academion

BSc Business Information Technology
University of Twente

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Project code P2220

# Contents

# Summary


### Standard 1. Intended learning outcomes

The goal and aims of the BSc Business Information Technology are fitting for an academic bachelor's programme in this field. The aims of the programme have been translated into a clear, coherent and well-formulated set of programme intended learning outcomes (PILOs), that are aligned with the requirements of the academic and professional field. The panel is satisfied that the programme has an active External Advisory Board as a means to keep the PILOs connected to the requirements of the professional field.

### Standard 2. Teaching-learning environment

The curriculum of the BSc Business Information Technology adequately reflects the intended learning outcomes of the programme. The programme uses several activating and inspiring teaching methods. The involvement of industry (e.g. via projects or internships) is also a positive aspect. Students are exposed to a challenging conference format for their final bachelor's project and have freedom to choose a thesis topic and supervisor from a set list of options.

The panel finds that the current build-up of the curriculum paints a somewhat unbalanced picture of the programme's content to first-year students; this might be a contributing factor to the high drop-out rate. The panel agrees that the first year may be selective, but it should also motivate and enthuse the students. The panel therefore recommends that the programme reconsiders the current structure of the programme, for instance by a different distribution of the modules and increased integration of the IT and business domains. An investigation into whether some of the offerings in programming and mathematics might be redundant, is advisable. Most importantly, the panel urges the programme to ensure that the intersection of business and IT (BIT) remains at the core of the programme.

The panel finds that the programme currently uses a rather narrow interpretation of 'business' (i.e. accounting and finance), which is worth reconsidering. There are many relevant business domains (e.g., marketing, sales and customer relationships; production and services management; human resources management; R&D and product development; strategic management; performance and sustainability management; enterprise governance) and the panel thinks that the programme would benefit from exploring these beyond accounting and finance.

The teaching staff is well-qualified, both in terms of academic activities and teaching qualifications. The mentoring programme and involvement of teaching assistants are real assets to the programme. The panel furthermore finds that the programme deploys a good set of committees and initiatives to look after the quality of the programme. The programme is open to feedback and is willing to take measures to improve itself.

### Standard 3. Student assessment

The programme has a reliable, valid and transparent system of assessment in place. There are adequate procedures for design and quality assurance of exams and assignments. The panel sees opportunities for the programme to optimize the assessment of the bachelor research projects, by making more explicit how the assessment criteria relate to the PILOs and how the marks given are derived from the reviews on the assessment forms.

The Examination Board fulfils its legal duties. However, the panel noted that the programme has not yet followed up on the recommendation of the previous panel to intensify the carousel meetings to discuss and calibrate bachelor research projects' assessments process and grading. The panel urges that the B-BIT

programme now takes concrete steps to make sure that the systematic quality checks of the bachelor research projects will take place in the near future. If additional resources for the Examination Board are necessary to achieve this, the panel advises that management will ensures this.

### Standard 4. Achieved learning outcomes

The bachelor final projects show that students of the programme realize the intended learning outcomes of the programme. The panel encountered a broad diversity of topics and overall variety in the (set-up of the) papers, that potentially relate to different learning goals. The panel therefore recommends that the programme considers an approach in which the topics are explicitly greenlit by the B-BIT programme in an early stage, to ensure that the topic remains within the scope of business information technology.

Alumni are satisfied with their education and successfully find their way to the labour market or a master's programme.

## Score table

The panel assesses the programme as follows:

*B Business Information Technology*

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

Prof. Olga De Troyer
Chair

Linda te Marvelde
Secretary

Date: 6 April 2024

# Introduction

## Procedure

### Assessment

On 6 and 7 December 2023, the bachelor's programme Business Information Technology at the University of Twente was assessed by an independent peer review panel as part of the cluster assessment Information Science, together with the master's programme Business Information Technology. The assessment cluster consisted of 8 programmes, offered by the Open Universiteit, Radboud University, University of Twente, Utrecht University and Vrije Universiteit Amsterdam. The assessment followed the procedure and standards of the NVAO Assessment Framework for the Higher Education Accreditation System of the Netherlands (September 2018).

Quality assurance agency Academion coordinated the assessment upon request of the cluster Information Science. Peter Hildering acted as both coordinator and secretary, and Anne-Lise Kamphuis and Linda te Marvelde acted as secretaries in the cluster assessment. They have been certified and registered by the NVAO.

### Preparation

Academion composed the peer review panel in cooperation with the institutions and taking into account the expertise and independence of the members, as well as consistency within the cluster. On 20 July 2023, the NVAO approved the composition of the panel. The coordinator instructed the panel chair on her role in the site visit according to the Panel chair profile (NVAO 2016).

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

The programme provided the coordinator with a list of graduates over the period 2021-2023. In consultation with the coordinator, the panel chair selected 15 theses, taking the diversity of final grades and examiners into account. Prior to the site visit, the programme provided the panel with the theses and the accompanying assessment forms. It also provided the panel with the self evaluation report and additional materials (see appendix 4).

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

### Site visit

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

### Report

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

## Panel

The following panel members were involved in the cluster assessment:

- Prof. Olga De Troyer, emeritus professor of Computer Science, Vrije Universiteit Brussel – chair;
- Prof. Geert Poels, professor of Management Information Systems, Ghent University;
- Prof. Alessandro Bozzon, professor of Human Centered AI, Delft University of Technology;
- Prof. Jos van Hillegersberg, scientific director Jheronimus Academy of Data Science Den Bosch (TU/e and TiU), professor Design and Implementation of Information Systems, University of Twente.
- Prof. Jürgen Ziegler, professor of Interactive Systems, University of Duisburg-Essen;
- Prof. Barbara Pernici, professor of Computer Science and Engineering, Politecnico di Milano;
- Prof. Remco Dijkman, professor of Information Systems, Eindhoven University of Technology;
- Prof. Marijn Janssen, professor of ICT and Governance, Delft University of Technology;
- Kelly Kurowksi BSc, master student Business Informatics, Utrecht University – student member;
- Amber Pater BSc, master student Information Sciences, Radboud University – student member.

The panel assessing the bachelor's programme Business Information Technology at the University of Twente consisted of the following members:

- Prof. Olga De Troyer, emeritus professor of Computer Science, Vrije Universiteit Brussel – chair;
- Prof. Geert Poels, professor of Management Information Systems, Ghent University;
- Prof. Remco Dijkman, professor of Information Systems, Eindhoven University of Technology;
- Prof. Marijn Janssen, professor of ICT and Governance, Delft University of Technology;
- Kelly Kurowksi BSc, master student Business Informatics, Utrecht University – student member.

Drs. Linda te Marvelde acted as secretary for the site visit.

## Information on the programme

| | |
|---|---|
| Name of the institution: | University of Twente |
| Status of the institution: | Publicly funded institution |
| Result institutional quality assurance assessment: | Positive |

| | |
|---|---|
| Programme name: | B Business Information Technology |
| CROHO number: | 56066 |
| Level: | Bachelor |
| Orientation: | Academic |
| Number of credits: | 180 EC |

| | |
|---|---|
| Location: | Enschede |
| Educational minor: | Applicable |
| Mode(s) of study: | Fulltime |
| Language of instruction: | English |
| Submission date NVAO: | 1 May 2024 |

# Description of the assessment

## Recommendations previous panel

The programme's documentation included an overview of how it followed up on the recommendations given by the previous accreditation panel (2018). The panel concludes that in most cases the recommendations have been acted upon by the programme; the panel is satisfied with the improvement measures taken and sees that these have contributed to the improved quality of the programme. The follow-up of some recommendations, as well as one recommendation that is still work in process, is highlighted in this report under the applicable standards.

## Organization

The management of the bachelor's and master's programme Business Information Technology (B-BIT, M-BIT) is shared by the Faculty of Behavioural, Management and Social Sciences (BMS) and the Faculty of Electrical Engineering, Mathematics and Computer Science (EEMCS). To reinforce the balance between Business Administration and Information Technology, the BIT Programme Director is appointed alternately from EEMCS and BMS for a five-year term.

## 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 English-taught bachelor's programme Business and Information Technology (B-BIT) prepares students to become academics and professionals who are capable of bridging the gap to produce innovative ICT-based solutions to business problems as well as adapting business processes to leverage the benefits of technology. This is based on the vision that society depends on people who know how organizations (businesses) work, who know how to make information and communication technology (ICT) useful for these organizations, and who are capable of bridging the gap between these two areas. The programme's goal is to educate professionals and academics capable of leading ICT-driven business and societal transformations while the technologies, techniques and theories of Business and IT constantly evolve to keep up with the needs of organizations and society. To keep up with such a dynamic environment, B-BIT uses the Twente Educational Model 2.0 (see Standard 2), which promotes critical thinking, ethical and cultural reflection, and intensive practice through its project-based learning nature.

*Intended learning outcomes*

The ambitions of the programme have been translated into a clear and balanced set of Programme Intended Learning Outcomes (PILOs) (see Appendix A). The panel deems the PILOs to be in line with the aims of the programme and finds that they show a good coverage/mix of business and IT (skills). They are organized in six domains, the first three of which (business domain, IT domain, and business-IT alignment domain) provide a good match with the purpose and nature of a BSc in Business Information Technology programme. The other three domains (scientific approach, professional skills, ethics/social/societal/cultural) are a necessary complement for the mapping onto Meijer's criteria. Taken together the PILOs of the six domains provide a complete coverage of the IS 2020 domain-specific reference framework (A Competency Model for Undergraduate Programs in Information Systems, ACM/AIS IS2020 Task Force) and the Meijer's criteria.

*Professional field*
The panel is satisfied with the manner in which the programme keeps the PILOs and the curriculum up-to-date. The External Advisory Board (EAB) plays a role in this process. The EAB has seven members representative of industry, who are appointed for five years, with an additional five-year term as a possibility. Membership of the EAB is a personal position based on company/profile/link with BIT field. The board meets once or twice per year to give advice to the programme (director) based on (job) market perspective and needs. It also serves as a sounding board to discuss programme matters on a more strategic level.

### Considerations
The goal and aims of the BSc Business Information Technology are fitting for an academic bachelor's programme in this field. The aims of the programme have been translated into a clear, coherent and well-formulated set of programme intended learning outcomes (PILOs), that are aligned with the requirements of the academic and professional field. The panel is satisfied that the programme has an active External Advisory Board as a means to keep the PILOs connected to the requirements of the professional field.

### Conclusion
The panel concludes that the programme meets standard 1.

## Standard 2. Teaching-learning environment

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

### Findings

*Curriculum*
B-BIT adopted the university-wide Twente Educational Model (TOM 1.0) in 2013, which is strongly based on practice and developed around integrating projects. In TOM, all bachelor's programmes organize their courses in four modules of 15 EC per year. Since the academic year 2020-2021, B-BIT has evolved to adopt TOM 2.0, giving students more flexibility by breaking down the modules into smaller pieces (study units), while keeping the project-driven nature of TOM 1.0 and its consequent integration between the study units. The first academic year deals mainly with the 'beta part' of the curriculum (IT). The second year focuses mainly on courses in the Business Domain and Business-IT alignment, the 'gamma part' of the curriculum. The third year provides students with 30 EC for a minor/elective space and the two final modules leading to graduation.

Courses contain an equal amount of lecture hours (theory) and practical activities, which can stimulate students' creativity and develop their academic, professional, and personal skills. Students report that most courses go beyond teaching just theory and are supported to apply the learned content in practical context, usually via projects based on real-life company examples. The panel remarks that the TOM educational model seems well integrated in B-BIT. Furthermore, the panel finds that the programme is clearly embedded in a multi-disciplinary environment, which reflects the nature of the programme well.

The panel studied the curriculum and concluded that it enables students to achieve the PILOs. The panel spoke extensively about the choices the programme has made concerning the design of the curriculum in the first two years, mainly due to the considerable dropout rate (approx. 50% in the first year). Discussions with the students, lecturers and the programme management confirmed that the first year of the programme is considered quite difficult due to the heavy focus on IT, which some students might

underestimate. In the second year (which the students consider 'lighter' than the first year), the business courses focus on accounting and finance. The panel finds that this is a rather narrow interpretation of 'business', which is worth reconsidering. There are many relevant business domains and the panel thinks that the programme would benefit from exploring these beyond accounting and finance. The panel would expect a B-BIT programme to, for instance, give students an overview of functional domains in an organization and/or basic economics, rather than an in-depth exploration of one particular business domain.

Students informed the panel to appreciate the mix between business and IT courses, but do remark that the first and second year could be more balanced and that the curriculum could benefit from increased coherence. The panel agrees with the students' findings. Furthermore, due to the set-up of the curriculum, the integration between business and IT is currently somewhat implicit and not optimally aligned, according to the panel. Students encounter a rather technical and full programme in the first year. In the second year the programme is hardly challenging (or technical) enough. The panel finds that the programme could benefit from a more balanced distribution of the study load. Also, the programme contains a lot of advanced programming and mathematics in the first year. The programme recognizes that students may struggle with this and has recently added, a 'programming line' centred on metacognition training, mentoring, and community building. In addition, a one-on-one tutoring project was launched in the 'mathematics line'. Nevertheless, the panel encourages the programme to investigate whether some of the offerings in programming and mathematics might be redundant. Most importantly, the panel urges the programme to ensure that BIT (the intersection of business and IT) remains at the core of the programme. A reconsideration of the structure of the current programme could be useful, for instance by a different distribution of the modules and increased integration of the IT and business domains.

The panel also spoke at length about the final two modules in the third year, leading to graduation. In M11 (Bit Inc.), students work in small groups on a real business problem at a company. In M12 (Research Project), students do an individual research project. Students are presented with possible research topics via a dedicated Canvas page. The topics are divided over tracks that are supervised by track chairs; these chairs have a responsibility to ensure that high quality topics are available (see Standard 4). After finishing their research project, students write a short individual paper (eight pages) that follows a typical scientific structure along the line of: introduction, research questions, related work, research method, results, conclusions. It is submitted through conference management software (Easychair). The panel spoke with several stakeholders about the scientific conference format the B-BIT programme has chosen. The panel finds that the format is unusual for a bachelor's programme (perhaps more fitting for a master's programme), but it is positive that students are exposed to writing scientific papers early in their studies and is impressed about the overall level that students achieve (see Standard 4).

*Student feedback*

The panel found that students have several means to give feedback to the programme. The CEEP (Committee for Education Evaluation Panels) - an independent student committee- supports lecturers and Programme Management with an in–depth evaluation of various educational aspects at the end of a course. Their final report is sent to the Programme Committee (BITOC), Programme Management, and the lecturers. At the end of a course, each student is also asked to fill in the Student Experience Questionnaire (SEQ), providing feedback on content, teaching, knowledge and skills gained and study load. The EEMCS Quality Assurance Team consolidates the results of the SEQ and then sends it to the Programme Director and Programme Committee. The Programme Management shares the results with the responsible lecturers and asks for a reflection from the responsible lecturer, including an action plan to address relevant issues. The BIT Programme Committee (BITOC) also receives the consolidated SEQ and analyzes it together with the report provided by the CEEP. The BIT Programme Committee, based on the outcomes, provides the

Programme Management with a set of recommendations to improve the course whenever applicable. Students informed the panel that meetings are a particularly useful way to give feedback, but they should preferably not be scheduled in busy periods. The panel concludes that the programme provides students with ample opportunities to provide feedback and it agrees with students that it would be an improvement if updates on what was done with the feedback given would be provided in a systematic manner.

*Guidance*

The panel finds that students receive regular feedback on their progress via intermediate testing, diagnostic testing, peer feedback and meetings with project mentors. Students particularly appreciate the mentoring approach, in which older students assist newer students with both study-related and personal issues (e.g., having bi-weekly meetings to discuss progress, being a first point of contact in case something was going wrong). This contributes to students becoming more engaged and creating a community feeling in which students can learn and grow with each other. The involvement of teachings assistants is also positively evaluated by the students. Students report that some modules and courses, however, are affected by organizational issues, leading to information offered too late or too scattered and diffuse communication lines. The panel supports the students who recommend that the programme ideally streamlines its communication channels, prevents the use of many different platforms besides Canvas.

*English-taught programme*

The panel finds that the choice of English as the language of instruction is logical and justified. The domain of business information technology is evolving at a rapid pace, most scientific literature is exclusively available in English and the majority of new developments are published in English too. Furthermore, the programme wants students to be fully prepared for the global employment market. Therefore, offering the programme in English is fitting, considering the international scope of the scientific field of business information technology and the job market in which graduates will end up working.

*Staff*

The panel is positive about the quality of lecturing staff in the B-BIT programme, who hail from the Faculty of Behavioural, Management and Social Sciences (BMS) and the Faculty of Electrical Engineering, Mathematics and Computer Science (EEMCS). B-BIT staff members teach in multiple programmes. So-called 'module board meetings' ensure that module coordinators are aware of trends and developments in all modules in the programme. Usually, teachers from both faculties are active in one module, since they consist of several study units (courses). The student-staff ratio is low (15:1), which the panel finds commendable considering the intensive teaching model with many contact hours and a great variety of teaching methods and the increase in student inflow; the B-BIT programme moved from a cohort of 58 students in 2017 to a cohort of 150 in 2022.

Students are content with the lecturers, who they describe as motivating, enthusiastic and knowledgeable; they challenge the students to excel. The programme made a significant step in ensuring that lecturers obtain a UTQ. The number of lecturers with a UTQ (or are in the process of obtaining certification) increased to 94%. In addition, 94% of the lecturers have a certification showing English-language proficiency at level C1 or C2. The teaching staff is highly qualified with almost all having a PhD. However, the panel noted that the involvement of full professors in the programme is somewhat limited. The panel suggests that the programme would benefit from their increased involvement and should ideally make an effort in the future to attract (more) full professors from the BIT domain.

### Considerations

The curriculum of the BSc Business Information Technology adequately reflects the intended learning outcomes of the programme. The programme uses several activating and inspiring teaching methods. The involvement of industry (e.g. via projects or internships) is also a positive aspect. Students are exposed to a challenging conference format for their final bachelor's project and have freedom to choose a thesis topic and supervisor from a set list of options.

The panel finds that the current build-up of the curriculum paints a somewhat unbalanced picture of the programme's content to first-year students; this might be a contributing factor to the high drop-out rate. The panel agrees that the first year may be selective, but it should also motivate and enthuse the students. The panel therefore recommends that the programme reconsiders the current structure of the programme, for instance by a different distribution of the modules and increased integration of the IT and business domains. An investigation into whether some of the offerings in programming and mathematics might be redundant, is advisable. Most importantly, the panel urges the programme to ensure that the intersection of business and IT (BIT) remains at the core of the programme.

The panel finds that the programme currently uses a rather narrow interpretation of 'business' (i.e. accounting and finance), which is worth reconsidering. There are many relevant business domains (e.g., marketing, sales and customer relationships; production and services management; human resources management; R&D and product development; strategic management; performance and sustainability management; enterprise governance) and the panel thinks that the programme would benefit from exploring these beyond accounting and finance.

The teaching staff is well-qualified, both in terms of academic activities and teaching qualifications. The mentoring programme and involvement of teaching assistants are real assets to the programme. The panel furthermore finds that the programme deploys a good set of committees and initiatives to look after the quality of the programme. The programme is open to feedback and is willing to take measures to improve itself.

### Conclusion

The panel concludes that the programme meets standard 2.

## Standard 3. Student assessment

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

### Findings

The programme refers to various documents for its assessment policies and practices. The B-BIT programme follows the guidelines of the Quality Assurance Framework for Student Assessment UT as well as the EEMCS faculty assessment policy. The quality policy rests on three pillars:

1. The Examination Board (EB) monitors the assessment system and intervenes, if necessary.
2. The appointed examiners for components of the programme should be well–trained and qualified to teach and assess (see Standard 2).
3. Detailed rules and procedures that are in place aim to ensure a high–quality assessment system and to prevent fraud.

*Course assessment*

The panel finds that the programme has an adequate system of assessment. An assessment plan (including the schedule) is published on Canvas two weeks before the start of a course. Generally, at least one representative practice test is available for students to prepare for the examination. Written tests are peer-reviewed to assure their quality. The aspects checked in the peer review include validity, reliability, and level. In the case of oral exams, there are either two assessors, or the exam is video-recorded. In case project reports or presentations are distributed for grading over multiple examiners, they discuss the grading criteria and interpretation to ensure consistency. The panel appreciates the variety of aforementioned assessment methods that are used in the programme; although some students report that the use of multiple choice assessments could be reduced. The panel discussed group work with the students, which they reported worked well.

*Bachelor Research Project assessment*

After finishing their research project, students write a scientific paper to submit through Easychair (conference management software). The paper is assessed by two additional reviewers selected by the student's supervisor (where one of the reviewers is a student from the same 'track' of the conference). The student's supervisor is the chair of the review committee. As the review committee chair, the supervisor is responsible for consolidating the feedback of other reviewers, making a 'meta-review' and forwarding the feedback document to the student —including their feedback (as supervisor/reviewer). The student's supervisor is responsible for the grading, which is done based on their expertise, their experience with the student during supervision, and the other reviewers' feedback. Finally, to determine the grade, the supervisor applies the following weights to the grading criteria: Scientific Quality (50%), Paper Writing Quality (20%), Oral Presentation (10%), and Overall Process (20%).

As part of its preparation for the site visit, the panel studied a sample of bachelor's projects. The panel concluded that they were generally appropriately assessed with a helpful assessment form that breaks down the evaluation in different criteria. The multiple examiners involved in the evaluation add to the reliability and validity of the assessment. At the same time, the panel noted that, because the evaluation is done as is common in conferences, the criteria for assessment are quite general: overall impression, strong points, weak points, quality of writing and structure, overall quality of the research. This gives less guidance to examiners as to what elements are considered important in the evaluation (literature, research question, research contribution, research method, …) and may also lead to inconsistency in judgement. The panel thinks that this could be improved by relating the assessment criteria more clearly to the PILOs, and paying more attention to substantiating how the marks given are derived from the reviews on the assessment forms. All in all, the panel found that the papers were graded slightly on the high side. Given its findings on the bachelor research project assessment, the panel recommends to make the criteria for the assessment more explicit by linking them to the PILO. This, the panel concludes, would help in the objectification of the assessment and enhance the focus of students of what is expected of them.

The previous panel recommended to intensify the carousel meetings, during which examiners discuss and calibrate bachelor research projects' assessments process and grading. The panel was informed that the programme management has set up a thesis carousel structure, but that priority was given to developing the carousel in the master's programme, and that B-BIT is still awaiting its turn. The panel urges that the B-BIT programme speeds this up and takes concrete steps to make sure that the carousel meetings for the bachelor research projects will take place in the near future. If additional resources for the Examination Board are necessary to achieve this, the panel advises that management ensures this.

*Examination Board*
The Examination Board (EB) is organized at the level of the faculty EEMCS. Responsibilities are mandated to subcommittees, the BIT subcommittee is responsible for both the bachelor's and master's programme Business Information Technology (EB-BIT). Faculty–wide affairs are mandated to the subcommittee for General Affairs.

Several procedures are in place to guarantee quality during a course's (or module's) lifetime, which the panel is positive about. To initiate a new course (or redesign a module), the lecturer provides a document describing the topics, learning objectives, teaching methods, planning, teaching material and assessment scheme. The Programme Committee assesses this document, after which the Examination Board reviews the assessment and the Programme Management authorizes the course to be registered and started. While a course is running, the BIT quality-assessment cycle takes place. Students play a role in providing lecturers, the Programme Committee (BIT-OC), and the Programme Management with a comprehensive report at the end of each course.

In 2023, the BIT Programme sealed an agreement with the BIT EB subcommittee and the EEMCS Quality Assurance Team on a new workflow for continuous improvement, which ensures that all bachelor modules are checked at least every three years. The panel thinks that this new working method looks promising and adequately involves all important stakeholders.

### Considerations
The programme has a reliable, valid and transparent system of assessment in place. There are adequate procedures for design and quality assurance of exams and assignments.

The panel sees opportunities for the programme to optimize the assessment of the bachelor research projects, by making more explicit how the assessment criteria relate to the PILOs and how the marks given are derived from the reviews on the assessment forms.

The Examination Board fulfils its legal duties. However, the panel noted that the programme has not yet followed up on the recommendation of the previous panel to intensify the carousel meetings to discuss and calibrate bachelor research projects' assessments process and grading. The panel urges that the B-BIT programme now takes concrete steps to make sure that the systematic quality checks of the bachelor research projects will take place in the near future. If additional resources for the Examination Board are necessary to achieve this, the panel advises that management will ensures this.

### Conclusion
The panel concludes that the programme meets standard 3.

## Standard 4. Achieved learning outcomes

The programme demonstrates that the intended learning outcomes are achieved.

### Findings
Prior to the site visit, the panel studied a selection of 15 bachelor research projects (papers). It concludes that the quality of the papers is good; the panel noted that, compared to other BSc programmes in the domain, the research component is quite high level. The papers all follow a typical scientific structure along the line of: introduction, research questions, related work, research method, results, conclusions. The papers have a broad range of topics and are strong in their coverage of the literature. The panel did notice quite

some variety in the papers as some are more practical where others are conceptual. There were papers in the panel's selection that presented a model or other artifact, while other not produce a model, but rather presented a 'digest' of the literature on a particular topic. The panel argues that these are different results that potentially relate to different learning goals, which is something that both the programme and the Examination Board should be clear about. This variety should at minimum be the result of an explicit choice, made by the programme. As discussed in Standard 2, the topics that students can choose are the responsibility of several track chairs. It might be worth considering whether an approach in which the topics are explicitly greenlit by the B-BIT programme in an early stage is feasible.

*Alumni*
The most common choice of B-BIT graduates is to continue their studies in the M-BIT programme (40%). Approx. 32% leaves the University of Twente altogether, either to pursue another institution's study programme or to join the labour market. The most common areas of professional practice chosen by alumni are 'Business & IT Consultancy', Software Development and Engineering, and 'Data Management and Analysis'. B-BIT alumni mostly have jobs as Business Consultant, IT Consultant, Business (Intelligence) Analyst, Data Analyst, and AI or Data Science Consultant. The panel notes that it is positive that bachelor's alumni find their way to jobs that relate well to the programme.

The panel noted the somewhat modest outflow from B-BIT to M-BIT (40%). This percentage has decreased over the years and is lower than other EEMCS faculty programmes. B-BIT would like to inspire its graduates to continue their education in the M-BIT programme and, ultimately, to pursue an academic career in the BIT field. BIT management currently investigates ways to improve the connection between B-BIT, M-BIT students and researchers collaborating in the master's programme. The panel supports these efforts.

### Considerations
The bachelor final projects show that students of the programme realize the intended learning outcomes of the programme. The panel encountered a broad diversity of topics and overall variety in the (set-up of the) papers, that potentially relate to different learning goals. The panel therefore recommends that the programme considers an approach in which the topics are explicitly greenlit by the B-BIT programme in an early stage, to ensure that the topic remains within the scope of business information technology.

Alumni are satisfied with their education and successfully find their way to the labour market or a master's programme.

### Conclusion
The panel concludes that the programme meets standard 4.

## General conclusion
The panel's assessment of the BSc Business Information Technology is positive.

## Development points

1. Considering the curriculum structure in the light of the programme's aims, the panel recommends that:
    a. the programme reconsiders the structure of the current programme to ensure that business and IT remains at the core of the programme, for instance by a different distribution of the modules and increased integration of the IT and business domains;
    b. the programme investigates whether some of the offerings in programming and mathematics might be redundant.

2. The panel finds that the programme currently uses a narrow interpretation of 'business' (i.e. accounting and finance). As there are many relevant business domains, the panel recommends that the programme at least substantiates its choice with regards to offering an in-depth exploration of the business domain accounting and finance, rather than an overview of functional domains in an organization and/or basic economics.

3. Regarding the (the assessment of) the bachelor research project, the panel recommends to:
    a. explicitly link the assessment criteria to the PILO's;
    b. systematically extend the thesis carousel to the bachelor's programme;
    c. further develop the assessment form so that they provide insight in how the marks given are derived from the reviews.
    d. consider an approach in which the topics are explicitly greenlit by the B-BIT programme in an early stage (to ensure that the topic remains within the scope of business information technology).

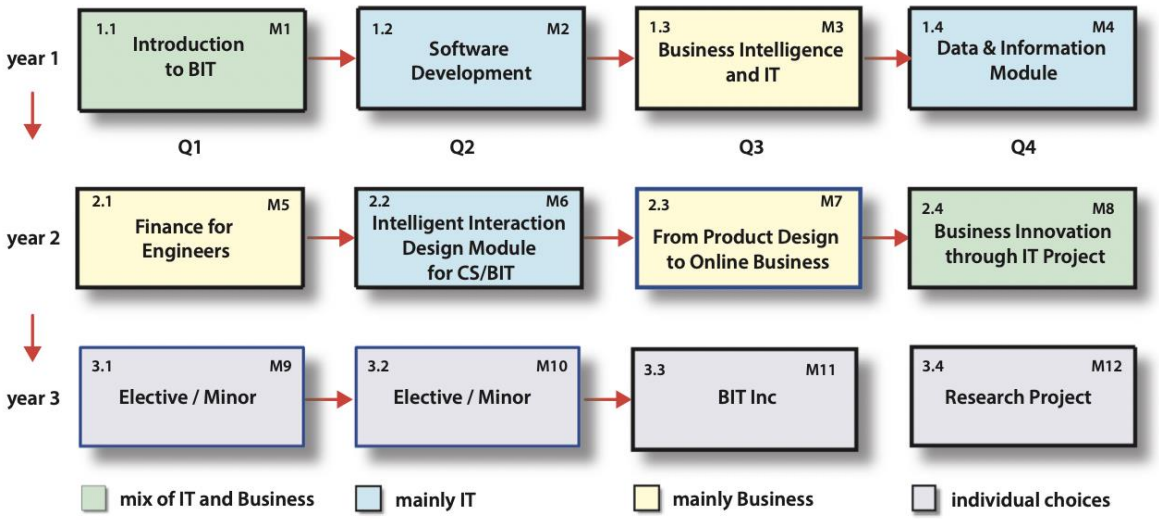
4. The panel recommends the programme streamlines its communication channels to avoid scattered and diffuse communication lines.

# Appendix 1. Intended learning outcomes

After completing this study programme the graduate:

| | |
|---|---|
| **1** | **Business domain knowledge and skills** |
| 1.1 | Understands theories of the process behind the production of goods and services and can apply this in designing solutions. |
| 1.2 | Understands models of costing and budgeting and their significance for the ability to manage business processes and can apply this in designing solutions. |
| 1.3 | Can analyse, design and/or redesign business processes that support business operations, making use of theories and models of business processes and methods for analysis and design. |
| **2** | **Information Technology domain knowledge and skills** |
| 2.1 | Understands the methods, techniques and tools for the development of software systems and can apply them. |
| 2.2 | Understands theories, methods and techniques for the management and analysis of data, as well as of relevant implementation and maintenance aspects. |
| 2.3 | Knows and understands how to design user interfaces, focusing on the interactions between the end-users and the system. |
| 2.4 | Knows and understands how to design, implement, and manage secure information systems and networks. |
| **3** | **Business-IT alignment knowledge and skills** |
| 3.1 | Can systematically integrate requirements and practices from business and IT in specified application areas using theories and models of organisation and IT. |
| 3.2 | Understands theories concerning the role of information technology in business operations and innovation. |
| 3.3 | Can analyse, design and/or redesign the information systems that support business operations using the design cycle (see 4.1). |
| 3.4 | Understands the management aspects, quality and risk management of the software development process and software products. |
| 3.5 | Can analyse and interpret data through data-driven approaches to inform intelligent business decision-making and drive innovation. |
| **4** | **Scientific approach** |
| 4.1 | Can under supervision systematically apply the design cycle (analysis, design, implementation, evaluation and reflection) to IT– and business–related problems, while applying theories from different disciplines if necessary. |
| 4.2 | Can under supervision systematically design and execute a research plan (literature research, problem analysis, formulating hypothesis, design and execution of a research plan, data analysis, reporting, conclusions) crossing different disciplines or fields if necessary. |
| 4.3 | Has basic knowledge of, and is able to apply research methodology and research ethics, both in the area of social science research as in design research. |
| 4.4 | Can apply creative and critical thinking, reflection and argumentation. |
| 4.5 | Is capable of independently acquiring new knowledge and skills from different disciplines. |
| 4.6 | Can apply specific mathematical theories, and analyse problems and solutions conceptually. |
| **5** | **Professional skills** |
| 5.1 | Can co–operate, discuss and report in written and verbal ways, in English, in both professional and research settings, and is aware of the differences between these settings. |
| 5.2 | Is capable of working as part of a (multi-disciplinary) team in different roles, as member or leader, in terms of sharing responsibilities, applying time management, and planning resources and reporting, and is aware of group dynamics in development projects. |
| 5.3 | Is capable of functioning as a professional in and between different disciplines/fields. |
| 5.4 | Is capable of setting up and leading a (simple) enterprise. |
| 5.5 | Is capable of shaping his/her learning process, his/her competencies and develop his/her professional identity, by deliberately choosing, motivating and completing study units that match personal capacities, skills, and motives. |
| **6** | **Taking account of Social and Temporal context** |
| 6.1 | Is capable of analysing and discussing ethical, social, cultural, and societal aspects of problems, solutions and developments and their consequences in the field. |
| 6.2 | Can value differences between cultures and can learn from these. |

## Appendix 2. Programme curriculum



## Appendix 3. Programme of the site visit

Wednesday 6 December 2023

| | |
|---|---|
| 12.00 - 12.15 | Welcome |
| 12.15 - 14.00 | Panel preparation (incl. lunch) |
| 14.00 - 15.00 | **Interview programme management** |
| 15.15 - 16.00 | **Interview BSc students and recent BSc alumni** |
| 16.00 - 16.30 | Break |
| 16.30 - 17.15 | **Interview BSc teaching staff** |
| 17.15 - 17.30 | Internal panel meeting |

Thursday 7 December 2023

| | |
|---|---|
| 08.45 - 09.15 | Panel preparation |
| 09.15 - 10.00 | **Interview MSc students and recent alumni** |
| 10.15 - 11.00 | **Interview MSc teaching staff** |
| 11.00 - 11.30 | Break |
| 11.30 - 12.00 | **Interview Board of Examiners** |
| 12.00 - 13.00 | Internal panel session (incl. lunch) |
| 13.00 - 13.30 | **Concluding session programme management** |
| 13.30 - 15.00 | Concluding session panel |
| 15.00 - 15.30 | **Oral feedback panel** |
| 15.30 - 16.15 | **Development dialogue** |

# Appendix 4. Materials

Prior to the site visit, the panel studied 15 theses per programme. Information on the theses is available from Academion upon request. The panel also studied other materials, which included:

**Appendices**

- Comments Previous Assessment & Actions at the University of Twente
- Programme Intended Learning Outcomes
- Overview of Modules and Courses
- Intake of students B-BIT
- Intake of female students
- Grades
- Dropouts
- Graduated students
- External Advisory Board
- Staff of the programme
- Student–staff ratio BIT

**Online references**

- Self-Evaluation report
- Positive audit UT (28 April 2020)
- NVAO report UT (22 March 2020)
- Quality Assurance Framework for Student Assessment UT
- EEMCS faculty assessment policy
- Domain-Specific Frame of Reference
- External Advisory Board (EAB)
- Inter-Actief
- ENIAC
- Education and Examination Regulations (EER)
- Osiris
- Criteria for Academic Bachelor's and Master's Curricula, also known as the Meijer's criteria
- Summary of the Meijer's criteria
- Dublin Descriptors
- Entry requirements UT website
- Information for prospective students
- Statement of the rectors of all Dutch universities
- Twente Educational Model
- Online Teaching
- Mobility–Online
- EEMCS Faculty Regulations document
- BIT Quality Control
- Senior University Examination Qualification
- Overview of the subcommittees
- University Teaching Qualification (UTQ)
- EEMCS Rules & Guidelines
- Plagiarism
- Netherlands Code of Conduct for Research Integrity

- Questionnaire to check for potential issues due to Corona
- Netherlands Code of Conduct for Research Quality Assurance Workflow
- National Student Enquiry (NSE2023)
- Fraud
- Twente Student Conference on IT