check if available) whenever possible; it will remove some errors.

Visual presentation: This refers to the appropriate use of tables, graphs, figures, and a good layout. It also includes other form aspects, such as a correct title page.

Referencing: Guidelines for correct referencing can be found in the library at the UNIGIS website, see 'English language and reference aids'.

Content

Correct answers to the assignments: Some assignments have a single, correct answer. The assessment of the validity of the answer of essays is based on evaluation of the arguments they contain.

Analytical approach: An analytical approach (as opposed to a descriptive approach) is expected. An analytical approach shows good understanding of the topics discussed, the problem is well-analysed.

Critical and balanced treatment of subject: These criteria refer to the argumentation and reasoning used in the assignment.

Originality: Original answers require creative thinking; original answers may connect to the current state of affairs and possible future developments.

Coherent conclusion: The conclusion is a very important part of your assignment, in which you give an answer to the problem, based on your argumentation and/or findings.

Adequate use of sources: Relevant, up-to-date, and representative material from books, Internet, or other sources can improve the quality of the assignment but you should cite all references in your work, and list the references in full at the end.