M Geo-Information Science
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Project code P2314

Contents

Summary

Standard 1. Intended learning outcomes

The master's programme Geo-Information Science (MGI) of Wageningen University (WU) focuses on solving spatial problems by using geographic information systems (GIS) and earth observation imagery (remote sensing, RS). The programme aims to educate students to become geo-information scientists who can analyse the usability of geo-information in complex spatial problems and develop innovative, interdisciplinary solutions. MGI combines expertise from various fields, such as information and communication technology, GIS, spatial modelling, statistics, RS, photogrammetry, GPS and mapping, and environmental and social sciences (land use planning, geography, soil science, and communication). MGI centres around geo-information science in the context of environmental and life sciences, and focuses on rural areas and urban fringes.

According to the panel, MGI's profile is clear and distinctive. Strong points include MGI's expertise in technical geospatial data, the wide variety of methodologies addressed in the programme, and the focus on environmental issues. The panel encourages the programme to profile itself primarily by its focus on environmental problems, rather than by a focus on rural areas, as environmental issues can apply to rural as well as urban areas. This profile could be formulated more accurately in the programme's vision and be communicated more clearly to (prospective) students and the professional field. The panel considers the intended learning outcomes (ILOs) to be well described and aligned with the academic master's level as described in the Dublin descriptors. The ILOs cover all relevant areas. According to the panel, MGI is well connected to and aligned with the professional field, amongst others through consultation of the External Advisory Board (EAB).

Standard 2. Teaching-learning environment

According to the panel, the curriculum is well designed. A positive aspect is the high degree of flexibility. The panel also appreciates the broad scope of methodologies addressed in the courses and the strong focus on the acquisition of technical skills. The curriculum incorporates ample opportunities to apply knowledge and skills in real-life contexts, such as in the internship and the Academic Master Cluster. Students are enabled to prepare themselves for the programming courses in Datacamp, offered before the start of the academic year. The thesis project and the matching of students with thesis topics and supervisors are well structured. The panel recommends the programme to structure the course content in year 1 more systematically and to visualize learning lines to increase awareness of how courses build on each other. Also, the programme may organize an event in period 6 to create an opportunity for the overarching scientific debate on the topics addressed in year 1. Furthermore, the panel encourages the programme to consider implementing a ribbon course and/or portfolio throughout the curriculum.

MGI is taught in English, which, according to the panel, flows logically from the international nature of the academic and professional field. The programme's didactical approach reflects a good combination of theory and hands-on practice. There is also a fine balance between individual and group work. In group projects, students can develop collaboration skills and learn from others as they each bring different sets of experience and expertise to the group. There is a strong learning environment, thanks to the close-knit and small-scale nature of the programme.

The admission criteria are clear and appropriate. The panel believes that the programme is feasible, and is happy to see that the programme actively monitors the study progression of students. Student guidance is of high quality. Besides the thesis and internship coordinators, the dedicated study advisor has an important role in student guidance. The study advisor supports students in making informed choices regarding (restricted) electives and has a vital role in preparing the diverse influx for the courses and preventing any possible deficiency issues for students. The study advisor has a strongly personal, student-centred and

proactive attitude. According to the panel, the facilities for students with a disability are appropriate and sufficient.
The teaching team represents a diverse range of topical expertise and demonstrates a student-centred, personal, and approachable attitude towards students. The teachers are didactically qualified and have sufficient proficiency in English. Due to the close-knit environment, there is a lot of informal communication and alignment within the teaching team. Although the panel sees the advantages of this, it also stresses the importance of more formalized structures, to prevent overlooked weaknesses and an over-reliance on personal relationships for alignment. The panel recommends the programme to reflect on the communication, calibration, and alignment processes and to formalize procedures to elevate the quality assurance culture.

Standard 3. Student assessment

The panel considers the assessment in the programme to be well designed, allowing students to achieve the final exit level for all ILOs. The assessment matrix demonstrates solid constructive alignment. The programme uses a fine diversity of appropriate assessment methods. The assessment procedure for the thesis is well structured. Each thesis is assessed by two assessors, based on an elaborate form, including written feedback. According to the panel, the written feedback could be improved. The panel advises the programme to make sure that (sub) scores are substantiated with sufficient written feedback. Related to this, the panel recommends the programme to organize calibration sessions regarding thesis assessment. The panel considers the Examining Board of Environment and Landscape (EBEL) to be independent, competent and in control. It is proactive in safeguarding the quality of assessment and the exit level, amongst others by performing chair group visits, thesis reviews, and reflection on the constructive alignment at programme level.

Standard 4. Achieved learning outcomes

Based on the review of a sample of 15 theses from the programme, the panel concludes that the level demonstrated in the theses is appropriate for an academic master's programme. The documentation and the interviews indicate that graduates of MGI are well prepared for and prove to be successful in the professional field.

Score table

The panel assesses the programmes as follows:

Master's programme Geo-Information Science

Standard 1: Intended learning outcomes	meets the standard
Standard 2: Teaching-learning environment	meets the standard
Standard 3: Student assessment	meets the standard
Standard 4: Achieved learning outcomes	meets the standard
General conclusion	positive

Prof. dr. Jacqueline van Muijlwijk, panel chair
8 April 2025

Anne-Lise Kamphuis MSc, panel secretary

Introduction

Procedure

Assessment

On 29 January 2025, the master's programme Geo-Information Science of Wageningen University was assessed by an independent peer review panel as part of the cluster assessment WO Life Sciences and Natural Resources 3. The assessment cluster consisted of ten programmes, offered by Wageningen University. The assessment followed the procedure and standards of the NVAO Assessment Framework for the Higher Education Accreditation System of the Netherlands (September 2024).

Quality assurance agency Academion coordinated the assessment upon request of Wageningen University. Jessica van Rossum acted as coordinator and panel secretary. Anne-Lise Kamphuis, Rik Ligthart and Sarah Boer also acted as panel secretaries in the cluster assessment. They have been certified and registered by the NVAO. Anne-Lise Kamphuis acted as panel secretary for the site visit in which the master's programme Geo-Information Science was assessed.

Preparation

Academion composed the peer review panel in cooperation with the institution and taking into account the expertise and independence of the members, as well as consistency within the cluster. On 6 September 2024, the NVAO approved the composition of the panel. The coordinator instructed the panel chair on her role in the site visit according to the Panel chair profile (NVAO 2016).

The programme composed a site visit schedule in consultation with the coordinator (see appendix 3). The programme selected representative partners for the various interviews. They also determined that the development dialogue would be made part of the site visit. A separate development report was made based on this dialogue.

The programme provided the secretary with a list of graduates of the academic years 2022-2023 and 2023-2024. In consultation with the coordinator, the panel chair selected 15 theses of the master's programme Geo-Information Science. They took the diversity of final grades into account. Prior to the site visit, the programme provided the panel with the theses and the accompanying assessment forms. It also provided the panel with an information file (see appendix 4).

The panel members studied the information and sent their findings to the panel secretary. She collected the panel's questions and remarks in a document and shared this with the panel members. In a preliminary meeting, the panel discussed the initial findings on the information file and the theses, as well as the division of tasks during the site visit. The panel was also informed on the assessment framework, the working method and the planning of the site visit and report.

Site visit

During the site visit, the panel interviewed various programme representatives (see appendix 3). The panel also offered students and staff members an opportunity for confidential discussion during a consultation hour. No consultation was requested. The panel used the final part of the site visit to discuss its findings in an internal meeting. Afterwards, the panel chair publicly presented the preliminary findings.

Report

The panel secretary wrote a draft report based on the panel's findings and submitted it to the coordinator for peer assessment. Subsequently, the secretary sent the report to the panel for feedback. After processing this feedback, the secretary sent the draft report to Wageningen University in order to have it checked for factual irregularities. The secretary discussed the ensuing comments with the panel chair and changes were implemented accordingly. The panel then finalized the report, and the coordinator sent it to the Wageningen University.

Panel

The following panel members were involved in the cluster assessment:

- Prof. dr. J.E. (Jacqueline) van Muijlwijk-Koezen, Chief Education Officer and professor in Innovations in Human Health and Life Sciences at the Vrije Universiteit Amsterdam (chair);
- Ir. M.L. (Margot) Kok, Director of Education Policy at the Faculty of Science at Utrecht University;
- Dr. A.A.J. (Annik) Van Keer, policy officer for Education at Utrecht University;
- Dr. Ir. L.G.J. (Luc) Boerboom, associate professor at the Faculty of Geo-Information Science and Earth Observation at the Universiteit Twente;
- Dr. G.M. (Garrett) Broad PhD, associate professor in Communication Studies at Rowan University (United States of America);
- Prof. V.B. (Vilis) Brukas, professor in Forest Planning at the Swedish University of Agricultural Sciences (Sweden);
- Prof. dr. M. (Marleen) De Troch, associate professor in Marine Ecology at Ghent University (Belgium);
- Prof. dr. M.P. (Michael) Gilek, professor in Environmental Science at Södertörn University (Sweden);
- Prof. dr. Ing. B.J.J.M. (Bart) van der Hurk, Scientific Director at Deltares and professor in Climate Interactions with the Socio-Ecological System at the Vrije Universiteit Amsterdam;
- Prof. dr. P.L. (Pierre) Ibisch, professor in Socio-ecology of Forest Ecosystems at the Hochschule für nachhaltige Entwicklung Eberswalde (Germany);
- Dr. T.K. (Torsten) Krause, associate professor at the Lund University Centre for Sustainability Studies of Lund University (Sweden);
- Em. prof. dr. B.A. (Bruce) Lankford, professor emeritus in Water and Irrigation Policy at the University of East Anglia (United Kingdom);
- Prof. dr. T. (Tatiana) Loboda, professor at the Department of Geographical Sciences of the University of Maryland (United States of America);
- Prof. dr. ing. S. (Steffen) Nijhuis, professor in Landscape-based Urbanism at the Delft University of Technology, Department of Urbanism, Section Landscape Architecture (referee panel member);
- Dr. M.A.F. (Mirjam) Ros-Tonen, researcher and former associate professor at the Faculty of Social and Behavioural Sciences of the University of Amsterdam;
- Prof. dr. S.T. (Sabine) Timpf, professor in Geoinformatics at the University of Augsburg (Germany);
- Prof. dr. V.B. (Veerle) Van Eetvelde, professor in Landscape research at Ghent University (Belgium);
- Prof. C.W. (Christian) Werthmann, professor in Landscape Architecture and Design at Leibniz University Hannover (Germany);
- J.A. (Job) Tuinder BSc, master's student Earth Sciences at the University of Amsterdam (student member);
- F. (Finn) van der Straaten BSc, master's student International Development Studies at the University of Amsterdam (student member).

The panel assessing the master's programme Geo-Information Science at Wageningen University & Research consisted of the following members:

- Prof. dr. J.E. (Jacqueline) van Muijlwijk-Koezen, Chief Education Officer and professor in Innovations in Human Health and Life Sciences at the Vrije Universiteit Amsterdam (chair);
- Ir. M.L. (Margot) Kok, Director of Education Policy at the Faculty of Science at Utrecht University;
- Prof. dr. T. (Tatiana) Loboda, professor at the Department of Geographical Sciences of the University of Maryland (United States of America);
- Prof. dr. S.T. (Sabine) Timpf, professor in Geoinformatics at the University of Augsburg (Germany);
- J.A. (Job) Tuinder BSc, master's student Earth Sciences at the University of Amsterdam (student member).

Information on the programmes

Name of the institution:	Wageningen University
Status of the institution:	Publicly funded institution
Result institutional quality assurance assessment:	Positive
Programme name:	M Geo-Information Science
CROHO number:	60108
Level:	Master
Orientation:	Academic
Number of credits:	120 EC
Specializations or tracks:	-
Location:	Wageningen
Mode(s) of study:	Fulltime
Language of instruction:	English
Submission date NVAO:	1 May 2025

Description of the assessment

Organization

Wageningen University (WU) comprises of one faculty with five science groups, also known as departments. These science groups are Agrotechnology and Food Sciences, Animal Sciences, Environmental Sciences, Plant Sciences, and Social Sciences. The science groups deliver education through chair groups. The science groups are responsible for the management of the activities of the chair groups and the research institutes of Wageningen Research (WR). Chair groups are usually clustered according to similarities under the broad field of a particular science group. A chair group is the organizational component within WU to give shape to academic teaching and research and create societal value in a specific field. There are about ninety chair groups, each of them led by a professor, that conduct research in specific domains. Despite the exclusiveness of every chair group, they all work under the thematic area of healthy food and living environment. A chair group can be involved in the education of more than one programme. The involvement of chair groups in a programme is evident in the courses and the specializations. For each educational programme, the Board of Education oversees that the programme director and the programme committee (PC), consisting of students and teachers, develop and update bachelor's and master's curricula and align with the chair group(s) on whether new courses and specializations are needed and/or existing courses or thesis specializations have to be enhanced.

Previous accreditation's panel's recommendations

The previous accreditation of the master's programme Geo-Information Science (MGI) took place in 2018. The panel assessed standards 1, 2, and 4 as good, and standard 3 as satisfactory. The panel gave a number of recommendations. In response to these recommendations, the programme implemented several improvements, including intensifying the thesis supervision (two thesis coordinators and the implementation of thesis rings), formalizing the thesis process and registration system, more attention to urban issues in several courses, intensifying contact with the Examining Board (yearly meeting with the Programme Committee), implementing a standard plagiarism check, including the presentation of internship results in the internship assessment, performing a new benchmark analysis, organizing career days, and the establishment of an MGI study association (SA Artemis). The panel examined the programme's response to the recommendations and concludes that they have been seriously acted upon by the programme. The panel is generally content with the improvement measures taken and with the argumentation provided for suggestions that were not fully followed up on. For a couple of recommendations, the programme is still in the process of further improvement. These issues will be addressed further on in this report.

Standard 1. Intended learning outcomes

The intended learning outcomes tie in with the level and orientation of the programme; they are geared to the expectations of the professional field, the discipline, and international requirements.

Findings

Profile and vision

MGI focuses on solving spatial problems by using geographic information systems (GIS) and earth observation imagery (remote sensing, RS). The programme aims to educate students to become geo-information scientists who can analyse the usability of geo-information in complex spatial problems and develop innovative, interdisciplinary solutions. Students are trained to critically evaluate geo-information

and derive additional information, and to analyse, model, and visualize geodata. MGI combines expertise from various fields, such as information and communication technology, GIS, spatial modelling, statistics, RS, photogrammetry, GPS and mapping, and environmental and social sciences (land use planning, geography, soil science, and communication). The programme emphasizes the integration of GIS and earth observation techniques to develop integrated monitoring systems. MGI centres around geo-information science in the context of environmental and life sciences, and focuses on rural areas and urban fringes. Both elements are in line with the university's profile and mission.

The documentation includes a description of a benchmark in which MGI is compared to similar programmes in the Netherlands. At the moment of the site visit, the programme is in the process of updating the benchmark together with the professional association Geo-Informatie Nederland (GIN). The programme is closely involved in GIN's educational work group in which GIS and RS programmes (academic as well as professional and vocational programmes) across the Netherlands participate. The collaboration within GIN allows MGI to stay informed of developments in the field and to position itself within the context of the current educational offer in the Netherlands related to GIS and RS. Within the GIN network, a benchmark at national level is currently being developed, in anticipation of the possible formation of a national accreditation cluster.

The panel considers MGI's profile to be clear and distinctive. According to the panel, MGI is a well-established programme, known for its expertise in technical geospatial data, particularly in the field of environmental science. The panel appreciates the wide variety of methodologies and applications that are addressed in the programme. It considers the focus on environmental science a strength of the programme. Following from a recommendation from the previous panel to increase the attention for urban issues, the focus on rural versus urban areas was discussed during the site visit. The programme explained that it decided to focus primarily on rural areas but at the same time does not want to leave out urban areas. The panel thinks that the dilemma of rural versus urban areas is a secondary issue: there may be no need to choose between rural and urban areas. Instead, the programme could emphasize its focus on methodologies for addressing environmental problems, which can apply to both rural and urban contexts. The panel encourages the programme to formulate this more accurately in its profile and vision. Subsequently, it could also be communicated more clearly to (prospective) students and the professional field.

Intended learning outcomes

The programme formulated twelve intended learning outcomes (ILOs, see Appendix 1). Four ILOs concern specific knowledge and understanding, three ILOs relate to research skills, and five ILOs refer to generic academic skills and attitude. The documentation includes a table in which the ILOs are linked to the Dublin descriptors. The panel considers the ILOs to be well formulated and appropriate for the academic master's level as described in the Dublin descriptors. The ILOs cover all relevant areas related to the field of geo-information science.

Professional field

The programme has an External Advisory Board (EAB) that is consulted once a year. The EAB consists of various representatives from the professional field and several representatives of similar international programmes. The topics discussed in the EAB meetings include the programme's profile, ILOs and (changes in the) curriculum. The EAB reflects on these aspects in light of developments in the professional field, to see if the programme is (still) aligned to the needs and expectations of the professional field. Based on the documentation and the interviews, the panel concludes that MGI is well connected to the professional field. The composition of the EAB is a good reflection of the professional field, and the EAB appears to function well. The programme receives a lot of input and feedback from the professional field, and is well informed of

the needs, expectations, and developments, which allows the programme to update and align the programme when needed.

Considerations

According to the panel, MGI's profile is clear and distinctive. Strong points include MGI's expertise in technical geospatial data, the wide variety of methodologies addressed in the programme, and the focus on environmental issues. The panel encourages the programme to profile itself primarily by its focus on environmental problems, rather than by a focus on rural areas, as environmental issues can apply to rural as well as urban areas. This profile could be formulated more accurately in the programme's vision and be communicated more clearly to (prospective) students and the professional field. The panel considers the ILOs to be well described and aligned with the academic master's level as described in the Dublin descriptors. The ILOs cover all relevant areas. According to the panel, MGI is well connected to and aligned with the professional field, amongst others through consultation of the EAB.

Conclusion

The panel concludes that the master's programme Geo-Information Science meets standard 1.

Standard 2. Teaching-learning environment

The curriculum, the teaching-learning environment and the quality of the teaching staff enable the incoming students to achieve the intended learning outcomes.

Findings

Curriculum

MGI consists of 120 EC and is offered as a two-year, fulltime programme (see Appendix 2 for a curriculum overview). The first year consists of eight 6 EC courses (48 EC in total) and the 12 EC Academic Master Cluster. The first year starts with two mandatory courses ('Geo-information Science in Context' and 'Geoscripting') in the first period, in which students are introduced to the GIS domain and to programming for applied spatial analysis. A week before the start of the course Geoscripting, students are offered the opportunity to self-assess their programming skills under supervision of staff and the study advisor in Datacamp. When students encounter deficiencies, they can repair these with the help of modules in Datacamp.

From period 2 on, students can choose a number of courses (18-30 EC in total) from clusters of restricted optionals and 6-18 EC of free electives. The number of EC available for free electives depends on students' background and their choice of thesis topic. The programme offers three clusters of restricted optional (RO). The RO 0 cluster offers foundational courses in GIS and RS, meant for students who did not (sufficiently) cover these topics in their pre-education. The RO 1 cluster contains advanced GIS and RS courses, while the RO 2 cluster focuses on (geo) data science and artificial intelligence (AI). Students can compose their own combination of restricted optionals and electives. This is always done in consultation with the study advisor. The flexibility of the programme is much appreciated by the students, as is evident from the documentation and the interviews during the site visit. In the final period of the first year, students take the 'Academic Master Cluster', a compulsory curriculum component for all WU master's programmes. MGI students take the MGI specific Academic Master Cluster 'Remote Sensing and GIS Integration', in which they work on a group project in the geo-spatial domain for an external client.

The second year is dedicated to the thesis (36 EC) and the internship (24 EC). In the thesis, students perform an entire research project individually, under supervision of a staff member. Most of the theses are

supervised by the chair group connected to MGI: 'Laboratory of Geo-information Science and Remote Sensing' (GRS). GRS presents a list of possible thesis topics. Students choose their thesis topic in consultation with the thesis coordinator. At the beginning of the thesis project, there is a go/no-go moment based on a GRS member's review of the thesis proposal. About 2.5 months into the thesis project, the student and the supervisor have a progress evaluation meeting. During the thesis project, students can participate in a thesis ring, which means they have weekly meetings with other thesis students to discuss issues and provide peer feedback on each other's writing. In the internship, students apply their competencies in an external host organization in the professional field. The projects and tasks performed need to be at academic master level. During the internship, students are supervised by a WU supervisor (for progress and evaluation) and a host supervisor (for daily supervision at the host organization). Many students continue working at the host organization after graduation. This is the reason why the internship is scheduled after the thesis in year 2. However, students are free to do the internship earlier in the programme.

The panel considers the curriculum to be well structured, covering all relevant topics. It is a strong and well-balanced curriculum that enables students to achieve the ILOs. The high degree of flexibility is a positive aspect, allowing students to develop their own profile. The panel appreciates the broad scope of methodologies and instruments that are addressed in the courses and the strong focus on the acquisition of technical skills, which is highly relevant in the professional field. Another strong point is Datacamp, which is an excellent way to prepare students for programming courses. The panel is also pleased with the 'fieldwork' opportunities to apply knowledge and skills in real-life contexts, not only in the internship but also in the Academic Master Cluster. According to the panel, this is a very valuable ingredient of the curriculum. The internship, scheduled at the end of year 2, appears to be a good way to allow students to transition smoothly into the professional field. The panel is positive about the well-structured thesis project. It especially appreciates the thesis rings, which are very helpful for the students. There is a good system in place to match students with thesis topics and supervisors. This matchmaking system, which is continually improved by the thesis coordinators, helps to balance supervisors' workload while avoiding waiting lists and possible delays for students.

From the interview, the panel learnt that students feel a need for more coherence in the (mandatory) courses of the first year. The panel recognizes this, and feels that the programme may also pay more attention to the overarching scientific debate on the topics addressed in year 1. The panel recommends the programme to structure the course content more systematically and to visualize learning lines so that students can be made aware of the way courses build on each other. Another way to achieve more coherence, is organizing an event (such as a seminar) in period 6 in which students reflect on everything they learnt in the first year, from a broad perspective. Such a seminar could include state-of-the-art developments, hot topics, and emerging trends in the field. The panel also learnt that the programme is considering developing ribbon courses and/or a more elaborate portfolio throughout the curriculum. At the moment of the site visit, there are pilots and project groups at WU-level looking into how to implement this. Up until now, the programme management decided to monitor these developments but not to implement a ribbon course yet. The panel encourages the programme to continue discussions about these options, as they may help to build more structure and coherence into the curriculum.

Learning environment

The didactic approach in the programme is based on the university's vision on education. This vision emphasizes a focus on high-quality scientific knowledge, a rich learning environment combining knowledge, skills, and attitude, and room for flexible and personalized learning paths. Due to the relatively small number of students (in the past few years, MGI had an intake of around 50-70 students per year) and the strong

connection to one chair group (GRS), MGI is characterized by a small-scale, close-knit environment in which students and staff know each other and work closely together. The programme uses a lot of interactive, hands-on teaching methods, like (group and individual) assignments and exercises. Each course provides a theoretical basis and allows students to apply the theory to (real-life) cases or scenarios. For students who are working on their thesis, a workspace is available called the 'thesis room'. The thesis room is located close to the GRS staff, allowing for frequent (informal) contacts between the students and staff. The interview with students made clear that the thesis room is much appreciated by them.

The panel is positive about the programme's didactical approach, which reflects a good combination of theory and hands-on practice. The close-knit environment, including facilities like the thesis room, provides students with a strong learning environment. The panel also appreciates the group work incorporated in the programme, allowing students to develop collaboration skills. In the group projects, students learn from others as they each bring different sets of experience and expertise to the group.

Language of instruction
MGI has an English name and is taught in English. This is in line with the university-wide policy for its master's programmes. The international classroom is one of the basic educational principles at the university, allowing students to develop their skills with regard to international collaboration and dealing with diversity of cultures and perspectives. The panel agrees with MGI's argumentation for an English-taught programme and an English name. The panel considers the international classroom to be a very valuable feature of the programme. Also, the programme's international orientation flows logically from the international nature of the academic and professional field, where the vast majority of the discourse is in English. According to the panel, English proficiency is essential for keeping up with developments in the field. Therefore, an English-taught programme allows students to be prepared for this international field.

Admission
The admission criteria are laid down in the Education and Examination Regulations (EER). Applications should include relevant diplomas, grade transcripts, a CV, and a motivation letter. They are decided on by an Admission Board, consisting of MGI's programme director and study advisor. The admission requirements of MGI include sufficient proficiency in English and a bachelor's degree in a relevant discipline. Relevant bachelor's degrees are stipulated in the EER and pertain to the WU bachelor's programmes 'Forest and Nature Conservation', 'International Land and Water Management', 'Landscape Architecture and Spatial Planning', and 'Soil, Water, Atmosphere', or any equivalent of these programmes. MGI requires prior knowledge (equivalent to at least 6 EC) in at least two of the following topics: GIS, RS, and programming skills. For students who are not directly admissible, the programme offers a premaster's programme that can be customized to individual students, to target their specific deficiencies. The panel considers the admission criteria to be clear and appropriate for the programme. It is happy to see that MGI is open to a variety of different bachelor backgrounds, as this strengthens the breadth of the programme. The domain expertise that students bring from their bachelor backgrounds, is essential to the field of MGI.

Feasibility
The documentation shows that there is a reasonable study delay in the programme. Over the past few years, between 12-30% of the students graduated within two years. About two-thirds graduated within three years. In the cover letter and the interviews, the programme indicated that, besides personal circumstances, part of the delay is caused by the high number of students who follow two master's programmes, take extra courses, and/or do extracurricular activities, such as working as a student assistant. In the interview, students indicated that the programme is doable within two years. International students with a scholarship usually succeed at finishing in time. The staff is reluctant to put a lot of pressure on students to graduate in

time at the cost of extra courses or extracurricular activities, which seems to match with the university's student-centred and somewhat lenient culture. The panel believes that the programme is feasible within two years. Delay is often a deliberate choice of students, as is evident from the interviews. The panel sees that students are happy in this environment, which is a positive aspect overall. On the other hand, delays need to be minimized where possible, according to the panel. In this light, the panel appreciates the proactive measures taken by the programme, including the close monitoring of student progress, and the recent university-wide formalization of the thesis trajectory. This thesis policy includes a deadline for the thesis project, which can only be extended beyond two months after approval of the Examining Board.

Guidance
Information about the programme and courses can be found in the online Study Handbook, the course guides, and on the online learning platform Brightspace. Also, an MGI information booklet is available with elaborate information on the curriculum, guidance, schedules and the student association. Student guidance is organized according to the university's 'Study Advice Service Level Commitment'. This policy stipulates the role, responsibilities and tasks of study advisors for various student groups. MGI has one dedicated study advisor. In the interview, the study advisor explained that she contacts all enrolled students in the summer before the start of the programme. In these intakes, the required/preferred choice of (restricted) electives is discussed considering the student's prior education. Based on the intake and Datacamp, some students are advised to train themselves in specific programming languages. During the first period, the study advisor gets in touch with the students to further discuss their ambitions. Students then also have a chance to talk to second-year students. Another meeting with the study advisor is planned halfway through the year. Besides these moments, the study advisor is always available, for advice on individual learning trajectories, and for students who struggle with their study due to personal issues. Students are very positive about the study advisor and the guidance during the programme, as is evident from the interview.

The panel concludes that the information provision and guidance are in order. The panel is very positive about the programme's dedicated study advisor, who is particularly important in light of the flexibility in the programme, to help students make informed choices. The study advisor also has a vital role in preparing the diverse influx for the courses in the programme and preventing any possible deficiency issues for students. The study advisor is well informed about the curriculum and has a strongly personal, student-centred and proactive attitude. A good system of guidance is in place, ensuring that all students have timely and equal access to the study advisor.

Apart from student guidance, the programme also pays attention to creating networking opportunities and spaces for students to meet with staff and alumni. The thesis room is one example of this. Another example is the annual career day in which alumni are invited to share their experiences with the transition from MGI to their first job. With regard to the thesis project, the thesis coordinators play an important role in student guidance, as they match students with thesis topics and supervisors. The same applies to the internship coordinator, who supports students in finding a suitable internship. All in all, the panel concludes that student guidance in MGI is of high quality.

The facilities for students with disabilities are laid down in the university's policy regarding studying with a disability. Students can appeal to the student dean to request modifications in education and/or exams. In most cases, a statement from the student psychologist or student doctor is required. The student dean sends the request to the Examining Board. The panel considers the facilities for students with a disability to be appropriate and sufficient.

Teaching staff
MGI is taught by a team of 34 teachers. The majority of the teachers are connected to GRS. About a third is associated with several other chair groups, including 'Information Technology' and 'Artificial Intelligence'. The documentation and the interviews show that students are content with the teachers and appreciate their enthusiasm and approachable attitude. The panel is positive about the teaching staff. The teaching team represents a diverse range of topical expertise and perspectives. The team is international, which enriches the learning environment. The panel also appreciates teachers' student-centred, personal, and approachable attitude towards students.

Most teachers (29 out of 34) hold a University Teaching Qualification (UTQ) or are in training to obtain one. In the interview, the programme management explained that two teachers from the team will start a Senior University Teaching Qualification (SUTQ) trajectory next year. The panel applauds the SUTQ ambitions. It also thinks that the number of teachers with a UTQ should be further improved. In the interview, the programme management explained that the overview in the documentation may not give a complete picture of the didactical qualifications of the teachers. For example, the overview mainly shows UTQ's that were awarded by the WU, whereas some teachers have obtained a UTQ (or equivalent) at another university. The university-wide policy is that every teacher is required to hold a UTQ, with no exceptions. The panel was informed that a new policy on the registration of the UTQ is being implemented at the university, which will solve the problems described. The panel underlines the importance of correct and complete registration of the didactic qualifications of teachers.

This also includes qualifications regarding proficiency in the English language. No registration of English proficiency was available in the documentation. However, based on the interviews, the panel is positive about the English proficiency of teachers and has no reason to suspect any problems in this area, as no complaints were voiced. Nevertheless, the panel does think that the registration of English proficiency should be improved. The university's language policy requires teachers to take English tests and/or training programmes, but a complete registration of this is missing. The panel underlines the importance of a complete registration system for English proficiency.

Because of the small-scale character of MGI, the teachers are closely connected with each other and work as a team. The interviews made clear that, due to the close-knit environment, there is a lot of (informal) communication and alignment among teachers. The programme explained that alignment between courses is relatively easy to ensure because of the short communication lines and because teachers often teach in multiple courses. Calibration of grading usually also happens organically, as some courses are taught and assessed by a team of multiple teachers. Besides the informal alignment, there is an educational retreat once every two years in which the team examines the alignment within the curriculum. Although the panel understands the advantages of the close-knit teaching team, it also thinks that it presents potential challenges. The programme may rely on this informal culture too much, and, as a result, not be sufficiently aware of the pitfalls. The informal nature of many processes may lead to overlooked weaknesses or mistakes and an over-reliance on personal relationships for alignment. The informal approach may work most of the time, especially when no major problems arise, but it is vulnerable when substantial failures occur. These are hard to tackle based on an informal culture. Therefore, the panel recommends the programme to reflect on the communication, calibration, and alignment processes and to formalize procedures to elevate the quality assurance culture.

Considerations

According to the panel, the curriculum is well designed. A positive aspect is the high degree of flexibility. The panel also appreciates the broad scope of methodologies addressed in the courses and the strong focus on the acquisition of technical skills. The curriculum incorporates ample opportunities to apply knowledge and skills in real-life contexts, such as in the internship and the Academic Master Cluster. Students are enabled to prepare themselves for the programming courses in Datacamp, offered before the start of the academic year. The thesis project and the matching of students with thesis topics and supervisors are well structured. The panel recommends the programme to structure the course content in year 1 more systematically and to visualize learning lines to increase awareness of how courses build on each other. Also, the programme may organize an event in period 6 to create an opportunity for the overarching scientific debate on the topics addressed in year 1. Furthermore, the panel encourages the programme to consider implementing a ribbon course and/or portfolio throughout the curriculum.

MGI is taught in English, which, according to the panel, flows logically from the international nature of the academic and professional field. The programme's didactical approach reflects a good combination of theory and hands-on practice. There is also a fine balance between individual and group work. In group projects, students can develop collaboration skills and learn from others as they each bring different sets of experience and expertise to the group. There is a strong learning environment, thanks to the close-knit and small-scale nature of the programme.

The admission criteria are clear and appropriate. The panel believes that the programme is feasible, and is happy to see that the programme actively monitors the study progression of students. Student guidance is of high quality. Besides the thesis and internship coordinators, the dedicated study advisor has an important role in student guidance. The study advisor supports students in making informed choices regarding (restricted) electives and has a vital role in preparing the diverse influx for the courses and preventing any possible deficiency issues for students. The study advisor has a strongly personal, student-centred and proactive attitude. According to the panel, the facilities for students with a disability are appropriate and sufficient.

The teaching team represents a diverse range of topical expertise and demonstrates a student-centred, personal, and approachable attitude towards students. The teachers are didactically qualified and have sufficient proficiency in English. Due to the close-knit environment, there is a lot of informal communication and alignment within the teaching team. Although the panel sees the advantages of this, it also stresses the importance of more formalized structures, to prevent overlooked weaknesses and an over-reliance on personal relationships for alignment. The panel recommends the programme to reflect on the communication, calibration, and alignment processes and to formalize procedures to elevate the quality assurance culture.

Conclusion

The panel concludes that the master's programme Geo-Information Science meets standard 2.

Standard 3. Student assessment

The programme has an adequate system of student assessment in place.

Findings

Assessment system

Assessment in the programme is based on the university's education assessment policy, which describes how assessment should be designed and structured in each programme. It also describes the roles and responsibilities of various actors and the assessment quality assurance cycle. The vision for assessment described in this policy emphasizes constructive alignment, which is visualized in the programme's assessment matrix. This matrix demonstrates how the programme's ILOs relate to the courses, and where and how each ILO is assessed. The documentation includes MGI's assessment matrix, which shows that all ILOs are assessed in multiple courses, allowing students to achieve the final exit level in all areas. The matrix also shows that each course is assessed through multiple assessment methods. The various tests in each course are related to the course learning outcomes as well as the ILOs. Also, for each course learning outcome, the cognitive dimension is described (remember, understand, apply, analyse, evaluate, create).

The panel considers assessment in MGI to be well designed, covering all ILOs. The assessment matrix provides a good overview of assessment in the programme, demonstrating solid constructive alignment. The panel appreciates the link to the cognitive dimensions. A wide variety of appropriate (hands-on) assessment methods is applied, such as written tests, (group) assignments, reports, posters, presentations, oral tests, and reflections.

Thesis assessment

The thesis is the final student project in which students demonstrate that they have achieved the ILOs. In the course of the thesis trajectory, students present their project and preliminary results in a midterm presentation. At the end of the project, the thesis is assessed based on a written report, a (public) oral presentation, and a defence. The thesis is assessed by two assessors: the supervisor and a second assessor. They independently assess the thesis, based on a university-wide thesis assessment form. The thesis assessment form contains several criteria/categories that need to be scored. Based on the scores and weighting of the separate criteria, the overall grade is calculated.

According to the panel, the thesis assessment procedure is well set up. The panel is pleased to see that the four eyes principle is applied. It also appreciates the extensive rubrics in the assessment form. As part of the preparation for the site visit, the panel reviewed a sample of 15 theses from the programme, including the filled-in assessment forms. The panel agrees with the grades awarded to the theses included in the sample. It is generally positive about the assessment process demonstrated in the forms. The procedure is transparent and scores are substantiated with written feedback. The panel does think that the written feedback could be further improved. The underpinning of the sub-scores is not always sufficiently elaborate. This issue was also pointed out by the Examining Board. The panel advises the programme to make sure that (sub) scores are substantiated with sufficient written feedback. Related to this, the panel recommends the programme to organize calibration sessions regarding thesis assessment.

Examining Board

MGI falls under the responsibility of the Examining Board of Environment and Landscape (EBEL). EBEL is responsible for all programmes in the cluster Environment and Landscape. Besides appointing examiners and handling requests and complaints, EBEL performs several activities to safeguard the programme's

assessment quality. Two important activities in this respect are the evaluation of course assessment strategies during chair group visits and the review of samples of theses. Each chair group is visited at least once every five years. Prior to a chair group visit, all courses hosted by the chair group are evaluated by EBEL. The results of these evaluations are then discussed with the chair group during the visit. EBEL also performs thesis reviews. The documentation includes the report of a MGI thesis review performed in 2023. In the interview with representatives of EBEL, it became clear that, besides chair group visits and thesis reviews, EBEL meets with MGI's PC each year, to investigate the constructive alignment at programme level.

The panel considers EBEL to be independent, competent, and in control. The previous panel felt that there was too much distance between EBEL and the programme. The current panel sees improvements, such as the yearly meetings between EBEL and the PC, have been made. The panel appreciates the thorough chair group visits EBEL performs to safeguard the quality of assessment in courses. The panel is pleased to see that EBEL is proactive regarding AI policies. It is clear that valuable discussions take place about how AI may be used by students in an ethical and responsible way. These discussions are aligned with the university-wide developments in this area.

In the thesis review from 2023, EBEL pointed out an issue with two theses included in the sample. These two theses had been assessed based on an old assessment form. Based on the applicable assessment form, these theses should have been graded a fail instead of a pass. The panel discussed this situation with the programme in several interviews. EBEL and the programme management explained that the programme took the issue very seriously. Because of the new thesis registration system (Osiris), issues like these can no longer occur. The panel is happy to see that serious measures were taken and is confident that such problems will not arise again, thanks to the new procedures in Osiris.

Considerations

The panel considers the assessment in the programme to be well designed, allowing students to achieve the final exit level for all ILOs. The assessment matrix demonstrates solid constructive alignment. The programme uses a fine diversity of appropriate assessment methods. The assessment procedure for the thesis is well structured. Each thesis is assessed by two assessors, based on an elaborate form, including written feedback. According to the panel, the written feedback could be improved. The panel advises the programme to make sure that (sub) scores are substantiated with sufficient written feedback. Related to this, the panel recommends the programme to organize calibration sessions regarding thesis assessment. The panel considers EBEL to be independent, competent and in control. It is proactive in safeguarding the quality of assessment and the exit level, amongst others by performing chair group visits, thesis reviews, and reflection on the constructive alignment at programme level.

Conclusion

The panel concludes that the master's programme Geo-Information Science meets standard 3.

Standard 4. Achieved learning outcomes

The programme demonstrates that the intended learning outcomes are achieved.

Findings

Theses

As mentioned earlier, the thesis is regarded as the final student project, demonstrating the achieved level of students. The panel reviewed a sample of 15 theses from the programme. The panel concludes that the theses are of a high quality, reflecting a level that is appropriate for an academic master's programme. The theses are based on substantial research projects and are methodologically and scientifically robust. They demonstrate a high level of writing, knowledge, and skills. According to the panel, some theses are of excellent quality, potentially publishable with additional revisions.

Alumni

It is evident from the documentation and interviews that graduates of MGI have good employment opportunities. Quite a few students continue working at the organization of their internship. Graduates clearly have the required knowledge and skills for the professional field, and they find work relatively easily. In the interview, alumni indicated they felt well prepared for the professional field. With regard to career preparation, they especially found the internship and the Academic Master Cluster helpful. Alumni find jobs in sectors such as trade & industry, government, education & research, and consultancy. Employers are satisfied with alumni from MGI.

Considerations

Based on the review of a sample of 15 theses from the programme, the panel concludes that the level demonstrated in the theses is appropriate for an academic master's programme. The documentation and the interviews indicate that graduates of MGI are well prepared for and prove to be successful in the professional field.

Conclusion

The panel concludes that the master's programme Geo-Information Science meets standard 4.

General conclusion

The panel's assessment of master's programme Geo-Information Science is positive.

Development points

1. Structure the course content in year 1 more systematically and visualize learning lines to increase awareness of how courses build on each other. Possibly, the programme may organize an event in period 6 to create an opportunity for the overarching scientific debate on the topics addressed in year 1. The programme may also consider implementing a ribbon course and/or portfolio throughout the curriculum.
2. Reflect on the communication, calibration and alignment processes within the teacher team and formalize procedures to elevate the quality assurance culture.

Appendix 1. Intended learning outcomes

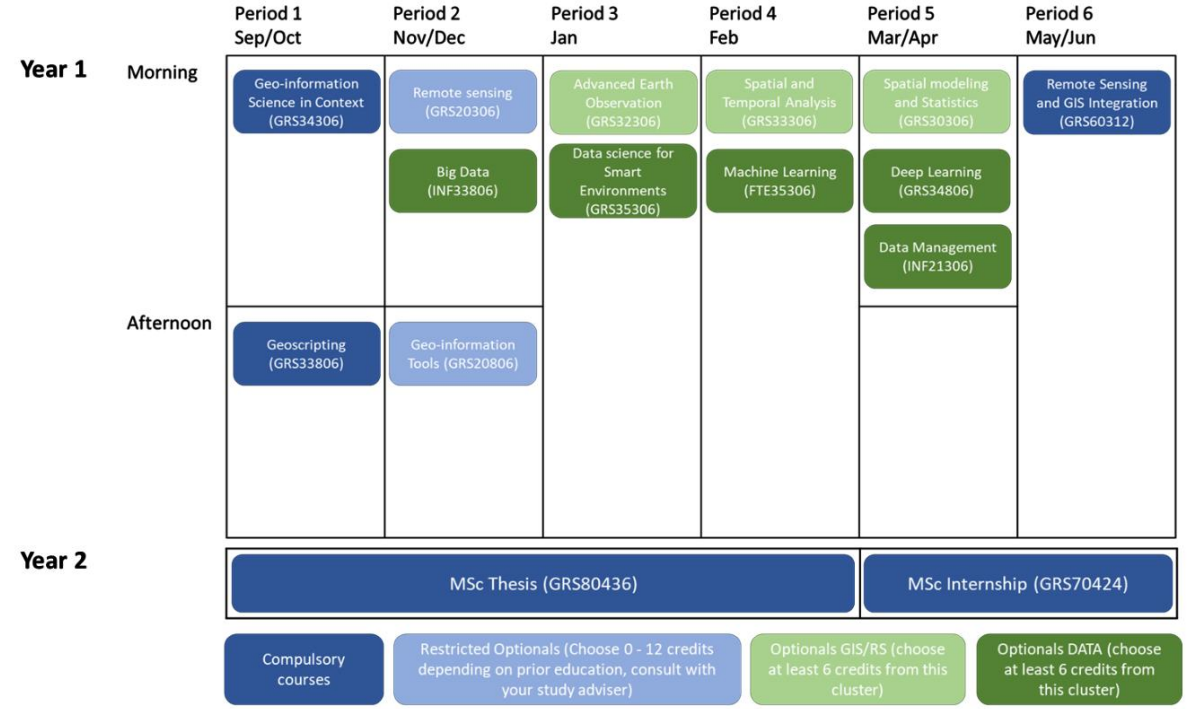
MSc Geo-Information Science

After successful completion of this Msc programme graduates are expected to be able to:

			Dublin descriptors: Have knowledge and understanding	Apply knowledge and understanding	Make judgements	Communication	Learning skills
Domain Specific knowledge and understaning	1	Explain the basic theories, concepts and methods in the field of geo-information science and remote sensing	x				
	2	Apply knowledge from the domains of geo-information science and remote sensing and programming skills for the acquisition, storage, analysis, visualization and dissemination of spatial d		x			
	3	Investigate and judge the usability of geo-information in complex spatial problems in domains related to natural resources, living environment, food production and human society		x	x		
	4	Create geo-information solutions for spatial problems in an interdisciplinary application domain		x	x		
Research qualifications	5	Analyze concepts, approaches and methods and reflect upon scientific literature, with special reference to the field of geo-information science and remote sensing		x	x		
	6	Design a research plan in the field of geo-information science and remote sensing by integrating adequate methods and techniques to collect, process and interpret data		x	x		
	7	Carry out a research in the field of geo-information science and remote sensing and judge on the quality for the different phases of the scientific research process		x	x		
Generic academic skills and attitudes	8	Communicate clearly orally, in writing and by visualizing the outcomes of research and design projects and discuss these results with specialists and non-specialists				x	
	9	Function effectively as a specialist in international multidisciplinary teams with an active and critical attitude		x		x	x
	10	Respond to social, organizational, scientific, multicultural and ethical issues that are encountered in the field of geo-information science and remote sensing		x	x		
	11	Reflect critically on their results and performance, as well as on those of colleagues			x		x
	12	Design and plan their own learning processes through continuous reflection on and experiences gained in the domain of geo-information science and remote sensing.					x

Appendix 2. Programme curriculum

MSc Geo-Information Science program overview



The program may change; no rights can be derived from this overview

Appendix 3. Programme of the site visit

Panel visit MGI, January 29, 2025

January, 29	Session	
8.30-8.45	Welcome	
8.45-9.15	Panel preparation	
9.15-10.00	Interview programme management	• Programme Director • Chair Programme Committee (PC) • Student-member PC and Daily Board • Dean of Education • Member Board of Education
10.00-10.30	Internal deliberations panel	
10.30-11.15	Interview students and alumni	• Student, year 2 • Student, year 2 • Student, year 2 • Student, year 2 • Student, year 2 • Student, year 2 • Student, year 1 • Alumnus, employed at ISRIC (World Soil Information) • Alumnus, Employed at Sweco
11.15-11.30	Break	
11.30-12.15	Interview teaching staff	• Lecturer, Chair holder GRS (RS) • Lecturer GRS (RS), PC member, internship coordinator • Lecturer GRS (GIS), PC member • Lecturer GRS (RS), Education Coordinator • Lecturer GRS (GIS) • Lecturer GRS (RS), thesis coordinator • Lecturer SGL (Soil geography and Landscape) • Lecturer FTE (Agricultural Biosystems Engineering)
12.15-13.15	Lunch	
13.15-14.00	Board of Examiners Examining Board + Study Advisors	• Chair Examining Board • Secretary and member Examining Board • Member Examining Board • Study advisor
14.15-15.15	Thematic Session	• Member Academic Admission Committee • Lecturer, member PC • Lecturer, member PC • Lecturer, course coordinator p1 and p6 • Programme Director • Student-member PC and Daily Board • Student-member PC • Student-member PC

15.15-16.00	Internal deliberations panel	
16.00-16.30	Concluding session programme management	• Programme Director • Chair Programme Committee (PC) • Student-member PC and Daily Board • Dean of Education • Member Board of Education
16.30-17.15	Internal deliberations panel	
17.15-17.45	Oral presentation of preliminary findings	
17.45	Drinks	

Appendix 4. Materials

Prior to the site visit, the panel studied 15 theses of the master's programme Geo-Information Science. Information on the theses is available from Academion upon request.

The panel also studied other materials, which included:

- Cover letter accreditation MGI
- Reading guide
- General information WU
  - Administrative data of MGI
  - Governance structure and the organization of WU Degree Programmes
  - WU Vision for Education 2017
  - Education and Examination Regulations WU 2024-2025 (general part)
  - Framework for education WU 2024-2025
  - Assessment policy WUR 2023
  - Study Advice Service level commitment
  - Academic Calendar WUR 2024-2025
  - Provisions for students with impairments
  - UTQ Policy and registration Sep 2024
- General information MGI
  - Education monitor MGI Oct 2023
  - Student SWOT MGI 2023
  - NSE 2024 MGI factsheet
  - MGI admission procedure & requirements
- Standard 1
  - MGI's ILOs, Dublin descriptors and profile
  - Composition External Advisory Board MGI 2024
  - Reports External Advisory Board (2021-2024)
- Standard 2
  - Study programme MGI (curriculum 2024-2025)
  - Recent changes in MGI programme
  - List of teaching staff MGI 2024-2025
- Standard 3
  - Relation ILOs and courses
- Standard 4
  - MGI employment 2022 including PhD
  - LinkedIn analysis MGI graduates 2021-2023
  - First job MGI alumni 20 years MGI celebrations
- Course materials from 3 selected courses
- Thesis and internship
  - MSc thesis course guide WU 2024-2025
  - MSc internship course guide WU 2023-2024
  - Rubric MSc thesis WU 2024-2025
  - Rubric MSc internship WU 2024-2025
- Examining Board
  - Annual reports from 2020-2023

    - Thesis review report EBEL 2023
    - Rules and Regulations Examining Boards WU 2023-2025
- Programme Committee: annual reports from 2021-2024
- Student support and guidance
    - Communication to students form study advisor
        - Information on study delay
        - Information on Programming DAY (1 week before start academic year)
        - Various information-mails to students
        - MGI Information booklet 2024-2025
        - Who What WUR 2024-2025
    - Brightspace page MGI
    - MGI programme and your future GI career 2024
    - Thesis
        - Thesis Brightspace page
        - Thesis guideline 2024
        - Call for new GRS thesis topics
        - GRS thesis and internship info lunch meeting
    - Internship
        - Internship Brightspace page
        - MGI Internship guidelines 2024
        - Call for new GRS thesis topics
        - GRS thesis and internship info lunch meeting