

Assessment report  
Limited Framework Programme Assessment

**BA Civil Engineering**

University of Twente

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## 1. Executive summary

In this executive summary, the panel presents the main considerations, which led to the assessment of the quality of the Bachelor Programme Civil Engineering of the University of Twente in Enschede. The programme was 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 has laid out its aims and ambitions in the intended learning outcomes, which are drafted according to the Meijers criteria and match with level 6 of the Netherlands Qualification Framework. In addition, the programme benchmarked its learning outcomes against international standards for engineering programmes and a selection of ten international study programmes. The programme's graduates are capable of developing, applying and disseminating knowledge and novel solutions in the domain of civil engineering and its subfields: water, construction and transport. The programme distinguishes itself from other programmes in Civil Engineering by its emphasis on project management in Civil Engineering. The programme's profile is highly appreciated by the professional field. The panel is positive about the specific profile of the programme in comparison to other national and international programmes. The panel recommends the programme to specify the learning outcomes and consider including relevant developments to the field of Civil Engineering which could be addressed in the programme, such as digitalization, resilience and safety;

In addition, it recommends the programme to develop a learning outcome with regard to intercultural competencies. Since the academic year 2017-2018 the complete programme is taught in English and open to international students. The panel is positive about this development, which is in line with developments in the field of Civil Engineering. However, specific areas within the field are related to the national context and terminology. The programme is aware of this but it should be made more explicit throughout the programme which areas these are. In addition, the panel encourages the programme to enlarge the number of international students, in order to improve the balance between national and international students. The panel has assessed the programme's intended learning outcomes as satisfactory.

The panel is positive about the coherence of the programme, amongst others provided by a clear modular structure. Every module contains a module project during which students integrate various sub-disciplines. The programme shows deliberate attention for the development of skills, this relates well to the profile of the programme and specifically its focus on project management. The panel found elements of a student-centred approach throughout the programme, this is for example reflected in the skills learning line, allowing students flexibility to choose which skills they prefer to develop. The panel advises the programme to consider a more stringent policy for the minor, in order to ensure that all students deepen their knowledge in one of the technical fields, relevant to civil engineering.

The panel is positive about the staff team and policies adopted by the programme, such as the team-teaching policy, which is adopted since the introduction of module-based teaching. It encourages the programme to attract a diversity of nationalities among its staff members. An increase of students coming from abroad would allow the programme's students to stronger benefit from the international classroom.

The panel was impressed by provision of information and study guidance for students. The programme's deliberate and well-executed policies in this regard are well-thought, appreciated by students and highly characterizing for the programme. The panel assessed the teaching and learning environment as good.

By its policies, the programme ensures that students are assessed independently and that the assessment methods are related to the content and form of education. The programme has a number of checks and balances in place that safeguard the quality of assessment and the coherence of assessment over the course of the programme. An example is the peer-review system, which was recently implemented in which module teams review the assessment of the module previous to their module. The system not only ensures that the tests and examinations are reviewed structurally but also encourages staff members to be critical of their assessments and that of colleagues. The panel strongly advises the programme to review the grade form used for the thesis. The current form does not sufficiently clarify why a certain grade was given. Although the panel reached similar conclusions as the programme on the grades given for thesis work, the rationale behind the grade should be better documented. The assessment system is assessed as good.

The panel assessed the realised learning outcomes as satisfactory. The panel is positive about the theses it reviewed. Graduates are prepared to pursue their studies at a Msc. Level. They have developed a solid foundation in terms of knowledge and skills and have been able to orient themselves on the professional field and various job perspectives. However, the panel recommends the programme to ensure a reflection on used methodologies within the thesis itself. Although students do reflect on the use of methodologies in the thesis proposal, such a reflection is not part of the thesis. Therefore, the achieved learning outcomes are assessed as satisfactory.

The panel that conducted the assessment of the Bachelor Programme Civil Engineering of the University of Twente 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 recommends NVAO to accredit this programme.

Rotterdam, 25 March 2019

Prof. dr. P. Bosch  
(panel chair)

Jetse Siebenga MSc.  
(panel secretary)

## 2. Assessment process

The evaluation agency Certiked VBI received the request by the University of Twente in Enschede to support the limited framework programme assessment process for the Bachelor Civil Engineering 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).

The management of the programmes in the assessment cluster Civil Engineering convened to discuss the composition of the assessment panel and to draft the list of candidates.

Having conferred with management of the 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. Petra Bosch, Professor of Management, Technology and Innovation, Chalmers University of Technology (Chair);
- Prof. dr. Jos Arts, Professor of Environmental and Infrastructure Planning, University of Groningen;
- Ir. Adriëne van der Sar, staff of the Delta Programme Commissioner;
- Quinten Swanborn BSc, student Master Industrial Engineering & Management, University of Groningen.

On behalf of Certiked, J.W. Siebenga MSc. served as the secretary in the assessment process. The overall coordination of the assessment cluster Civil Engineering was executed by drs. W. Vercouteren.

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 of the site visit schedule.

Well in advance of the site visit date, programme management sent the list of final projects of graduates of the programme of the last two complete years. Acting on behalf of the assessment panel, the process coordinator selected 15 final projects from this list. The grade distribution in the selection was ensured to conform to the grade distribution in the list, sent by programme management.

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, these final projects being part of the selection made by the process coordinator.

A number of weeks before the site visit date, the assessment panel chair and the process coordinator met to discuss the self-assessment report provided by programme management, the procedures regarding the assessment process and the site visit schedule. In this meeting, the profile of panel chairs of NVAO was discussed as well. The panel chair was informed about the competencies, listed in the profile. Documents pertaining to a number of these competencies were presented to the panel chair. The meeting between the panel chair and the process coordinator served 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 preliminary meeting, the preliminary 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 8 and 9 November 2018, the panel conducted the site visit on the University of Twente Campus. The site visit schedule was in accordance with the schedule as planned. In a number of separate sessions, the panel was given the opportunity to meet with Faculty Board representatives, programme management, Examination Board representatives, lecturers and final projects examiners, professional field and students and alumni.

In a closed session at the end of the site visit, the panel considered every one 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 process of the programme assessment, the assessment panel members and programme representatives met to conduct the development dialogue, with the objective to discuss future developments of 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: B Civil Engineering  
Orientation, level programme: Academic Bachelor  
Grade: BSc  
Number of credits: 180 EC  
Specialisations: n.a.  
Location: Enschede  
Mode of study: Full-time (language of instruction: English)  
Registration in CROHO: 21PH-56952

Name of institution: University of Twente  
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 Bachelor Civil Engineering of the University of Twente is a three-year (180 EC), research-based, interdisciplinary Bachelor programme in the domain of Civil Engineering. The University of Twente offers, in addition, two Master programmes in this domain. Since 2017-2018, the programme is offered in English.

The programme objectives are to teach students to develop, apply and disseminate knowledge and novel solutions in the domain of civil engineering, in order to contribute to a safe, sustainable, efficient and resilient society. The programme aims to develop a good balance between students' capacity for technical design, research and soft skills in the temporal and societal context. The programme further aims for students to become T-shaped professionals, with a solid foundation in the discipline of Civil Engineering and the right skills to be able to apply their knowledge in collaboration with other disciplines and society. Students gain knowledge and insights in design and research, in technical aspects such as civil engineering, mechanics, mathematics and in non-technical aspects such as management science and public administration. The attention for non-technical aspects, specifically on project management, is a distinguishing element of the programme, in comparison to other Dutch programmes in Civil Engineering. In addition, the University of Twente is the only University in the Netherlands where the programme is offered in English.

The programme focuses on three subfields in Civil Engineering: water, construction and transport. Students gain knowledge on building and infrastructure, traffic and transport systems and hydraulics of natural water systems and on project management within Civil Engineering projects. They learn how to apply this knowledge, formulate research questions and conduct research on problems, design solutions, apply models and reflect on the use of these models, work independently and learn how to operate and communicate and how to take into account the temporal and societal context. Students in addition develop a reflective approach, which includes reflection on personal development.

The learning outcomes conform to the Meijers Criteria, which have been developed by the 3TU Federation and are related to the Netherlands Qualification Framework (NQLF). The International benchmarking has further been made through comparison with the IDEA qualification profile in engineering, developed by leading European Universities, and the ABET (Accreditation Board for Engineering and Technology) criteria which are used in the USA. The programme performed an additional benchmark in 2016 with ten universities, which were selected on the basis of their position in international rankings. This benchmark included an investigation of core courses.

The comparison with the other study programmes has shown that the programme focuses more on project management, law, management and maintenance, risk management. Furthermore, the programme pays more attention to the modelling of systems and the uncertainties involved, as well as to water and traffic. There is less room for more technical subjects such as soil mechanics, underground structures as well as for topics related to environment and sustainability.

The learning outcomes of the Dutch Civil Engineering programmes are regularly reflected on by an advisory council representing industry and government, the Dutch OCIB (Stichting Universitair Onderwijs Civiele Techniek voor Bedrijfsleven en Overheid). Representatives of the professional field expressed their appreciation for the programme's learning outcomes during the site visit, and emphasized

the importance of the distinguishing profile of the programme in terms of attention for business/public administration and soft skills. During the site visit, it became clear that the interest of the professional field in the programme has grown in recent years. Whereas the professional field used to be mainly interested in the MSc. Level programmes, industry becomes more and more involved with education at a bachelor's level.

Several aspects were mentioned that will become of greater relevance to Civil Engineering, such as digitalization, safety and resilience. The international orientation of the programme is relevant to certain professional fields such as consultancy and construction industry. In addition, Civil Engineers increasingly work in international teams and have international contacts. It is important that future engineers gain intercultural competencies. Although the programme facilitates that students gain intercultural competences, these are not part of the learning outcomes yet.

All participants during the site visit agreed that the Civil Engineering programme is important for Dutch industry and organizations and that in specific areas (like water and law), Dutch terminology should be taught to students, especially when they have an interest in these specific areas.

#### *Considerations*

The panel is positive about the learning outcomes of the programme. They reflect a bachelor's level and are well-formulated. They provide insight to what can be expected of graduates of the programme, and give insight in the T-shape professional that the programme's graduates should be. Graduates of the programme have the right entry qualifications for a master programme in Engineering and in related fields. An aspect that can be addressed more explicitly are the intercultural competencies that students say to have developed during the programme. In support of the tendencies addressed by the professional field, the panel recognized the importance of digitalization, safety and resilience. It recommends to consider these topics of relevance to the programme and suggests to address these more specifically in the intended learning outcomes and the programme. The panel is positive about the growing involvement of the professional field for the programme. The benchmark the programme performed nationally and internationally shows awareness of the programme's profile in comparison to other programmes. The demands from the professional field as well as developments within the discipline of Civil Engineering provide sufficient rationale for the programme to develop an international character. The local aspects and terminology that remain important in specific areas should be addressed more specifically in order to ensure that staff members, students and graduates remain familiar with relevant terminology used in everyday's local business.

#### *Assessment of this standard*

These considerations have led the assessment panel to assess standard 1, Intended learning outcomes, to be satisfactory.

## 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*

#### *Organization*

The programme is offered by the department of Civil Engineering. The programme director is responsible for the day-to-day management of the programme and the related MSc. Programmes and PDEng programme. The director is assisted by the programme coordinator. The Programme Committee, being composed of lecturers and students, advises programme management on the quality of the programme. The Examination Board has the authority to ensure the quality of the examinations and assessments of this programme and the other programmes in the Field of Civil Engineering.

The number of students entering the programme remained rather stable between 2012 and 2015, being on average 80 students per year and ranging from 78 to 82 students per year. The last three years, the inflow was substantially higher at about 100 students per year. Over the years, the number of students from abroad has been increasing, from almost zero to in the last two year respectively 13% and 20%.

#### *The curriculum*

The curriculum consists of twelve 15-EC modules scheduled in three years. During the first year, students are introduced to Civil Engineering and the three subfields water, traffic and construction. During the second year, students are offered a more in-depth view to each of the sub-fields and are provided with developments concerning sustainability. During the third year, students have 30 EC space for electives and prepare and work on their thesis.

In each module, students work on a project which is theme-based and for which students integrate several module components such as theory courses, tutorials and design classes. The content offered in the modules is structured in nine learning lines, covering topics like modelling, design, management, technical engineering and measuring. These learning lines provide the increasing complexity of the programme and ensure that students are getting acquainted with the relevant knowledge and skills. The module system also allows students to practice a multidisciplinary approach.

During the first-year modules students get a firm foundation in mathematics and structural mechanics and are introduced to water management and traffic and transport theory. Projects include the enquiry of stakeholder requirements for a cycling freeway, water management of the Nile Dam, the design of a traffic and transport vision for the city of Enschede and the design of a parking garage.

During the second-year modules the attention is drawn towards engineering, design and managerial aspects. The modules revolve around the three sub-fields of CE and sustainability. Projects include the analysis of water safety of a dike ring, the design of a self-sustaining business park, the development of an alternative spatial development proposal and the analysis of traffic flows and simulation.

Throughout the programme students get in touch with the professional field, either by cases as part of the course material or by field trips. The professional skills training in the programme is partly organized in a flexible way so that students can work on skills that they are interested in or which they do not master properly. In the second module students work amongst others on presentation skills and writing skills. If they score insufficient in one of the practiced skills, the fourth module offers the possibility to choose from a variety of 1-EC skills training elements. Students who scored insufficient in one of the skills trained in the second module, have to follow remedial teaching in these specific skills, other students can choose freely.

The minors on offer allow students to take courses (30 EC) in other departments of the University of Twente, providing them with more in-depth knowledge in one of the subdisciplines or scientific fields. Students can also choose to broaden their knowledge on a subject, which is less directly related to CE. Whether students use the minor to broaden or deepen their knowledge is up to them and instead of following one of the minors on offer, students can also choose to study abroad.

The second half of the third year students prepare their thesis in a thesis preparation module during which students develop their research question, amongst others based on a literature review. During this module, students also reflect critically on the chosen methodology for their research. Later on students carry out an individual project at a company or (public) organization and write their thesis about this project.

#### *Provision of information, student guidance and admission*

Information about the programme and the admission criteria to Dutch and international students are provided on the University's website. Dutch students with a VWO-diploma and profile 'Natuur en Techniek' can enter the programme, as well as international students with an equivalent diploma and English proficiency B2. An introduction week is organized for all admitted students during which students follow workshops that amongst others address intercultural awareness. Throughout the programme, students with different national backgrounds work together in project teams, further developing their intercultural competencies. During the site visit, the panel learned that the programme aims to develop an international classroom. Due to the current number of international students, the intensity to which intercultural exchange is experienced by all students remains somewhat limited which hinders the programme in the development of a truly international community. The programme intends to stimulate intercultural exchange in various ways, and takes measures where possible. An illustration of this is that the programme noticed that project group dynamics in groups containing one international student are less favourable to establishing cultural exchange than groups with more than one international student. As a rule, the programme established that project groups are composed in such a way that they have at least two students from abroad. Although the numbers of international students are slim, students do get the chance to work together in an international setting.

Students are informed and guided throughout the programme via the website, a mentor programme (during the first year) and by the study advisors. The programme organizes several meetings (start of the programme, choice of minor programme, electives and master programmes) during which the study advisor presents all options students can choose from and offers personal guiding. The programme also combines the attainment of educational goals with student's need to orient themselves. An example is that students interview a staff member in order to inform themselves on a research topic for their Bsc. thesis, by which at the same time they train interviewing skills (for which they receive instructions beforehand and are given feedback afterwards).

#### *Study Success rate*

The percentage of students finishing the programme within four years is 70%. During the first year, topics like mathematics and structural engineering are a hurdle to several students because of their complexity. The programme recently made an adjustment to the mathematics course, in order to facilitate students to study effectively. The module system diminishes the flexibility for students to participate extensively in extracurricular activities since it demands from students that they study full-time. The programme provides tailor made-solutions for students with specific needs and responsibilities. Last but not least, students studying abroad sometimes also experience delay in their studies.

Those students that fail to obtain 45 EC during the first-year receive a negative advice to continue studying. The programme arranged with the local university of applied sciences that these students can continue their studies without too much loss of time at the civil engineering programme of this university.

### *Staff*

The programme has several policies in place with regard to the staff. All staff members were assessed on their proficiency in English, and some had to take additional courses, so as to secure that the programme's quality did not suffer from changing the language from Dutch to English. The vast majority of the staff has obtained a PhD (91%) and is involved in both teaching and research. The percentage of staff members with a University Teaching Qualification (UTQ) is 74%, in case a staff member did not obtain a UTQ this is mostly because of a recent appointment. Staff members work in module teams, which meet when necessary. For each module, a coordinator is appointed, during the year, several meetings are held with all module coordinators, as to ensure coherence in the (delivery) of the programme. The programme aims to attract more international staff members, currently 20% of the staff members have an international background.

### *Considerations*

The panel has established that the learning outcomes are translated into the learning objectives of each module. The programme is carefully developed and has been fine-tuned over the years. It is coherent by the learning lines and the projects, and the complexity of the material studied by students increases gradually. The panel also encountered evidence of a student-centred approach, such as the flexible provision of professional skills-training as well as tailor-made solutions provided to students who, for legitimate reasons, cannot study a complete 15 EC module.

The panel is positive about the efforts made by the programme to stimulate cultural exchange. The instruments to this aim are well chosen and appreciated by the students who say their cultural awareness has grown. It is important that the programme continues these efforts in order to cultivate its experience with and knowledge of the international classroom. In addition, the panel is positive about the contacts students have with the professional field. The study material as well as extracurricular activities allow students to orient themselves on their study path and future career. Elements that could be improved are a more explicit identification of the courses that contain a local focus and for which it is inevitable that students learn local (Dutch) terminology. In addition, the panel encourages the programme to effectively market the programme internationally, in order to increase the number of international students. This will positively effect classroom dynamics and help the programme to further realise its ambitions with regarding an international classroom.

The programme's content allows students to obtain the learning outcomes. Students gradually build up knowledge in relevant disciplines and subdisciplines and are trained in various professional skills. The panel encourages the programme to reconsider the minor so as to ensure that students use their time completely or partially to deepen their knowledge in a fundamental and specific way.

Although the study success rates within four years are in par with the targets set by the ministry of education, the panel encourages the programme to improve the study success rates, so that more students finish the programme within three years.

The quantity and quality of staff fits the programme. Staff members are well-equipped for the deliverance of the programme. The organization of staff members in module teams, strengthens the coherence of the curriculum and could also stimulate cultural exchange among staff members. The panel encourages the programme to attract more staff members with an international background, so as to stimulate the development of an international community.

The programme stands out to comparable programmes in civil engineering with respect to the provision of information to students as well as student guidance.

Overall, the panel is positive about the teaching and learning environment of the programme.

#### *Assessment of this standard*

These considerations have led the assessment panel to assess standard 2, Teaching-learning environment, to be good.

### **4.3 Standard 3: Student assessment**

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

The programme's examination and assessment rules are derived from the University of Twente assessment policy. This policy describes constructive alignment as an important principle by which assessment should be developed on a programme level. The principles and procedures for the examinations are worked out in the programme test plan, which is checked by the programme director before the start of the education. Other rules and regulations with regard to assessment have been written out in the Education and Examination Regulations.

In all modules, multiple examination methods are adopted. Examination methods include written examinations, being predominantly open questions examinations, papers, assignments and presentations. The methods are selected in line with the nature of the course goals to be assessed. The construction of a test on one of the courses within a module is the responsibility of a lecturer. Module coordinators and lecturers together compile a module manual that describes the content, the learning objectives, the design project's theme and the forms of assessment that are used.

The quality assurance processes on assessment contain ex-ante and ex-post checks on the assessment. Ex-ante measures include the check of each test by an assessment expert from the faculty before students take their exams. In addition, all module manuals have to be approved by the programme director and the examination board before the start of the education. Ex-post measures are the evaluation of lecturers on the exams after students took them. To this end, lecturers receive an analysis of the grade distribution as well as the results of student survey. In addition, the programme recently started system of peer-feedback in which the module teams evaluate each other's project, test plans, assessment methods, student workload and the results of student evaluation, after completion of a course.

The BSc. proposal, which is developed during the thesis preparation module, is marked by the supervisor and the module coordinator and for which an elaborate form is used with a range of criteria. This form has been developed more recently. During the site visit, the committee was informed that experiences with this form are good. The completed BSc. thesis is marked by the supervisor and a second assessor, for which a form is used with few criteria. In order to provide guidance to the supervisor and second assessor, a table is used which describes the meaning of each mark. During the site visit, thesis supervisors explained how the form and the table are being used in order to assess students. Thesis supervisors are used to the form and appreciate the grade table, which is especially used in case the outcome of the assessment leaves room for discussion.

The second assessor is a staff member from another research group and is appointed by the programme coordinator. The supervisor from industry gives advice on the assessment of the BSc thesis. During the thesis defence ceremony, students receive their grade and feedback on their work. The (oral) thesis defence can lead to a higher or lower grade, and as such, presentation skills and oral skills are also assessed in the thesis.

The examination board has the authority to monitor the quality of examination and assessment processes and products of the programme. The board spot-checks theses on a regular basis and all board

members attend a student's defence twice a year. If the examination board disagrees with the mark given, it will discuss this with the lecturer. In addition, the examination board invites a lecturer to its (monthly) meetings during which the lecturer presents the assessment for a certain course. The examination board discusses the assessment with the lecturer and gives feedback on it.

#### *Considerations*

The panel is positive about the assessment system in place. The attention paid to quality of assessment and the assurance thereof is high. In the first place, the system ensures that a test is being reviewed before and after the test is held. Secondly, the programme oversees the assessment for the programme as a whole, ensuring that all intended learning outcomes are assessed several times throughout the curriculum and that the assessment methods used are varied. The panel is positive about the peer-review system, through which lecturers are provided with feedback and give feedback and are motivated to improve assessment as well as ensure that the several modules are coherent in terms of what they assess. Students are provided with information on the assessment criteria and the assessment method(s). The panel has also established that to students it is clear why they receive a certain grade and that students receive ample feedback on their thesis. However, the panel saw a contrast between the form used to assess the thesis proposal, which is quite elaborate, and the form used to assess the completed thesis, from which it is hard to derive why a certain grade was given since the criteria are very limited and the comments of the supervisor on each criterion somewhat limited in most theses the panel reviewed. The panel therefore recommends the programme to redesign the thesis assessment form and suggests to develop a form which can be used for both the assessment of the thesis proposal and the assessment of a completed thesis. The examination board performs its legal duties and reports on its finding and the results of checks performed.

#### *Assessment of this standard*

The considerations have led the assessment panel to assess standard 3, Student assessment, to be good.

#### 4.4 Standard 4: Achieved learning outcomes

The programme demonstrates that the intended learning outcomes are achieved.

##### *Findings*

The programme took various initiatives to be able to assess the quality of its graduates besides the grades and course work of students. The programme collected evaluations by external BSc thesis supervisors, from which can be concluded that they are positive about the knowledge and skills of the students and their various abilities (proactivity, acquire new information and handle criticism). In addition, every year some of the programme's students participate in the annual student research conference and are stimulated to participate in other research conferences and submit a paper. Almost all graduates (academic years 2014-2015 until 2017-2018) entered a master programme at the University of Twente or elsewhere. The students and alumni interviewed by the panel report to be positive about the preparation of the programme on a master's programme. Students do not appear to have specific difficulties in these master programmes.

The panel reviewed 15 theses with a variety of topics. A number of theses contain focus on the design of a solution whereas in other theses the analysis of a certain problem is the prominent focus. The panel also studied some project proposals, which are a result from the thesis preparation module.

##### *Considerations*

The theses the panel reviewed match the intended learning outcomes. Students prove to be able to conduct research, which leads to (improvement of) a Civil Engineering project or develop a design in one of the three areas water, construction or transport. The thesis variety of subjects reflect the profile of the programme. All theses show comprehension of the Civil Engineering domain on a bachelor's level, with some thesis displaying a focus on or elements of project management and procurement, which is specific for this programme. Based on the review of the thesis, the panel advises the programme to stronger connect the thesis preparation module (11) with the thesis (module 12) in terms of reflection on the choice of methodology. Although during the preparation of the thesis students reflect on the chosen methodology, the panel is of the opinion that also the thesis should contain a reflection on the chosen methodology. The panel has established that the programme is designed in such a way that students get a good understanding of the job market and relevant master programmes. Graduates are able to enter and complete a relevant master programme in the domain of Civil Engineering.

##### *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	Satisfactory
Standard 2: Teaching-learning environment	Good
Standard 3: Student assessment	Good
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, the most important ones have been brought together below. The panel recommends the programme:

- to specify the programme's learning outcomes and consider including relevant developments to the field of Civil Engineering which are or should be addressed in the programme, such as intercultural awareness, digitalization, resilience and safety;
- to stronger connect the thesis preparation module and the thesis, so as to ensure that a reflection on the methodologies used will not only be part of the preparatory phase but will also be part of the actual thesis.
- to continue strengthening the international character of the programme by making more explicit for which courses local terminology is taught and by marketing the programme under an international audience, so as to increase the number of international students in the programme;
- to attract more international staff members;
- to improve the thesis assessment form so that it provides a clearer explanation of why a student received a certain mark.