Assessment report
Limited Framework Programme Assessment

Master Geographical Information Sciences

VU Amsterdam

Contents of the report

1. Executive summary

In this executive summary, the panel presents the main considerations which led to the assessment of the quality of the Master Geographical Information Sciences programme of VU Amsterdam, which has been assessed according to the standards of the limited framework, as laid down in the NVAO Assessment framework for the higher education accreditation system of the Netherlands, as published on 20 December 2016 (Staatscourant nr. 69458).

The programme is well-organised and thoroughly embedded in the School of Business and Economics. The panel noted the programme to be economically viable. For the School, the programme may also be regarded to be a valuable investment in new digital learning methods.

In the panel's view, the programme objectives are sound and relevant, cover the programme domain comprehensively, meet the international requirements very adequately and are in tune with current trends in the domain. The panel considers the objectives with respect to the research orientation and academic level of the to be strong, especially taking the post-initial academic nature of the programme into account.

The post-initial characteristics of the programme are reflected in students being educated to address complex, interdisciplinary problems in the professional field. The panel welcomes the programme being in close contact with organisations in industry and government.

The panel regards the intended learning outcomes of the programme to be well-articulated, to meet the programme objectives and to express the innovative goals of the programme. The intended learning outcomes meet the master level.

The panel recommends to increase the number of incoming students and to limit the fluctuations in the student body composition. Although the panel considers the average proportion of incoming students with master degrees to be acceptable, the panel advises to raise the proportion of these students.

The panel is positive about the contents of the curriculum. The curriculum meets the intended learning outcomes of the programme. The courses and workshops address both the theoretical knowledge of the domain and the research and academic skills on this master level adequately. The panel was pleased to hear a course on visualisation being added, as a course on cartography/geo-visualisation has been lacking. The Master thesis is a solid curriculum component in terms of research and academic skills. Although the curriculum as a whole is satisfactorily coherent, the panel suggests to organise the second year more consistently, allowing the specialisations to come out more clearly.

The lecturers in the programme are very motivated. The panel welcomes the lecturers being researchers at SPINlab, as this ensures current research nurturing the programme. The educational capabilities of the lecturers are satisfactory, although the proportion of BKO-certified lecturers lags somewhat behind. The panel regards, however, the BKO-obligation for newly recruited lecturers as positive. The panel noted the appreciation of the students for their lecturers.

The panel considers the admission requirements to be clear and the admission processes to be elaborate and well-organised. The panel welcomes the pre-master programme for categories of incoming students. The panel proposes, however, to articulate the admission requirements in more straight terms and to manage the intake of students more strictly.

The panel appreciates the teaching-learning environment of the programme. The transition from the purely distant-learning set-up to the blended-learning set-up enhances the variety of study methods deployed, promotes direct contact between lecturers and students and allows students being trained more intensively in academic skills. The panel feels the balance between the flexibility for the students and the teaching efficiency is up to standard. The number of contact hours and the students-to-staff ratio (24/1) are adequate. The panel suggests to raise the student success rates, as they are not very favourable.

The programme examinations and assessment rules and regulations are appropriate, these being in line with VU Amsterdam and School of Business and Economics guidelines and policies. Although the Examination Board for the programme has adequate responsibilities, the panel suggests to have the School Examination Board monitor the programme examinations and assessments.

The individual theoretical and practical assignments as examination methods have been conscientiously chosen and provide adequate assurance, that students met the course goals. The Master thesis manual is comprehensive and elaborate. The Master thesis supervision is appropriate and the assessments are conducted reliably, involving two or three examiners and scoring forms with relevant assessment criteria.

The panel is positive about the measures programme management and the Examination Board have taken to ensure the quality of the examinations and assessments.

The course examinations, which the panel reviewed were up to standard.

The Master theses the panel studied, match the intended learning outcomes. The theses are generally solid studies, based on well-structured research and well-organised in terms of text and illustrations.

In terms of achieved learning outcomes, the panel regards this programme to be able to compete with two-year programmes in this domain. As professionals, the programme graduates make good use of the programme knowledge and skills for their careers.

The panel that conducted the assessment of the Master Geographical Information Sciences programme of VU Amsterdam assesses this programme to meet the standards of the limited framework, as laid down in the NVAO Assessment framework for the higher education accreditation system of the Netherlands, judging the programme to be satisfactory. Therefore, the panel advises NVAO to accredit the programme.

Rotterdam, 16 October 2018

Prof. dr. H.F.L. Ottens
(panel chair)

drs. W. Vercouteren
(panel secretary)

2. Assessment process

The evaluation agency Certiked VBI received the request by VU Amsterdam to manage the limited framework programme assessment process for the Master Geographical Information Sciences programme of this University. The objective of the programme assessment process was to assess whether the programme would conform to the standards of the limited framework, as laid down in the NVAO Assessment framework for the higher education accreditation system of the Netherlands, published on 20 December 2016 (Staatscourant nr. 69458).

Having conferred with management of the VU Amsterdam programme, Certiked invited candidate panel members to sit on the assessment panel. The panel members agreed to do so. The panel composition was as follows:

- Prof. dr. H.F.L. Ottens, professor emeritus Social Geography, Geographical Information Sciences specialisation, Utrecht University (panel chair);
- Dr. G. Wallentin, associate professor Geoinformatics and Ecology, director of studies UNIGIS programme, University of Salzburg (panel member);
- Dr. S.C. van der Spek, associate professor Urban Design, Delft University of Technology (panel member);
- C. Amsing, CIO Office trainee, former student Master Geographical Information Management and Applications (student member).

On behalf of Certiked, drs. W. Vercouteren served as the process coordinator and secretary in the assessment process.

All panel members and the secretary confirmed in writing being impartial with regard to the programme to be assessed and observing the rules of confidentiality. Having obtained the authorisation by the University, Certiked requested the approval of NVAO of the proposed panel to conduct the assessment. NVAO have given their approval.

To prepare the assessment process, the process coordinator convened with management of the programme to discuss the outline of the self-assessment report, the subjects to be addressed in this report and the site visit schedule. In addition, the planning of the activities in preparation of the site visit were discussed. In the course of the process preparing for the site visit, programme management and the Certiked process coordinator regularly had contact to fine-tune the process. The activities prior to the site visit have been performed as planned. Programme management approved the site visit schedule.

Well in advance of the site visit date, programme management provided all of the final projects of graduates of the programme of the years 2013 to 2017.

The panel chair and the panel members were sent the self-assessment report of the programme, including appendices. In the self-assessment report, the student chapter was included. In addition, the expert panel members were forwarded a number of final projects of the programme graduates.

The assessment panel chair and the process coordinator discussed the assessment process procedures and the site visit schedule. The panel chair was informed about the profile of panel chairs of NVAO, serving as the briefing for panel chairs, as meant in the NVAO profile of panel chairs.

Prior to the date of the site visit, all panel members sent in their preliminary findings, based on the self-assessment report and the final projects studied, and a number of questions to be put to the programme representatives on the day of the site visit. The panel secretary summarised this information, compiling a list of questions, which served as a starting point for the discussions with the programme representatives during the site visit.

Shortly before the site visit date, the complete panel met to go over the preliminary findings concerning the quality of the programme. During this meeting, the findings of the panel members, including those about the final projects were discussed. The procedures to be adopted during the site visit, including the questions to be put to the programme representatives on the basis of the list compiled, were discussed as well.

On 29 June 2018, the panel conducted a site visit on the VU Amsterdam campus. The site visit schedule was in accordance with the schedule as planned. In a number of separate sessions, panel members were given the opportunity to meet with Faculty Board representatives, programme management, Examination Board representatives, lecturers and final projects examiners, and students and alumni.

In a closed session at the end of the site visit, the panel considered each of the findings, weighed the considerations and arrived at conclusions with regard to the quality of the programme. At the end of the site visit, the panel chair presented a broad outline of the considerations and conclusions to programme representatives.

Clearly separated from the programme assessment process, assessment panel members and programme representatives met to conduct the development dialogue, with the goal to discuss future developments of the relevant scientific fields and the consequences for the programme.

The assessment draft report was finalised by the secretary, having taken into account the findings and considerations of the panel. The draft report was sent to the panel members, who studied it and made a number of changes. Thereupon, the secretary edited the final report. This report was presented to programme management to be corrected for factual inaccuracies. Programme management were given two weeks to respond. Having been corrected for these factual inaccuracies, the Certiked bureau sent the report to the University Board to accompany their request for re-accreditation of this programme.

3. Programme administrative information

Name programme in CROHO:	M Geographical Information Sciences
Orientation, level programme:	Academic Master (post-initial)
Grade:	MSc
Number of credits:	60 EC
Specialisations:	Geographical Information Systems Geographical Information Science Geographical Information Systems and Management Geographical Information Systems and Environment
Location:	Amsterdam
Mode of study:	Part-time, three years, distance learning programme in English
Registration in CROHO:	75040
Name of institution:	VU Amsterdam
Status of institution:	Government-funded University
Institution's quality assurance:	Approved

4. Findings, considerations and assessments per standard

4.1 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
The Master Geographical Information Sciences programme is one of the seventeen post-graduate master programmes of the School of Business and Economics of VU Amsterdam. These post-graduate programmes are meant for mid-career professionals, who want to advance their careers. The School comprises four bachelor programmes and seven regular master programmes as well. The School Board, chaired by the dean has the authority to deliver the programmes and ensure the quality of the programmes. Being assisted by the programme coordinator, the programme director takes care on a day-to-day basis of the design, contents, scheduling and quality of the programme. The Programme Committee, being composed of equal numbers of lectures and students, advises programme management on the programme quality. The Examination Board, specifically installed for this programme, monitors the quality of examinations and assessments. Academic staff are employed at the SPINlab research group and are recruited to lecture in the programme. In this post-initial or post-graduate programme, students are charged cost-based tuition fees. Tuition fees are mostly paid for by employers.

The domain of geographical information sciences is concerned with the collection, storage, analysis, communication, distribution and use of geospatial information to support scientific, commercial or civic processes, by integrating geography, geodesy, cartography, photogrammetry, remote sensing and computer science. The objectives of this programme are to educate students to integrate and synthesise information from these sources and to create geographical information sciences applications. The programme is interdisciplinary, as the disciplines mentioned are integrated to arrive at new forms of communication and collaboration. Programme management drafted the domain-specific reference framework for this domain, using internationally accepted notions. The programme meets the domain-specific requirements. Geographical information sciences is a new and rapidly evolving field. The programme intends to keep up with and absorb new trends.

The programme is one of the founders of the UNIGIS consortium, which is composed of university programmes and study centres across the globe. The UNIGIS membership allows the programme to develop and update study material in collaboration with partner institutions and to exchange students with other members.

Programme management conducted a survey, comparing the programme to similar programmes in the Netherlands. Apart from similarities in contents, the VU Amsterdam programme distinguishes itself by being a part-time programme, meant primarily for students already working in this field.

The programme aims to familiarise students with practical applications and aims to educate students to address and solve real problems in the professional practice, based on the knowledge of theoretical concepts. As the programme is specifically geared towards educating students for the professional field, programme management maintains regular contacts with a range of industry and government partners, both in the Netherlands and abroad. In addition, programme management recently installed an advisory board with representatives from the professional field.

The programme objectives have been translated into the programme intended learning outcomes. These include, among others, state-of-the-art theoretical and technological knowledge and skills in this domain, academic research skills in the programme domain, problem-solving skills for complex, real-life geo-spatial problems and communication skills in this field.

Programme management drafted a table from which the matching of the intended learning outcomes to the Dublin descriptors for master programmes may be inferred.

Considerations
The panel regards the programme to be well-organised and to be thoroughly embedded in the School of Business and Economics. The panel noted the programme to be economically viable despite the limited intake for the full master program. Courses are also taken by students studying for certificates. For the School, the programme may also be regarded to be a valuable investment in new digital learning methods.

The programme objectives are sound and relevant. In the panel's opinion, these objectives cover the programme domain comprehensively, meet the international requirements very adequately and are in tune with current trends in the domain. The panel considers the objectives with respect to the research orientation and academic level to be strong, especially taking the post-initial academic nature of the programme into account.

The programme's post-initial characteristics are reflected in students being educated to address complex, interdisciplinary problems in the professional field. The panel welcomes the programme being in close contact with organisations in industry and government.

The panel regards the intended learning outcomes of the programme to be well-articulated, to meet the programme objectives and to express the innovative goals of the programme. The panel has established the intended learning outcomes to conform to the master level, this being exemplified by the Dublin descriptors for master programmes.

Assessment of this standard
These considerations have led the assessment panel to assess standard 1, Intended learning outcomes, to be good.

4.2 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
The number of incoming students in the last few years, was on average about 17 students, ranging from 10 students in 2015 to 20 students in 2017 and 26 students in 2011. The backgrounds of students are bachelor degrees from higher vocational education institutes (on average 20 % of the students in the last seven years), academic bachelor degrees (about 30 % of the students in these years) and academic master degrees (about 50 % of the students in these years). The proportions of these groups may differ across the years. Most incoming students have professional experience in this field (about 60 % to 70 % over the years) and formal training in this domain (about 80 % over the years). The minority of students have no professional experience in this field. The student body is rather heterogeneous in terms of backgrounds. On average, 30 % to 40 % of the students come from abroad. These numbers differ across the years.

The curriculum of the programme takes three years, the total study load being 60.0 EC. Programme management presented a table, showing the mapping of the intended learning outcomes and the courses. Starting in the programme, students register for either the Postgraduate Certificate (to be awarded after the first year), the Postgraduate Diploma (to be awarded after the second year) or the Master of Science title (to be awarded after having completed the full, three-year programme). Students may adapt their aims in the course of their study. On average, the three registrations are equally divided among students. The first year of the curriculum consists of one introductory workshop and four compulsory courses (18.0 EC). At the end of the year, students attend the compulsory Spatial Analysis Workshop (1.0 EC). In the courses of this year, students are offered the theoretical foundations of the domain as well as being trained in practical applications. In the first year Research Methods course (4.0 EC), students are trained in academic and research skills. In the second year, students select one of the four specialisations offered in the programme. Depending on the specialisation chosen, the second year is composed of one or two compulsory courses and two or three elective courses (18.0 EC in total). Students tend to select the electives in line with professional careers requirements. In the second year, students may take courses of UNIGIS partners and may take courses of other specialisations. At the end of this year, students attend the compulsory Decision Support Workshop (1.0 EC). In the third year, students attend the Thesis Workshop, draft the research proposal for the Master thesis and complete the finalising Master thesis (22.0 EC in total). In all of the courses, readers are provided as the starting point for courses and students are required to study journal articles. These articles are updated every six months.

A total number of 16 lecturers are involved in the programme. All are specialists in their fields and ten lecturers or 63 % have PhDs. Fourteen lecturers are active researchers, of whom ten at SPINlab, the VU Amsterdam research group in this domain. Ten lecturers or 63 % of the total number obtained the BKO-certificate. Junior lecturers are guided by senior lecturers in the programme and are required to obtain the BKO-certificate. Students are generally content with the accessibility and the educational and academic capabilities of the lecturers.

Students may enter the programme in September or February. Detailed admission requirements and procedures have been outlined. Students having academic bachelor and master degrees are admitted to the programme, if they demonstrate having taken geographical information sciences courses in their prior education. If this is not the case, they have to take the pre-master Introduction to GIS course (6.0 EC). Students having higher vocational education institutes bachelor degrees must demonstrate at least a grade point average of 7.0 or must have at least three years of working experience in the relevant field. Otherwise, they will not be admitted. Students meeting these prerequisites are admitted to the programme, provided they have completed the pre-master programme, consisting of two courses, Introduction to GIS (6.0 EC) and Academic Skills (6.0 EC). Foreign students have to prove good grades and have to be proficient in English. Students having no prior professional experience in this field, are urged and supported in gaining relevant work experience during the programme. The Examination Board approves of students' admissions, on the basis of the programme coordinator's advice. The Examination Board grants exemptions and approves study paths. Exemptions are requested about two to four times per year.

The educational set-up of the programme is adjusted to students' professional careers. As the programme is a distant learning programme, the programme may be combined with their work. The educational concept of the programme is to allow students' self-directed learning through structured on-line study materials, in close and direct contact with lecturers, learning in small groups and flexible study schedules. During the last few years, educational innovation was a priority and the programme evolved from the distant learning educational set-up to the blended learning set-up. The study methods in the programme are self-study, on-line discussion fora, conference calls and face-to-face education in workshops. Self-study activities are accommodated through the Canvas electronic learning system. Through this system, course materials may be accessed and students can interact. Conference calls between lecturers and students are scheduled in the evenings, three or four times per course. Students who are unable to attend, can view video recordings afterwards. In total, more than 50 % of the students attend these conference calls per course. In the courses, individual assignments are scheduled. In addition, students and lecturers meet in person in the workshops. In the workshops, students collaborate, submit group assignments and present their findings. The total number of hours of face-to-face education is about 60 hours per year in the first two years and about 20 hours in the third year. Programme management makes efforts to have five to six students in each of the second-year specialisations to allow for collaborative learning. All courses are offered twice per year. Courses take some ten weeks and have fixed starting and completion dates. Students may take periods off between courses. Students take at least about four years to complete the programme. The proportion of drop-outs is considerable in some years. Measures to limit the study duration are taken. The programme coordinator monitors students' study progress and contacts students regularly. Lecturers keep in contact with individual students.

Considerations
The panel recommends to aim at a higher and more stable increase of the number of incoming students and to try to somewhat reduce the fluctuations in the student body composition. Although the panel considers the average proportion of incoming students with master degrees to be acceptable, the panel advises to raise the proportion of these students. More full programme students and more master students will enable to make teaching and learning in the programme more efficient and effective. The panel realises that this is not an easy goal to accomplish.

The panel is positive about the contents of the curriculum. The curriculum meets the intended learning outcomes of the programme. The courses and workshops address both the theoretical knowledge of the domain and the research and academic skills on this master level adequately. The panel was pleased to hear a course on visualisation being added, as a course on cartography/geo-visualisation has been lacking. The Master thesis is considered by the panel to be a solid curriculum component in terms of research and academic skills. Although the curriculum as a whole is satisfactorily coherent, the panel suggests to organise the second year more consistently, allowing the specialisations to come out more clearly.

The lecturers in the programme are experienced by the panel as being very motivated. The panel welcomes the lecturers being researchers at SPINlab, as this ensures current research nurturing the programme. The educational capabilities of the lecturers are considered satisfactory, although the proportion of BKO-certified lecturers lags somewhat behind. The panel regards, however, the BKO-obligation for newly recruited lecturers as positive. The panel noted the appreciation of the students for their lecturers.

The panel considers the admission requirements to be clear and the admission processes to be elaborate and well-organised. The panel welcomes the pre-master programme for the various categories of incoming students. The panel proposes, however, to articulate the admission requirements in more straight terms and to manage the intake of students more strictly.

The panel appreciates the teaching-learning environment of the programme and the transition from the purely distant-learning set-up to the blended-learning set-up. This transition enhances the variety of study methods deployed, promotes direct contact between lecturers and students and allows students being trained more intensively in academic skills, such as collaboration skills and presentation skills. The panel feels the balance between the flexibility for the students and the teaching efficiency is up to standard. The number of contact hours and the students-to-staff ratio (24/1) are adequate. The panel suggests, however, to continue to try to reduce study delays and student drop out, which always are a concern in part-time and distance learning programmes and also in this master. The present situation is not really favourable.

Assessment of this standard
These considerations have led the assessment panel to assess standard 2, Teaching-learning environment, to be satisfactory.

4.3 Standard 3: Student assessment

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

Findings
The programme examination and assessment procedures are aligned with the VU Amsterdam policies on examination and assessment quality and the School of Business and Economics assessment policy implementation. Principles and procedures for the programme examinations and assessments have been laid down in the programme assessment plan. As has been indicated, the Examination Board for the programme has the authority to monitor the quality of examination and assessment processes and products.

In each of the courses, two individual assignments of equal weight are adopted as examination methods, one more practical and one more theoretical oriented assignment. Assignments are chosen as examination methods to prevent fraud in this distant-learning programme. For each of the assignments, rubrics scoring forms were recently implemented. The examination methods in the workshops are the students' presentations at the end of the workshops.

The Master thesis procedures are listed in the thesis manual. For the Master thesis, students may select their own topics. At the start of the process in the third year, students attend in person or on-line the Thesis workshop. In this workshop, students are guided in articulating their research questions, selecting the research methodology, drafting their research proposal, which includes the theoretical foundation of the thesis and the literature review. Students may only start the thesis research process, if the research proposal has been approved and if they have completed all first-year and second-year courses. In the thesis, students have to complete the full empirical cycle. Students are supervised by one of the programme supervisors. External supervisors may be involved, in case of theses addressing specific application domains. The programme thesis coordinator oversees the Master thesis processes. The assessment is based upon the written report, the oral presentation and the discussion with the examiners. Theses are assessed by the thesis supervisor, the second reader and, in most cases, the programme director, using the thesis scoring form with assessment criteria. In the 2017/2018 academic year, this form will be replaced by an elaborate rubrics scoring form. External readers from the students' organisations may participate in the assessment as advisors.

Programme management and the Examination Board have taken measures to promote the quality of examinations and assessments. In the programme assessment plan, the examination methods, the course goals and the intended learning outcomes have been aligned. The Examination Board appoints the examiners. The assignments and the theses are inspected every year by this Board. Assignments and theses are checked for plagiarism or fraud, cases being dealt with by Examination Board.

Considerations
The panel approves of the examinations and assessment rules and regulations of the programme, these being in line with VU Amsterdam and School of Business and Economics guidelines and policies. Although the current dedicated Examination Board for the programme has adequate responsibilities, the panel suggests to have the School Examination Board monitor the programme examinations and assessments to align these with School policies and procedures at more distance of the programme.

The individual theoretical and practical assignments as examination methods have been conscientiously chosen and provide adequate assurance, that students met the course goals.

The Master thesis manual is comprehensive and elaborate. The Master thesis supervision is appropriate and the assessments are conducted in a reliable way, involving two or three examiners and scoring forms with relevant assessment criteria. The panel welcomes the rubrics scoring forms for both the courses and the Master thesis.

The panel is positive about the measures programme management and the Examination Board have taken to ensure the quality of the examinations and assessments. The measures promote the validity, reliability and transparency of the examinations and assessments.

Assessment of this standard
The considerations have led the assessment panel to assess standard 3, Student assessment, to be satisfactory.

4.4 Standard 4: Achieved learning outcomes

The programme demonstrates that the intended learning outcomes are achieved.

Findings
The panel studied the examinations of a number of courses of the programme.

In addition, the panel reviewed the Master theses of programme graduates of the last five years. The average grade for these Master theses was 7.6. Having inspected a number of theses, the Examination Board approved of the grades given. Very positive is that a number of theses were turned into publications in academic or non-academic journals.

The results of a survey among alumni conducted in 2014, showed programme graduates evaluating the programme positively to very positively in terms of labour market relevance. Graduates tend to better their positions in the professional field.

Considerations
The course examinations, which the panel reviewed were up to standard.

The Master theses the panel studied, match the intended learning outcomes. No theses were found by the panel to be insufficient. The theses are generally solid studies, based on well-structured research and well-organised in terms of text and illustrations.

In terms of achieved learning outcomes, the panel regards this programme to be able to compete with two-year programmes in this domain. This may be the result of students combining the programme with their work in this field. As professionals, the programme graduates make good use of the programme knowledge and skills for their careers.

Assessment of this standard
The considerations have led the assessment panel to assess standard 4, Achieved learning outcomes, to be satisfactory.

5. Overview of assessments

Standard	Assessment
Standard 1. Intended learning outcomes	good
Standard 2: Teaching-learning environment	satisfactory
Standard 3: Student assessment	satisfactory
Standard 4: Achieved learning outcomes	satisfactory
Programme	satisfactory

6. Recommendations

In this report, a number of recommendations by the panel have been listed. For the sake of clarity, these have been brought together below. These panel recommendations are the following.

- To try and increase the number of incoming students.
- To limit the fluctuations in the student influx composition.
- To raise the proportion of incoming students with master degrees, although the panel considers the average proportion of these students to be acceptable.
- To articulate the admission requirements in more straight terms and to manage the intake of students more strictly.
- To continue to try to reduce study delay and student drop out.
- To have the School Examination Board monitor the programme examinations and assessments to align these with School policies and procedures.