

Assessment report
Limited Framework Programme Assessment

Master Business Analytics

Vrije Universiteit Amsterdam

Contents of the report

1. Executive summary	2
2. Assessment process	4
3. Programme administrative information.....	7
4. Findings, considerations and assessments per standard	8
4.1 Standard 1: Intended learning outcomes	8
4.2 Standard 2: Teaching-learning environment	11
4.3 Standard 3: Student assessment.....	13
4.4 Standard 4: Achieved learning outcomes	15
5. Overview of assessments.....	16
6. Recommendations	17

1. Executive summary

In this executive summary, the panel presents the main considerations which led to the assessment of the quality of the Master Business Analytics programme of Vrije Universiteit Amsterdam. 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, published on 20 December 2016 (Staatscourant nr. 69458).

The panel is positive about the programme objectives to educate students in profound understanding of and scientific insights in data science and business analytics in order to address practical quantitative problems in organisations. The panel supports that students are trained in research skills and academic skills.

The panel considers the Domain-Specific Framework of Reference to be an appropriate description of the mathematics discipline and of the standards and requirements graduates of both bachelor and master programme have to meet. The panel welcomes the efforts of the joint Mathematics programmes in the Netherlands to have drafted this Framework. The objectives and intended learning outcomes of this programme meet the Framework, but the panel finds it important to specify more clearly the relations between the business analytics domain and the mathematics discipline in the Framework. The panel advises to add ethical awareness to the intended learning outcomes, as specified in the Framework.

The panel approves of the three tracks being offered in the programme and of the full-time and dual-programme study modes in the programme. These options allow students to tailor the programme to their preferences and to combine study and work.

The programme intentions to educate students for positions in the non-academic, professional field or, in some cases, to proceed to PhD trajectories are supported by the panel.

The intended learning outcomes of the programme correspond to the programme objectives. These intended learning outcomes are in accordance with the master level.

The influx of students is appropriate. The programme admission requirements and procedures are adequate. The panel is positive about hbo-students being allowed to take the pre-master programme.

The curriculum of the programme matches the intended learning outcomes. The panel regards the curriculum to be appropriate, students being taught advanced subjects in the fields of mathematics or computer science and being taught to apply this knowledge and these skills to address quantitative problems in organisations. The programme introduces students clearly to the professional dimensions of the subjects taught. The panel suggests to maintain and, where required, strengthen the relations with research. The panel recommends to reinforce the subject of ethics in the curriculum.

The staff members in the programme have solid research backgrounds in the fields they are lecturing in and are motivated teachers. Their educational capabilities are up to standard. The panel notes the appreciation of lecturers by students. The panel is positive about the strong relations between the

Departments and the Faculty cooperating in the programme. As the work load of lecturers is rather challenging, the panel welcomes extra staff being recruited.

The educational concept and the study methods adopted in the programme are effective. The panel applauds the intensive and effective study guidance by the study advisor. The panel considers the material facilities for the programme to be satisfactory, in particular after the relocation to the new building. The student success rates of the programme are adequate.

The examinations and assessment rules and regulations of the programme are in line with Vrije Universiteit Amsterdam and Faculty of Science policies. The panel is positive about the position and the activities of the Examination board. The panel considers the measures taken by the programme to assure the quality of examinations and assessments to be appropriate. The rules for awarding dual-programme students credits for study-related activities in organisations are sound. The quality control of the Mastermath examinations is up to standard.

The panel approves of the examination methods adopted by the programme. The examination methods are consistent with the goals of the courses. The processes of marking examinations are adequate. The policies to curtail any effects of free-riding are appropriate.

Students are offered appropriate supervision in the Master projects. The assessment procedures are up to standard, involving two examiners assessing the work separately and on the basis of assessment scoring forms. The panel, however, advises to add more extensive arguments to substantiate the assessments of the Master projects.

The examinations of the courses are of adequate level. The panel assesses the Master projects to be satisfactory. The quality of the projects varies. The panel supports the grades awarded to the projects. No Master projects were found to be unsatisfactory.

The panel is convinced the programme graduates have reached the intended learning outcomes of the programme. The graduates are well prepared for the professional field. Programme graduates find appropriate positions close to their graduation date.

The panel that conducted the assessment of the Master Business Analytics programme of Vrije Universiteit 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 recommends NVAO to accredit this programme.

Rotterdam, 30 September 2019

Prof. dr. ir. O.J. Boxma
(panel chair)

drs. W. Vercouteren
(panel secretary)

2. Assessment process

The evaluation agency Certiked VBI received the request by Vrije Universiteit Amsterdam to support the limited framework programme assessment process for the Master Business Analytics programme of this University. The objective of the programme assessment process was to assess whether the programme conforms 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).

Management of the programmes in the assessment cluster WO Wiskunde convened to discuss the assessment panel composition and to draft the list of candidates. The panel composition for this assessment has been based upon these considerations.

Having conferred with Vrije Universiteit Amsterdam programme management, 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. ir. O.J. Boxma, full professor Stochastic Operations Research, Eindhoven University of Technology (panel chair);
- Prof. dr. R.H. Kaenders, full professor Mathematics and its Education, University of Bonn, Germany (panel member);
- Prof. dr. D. van Straten, full professor Algebraic Geometry, Johannes Gutenberg University Mainz, Germany (panel member);
- Dr. ir. H.J. Prins, manager Research & Development, Maritime Research Institute the Netherlands (panel member);
- Drs. J. Poppelaars, senior manager, practice leader Advanced Analytics, BearingPoint (panel member);
- S.R. den Breeijen MSc, recently graduated student Master Mathematics, Radboud University Nijmegen (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 planning of the activities in preparation of the site visit. The site visit schedule was also discussed. In addition, the outline of the self-assessment report and the subjects to be addressed in this report were part of the discussion.

In the course of the process preparing for the site visit, programme management and the Certiked process coordinator 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 sent the list of final projects of graduates of the programme of the most recent years. Acting on behalf of the assessment panel, the process coordinator selected the final projects of fifteen graduates from these years. The grade distribution in the selection was conform to the grade distribution in the list, sent by programme management. The study modes of the programme were covered in the selection.

The panel chair and the panel members were sent in time 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 theses of the programme graduates, these theses being part of the selection made by the process coordinator.

Before the site visit date, the assessment panel chair and the process coordinator met to discuss the self-assessment report to be 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 comprehensively informed about the competencies, listed in the profile.

Being informed by the process coordinator, 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 panel met to go over the preliminary findings concerning the quality of the programme. During this meeting, the preliminary findings of the panel members, including those about the theses 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 17 June 2019, the panel conducted the site visit on the Vrije Universiteit Amsterdam campus. The site visit schedule was as planned. In a number of separate sessions, the panel was given the opportunity to meet with Faculty Board representatives, programme management, Examination board members, lecturers and final projects examiners, students, and alumni and professional field representatives.

In a closed session near 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: M Business Analytics
Orientation, level programme: Academic Master
Grade: MSc
Number of credits: 120 EC
Specialisations: None
Location: Amsterdam
Mode of study: Full-time, dual-programme
Language of instruction: English
Registration in CROHO: 21PL-66856

Name of institution: Vrije Universiteit Amsterdam
Status of institution: Government-funded
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 Business Analytics programme is one of the master programmes of the Faculty of Science of Vrije Universiteit Amsterdam. The dean of the Faculty has the responsibility for all programmes of the Faculty. This Master programme is part of the Graduate School of Natural Sciences and Mathematics of this Faculty. The director of the programme is responsible for the contents, the organisation and the quality of the programme. The programme director is assisted by the programme coordinator and the academic advisor. The Programme committee for the Bachelor Business Analytics and Master Business Analytics programmes, being composed of equal numbers of lecturers and students, advises programme management on quality issues. Lecturers in the Programme committee come from both the Department of Mathematics and the Department of Computer Science. The Faculty-wide Examination board assures the quality of examinations and assessments of this programme. The sub-committee of this Faculty-wide board for the Mathematics and Business Analytics programmes has the responsibility to assure the quality of examinations and assessments of this programme.

The objectives of the programme are to provide students with profound understanding of data-driven approaches and with scientific insights into data science and business analytics in order to address practical quantitative problems. The programme is multi-disciplinary and educates students in the disciplines of mathematics, computer science and, to a lesser extent, business administration. In terms of fields within the mathematics discipline, the programme is directed towards stochastics and operations research. Students are trained in research skills and in academic skills, such as problem-solving skills, skills to work in multidisciplinary teams and communication skills.

The joint Mathematics programmes in the Netherlands drafted the Domain-Specific Framework of Reference for the Master Mathematics programmes. In this Domain-Specific Framework of Reference, the generic objectives and the generic intended learning outcomes for these programmes have been listed. These objectives and intended learning outcomes meet international standards and are largely comparable to those of the Mathematics programmes of renowned universities abroad, such as ETH Zürich, KU Leuven and University of Padova. The objectives and intended learning outcomes of this Master Business Analytics programme are supposed to be covered by this Framework but differ quite substantially from those of the Master Mathematics programmes.

In comparison to econometrics and operations research programmes of other universities in the Netherlands, the Master Business Analytics programme is more strongly directed toward computer science concepts. Compared to programmes in data science, this programme focusses more strongly on statistical or probabilistic modelling.

The programme offers three tracks, being optimisation of business processes, computational intelligence, and financial risk management. These tracks are not formalised in terms of track-compulsory courses. The programme is offered in the full-time study mode and in the dual-programme study mode. The latter study mode combines the study in the programme and being employed in organisations on positions, relevant for the programme. Students may apply for this option.

Students are primarily educated to find non-academic positions on the labour market. The majority of the graduates are educated for these positions. Some students proceed to PhD trajectories.

The objectives of the programme have been translated into the intended learning outcomes. These include, as main elements, knowledge and understanding of advanced methods in mathematics and computer science to be applied to business processes; knowledge and skills to plan and conduct research in this domain and to state and analyse research results; knowledge and skills to model complex business processes, using advanced methods from mathematics or computer science; knowing how to obtain working knowledge of other fields within the mathematics or computer science disciplines; awareness of the role of mathematics in society; skills to work in multidisciplinary teams; and skills to communicate in writing and orally with expert and non-expert audiences in this domain.

The intended learning outcomes of the programme have been compared to the Dublin descriptors for master programmes, to establish their master level.

Considerations

The panel is positive about the programme objectives to educate students in profound understanding of and scientific insights in data science and business analytics in order to address practical quantitative problems in organisations. The panel supports that students are trained in research skills and academic skills, such as problem-solving skills, skills to work in multidisciplinary teams and communication skills.

The panel considers the Domain-Specific Framework of Reference to be an appropriate description of the mathematics discipline and of the standards and requirements graduates of both bachelor and master programme have to meet. The panel welcomes the efforts of the joint Mathematics programmes in the Netherlands to have drafted this Framework. The objectives and intended learning outcomes of this programme meet the Framework, but the panel thinks it is important to specify more clearly the relations between the business analytics domain and the mathematics discipline in the Framework. The panel advises to add ethical awareness to the intended learning outcomes, as specified in the Framework.

The panel approves of the three tracks being offered in the programme and of the full-time and dual-programme study modes in the programme. These options allow students to tailor the programme to their preferences and to combine study and work.

The programme intentions to educate students for positions in the non-academic, professional field or, in some cases, to proceed to PhD trajectories are supported by the panel.

The intended learning outcomes of the programme correspond to the programme objectives. These intended learning outcomes are in accordance with the master level.

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

The number of students enrolling in the programme gradually increased over the years, going from 37 incoming students in 2013 to 59 students in 2018. The number of foreign students is rather stable at about five to ten students per year. The programme wants to increase the number of foreign students to promote the international classroom. About 25 % of the incoming students opt for the dual-programme study mode, combining study and work. Students having completed the Bachelor Business Analytics programme are admitted unconditionally. All other applicants are to have taken in their prior education at least 90 EC in mathematics and/or computer science and/or econometrics, at least 45 EC in mathematics, including statistics and probability, are to report programming skills, and are to be proficient in English. Students having obtained bachelor degrees in higher vocational education (hbo) are only admitted to the programme, if they have passed the pre-master programme (30 EC). The pre-master programme is tailor-made, the contents depending upon the student's prior education. Students with more than 30 EC of deficiencies are not admitted to the pre-master programme.

The study load of the curriculum is 120 EC. The curriculum takes two years to complete. Programme management presented a table, showing the curriculum to cover all of the intended learning outcomes. The curriculum is composed of 78 EC of mandatory courses, 24 EC of constrained elective courses and 18 EC of free elective courses. In the mandatory and constrained elective courses, students are primarily taught advanced methods in specific fields within mathematics or computer science. In three compulsory project-based courses, students are to integrate the knowledge and skills acquired. In the course *Project Optimisation of Business Processes*, students are to design and implement a decision support system for a virtual customer. In the course *Research Seminar Business Analytics*, students study literature on a specific research topic. At the end of the curriculum, students complete the *Master project* (36 EC), being an individual research project, conducted in an organisation. Some of the constrained elective courses are Mastermath courses.

The total number of permanent staff members lecturing in the Bachelor Business Analytics and Master Business Analytics is 44 lecturers representing 15.7 full-time equivalents of teaching capacity in total. Most of the lecturers in the programmes are staff members from the Department of Mathematics. In addition, lecturers from the Department of Computer Science of the Faculty of Science and from the School of Business and Economics of Vrije Universiteit Amsterdam are involved in the programme. Nearly all staff members are active researchers in their respective fields and almost all of them have PhD degrees. About 77 % of the staff members in the Department of Mathematics are BKO-certified. Others are in the process of obtaining the BKO-certificate. All permanent staff members are BKO-certified. Over 60 % of the lecturers from the Department of Computer Science and the School of Business and Economics have obtained the BKO-certificate. PhD students, postdoctoral researchers and senior master students lecture in tutorials or computer labs. They have been trained for this work. They are engaged in grading assignments and examinations, but only under the supervision of examiners. Lecturers meet monthly to discuss aspects of teaching in the programme. Lecturers are free to organise their lectures, as long as course goals are met. Students appreciate lecturers' capabilities

and accessibility. Lecturers experience the work load as challenging. About eight new positions in the Department of Mathematics are being created, among others on account of the Mathematics sector plan. Additional positions will be created in the Department of Computer Science as well.

The programme educational concept is to foster students actively engaging in the learning processes, to teach them to address advanced problems, mostly in teams. Study methods adopted in the programme are lectures, tutorials, computer practice sessions, small case studies, projects, written and oral presentations and self-study. The knowledge gained in the courses is integrated in projects, students in teams addressing problems in organisations. The academic advisor meets with every one of the students in the beginning of the programme. Students are invited to turn to the study advisor in case of problems. The programme coordinator counsels students on selecting elective courses. Hardly any students drop out of the programme. The average student success rates are 28 % after two years and 70 % after three years (figures for the last three years).

Considerations

The panel considers the influx of students to be satisfactory. The panel approves of the admission requirements and entry procedures of the programme. The panel is positive about hbo-students being allowed to take the pre-master programme.

The curriculum of the programme matches the intended learning outcomes. The panel regards the curriculum to be appropriate, students being taught advanced subjects in the fields of mathematics or computer science and being taught to apply this knowledge and these skills to address quantitative problems in organisations. The programme introduces students clearly to the professional dimensions of the subjects taught. The panel suggests to maintain and, where required, strengthen the relations with research. The panel recommends to reinforce the subject of ethics in the curriculum.

The staff members lecturing in the programme have solid research backgrounds in the fields they are lecturing in and are motivated teachers. Their educational capabilities are up to standard. The panel notes the appreciation of lecturers by students. The panel is positive about the strong relations between the Departments and the Faculty cooperating in the programme. As the work load of lecturers is rather challenging, the panel welcomes extra staff being recruited.

The educational concept and the study methods adopted in the programme are regarded by the panel to be effective. The panel applauds the intensive and effective study guidance by the study advisor. The panel considers the material facilities for the programme to be satisfactory, in particular after the relocation to the new building. The student success rates of the programme are adequate.

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 Vrije Universiteit Amsterdam policies and the Faculty of Science policies. The examinations and assessments are governed by the principles of constructive alignment, linking the course examinations to the programme intended learning outcomes. As has been indicated, the Sub-examination board for Mathematics and Business Analytics monitors the quality of examinations and assessments of this programme. This board is part of the Faculty-wide Examination board.

The examination methods for the courses are selected in line with the courses' contents. The examination methods in the programme include written examinations, written final examinations, homework assignments, programming tests, reports and oral presentations. In most of the courses, multiple examinations are scheduled. Homework assignments may constitute no more than 40 % of the course grade to counter the effects of any free-riding. The written examinations have to be at least 60 % of the course grade. To pass the course, the grade of written examinations has to be at least 5 out of 10. Teaching assistants may be involved in marking course examinations, but only under examiners' supervision.

The curriculum is concluded with the individual Master project, taking six months (36 EC) and being done as internships at organisations in the professional field. Students are required to address real-life problems in these organisations, taking analytical or data-driven approaches. The Master projects are scheduled strictly, being organised by the Internship coordinator. Students have to find the internship positions themselves, but may be assisted by the programme. Students are guided in the course of the projects by the daily supervisor from the host organisation and by the supervisor from the Department of Mathematics or Computer Science of Vrije Universiteit Amsterdam. Students have regular meetings with their university supervisor. Before being allowed to start, students must have their detailed project proposals be approved by the programme Internship board. The mathematics and/or computer science contents of the project have to be clear from the proposal. The projects are assessed separately by the university supervisor and the second reader, at least one of them coming from the Department of Mathematics or Computer Science. The projects are assessed on the basis of the written thesis (55 % of the grade, grade at least 5.5 out of 10), execution and attitude (35 % of the grade), and the final, oral presentation (10 % of the grade). The grades are to be motivated on the Master project assessment form.

Programme management and the Examination board have taken a number of measures to promote the quality of examinations and assessments. The Examination Board appoints two examiners for each of the courses. Course goals are drafted in clear terms. Draft examinations are peer-reviewed by fellow examiners. Examination matrices have been adopted. Answer models to mark examinations have to be submitted. The validity of examinations with pass rates of less than 50 % are checked by the Examination board. Students are entitled to inspect their marked examinations. Every year, the Examination board inspects 10 % of the course examinations, a number of Master projects and a

number of Master project's assessment forms. Master projects are all checked for plagiarism, unless issues with confidentiality emerge.

As has been said, dual-programme students are required to be employed in for the programme relevant positions within organisations. Whether positions are relevant for the programme is assessed by the programme on the basis of the dual work period proposal. For study-related activities in the organisation, students are awarded 12 EC of credits. To obtain these credits, dual-programme students are to submit the report of these activities at completion of the dual-programme period, which takes 16 months. Dual-programme students are to complete the Master project on the same conditions as the full-time students, the Master project internship being strictly separated from the dual work period.

The Examination board monitors the contents and quality of the examinations of the Mastermath courses. The Teaching and Examination Regulations of this programme apply for the Mastermath courses. The examination boards of all programmes, participating in Mastermath, meet yearly to discuss the Mastermath examinations' and assessments' quality assurance.

Considerations

The panel approves of the examinations and assessment rules and regulations of the programme, these being in line with Vrije Universiteit Amsterdam and Faculty of Science policies. The panel is positive about the position and the activities of the Examination board.

The panel approves of the examination methods adopted by the programme. The examination methods are consistent with the goals of the courses. The processes of marking examinations are adequate. The policies to curtail any effects of free-riding are appropriate.

The supervision and assessment processes for Master projects have been well-organised. Students are offered appropriate supervision. The assessment procedures are up to standard, involving two examiners assessing the work separately and on the basis of assessment scoring forms. The panel, however, advises to add more extensive arguments to substantiate the assessments of the Master projects. These may take the form of concise comments on the selection of the topic of the thesis, the preparation of the student on the subject concerned, the summary of the contents of the thesis, the specification of the own contributions by the student, the creativity and mathematical depth of the student contributions and the quality of writing and oral presentation by the student.

The panel considers the measures taken by the programme to assure the quality of examinations and assessments to be appropriate. The panel regards these measures as assuring valid, reliable and transparent examinations and assessments. The regulations adopted to assure the relevance of dual-programme students' positions in organisations and to justify awarding 12 EC for study-related activities in these organisations are appropriate. The quality control of the Mastermath examinations is up to standard.

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.

The panel reviewed the Master projects of fifteen graduates of the programme with different grades and being of both full-time students and dual-programme students. In the Master projects, students are to demonstrate mastering all intended learning outcomes of the programme. They are in particular assessed on understanding the problems put forward, obtaining, cleaning and analysing data sets, drafting and solving quantitative models, analysing and presenting results, and finding new ways of solving these problems. The average grade of the Master projects is 7.9 for the graduates of the last two years.

In the curriculum, activities are scheduled for students' labour market preparation. The Master projects are internships in organisations in the professional field, and, therefore, prepare students for the labour market. Dual-programme students are already employed and, as a consequence, know the professional practice. From 2008 onwards, the Work field advisory board for the Mathematics and Business Analytics programmes, being composed of programme alumni and professional field representatives, advises programme management on the alignment of the programme with trends in the professional field.

Many students in the programme are offered positions by the host organisations where they complete their Master project. The programme conducted a survey among graduates of the programme. About 97 % of all graduates are employed. Programme graduates are employed as data scientists (34 %), in finance (21 %), in consultancies (15 %), in IT companies (15 %), in logistics (10 %) or in research or academia (6 %). A limited number of students proceeds to PhD trajectories.

Considerations

The examinations of the courses which were reviewed by the panel are of appropriate level.

The panel assesses the Master projects to be satisfactory. The quality of the projects varies. The panel supports the grades awarded to the projects. No Master projects were found to be unsatisfactory.

The panel is convinced the programme graduates have reached the intended learning outcomes of the programme. The graduates are well prepared for the professional field. Programme graduates find appropriate positions close to their graduation date.

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	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 has been listed. For the sake of clarity, these have been brought together below.

- To add ethical awareness to the programme intended learning outcomes.
- To maintain and, where required, strengthen the relations with research in the curriculum.
- To strengthen the subject of ethics in the curriculum
- To add more extensive comments and arguments to substantiate the assessments of the Master projects.