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B Technical Computer Science | M Computer Science

University of Twente

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Contents

Summary

Standard 1. Intended learning outcomes

The panel concludes that the intended learning outcomes (ILOs)) of both the bachelor's programme Technical Computer Science (TCS) and the master's programme Computer Science (CS) are appropriate in level, scope and academic orientation, and provide a solid articulation of the programmes' profiles. While noting several areas for further sharpening, it also considers the ILOs to be consistent with the expected exit level for NLQF level 6 (bachelor) and NLQF level 7 (master).

For the bachelor's programme, the panel considers the dual orientation towards further academic study and entry into the professional field to be clearly reflected in the ILOs. The panel judges the set of ILOs to be coherent and well anchored in internationally recognized reference frameworks such as ACM and SWEBOK, and to cover the main disciplinary, analytical and design competences as well as ethical, societal and interdisciplinary dimensions. The panel regards the involvement of an Industrial Advisory Board as a relevant mechanism for external input at programme level.

At the same time, the panel considers that the bachelor's ILO set would benefit from further refinement. The level of specificity varies across subgroups of learning outcomes, and communication-related competences are not yet consistently and explicitly articulated within the ILO framework. The panel therefore advises further sharpening and streamlining to strengthen their clarity and verifiability.

For the master's programme, the panel considers the organization of the ILOs into seven domains to be appropriate for a research-oriented academic master's programme. The panel is positive about the strong and consistent embedding of all specializations in the university's research environment, which supports the academic depth and positioning of the programme.

With regard to external input at master's level, the panel notes that engagement with external stakeholders is primarily organized within the individual specializations and is not yet consolidated through a programme-wide mechanism. It therefore suggests considering a light programme-level arrangement to complement the specialization-level Boards and support a more coherent external perspective.

Across both programmes, the panel considers the ongoing reflection on the implications of developments such as GenAI to be an important strength. The panel therefore recommends that the programmes translate this reflection more explicitly into the ILOs, in particular by clarifying which competences graduates are expected to demonstrate in relation to such developments.

Standard 2. Teaching-learning environment

The panel concludes that both the BSc TCS and the MSc CS have translated their ILOs into a well-designed and well-structured curriculum. For the bachelor's programme, the panel considers the TIM-based curriculum structure to be coherent and well organized. A clear strength lies in the consistent integration of mathematics with computer science content, which supports analytical reasoning and the application of formal methods. The panel is also positive about the project- and challenge-based approach and the use of authentic external contexts, particularly in the Design Project. At the same time, the panel notes that students do not always experience cross-module coherence consistently, especially where cross-cutting themes are distributed across multiple modules. The panel therefore recommends that the bachelor's programme strengthen the visibility and coherence of cross-cutting learning lines, including cybersecurity and academic and professional skills, through clearer programme-level ownership and coordination, while maintaining the strong mathematics–computer science alignment.

For the master's programme, the panel is positive about the way the curriculum reflects developments in the discipline and about the flexibility offered through specializations, electives and profiling space. Internship opportunities are valued as a meaningful complement to the programme's academic orientation. The panel also appreciates the strong emphasis on autonomy, research engagement and independent learning, which aligns well with the programme's research-oriented profile. While interdisciplinarity is explicitly addressed in the ILOs, the panel observes that its realisation varies across specializations and often depends on individual student choices. The panel therefore recommends strengthening the programme-wide and more consistent embedding of interdisciplinary perspectives across specializations, building on existing elements such as the ethics component.

With regard to the EIT Digital dual-degree trajectory, the panel considers the shared core curriculum, UT's verification of alignment with UT requirements for outgoing students, and the involvement of a UT critical reviewer in thesis assessment to be adequate safeguards for academic standards and the final level of graduates receiving a UT degree.

The panel considers the current level of awareness regarding GenAI a valuable starting point for both programmes and encourages the further development of a coherent, curriculum-wide approach, supported by clear programme-level coordination of AI literacy and related educational and assessment practices.

With regard to admission and feasibility, the panel notes that the matching procedure in the bachelor's programme and the bridging route in the master's programme are designed to safeguard entry level and study feasibility. The panel is also positive about the accessibility and personal character of student guidance, particularly the visible and proactive role of study advisers. Support for shaping individual study trajectories in the master's programme is identified as a strength, and students indicate that they feel well prepared for the thesis phase.

In terms of facilities, the panel is satisfied that the available computing facilities adequately support the educational activities of both programmes. However, the panel urges the programmes and the faculty to address the shortage of quiet study and working spaces for Computer Science students, especially during peak periods.

The panel considers the teaching staff to be academically well qualified and didactically prepared. To further support shared ownership and programme-wide coherence, the panel advises strengthening communication within the teaching team, so that planned developments are more consistently understood and implemented across the programme.

Finally, with regard to teaching assistants, the panel emphasises their crucial contribution to intensive project- and practice-based education in the bachelor's programme. In this context, the panel advises continued monitoring of the impact of reduced teaching-assistant capacity on the timeliness of feedback and the level of hands-on guidance in practical and project-based components, particularly during peak periods. The panel also encourages the programme to maintain opportunities for the training and professional development of teaching assistants.

Standard 3. Student assessment

The panel concludes that the assessment system of both programmes is broadly appropriate and provides a sound basis for safeguarding the level and achievement of the ILOs. Across both programmes, assessment is varied, well organized and supported by good-quality examinations. The panel also appreciates the explicit emphasis on feedback in the assessment policy, including strengthened feedback arrangements in digital assessment and safeguards for multiple-choice testing.

At the same time, the panel notes that assessment coherence and oversight are currently most explicit at course level, while a consolidated programme-level overview is less visible. The panel therefore advises developing a more integrated programme-level assessment overview to strengthen cross-course coherence and support systematic monitoring.

The panel is positive about the organization of final-work assessment in both programmes. In the bachelor's programme, it appreciates the overall set-up of the two graduation modules and values the bachelor thesis carousel as a relevant calibration instrument, noting positively that it was carried out in 2025.

In the Design Project (M11), the panel notes that effective mechanisms are in place to address free-riding, including the red/yellow/green card approach. However, it considers it important that the application of these mechanisms is transparent and traceable. The panel therefore advises clarifying and standardising how the rationale for issuing cards and the implications for assessment decisions are recorded, so that decisions are consistently documented and applied across project components.

In the Research Project (M12), the panel strongly values the bachelor thesis conference as a structured academic moment that supports students' reflection and presentation skills. It also notes that the programme has formal safeguards for the four-eyes principle through the track chair's role as second examiner and the co-signing of assessment forms. At the same time, the panel finds it important that the second examiner's contribution is clearly defined, consistently implemented and transparently evidenced in the assessment dossier, given that substantive involvement is not always based on a full reading in practice.

In the master's programme, the panel appreciates the committee-based assessment set-up, including senior examiners and a second examiner from a different research group, and it considers the shared forms and criteria helpful in supporting transparency and consistency. The panel also views the thesis carousel as a valuable calibration instrument and encourages the programme to proceed with its plans to reinstate it and embed it more regularly and structurally.

Finally, the panel finds that the Examination Board has the right expertise to carry out its responsibilities, while noting that workload pressure and limited support capacity have affected its functioning in recent years. Building on recent progress, the panel recommends a more proactive and systematic approach to monitoring assessment quality, including routine verification of the four-eyes principle and follow-up on whether the thesis carousel is used as intended in both programmes. The panel appreciates that the Examination Board has considered the implications of GenAI for assessment, and encourages it to take a more steering role by establishing a programme-wide GenAI assessment framework and reviewing it periodically.

Standard 4. Achieved learning outcomes

The panel concludes that Standard 4 is met for both programmes. Based on the reviewed final works, it finds that graduates achieve the ILOs at the appropriate level.

For the bachelor's programme, the Design Project and the individual thesis together provide a sound basis for demonstrating the outcomes. The panel noted one case where its judgement differed from the programme's assessment; while not indicative of a structural issue, it underlines the importance of continued attention to shared minimum expectations and consistency in thesis assessment, particularly regarding the evidential basis for evaluation and the demonstration of engineering competence.

For the master's programme, the reviewed theses, across all specializations, including the EIT Digital dual degree track, demonstrate master-level depth, independence and strong analytical and research skills. Graduate destination information further supports that graduates are well prepared for further study and relevant positions in the labour market.

Score table

The panel assesses the programmes as follows:

B Technical Computer Science

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

M Computer Science

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

The assessment panel has reviewed the report and agrees with its contents. On behalf of the panel,

Prof. dr. ir. Bart Preneel, Panel chair	Esther Poort, Secretary

Date: 17 March 2026

Introduction

Procedure

Assessment

On 8 & 9 December 2025, the bachelor's programme Technical Computer Science and the master's programme Computer Science of the University of Twente were assessed by an independent peer review panel as part of the cluster assessment WO Informatica groep 3. The assessment cluster consisted of 27 programmes, offered by the Open Universiteit, Leiden University, the University of Groningen, Utrecht University, Radboud University, Eindhoven University of Technology, Delft University of Technology, Vrije Universiteit Amsterdam, the University of Amsterdam, and the University of Twente. The assessment followed the procedure and standards of the NVAO Assessment Framework for the Higher Education Accreditation System of the Netherlands (April 2024).

Quality assurance agency Academion coordinated the assessment upon request of the cluster WO Informatica groep 3. Peter Hildering and Yannick Slagter acted as coordinator in the cluster assessment. Esther Poort acted as secretary for the assessment of the programmes of University of Twente. They have been certified and registered by the NVAO.

Panel composition

Academion composed the peer review panel in cooperation with the institutions and taking into account the expertise and independence of the members. In order to strengthen the mutual consistency between the assessment panels within the cluster, the coordinator from Academion ensured joint instruction for the panel members and a comparable assessment method for all site visits. This consistency was also a point of attention at all concluding panel meetings during the site visits. Finally, overlap in assessment panels of the various site visits in the cluster further strengthened the consistency. The composition of the panels was designed in such a way that at least three panel members also participated in another assessment panel in the cluster.

On 30 April 2025, the NVAO approved the composition of the panel. The coordinator instructed the panel chairs on their role in the site visit according to the Panel chair profile (NVAO 2016) on 9 December 2024.

Preparation

The programmes composed a site visit schedule in consultation with the coordinator (see Appendix 3). The programmes selected representative partners for the various interviews. It was 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 programmes provided the coordinator with a list of graduates over the period 2024-2025. In consultation with the coordinator, the panel chair selected 16 students of the bachelor's programme and 15 of the master's programme. They took the diversity of final grades and examiners into account, as well as the various tracks/specializations. The bachelor's programme has a group project in collaboration with industry, and an individual thesis for their final test. For the bachelor's programme, they selected four different groups of the Design Project, totalling a number of 16 students. The panel studied the group products as well as the individual bachelor's theses of these students. For the master's programme, the selection included theses from all specializations: 4 each from Software Technology, Data Science & Technology and Cyber Security, and one from Internet Science & Technology. Furthermore, the thesis selection included two theses from the

EIT Digital programme, which allows students to combine the MSc Computer Science degree with a MSc degree at a partner institution (dual degree). This selection reflected the number of graduates in each particular specialization proportionally. Prior to the site visit, the programmes provided the panel with the theses and the accompanying assessment forms. They also provided the panel with the documentation (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 documentation and the theses, as well as the division of tasks during the site visit. The panel was also informed on the assessment frameworks, 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, general observations of the panel and suggestions for development themes.

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 programmes in order to have it checked for factual irregularities. The secretary discussed the ensuing comments with the panel chair and changes were implemented accordingly. The panel then finalized the report, and the coordinator sent it to the University of Twente.

Panel

The panel assessing the bachelor's programme Technical Computer Science and the master's programme Computer Science consisted of the following members:

- Prof. Dr. ir. B. (Bart) Preneel, Full Professor Computer Security and Industrial Cryptography at the Faculty of Engineering Sciences at the KU Leuven [Chair];
- Prof. dr. S. (Sjouke) Mauw, Full Professor in Security and Trust of Software Systems at the University of Luxembourg (Luxembourg);
- Prof. dr. habil. G. (Gergana) Vladova, Professor Computer Science Education/Computer Science and Society at the Humboldt-Universität zu Berlin (Germany);
- Prof. dr. M.H.M (Mark) Winands, Professor in Machine Reasoning at Maastricht University;
- F.P. (Floris) Westerman MSc. Alumnus (end of 2024) of the master's programmes Computer Security at the Vrije Universiteit Amsterdam, Computing Science (Track Software Engineering and Distributed Systems) at the Rijksuniversiteit Groningen, and Logic (track Logic & Computation) at the Universiteit van Amsterdam [Student member].

Each panel member, the panel secretary and the programmes have filled out the Statement of Impartiality and non-disclosure agreement, as required by the NVAO. They can confirm that the assessment was carried out in complete independence.

Information on the programmes

Name of the institution:	University of Twente
Address:	Drienerlolaan 5, 7522 NB Enschede
Website:	www.utwente.nl
BRIN-number:	21PH
Status of the institution:	Publicly funded institution
Result institutional quality assurance assessment:	Positive

Programme name:	Technical Computer Science
ISAT number:	59335
Orientation of the programme:	Academic
Level of the programme:	Bachelor (NLQF 6)
Number of credits:	180 EC
Language of instruction:	English
Professional requirements:	no
Location:	Enschede
Mode(s) of study:	Fulltime
Assessment group:	Informatica groep 3
Awarded degree:	BSc
Submission date NVAO:	1 May 2026

Programme name:	Computer Science
ISAT number:	60300
Orientation of the programme:	Academic
Level of the programme:	Master (NLQF7)
Number of credits:	120 EC
Language of instruction:	English
Professional requirements:	no
Specializations or tracks:	Cyber Security Data Science and Technology Internet Science and Technology Software Technology
Location:	Enschede
Mode(s) of study:	Fulltime
Dual degree programmes:	EIT Digital dual degrees with multiple European partner universities *
Assessment group:	Informatica groep 3
Awarded degree:	MSc
Submission date NVAO:	1 May 2026

* KTH Royal Institute of Technology (Sweden), Technical University of Madrid (Spain), University Cote d'Azur (France), Polytechnic University of Milan (Italy), Aalto University (Finland), University of Rennes (France), University of Turku (Finland), University of Trento (Italy), Budapest University of Technology and Economics (Hungary), Eötvös Loránd University in Budapest (Hungary), Babeş-Bolyai University (Romania)

Description of the assessment

Organization

The bachelor's programme Technical Computer Science (BSc TCS) and the master's programme Computer Science (MSc CS) are part of the Faculty of Electrical Engineering, Mathematics and Computer Science (EEMCS). The teaching staff comes primarily from the seven research groups that together make up the Computer Science Department. Educational and organizational support for the programmes is provided by the Office of Educational Support EEMCS (EDU), in close cooperation with several central service departments of the University of Twente, including student administration, educational logistics, IT services and student support services.

The programme management team is responsible for both programmes, and consists of a Programme Director, Programme Coordinators and Study Advisers, who work closely together in the day-to-day organization and continuous development of the programmes. In addition, dedicated Programme Mentors are appointed for each of the four master's specializations to support students in making well-informed curricular choices and to safeguard coherence within and across specializations.

Programme management is advised on educational matters by the Programme Committee and the Examination Board, which together contribute to systematic quality assurance and transparency in decision-making. Furthermore, the programmes maintain strong and active links with the study association Inter-Actief and the alumni association ENIAC, that support student engagement, feedback from the student body and ongoing connections with graduates and the professional field.

Recommendations previous panel

The previous accreditation panel formulated several recommendations for both programmes. For the BSc TCS, these recommendations concerned strengthening the programme's connection to the professional field through a more explicit embedding of an Industrial Advisory Board, safeguarding that the ongoing transition towards digital testing does not come at the expense of the quality of feedback, and safeguarding personal mentoring. In addition, the panel recommended improving transparency in the bachelor end projects by ensuring that the external quality check on the individual research project is explicitly documented in the assessment dossier.

For the MSc CS, the recommendations focused on enhancing the consistency and transparency of thesis assessment, including the provision of substantive qualitative feedback and the consistent use of assessment forms. In addition, the panel recommended that additional quality checks within the EIT Digital dual degree be documented in a traceable manner.

For both programmes, the previous accreditation panel recommended clarifying the programmes' positioning with respect to developments in artificial intelligence (AI) and continuing to match available facilities and staffing resources with the growth in student numbers.

The current panel concludes that the programmes have adequately addressed most recommendations. The measures taken are clearly aligned with the issues raised and are structurally embedded in the programmes. Further details are discussed in the relevant sections of this report. Regarding the recommendation on the bachelor assessment dossiers, the associated project was delayed and not yet implemented at the time of the site visit. The current panel could establish that external quality checks are routinely undertaken as part of thesis assessment. It therefore concludes that this is not a serious shortcoming, but still considers that the programme should take up this recommendation of the previous panel as part of the planned redesign of the thesis assessment process.

Standard 1. Intended learning outcomes

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

Findings

Profile

The BSc TCS and the MSc CS of the University of Twente are positioned as academically oriented programmes with a strong technical and engineering focus, addressing the understanding, design and analysis of computational systems within a research-intensive university context.

The bachelor's programme is characterized by a combination of in-depth disciplinary knowledge in computer science and a broad technical and engineering-oriented perspective. The programme emphasizes analytical reasoning, systems thinking and problem-solving, supported by a strong foundation in programming and mathematics. Interdisciplinary collaboration forms a recurring element of the educational approach, with team projects that involve working alongside experts and peers. The programme is offered in an international academic context with English as the primary language of instruction.

Building on an undergraduate foundation in computer science, the master's programme is positioned as a research-oriented academic programme that offers further deepening and specialization in core areas of the discipline. Through its four specializations, Cybersecurity, Data Science & Technology, Internet Science & Technology, and Software Technology, the programme aims to provide advanced disciplinary depth and methodological rigour in close connection to the university's research environment.

According to the panel, the programmes have appropriate profiles that reflect the key characteristics and unique elements of each programme. These characteristics are appropriate for bachelor's and master's programmes in computer science.

Intended learning outcomes

The intended learning outcomes (ILOs) of both programmes are derived from the university-wide educational vision Learning-by-Interacting. This vision emphasizes active and experiential learning, collaboration within learning communities and student self-development. These principles are reflected in the formulation of the ILOs, which address analytical reasoning, systematic problem-solving and design, teamwork, ethical and societal awareness, and the capacity for lifelong learning.

For the BSc TCS, the ILOs are structured according to the FIRIS-P framework, which provides a coherent categorisation of intended outcomes into six domains: Fundamental (disciplinary foundations), Instrumental (technical tools and platforms), Reasoning (analysis and judgement), Interventional (design and implementation), Societal (teamwork and responsible engagement with context), and Personal (critical thinking, problem solving, adaptability and professional best practices). The programme benchmarks its ILOs against internationally recognized reference frameworks, including the ACM/IEEE/AAAI Computer

Science Curricula (CS2023) and the SWEBOK knowledge areas for software engineering, and relates them to the Meijers criteria, the Dublin Descriptors and the Dutch Qualifications Framework (NLQF level 6).

Based on its review of the documentation and the discussions during the site visit, the panel notes that the bachelor's programme pursues a dual orientation aimed at preparing students both for progression to master's education and for entry into the professional field. This orientation is reflected in the formulation of the ILOs, which address a solid disciplinary foundation in computer science, analytical reasoning, and design and implementation competences, alongside explicit attention to ethical and societal dimensions. The panel is positive about the way societal relevance is embedded in the learning outcomes and notes that the set of ILOs is internally coherent and aligned with internationally recognized reference frameworks such as ACM and SWEBOK.

In examining the structure and scope of the bachelor's ILOs, the panel notes that the overall set is extensive and that the level of specificity varies across outcome clusters. In particular, communication-related competences are not yet articulated consistently and explicitly within the ILO framework, resulting in uneven detail across competences. The panel therefore advises further sharpening and streamlining of the ILOs to strengthen their clarity and verifiability.

For the MSc CS, the ILOs are formulated at programme level and organized across seven domains covering advanced disciplinary knowledge, research proficiency, critical evaluation, design and implementation of complex systems, collaboration and leadership, continuous professional development, and ethical and societal awareness. These programme-level ILOs are further specified in specialization-specific intended learning outcomes (SILOs) for four specializations: Cybersecurity, Data Science & Technology, Software Technology, and Internet Science & Technology. The master's programme relates its ILOs to the Meijers criteria, the Dublin Descriptors and the Dutch Qualifications Framework (NLQF level 7).

For the master's programme, the panel finds the organization of the programme-level ILOs into seven domains to provide a clear overarching structure for the programme. Across all four specializations, the panel notes a strong and consistent embedding in the university's research environment through links with active research groups, which is reflected in the programme's academic orientation.

Across both programmes, the panel notes a strong awareness of the impact of developments such as generative Artificial Intelligence (GenAI) on the discipline and on education and assessment, as discussed during the site visit. Programme management explained that the ILOs are deliberately formulated at a relatively abstract level in order to allow flexibility in curriculum design and assessment; the panel understands this rationale. However, the panel considers that the pervasive impact of GenAI merits a more explicit reflection in the ILOs, particularly with regard to the competences expected of graduates. It therefore recommends that the programmes articulate more explicitly in the ILOs the competences graduates are expected to demonstrate in relation to the responsible and critical use of GenAI.

External input
The documentation indicates that, alongside university-wide educational policies, both programmes attach particular importance to engaging with ongoing technological and societal developments, given the rapidly evolving nature of the computer science discipline. This is reflected in an emphasis on critical reflection on technology, responsible professional conduct, and attention to ethical and societal implications.

The bachelor's programme has established an Industrial Advisory Board. The panel notes that this Board provides input on developments in the professional field and appreciates that it functions as an active mechanism for external engagement at programme level, with its role and functioning discussed with programme management.

For the master's programme, external stakeholder input is organized primarily at specialization level through four separate Industrial Advisory Boards. The panel observes that, in the absence of a programme-wide mechanism for external input at master's level, external alignment is not systematically consolidated across the programme as a whole. It suggests considering a light programme-level arrangement to complement the specialization-level Boards and support a more coherent external perspective.

Considerations

The panel concludes that the ILOs of both the bachelor's programme TCS and the master's programme CS are appropriate in level, scope and academic orientation, and provide a solid articulation of the programmes' profiles. While noting several areas for further sharpening, it also considers the ILOs to be consistent with the expected exit level for NLQF level 6 (bachelor) and NLQF level 7 (master).

For the bachelor's programme, the panel considers the dual orientation towards further academic study and entry into the professional field to be clearly reflected in the ILOs. The panel judges the set of ILOs to be coherent and well anchored in internationally recognized reference frameworks such as ACM and SWEBOK, and to cover the main disciplinary, analytical and design competences as well as ethical, societal and interdisciplinary dimensions. The panel regards the involvement of an Industrial Advisory Board as a relevant mechanism for external input at programme level.

At the same time, the panel considers that the bachelor's ILO set would benefit from further refinement. The level of specificity varies across subgroups of learning outcomes, and communication-related competences are not yet consistently and explicitly articulated within the ILO framework. The panel therefore advises further sharpening and streamlining to strengthen their clarity and verifiability.

For the master's programme, the panel considers the organization of the ILOs into seven domains to be appropriate for a research-oriented academic master's programme. The panel is positive about the strong and consistent embedding of all specializations in the university's research environment, which supports the academic depth and positioning of the programme.

With regard to external input at master's level, the panel notes that engagement with external stakeholders is primarily organized within the individual specializations and is not yet consolidated through a programme-wide mechanism. It therefore suggests considering a light programme-level arrangement to complement the specialization-level Boards and support a more coherent external perspective.

Across both programmes, the panel considers the ongoing reflection on the implications of developments such as GenAI to be an important strength. The panel therefore recommends that the programmes translate this reflection more explicitly into the ILOs, in particular by clarifying which competences graduates are expected to demonstrate in relation to such developments.

Conclusion

The panel concludes that the bachelor's programme TCS and master's programme CS meet 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 bachelor's programme
The bachelor's curriculum is organized within the TCS Integrated Modules (TIM) framework. The programme consists of 15 EC modules that are designed as coherent units in which theoretical components, practical assignments and integrating projects are structurally aligned (see Appendix 2 for an overview of the curriculum structure). This modular set-up establishes a fixed study rhythm and supports the systematic development of disciplinary knowledge and skills through the close integration of theory and application. Overall, the curriculum structure is designed to support progression from introductory disciplinary orientation towards advanced application and increasingly independent work.

A curriculum revision initiated in 2023 has resulted in a substantial redesign of the first year. The revised introductory module presents four core subdomains of computer science, software, information, hardware, and cybersecurity, supported by a foundational mathematics component. Together, these elements introduce students to the breadth of the discipline and establish a shared conceptual and methodological basis.

Building on this orientation, subsequent modules deepen students' knowledge of these domains by progressively addressing programming, software design, systems, data, algorithms and modelling. Across the curriculum, students are expected to increasingly connect mathematical reasoning with computational concepts, moving from conceptual understanding towards application and integration in more advanced modules. To support this progression, the programme includes a structured set of mathematics courses, covering topics such as logic, calculus, linear algebra and discrete mathematics, which are distributed over the first and second year. These courses provide the formal and analytical foundations that underpin core computer science topics addressed later in the programme.

As the programme progresses, learning activities become more complex and open-ended, requiring structured problem-solving, systematic evaluation and a growing degree of individual responsibility. Key disciplinary domains include computer systems and architecture, algorithms and data-related methods, and elements of artificial intelligence and user-centred design. Across these elements, the curriculum also introduces students to core AI/ML concepts and data-driven approaches as part of the broader computer science knowledge base.

The third year offers increased curricular flexibility. Students may use this phase to follow elective modules, a minor, a study-abroad programme or an engineering internship. The documentation further indicates that a double-diploma option with applied mathematics is available for a limited group of students, embedded within the regular structure of the bachelor's programme. The major graduation components, the Design Project and the Research Project, are each positioned as 15 EC modules and are intended to integrate accumulated disciplinary knowledge with academic and professional skills. These modules can be scheduled in different quartiles, allowing flexibility in students' individual study trajectories.

Based on its review of the curriculum and discussions with students and staff, the panel notes that the bachelor's curriculum is coherently structured and characterized by clear learning lines and a strong integration of theory and practice. The panel particularly appreciates the consistent embedding of mathematical foundations within the computer science curriculum, which students and staff repeatedly highlighted as a distinctive strength of the programme. This integration contributes to the development of analytical reasoning skills and supports students in applying formal methods within disciplinary contexts.

However, the panel notes room for improvement in the experienced coherence across modules. Students pointed to instances of overlap and fragmentation, particularly where cross-cutting themes are addressed in multiple parts of the curriculum without clear coordination. The panel recognizes this pattern in relation to themes such as cybersecurity, artificial intelligence literacy and academic or professional skills, which are distributed across different modules but are not always experienced by students as part of a clearly articulated and recognizable learning line. The panel therefore recommends strengthening programme-level responsibility and coordination for these cross-cutting learning lines in order to enhance their coherence and visibility for students, while safeguarding the strong alignment between mathematics and computer science throughout the curriculum.

The panel notes that the bachelor's programme offers a double-diploma option for a limited number of students. The panel appreciates that this option is embedded in the regular programme structure and that its academic standards and quality assurance arrangements are safeguarded within the programme's existing frameworks.

Curriculum master's programme
The master's curriculum comprises 120 EC and is structured around four specializations: Cybersecurity, Data Science & Technology, Internet Science & Technology, and Software Technology. Each specialization includes a 20 EC core that introduces the key concepts, methods and tools associated with the respective domain. In addition, students select at least 20 EC from advanced course options, allowing for further deepening within specialist subfields. Across the specializations, the course portfolio covers a broad range of advanced topics within the discipline. Artificial intelligence and machine-learning methods form a substantive part of this portfolio, particularly within Data Science & Technology and Cybersecurity, and through advanced electives that address state-of-the-art developments. Appendix 2 provides a schematic overview of the structure and composition of the master's curriculum.

The curriculum includes a profiling space that allows students to shape their individual study trajectories. This space may be filled with advanced electives from within the programme, courses offered by related programmes, an internship or an international exchange. The curriculum structure allows for both research-oriented and practice-oriented trajectories, with the specializations providing a common framework while leaving room for individual choices and differences in student background.

The graduation trajectory consists of two interconnected components: Research Topics (10 EC) and the Final Project (30 EC). In the Research Topics component, students prepare a research proposal, conduct a literature study and explore relevant methods under the supervision of academic staff affiliated with the research groups. The second stage of the graduation trajectory is the Final Project (30 EC). This is an individual research, engineering and/or design project (usually a combination of all three), typically carried out on the same topic and building on the results of the preceding Research Topics component. The research component of a Final Project must be carried out according to a systematic approach and the results should be interpretable and verifiable. The design component must be carried out according to systematic methods and techniques and should serve a scientific purpose. The Final Project is carried out either within a University of Twente research group or in collaboration with external partners from industry or public organizations.

The curriculum documentation presents the master's programme as being organized around a shared structure across specializations, with explicit links to the university's research environment and with attention to methodological, ethical and disciplinary aspects. The curriculum combines programme-wide academic requirements with a substantial degree of student choice.

Based on its review of the curriculum and the discussions with students, staff and programme management, the panel is positive about the extent to which the master's curriculum reflects current developments in the computer science discipline and finds that it aligns with internationally recognized standards in the field. The panel notes that the programme offers a high degree of flexibility, allowing students to shape their study trajectory around one or, where appropriate, two of the four specializations.

The panel notes that the profiling space provides meaningful flexibility and supports both research-oriented and more practice-oriented trajectories. It also appreciates the availability of opportunities for students to pursue dual-degree trajectories. Selected pathways provide the possibility of obtaining a dual degree through the EIT Digital Master School. The panel notes that the master's programme offers elective opportunities for internships in industry and is positive about the way these internships complement the academic curriculum. Students and staff confirmed that internships are valued within the programme and contribute to students' exposure to professional practice alongside the programme's academic orientation.

Although interdisciplinarity is explicitly addressed in the ILOs, the panel finds that its realization within the curriculum varies across specializations is, to a significant extent, dependent on students' individual choices. Apart from the ethics component, the panel observes that interdisciplinary perspectives are not consistently embedded in a programme-wide manner across all specializations. It therefore recommends strengthening programme-wide embedding of interdisciplinarity by defining a shared baseline of interdisciplinary learning activities and ensuring that each specialization incorporates these perspectives in a more explicit and consistent way, rather than leaving them largely to individual student choices.

Finally, the panel notes that the coherence and cumulative build-up across courses are not always experienced by students as immediately transparent, given the breadth and flexibility of the master's programme. In particular, the panel observes that the existence and role of programme-wide common elements are not always clearly recognizable to students across the different specializations. In this context, the panel notes that study guidance and mentoring play an important role in supporting students in making coherent choices. It therefore suggests making the programme-wide common elements and their role more explicit and visible to students across the different specializations.

EIT Digital dual degree
Within the MSc Computer Science, students in the Data Science & Technology and Cyber Security specializations may apply for an EIT Digital dual degree. Participants study at two universities, typically spending one year at the University of Twente and one year at one of the eleven European partner institutions. The trajectory combines a technical major in the chosen specialization with a compulsory Innovation & Entrepreneurship (I&E) component, including an innovation- or project-based element and an I&E summer school, and culminates in a 30 EC master's thesis, typically carried out in collaboration with industry. Upon completion, students receive two master's diplomas: one from the University of Twente and one from the partner university.

The panel learned that partner universities have agreed on a shared core curriculum and that UT verifies, for its outgoing students, that the completed programme meets UT requirements. Programme management also explained how responsibility for monitoring and safeguarding academic standards for all curriculum components is allocated within the respective universities, which provided the panel with confidence in the governance of these trajectories. In addition, the panel was informed that thesis assessment includes the involvement of a critical reviewer (a University of Twente professor). Overall, the panel considers these arrangements adequate to ensure that UT can remain confident about the final level achieved by graduates receiving a UT degree.

Generative artificial intelligence in the curriculum (both programmes)
In addition, the documentation refers to ongoing discussions at programme and faculty level regarding the implications of GenAI for education and assessment. These discussions include considerations related to the responsible use of GenAI tools, academic integrity and the alignment of teaching and assessment practices with emerging technological developments. The documentation indicates that initial steps have been taken to address these issues within individual courses, while programme-level coordination is still being developed.

Based on its discussions with students, staff and programme management, the panel is positive about the broad awareness within both programmes of GenAI's impact on computer science education. Staff and students confirmed that GenAI tools are increasingly discussed in educational contexts and that, in some courses, they are already being addressed explicitly in relation to learning activities and assessment, which the panel considers a valuable starting point for further curriculum-wide development.

At the same time, the panel observes that guidance on GenAI use and the related development of GenAI literacy are currently shaped primarily at course level, resulting in varying approaches across courses and specializations. The panel therefore advises clarifying programme-level responsibilities and expectations in order to strengthen coherence and support a more systematic approach across both programmes.

Didactic concept and educational approach bachelor's programme
According to the documentation, the bachelor's didactic concept is implemented within the TIM framework and combines theoretical components with integrative elements that require students to apply recently acquired knowledge and skills.

Project- and assignment-based forms of learning constitute a prominent element of the educational approach. Students engage in design, implementation and analytical tasks embedded within the modules and directly related to disciplinary content. According to the programme documentation, these activities are typically carried out in small teams and supported by teaching staff and teaching assistants (senior bachelor or master students), particularly in laboratory and project settings. Teaching assistants play a supporting role in guiding students during practical activities and in providing formative feedback throughout the learning process.

Academic and professional skills, including teamwork, communication and planning, are embedded within the disciplinary context of the modules rather than offered as separate skills courses. The programme documentation presents the educational approach as supporting progression across the programme. Introductory modules focus on the acquisition of core concepts and basic methods, while later modules place increasing emphasis on more complex problem-solving and independent work. In the final phase of the programme, students are offered greater autonomy through elective components and graduation projects, which are intended to prepare them for the expectations of the master's phase.

Based on its review of the curriculum and discussions with students and staff, the panel is positive about the extensive use of project- and challenge-based learning formats in the bachelor's programme. The panel notes that these formats are applied throughout the programme and are meaningfully integrated with theoretical components. Students and teaching staff indicated that this approach contributes to an interactive learning environment and supports the application of disciplinary knowledge in practice-oriented contexts, which the panel recognizes as a clear strength of the programme's didactic concept.

During the site visit, the panel learned that engagement with professional practice is a recurring feature of the bachelor's programme. The panel is positive about the way authentic external contexts are incorporated into the curriculum, particularly through the externally commissioned Design Project, which allows students to work on real-world assignments and to experience professional standards and expectations. The panel considers this a meaningful complement to the programme's academic orientation.

Didactic concept and educational approach master's programme
According to the documentation, the master's programme Computer Science builds on the same educational vision as the bachelor's programme, while operating in a more research-oriented and student-driven context. Courses combine lectures with research-based assignments and applied laboratory work, with increased emphasis on independent study, critical reasoning and methodological justification. Students are expected to address complex problems using advanced techniques associated with their chosen specialization.

Students receive guidance from an academic mentor, who supports the development of a coherent study trajectory. As students progress towards the Research Topics component and the Final Project, they become increasingly embedded in the activities of research groups or, where applicable, external partners. This educational context is described as fostering academic independence, reflective practice and engagement with current research questions.

Based on its discussions with students and staff, the panel is positive about the master's didactic approach and notes its strong emphasis on autonomy, research engagement and independent learning. Students confirmed that the transition towards greater responsibility and self-direction is clearly recognizable in comparison with the bachelor's programme, and the panel appreciates that this progression is consistent with the programme's research-oriented profile.

Admission and feasibility bachelor's programme
The bachelor's programme attracts a large and diverse student population, including a substantial proportion of international students. In 2025, the total BSc TCS population comprised 799 students, of whom 40% held Dutch nationality, 38% came from other EEA countries and 22% from non-EEA countries.

In response to continued interest from applicants, the programme introduced a numerus fixus in 2021, which was replaced in 2023 by a mandatory matching procedure. This procedure serves as a readiness check and helps align expectations. It includes compulsory components focused on mathematics, logical reasoning and algorithmic thinking; applicants who do not complete the procedure are not eligible for admission. The aim is to ensure a good fit between students' prior preparation and the demands of the first-year curriculum, which requires immediate engagement with calculus, discrete mathematics and introductory programming in an integrated setting.

Study progress data indicate that most students complete the programme within three to four academic years. In 2025, overall pass rates were 35% within nominal duration and an additional 30% within nominal+1 year. The documentation further indicates that dropout rates have decreased in recent years, which the programme attributes to stricter admission-related measures and improved communication aimed at ensuring a better match between prospective students and programme demands.

Based on its review of the documentation and the discussions during the site visit, the panel notes that the programme's intake and feasibility measures are closely connected to the demands of the curriculum. The panel encourages continued monitoring of study load and feasibility, including attention to potential workload peaks in project-heavy periods and to the impact of ongoing curriculum changes.

Admission and feasibility master's programme
The master's programme has a heterogeneous inflow, including graduates from UT bachelor's programmes, students from other Dutch and European universities, graduates from universities of applied sciences, and a substantial international cohort. The annual influx is just over 90 students.

Admission decisions are based on explicit criteria regarding required prior knowledge in mathematics, algorithms, computer architecture, operating systems, object-oriented programming and networking. When applicants do not meet these prerequisites, a pre-master/bridging programme may be assigned to address specific deficiencies prior to entry. This bridging route is capped at a maximum of 30 EC and is defined as a coherent package set by the admissions committee.

Study progress data indicate that most students complete the programme within or close to nominal duration. Based on the study progress overview for cohorts 2019–2020 to 2024–2025, overall pass rates are 54% within nominal duration and an additional 43% within nominal+1 year, with an average study duration of 2.4 years.

Based on its review of the documentation and the discussions held during the site visit, the panel notes that the admission and bridging arrangements are clearly geared towards feasibility and timely completion. In particular, the panel considers the explicit specification of required prior knowledge and the clearly defined, coherent bridging route of up to 30 EC to be appropriate measures for safeguarding entry level and study feasibility.

Student guidance and support
Within the bachelor's programme, student guidance is organized through study advisers and the teaching team, complemented by extensive support in practical and project-based components. Teaching assistants provide hands-on support in tutorials, laboratories and project work, contributing to frequent interaction and accessible guidance throughout the learning process.

Based on the discussions during the site visit, the panel notes that bachelor's students experience study guidance as accessible, supportive and personal. Study advisers were described by students as a visible and proactive point of contact, and students indicated that progress is monitored and that attention is paid to student wellbeing, including mental health and diversity-related issues.

In the master's programme, guidance is primarily individualized. Each specialization is governed by one or two academic mentors, acting in synchronization with the programme management. These mentors help students articulate ambitions, make principled elective choices, and adapt plans as interests evolve. This customization is not aimless freedom; it is guided autonomy with explicit learning goals and checkpoints that sustain coherence and progression. Each student is assigned an academic mentor. During the graduation phase, supervision takes place within the research groups and, where applicable, is complemented by external supervision when the project is carried out in collaboration with an industry or societal partner.

The panel is positive about the support provided to master's students in shaping an individual study trajectory, in particular the guidance offered by study advisers in composing an individual study programme. Students indicated that this guidance is perceived as accessible and personal and that it effectively supports them in navigating the programme's flexibility and range of options. Students also indicated that they feel well prepared for the master's thesis project; the panel relates this to the progressive build-up of research- and project-based components within the curriculum and the alignment between specialization courses and thesis topics.

Across both programmes, students with disabilities or specific support needs have access to university-wide services, including student counsellors and disability support staff, as well as formal procedures for arranging individual accommodations. These provisions can include adjustments in assessment, scheduling and/or the learning environment. Study advisers, academic advisers and mentors act as key links between the central services and the programmes, supporting the consistent implementation of approved arrangements within the teaching–learning environment. The panel considers these provisions to be sufficient.

Language of instruction
Both the bachelor's and the master's programmes are taught in English. The programmes indicate that this choice supports the objective of fostering an international learning community, which is essential given the international orientation of the computer science field and to the predominance of English in the academic literature, software tooling and professional communication. The programmes also explain that the use of English programme titles reflects common terminology in the discipline and is intended to enhance recognizability for prospective students, academic partners and employers in an international context.

The panel finds that the rationale for English-medium instruction is coherent and considers it appropriate for the programmes' profile and the context in which graduates will operate. The panel also considers the use of English programme titles appropriate and recognisable within the academic discipline and relevant labour market.

Learning facilities
The programme documentation describes that the programmes are supported by a set of teaching and learning facilities intended to accommodate the practical and project-based character of both curricula. Students have access to computing facilities and software environments that are used for programming, software development and data-intensive work; during the site visit, students and staff also referred to the availability of powerful machines and a computing cluster, including support when specific technical set-ups are needed.

The documentation indicates that the programmes use the university's digital learning environment for distributing and submitting course materials, assignments and project documentation. In addition, both the documentation and the discussions during the site visit show that, where specific hardware or equipment is required in individual modules, students can make use of university lending facilities, supporting the continuity of practical work.

The panel noted that the information provision to students is adequate. It also finds that the available computing facilities sufficiently support the educational activities of both programmes. At the same time, echoing student input, the panel notes a shortage of dedicated quiet study and working spaces for Computer Science students, which can make it challenging to find suitable locations for individual study and group work, particularly during peak periods.

Teaching staff
The programmes are delivered by a teaching team that is largely drawn from the Computer Science research groups. Through this staffing model, the programmes aim to ensure a strong connection between education and research, reflected in curriculum content, the master's specializations and the supervision of graduation projects.

The programmes are supported by a substantial and academically diverse staff base covering the main disciplinary domains addressed in the programmes. Examiners meet institutional qualification requirements (including research qualifications and educational competence), and academic staff are expected to obtain the University Teaching Qualification (UTQ) within three years after appointment. Of the 151 staff members, 87 have completed the UTQ and 18 are currently enrolled. Among the remainder, 6 have been granted dispensation, 19 hold an exemption, 3 are BKE-certified, and 1 position carries no UTQ obligation. Two staff members have not yet started the UTQ, and for 15 staff members the UTQ status is not registered. Professional development opportunities, such as SUTQ trajectories, didactic workshops and participation in educational innovation projects, are available to teaching staff. The programmes further report staff involvement in ongoing curriculum development, including the redesign of the first-year bachelor modules.

Teaching capacity is further supported by a large group of teaching assistants, many of whom are senior bachelor's or master's students. These assistants play a prominent role in supporting laboratory work, tutorials and project-based components, particularly in the bachelor's programme. They receive preparatory training and operate under the responsibility of the academic staff members in charge of the course or module.

The organizational structure at bachelor level includes module coordinators, programme management and administrative support. Each bachelor module has a dedicated module coordinator responsible for overall coordination (e.g., scheduling and aligning activities and constraints). Together, the module coordinators form a Module Board, that meets regularly and exchanges information with programme management at least once per quartile, thereby supporting coordination within and across modules. At master level, coordination is organized at course level: each MSc course has an examiner appointed by the Examination Board at the request of programme management. Research groups provide the infrastructure and supervisory capacity for the graduation trajectories in the MSc CS and for the bachelor's Research and Design Projects.

The panel finds that the teaching staff are academically well-qualified, didactically prepared and able to operate effectively in an English-taught setting. Students consistently highlighted the approachability and engagement of teaching staff, which the panel regards as a strength of the learning environment.

To further support shared ownership and programme-wide coherence, the panel encourages programme management to strengthen communication towards the teaching team. During the site visit, the panel gained the impression that not all staff members were equally familiar with planned developments (for example in the area of cybersecurity), which may affect programme-wide alignment.

With regard to teaching assistants, the panel notes their important role in supporting intensive practical and project-based education, particularly in the bachelor's programme. The panel notes that a recent reduction in teaching-assistant capacity has been felt most strongly at bachelor level. During the site visit, the panel learned that the programmes have addressed this reduction through more efficient organization and a more targeted deployment of teaching-assistant support. While the panel is confident that overall educational quality has largely been maintained, both students and staff reported some impact on the student experience as well as on opportunities for the training and professional development of teaching assistants. The panel therefore advises programme management to monitor these effects and, where needed, to rebalance support to safeguard timely feedback and sufficient guidance in practical and project-based components. It also encourages the programme to maintain opportunities for the training and professional development of teaching assistants.

Considerations

The panel concludes that both the BSc TCS and the MSc CS have translated their ILOs into a well-designed and well-structured curriculum. For the bachelor's programme, the panel considers the TIM-based curriculum structure to be coherent and well organized. A clear strength lies in the consistent integration of mathematics with computer science content, which supports analytical reasoning and the application of formal methods. The panel is also positive about the project- and challenge-based approach and the use of authentic external contexts, particularly in the Design Project. At the same time, the panel notes that students do not always experience cross-module coherence consistently, especially where cross-cutting themes are distributed across multiple modules. The panel therefore recommends that the bachelor's programme strengthen the visibility and coherence of cross-cutting learning lines, including cybersecurity and academic and professional skills, through clearer programme-level ownership and coordination, while maintaining the strong mathematics–computer science alignment.

For the master's programme, the panel is positive about the way the curriculum reflects developments in the discipline and about the flexibility offered through specializations, electives and profiling space. Internship opportunities are valued as a meaningful complement to the programme's academic orientation. The panel also appreciates the strong emphasis on autonomy, research engagement and independent learning, which aligns well with the programme's research-oriented profile. While interdisciplinarity is explicitly addressed in the ILOs, the panel observes that its realisation varies across specializations and often depends on individual student choices. The panel therefore recommends strengthening the programme-wide and more consistent embedding of interdisciplinary perspectives across specializations, building on existing elements such as the ethics component.

With regard to the EIT Digital dual-degree trajectory, the panel considers the shared core curriculum, UT's verification of alignment with UT requirements for outgoing students, and the involvement of a UT critical reviewer in thesis assessment to be adequate safeguards for academic standards and the final level of graduates receiving a UT degree.

The panel considers the current level of awareness regarding GenAI a valuable starting point for both programmes and encourages the further development of a coherent, curriculum-wide approach, supported by clear programme-level coordination of AI literacy and related educational and assessment practices.

With regard to admission and feasibility, the panel notes that the matching procedure in the bachelor's programme and the bridging route in the master's programme are designed to safeguard entry level and study feasibility. The panel is also positive about the accessibility and personal character of student guidance, particularly the visible and proactive role of study advisers. Support for shaping individual study trajectories in the master's programme is identified as a strength, and students indicate that they feel well prepared for the thesis phase.

In terms of facilities, the panel is satisfied that the available computing facilities adequately support the educational activities of both programmes. However, the panel urges the programmes and the faculty to address the shortage of quiet study and working spaces for Computer Science students, especially during peak periods.

The panel considers the teaching staff to be academically well qualified and didactically prepared. To further support shared ownership and programme-wide coherence, the panel advises strengthening communication within the teaching team, so that planned developments are more consistently understood and implemented across the programme.

Finally, with regard to teaching assistants, the panel emphasises their crucial contribution to intensive project- and practice-based education in the bachelor's programme. In this context, the panel advises continued monitoring of the impact of reduced teaching-assistant capacity on the timeliness of feedback and the level of hands-on guidance in practical and project-based components, particularly during peak periods. The panel also encourages the programme to maintain opportunities for the training and professional development of teaching assistants.

Conclusion
The panel concludes that the bachelor's programme TCS and master's programme CS meet standard 2.

Standard 3. Student assessment

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

Findings

System of assessment
The programmes describe a structured approach to assessment, with programme-level policies and supporting guidelines that are intended to help staff select appropriate assessment formats and apply shared principles across courses and modules. A broad mix of assessment methods is used in both programmes, including written and/or digital examinations, programming and written assignments, project work, reports and oral components. Formative assessment is used alongside summative assessment, with course teams having discretion in how formative elements are implemented, while maintaining clarity about the summative structure.

The assessment policy places explicit emphasis on feedback. For assignments and projects, feedback is expected to be provided as a default element of grading. For closed examinations, including digital tests, the policy requires that students receive meaningful insight into their performance, for instance through model answers and review moments. This is further supported through strengthened feedback arrangements in computer-based assessment, such as individualized feedback reports in online quizzes/automated grading, the release of failed test cases in programming courses after the deadline, and the sharing of model answers or common-mistakes summaries for written digital exams (often complemented by item-level insight and short comments in Canvas). In addition, the policy includes specific safeguards for multiple-choice testing, including screening and post-test analysis, and it states that no final grade may be based solely on multiple-choice assessment.

Group work is structurally embedded in both programmes. The policy framework describes conditions for the use of group grades and stresses the importance of ensuring that individual performance can be differentiated, including in cases where collaboration is an explicit learning objective.

Both programmes have also developed guidance on the implications of GenAI for assessment validity. The documentation describes a shift towards assessment formats that allow verification of individual understanding, for example through oral elements, process evidence and reflective components, and it provides programme-level rules on when GenAI use may be permitted or restricted.

Based on its review of the documentation and the discussions during the site visit, the panel concludes that assessment across both programmes is varied, well-organized and supported by good-quality examinations. Assessment information is clearly available at course level. At programme level, however, a consolidated overview of assessment coherence is currently less explicit. The panel therefore advises developing a more integrated programme-level overview to strengthen cross-course coherence and support systematic monitoring. With regard to group projects, the panel noted that the bachelor's programme has effective mechanisms to address free-riding.

Assessment of final work bachelor's programme
In the bachelor's programme, the final phase consists of two graduation modules. The Design Project (M11) is team-based and focuses on designing and realizing a substantial product, often in an authentic external context. Students are assessed on multiple components, including the deliverable, the development process and the final presentation, with arrangements to make individual contributions visible where relevant.

The Research Project (M12) is an individual project culminating in a thesis written as a research paper and embedded in a conference setting. Students begin with a proposal phase that requires a formal "go"; "no-go" proposals are double-checked by the track chair before students can proceed. The project includes structured draft and final submissions with feedback rounds and an accept/reject decision prior to conference participation. As part of the bachelor thesis conference, students present and discuss their work; the conference produces public proceedings and adds an oral element to the assessment. Grading is rubric-based across scientific quality (50%), paper writing (20%), oral presentation (10%) and overall process (20%). Evaluation forms are co-signed by two examiners, with the track chair acting as examiner.

The programme also organizes a bachelor thesis carousel as a calibration exercise for M12, using a broad sample across tracks and grade categories. A committee consisting of the programme director, the module coordinator and track representatives discusses selected papers using the same rubric categories as in regular assessment, with the explicit aim of strengthening shared standards and confidence in grading. The most recent carousel was carried out in 2025.

Based on the materials provided and the discussions during the site visit, the panel is positive about the overall assessment set-up for the bachelor's final phase.

In reviewing the Design Project (M11), the panel noted that the bachelor's programme has effective mechanisms to address free-riding, including the use of a red/yellow/green card approach. However, the panel also observed that the way these mechanisms are applied and documented is not always equally transparent. In particular, the panel notes that the rationale for issuing cards and the implications for assessment decisions are not always consistently recorded. The panel therefore advises clarifying and standardizing the documentation procedure for the card system (including criteria, rationale and follow-up actions), so that decisions are traceable and applied consistently across project components.

With regard to the Research Project (M12), the panel particularly values the bachelor thesis conference as a structured academic moment in which students present and reflect on their work. With regard to the four-eyes principle, the panel notes that the programme has formal safeguards in place: the track chair acts as second examiner and co-signs the assessment forms. However, the panel learned during the site visit that the second examiner's involvement is not always based on a full reading of the thesis. In practice, the track chair's substantive review may take place mainly when a thesis raises concerns or is at risk of failing, rather than as a standard step for all theses. The panel therefore considers it important that the second examiner's contribution is clearly defined, consistently implemented and transparently evidenced in the assessment dossier, so that independent review is robustly assured across the board. Where substantial disagreement arises, the panel considers appointing a third reader an appropriate additional safeguard. The panel also considers the bachelor thesis carousel a relevant instrument to support calibration and notes positively that it has recently been used in practice.

Final work master's programme
In the master's programme, the Final Project culminates in an individual thesis and a public colloquium. Thesis assessment is carried out by an assessment committee of at least two examiners from different research groups. One examiner must be a senior examiner, reflecting extensive experience in supervising and assessing MSc theses. Approximately one month before the planned end of the Final Project, the committee holds a formal green-light meeting to confirm that the draft is sufficiently complete and on track to result in at least a pass.

The colloquium forms the public concluding element of the Final Project. During the colloquium, the student presents and discusses the thesis with the assessment committee, thereby demonstrating command of the topic, the ability to substantiate methodological and design choices, and the capacity to interpret and reflect on results.

Thesis grading is supported by programme-wide assessment forms and shared criteria, covering the scientific approach (including systematic work and appropriate validation), contribution/impact, written report, as well as process and presentation.

Like the BSc CS, the MSc CS uses a thesis carousel as a periodic calibration exercise within the graduation process. It serves to verify that thesis grading is aligned and consistent across tracks and examiners and to identify actionable improvements where discrepancies arise. Each thesis is assessed by at least two examiners from different research groups to mitigate group bias, and at least one senior examiner is involved to provide an experienced benchmark across theses and cohorts.

The panel is positive about the thesis evaluation process overall. It particularly appreciates the use of senior examiners and the appointment of a second examiner from a different research group, as these arrangements support independence and quality assurance. As in the bachelor's programme, the panel notes that, where substantial disagreement arises, appointing a third reader can provide an additional safeguard. The panel also considers the shared forms and rubrics helpful in promoting transparency and consistency in assessment The panel views the thesis carousel as a valuable calibration instrument. However, it notes that it has not been used for some time. The panel therefore encourages the programme to proceed with its plans to reinstate the thesis carousel for the master's thesis and to embed it more regularly and structurally.

Examination Board
The Examination Board operates within the faculty-wide Examination Board structure and includes programme-related subcommittee arrangements. The Board appoints examiners and applies institutional requirements for appointment. Regular alignment meetings between programme management and a representative of the Examination Board are held to discuss assessment quality themes, including final work supervision and grading, fraud, ethics and the emergence of GenAI.

The panel finds that the Examination Board has the appropriate expertise to fulfil its responsibilities. It also learned that the Board has faced substantial workload pressure and limited support capacity in recent years. While recognizing recent progress, the panel sees opportunities to strengthen the Board's proactivity. In particular, it notes that the four-eyes principle for course assessment is applied in practice but is not yet consistently verified, and that course-level review tends to take place mainly when issues arise. The panel therefore recommends that the Examination Board implements a more proactive and systematic cycle for monitoring assessment quality, including routine verification of the four-eyes principle and follow-up on whether the thesis carousel is being used as intended in both programmes. Finally, the panel appreciates that the Examination Board has considered the implications of GenAI for assessment and that further steps towards a more systematic, programme-wide review across courses are being taken. The panel encourages the Examination Board to reinforce this steering role by establishing a programme-wide GenAI and updating it periodically in response to developments.

Considerations
The panel concludes that the assessment system of both programmes is broadly appropriate and provides a sound basis for safeguarding the level and achievement of the ILOs. Across both programmes, assessment is varied, well organized and supported by good-quality examinations. The panel also appreciates the explicit emphasis on feedback in the assessment policy, including strengthened feedback arrangements in digital assessment and safeguards for multiple-choice testing.

At the same time, the panel notes that assessment coherence and oversight are currently most explicit at course level, while a consolidated programme-level overview is less visible. The panel therefore advises developing a more integrated programme-level assessment overview to strengthen cross-course coherence and support systematic monitoring.

The panel is positive about the organization of final-work assessment in both programmes. In the bachelor's programme, it appreciates the overall set-up of the two graduation modules and values the bachelor thesis carousel as a relevant calibration instrument, noting positively that it was carried out in 2025.

In the Design Project (M11), the panel notes that effective mechanisms are in place to address free-riding, including the red/yellow/green card approach. However, it considers it important that the application of these mechanisms is transparent and traceable. The panel therefore advises clarifying and standardising how the rationale for issuing cards and the implications for assessment decisions are recorded, so that decisions are consistently documented and applied across project components.

In the Research Project (M12), the panel strongly values the bachelor thesis conference as a structured academic moment that supports students' reflection and presentation skills. It also notes that the programme has formal safeguards for the four-eyes principle through the track chair's role as second examiner and the co-signing of assessment forms. At the same time, the panel finds it important that the second examiner's contribution is clearly defined, consistently implemented and transparently evidenced in the assessment dossier, given that substantive involvement is not always based on a full reading in practice.

In the master's programme, the panel appreciates the committee-based assessment set-up, including senior examiners and a second examiner from a different research group, and it considers the shared forms and criteria helpful in supporting transparency and consistency. The panel also views the thesis carousel as a valuable calibration instrument and encourages the programme to proceed with its plans to reinstate it and embed it more regularly and structurally.

Finally, the panel finds that the Examination Board has the right expertise to carry out its responsibilities, while noting that workload pressure and limited support capacity have affected its functioning in recent years. Building on recent progress, the panel recommends a more proactive and systematic approach to monitoring assessment quality, including routine verification of the four-eyes principle and follow-up on whether the thesis carousel is used as intended in both programmes. The panel appreciates that the Examination Board has considered the implications of GenAI for assessment, and encourages it to take a more steering role by establishing a programme-wide GenAI assessment framework and reviewing it periodically.

Conclusion

The panel concludes that the bachelor's programme TCS and master's programme CS meets standard 3.

Standard 4. Achieved learning outcomes

The programme demonstrates that the intended learning outcomes are achieved.

Findings

Final work bachelor's programme
For the bachelor's programme, the panel chair selected 16 students from the 2024–2025 graduate list, taking diversity in final grades and examiners into account. The selection comprised four Design Project groups (totalling 16 students). The panel reviewed the group products as well as the individual bachelor's theses, together with the accompanying assessment forms.

Overall, the panel finds that the reviewed bachelor work demonstrates that graduates generally achieve the ILOs at the appropriate level. Students show a solid foundation in core computer science concepts and mathematical reasoning and can apply these in structured problem solving. In the Design Project, students translate stakeholder needs into requirements and design choices, implement demonstrable prototypes, and present and document outcomes in a professional manner, with attention to planning and collaboration. The individually assessed Research Project provides clear evidence of students' ability to conduct a supervised research cycle, including formulating a research or design question, performing a literature study, selecting and applying methods, reporting results, and reflecting on limitations.

The panel did note one case where its judgement of a bachelor thesis differed from the assessment within the programme. The thesis included a solid literature review, but the developed tool was insufficiently described and not substantively evaluated. This led the panel to question whether the work fully met the intended bachelor-level exit qualifications. Although the panel does not view this single case as indicative of a structural issue given the quality of the overall sample, it highlights the importance of continued attention to consistency and shared minimum expectations in thesis assessment, particularly regarding the minimum evidential basis for evaluation and the explicit demonstration of engineering competence.

Final work master's programme
The panel reviewed 15 master's theses, covering all specializations and including two theses from the EIT Digital dual degree track. The selection was designed to reflect diversity across tracks and examiners and included work from each specialization. Based on this sample, the panel finds that graduates convincingly achieve the ILOs at master's level. The theses demonstrate advanced disciplinary knowledge, the ability to work independently in complex and sometimes unfamiliar contexts, and strong analytical and research skills. In the reviewed work, students engage with the relevant scientific literature, make methodologically well-founded choices, and substantiate their conclusions with clear reasoning. In addition, the programme indicated that a number of theses lead to publications or contribute to ongoing research, which aligns with the programme's strong research embedding.

Performance of graduates
To complement the evidence from final works, the panel also considered information on graduates' next steps.

Bachelor graduates progress both to the labour market and to further study at master's level. Over the period 2020–2024, a decreasing share of BSc graduates continued within the University of Twente into the MSc Computer Science (from 51% in 2020 to 28% in 2024). At the same time, a larger share did not transfer within UT (from 38% to 63%), indicating that many graduates either enter the labour market directly or continue in master's programmes elsewhere (or both). The programme reports that graduates generally find relevant positions in the field and notes that, particularly among international students, direct entry into employment has become more common, which the programme links to financial considerations. Examples of first destinations include roles such as (front-end) software developer/engineer and system engineer in both public and private organizations, as well as entrepreneurial trajectories.

For the master's programme, graduate tracking information (based on LinkedIn profiles for graduates between September 2021 and July 2025) indicates that graduates generally transition smoothly into relevant professional roles or research positions. Of the 324 graduates in this period, information was available for 274. The largest group starts in software development/engineering roles (31%), followed by positions as data analyst (18%) and security specialist (17%). In addition, 17% of graduates enter research-oriented roles, while 13% move into consultancy, management or entrepreneurial positions; the remaining 4% pursue other types of work. A relatively small share of the alumni identified (45) works abroad, most often in their home country.

Overall, the panel considers these graduate-destination data a useful complement to the evidence from final works. The patterns observed are consistent with the programmes' profiles and indicate that graduates are well prepared for relevant next steps, both in the labour market and in research-oriented trajectories.

Considerations
The panel concludes that Standard 4 is met for both programmes. Based on the reviewed final works, it finds that graduates achieve the ILOs at the appropriate level.

For the bachelor's programme, the Design Project and the individual thesis together provide a sound basis for demonstrating the outcomes. The panel noted one case where its judgement differed from the programme's assessment; while not indicative of a structural issue, it underlines the importance of continued attention to shared minimum expectations and consistency in thesis assessment, particularly regarding the evidential basis for evaluation and the demonstration of engineering competence.

For the master's programme, the reviewed theses, across all specializations, including the EIT Digital dual degree track, demonstrate master-level depth, independence and strong analytical and research skills. Graduate destination information further supports that graduates are well prepared for further study and relevant positions in the labour market.

Conclusion

The panel concludes that the bachelor's programme TCS and master's programme CS meets standard 4.

General conclusion

The panel's judges that the bachelor's programme TCS and the master's programme CS meet all four standards. The panel's assessment of both programmes is therefore positive.

Recommendations

The following recommendations are offered with a view to the further development and strengthening of the BSc TCS and the MSc CS.

Bachelor's programme:

- Strengthen the visibility and coherence of cross-cutting learning lines (including cybersecurity and academic/professional skills) through clearer programme-level ownership and coordination, while maintaining the strong mathematics–computer science alignment.
- Clarify and strengthen the second examiner's role in bachelor thesis assessment to ensure the four-eyes principle is consistently applied in the final phase.

Master's programme:

- Strengthen the programme-wide embedding of interdisciplinary perspectives across specializations, building on existing elements such as the ethics component.

Both programmes:

- Make the implications of developments such as GenAI more explicit in the ILOs, clarifying the related graduate competences.
- Ensure that the Examination Board strengthens its proactive, systematic monitoring of assessment quality by routinely verifying the application of the four-eyes principle, following up on the intended use of the thesis carousel in both programmes.

Appendix 1. Intended learning outcomes

BSc Technical Computer Science

Regarding societal PILOs of TCS, the graduate is capable of:

- S1. Teamwork: collaborating within a team and being aware of team dynamics.
- S2. Focusing on humans: making human-centred design and creating intelligent systems.
- S3. Taking context into account: social, ethical, legal, cultural, etc.
- S4. Acquiring knowledge: eliciting requirements, working with semi structured data, applying machine learning.

When it comes to interventional PILOs of TCS, the graduate is capable of:

- N1. Modelling: forming abstractions, architecting systems, making a design.
- N2. Testing: performing quality assurance, testing, verifying and validating software.
- N3. Coding: constructing software and in general programming in the small.
- N4. Analysing: analysing problems, evaluating solutions, performing comparisons, taking decisions.

Concerning reasoning PILOs of TCS, the graduate is skilful in:

- R1. Quality: non-functional requirements like performance, security, reliability, internal code quality, metrics, etc.
- R2. Engineering: different aspects of software engineering, its development process, project management and software evolution
- R3. Information management, database systems, data protection.
- R4. Domain: embracing domain specifics and making domain appropriate choices.

With respect to the instrumental PILOs of TCS, the graduate is accomplished in:

- L1. Hardware architecture on the lowest level: signals, sensors, gates, chips, assembler, registers, etc.
- L2. Networking technologies, distributed systems, concurrent processes, communication protocols.
- L3. System Software such as operating systems, deployment containers, game engines, compilers.
- L4. Various forms of specification and technical documentation, including the ability to produce formal descriptions, precisely define the problem being solved, express assertions and contracts.

In the fundamental matters of Technical Computer Science, the graduate is cognisant in:

- F1. Discrete data structures such as sets, collections, sequences, series, algebraic data types.
- F2. Algorithmics in general and complexity theory in particular.
- F3. Programming languages, concepts, paradigms
- F4. Mathematical knowledge that falls outside of the explicitly named topics: advanced discrete theories and continuous mathematics

For personal PILOs in TCS, the graduate has the following skills:

- P1. Critically analysing problems and solutions, questioning assumptions, evaluating evidence to make informed decisions.
- P2. Knowing, identifying, understanding, applying industry best practices, standards, methodologies in the field of computer science.
- P3. Approaching complex technical problems systematically, devising effective strategies to solve them, implementing practical solutions.

- P4. Being ready for adapting to new technologies, tools, methodologies, and continuously learning to stay current in a rapidly evolving field.

MSc Computer Science

1.1 General PILOs
(A) Domain Expertise: graduates possess in-depth knowledge and understanding of core computer science principles and specialised areas within their field of study, and are proficient in articulating this expertise through both written and oral presentations.
(B) Research Proficiency: graduates can independently design, conduct, and present original research, contributing novel insights to the field of computer science, while critically engaging with the existing body of scientific literature.
(C) Continuous Learning: Graduates can independently acquire new knowledge and skills, reflecting on industry trends and integrating this insight into their professional development.
(D) Critical Evaluation: Graduates can critically assess complex problems, solutions, systems and applications, making informed decisions even in unfamiliar or uncertain situations, based on any combination of theoretical debate and technical content.
(E) System Design and Implementation: Graduates can design, implement and validate effective and innovative computing systems, considering their operational contexts and constraints, by applying appropriate methods, techniques and technologies.
(F) Leadership and Collaboration: Graduates can lead and collaborate within teams (possibly multidisciplinary ones), effectively managing projects and communicating processes and outcomes.
(G) Context Awareness: Graduates understand and apply ethical principles, considering social, cultural and public impacts in their professional activities, and can integrate knowledge from other disciplines into their own work when necessary.

1.2 SILOs of CyberSecurity
(1) Graduates have practical experience in conducting scientific research within the field of cybersecurity, enabling them to contribute to research projects, apply research findings, stay aware of current trends and drive further developments in cybersecurity.
(2) CybSec graduates have specialised knowledge and deep understanding of key subfields or aspects of cybersecurity, enabling them to contribute effectively to further advancements in this field.
(3) CybSec graduates are skilled in applying relevant foundations of cybersecurity, including cryptography, formal methods, statistics, machine learning and data analytics, to address complex security challenges.
(4) CybSec graduates have a profound understanding of security and privacy risks in cyberspace and are proficient in modelling and evaluating these risks to implement effective mitigations.
(5) CybSec graduates are adept in cybersecurity engineering methodologies, both on a small scale (of individual systems) and a large scale (of enterprise-wide infrastructures), ensuring robust and scalable security solutions.
(6) CybSec graduates are capable of conducting comprehensive security evaluations of ICT systems using methods such as penetration testing, risk assessment, monitoring and analytics to identify and address vulnerabilities.

1.3 SILOs of Data Science and Technology
(1) Graduates have practical experience in conducting scientific research within the field of data science and technology, enabling them to contribute to research projects, apply research findings, stay aware of current trends and drive further developments in data science and technology.

(2) DST graduates have specialised knowledge and deep understanding of key subfields or aspects of data science, enabling them to contribute effectively to further advancements in this field.
(3) DST graduates understand the theoretical foundations of data science algorithms, covering information theory, probability theory, statistics and machine learning, enabling them to select and apply, or develop suitable methods for specific problems.
(4) DST graduates have thorough knowledge and skills in designing solutions for managing large volumes of structured, semi-structured and unstructured data, including sensor data, multimedia data, textual data, geographic data and social data.
(5) DST graduates are proficient in analysing large datasets and making informed decisions based on such analyses, utilising appropriate data science techniques.

1.4 SILOs of Software Technology
(1) Graduates have practical experience in conducting scientific research within the field of software technology, enabling them to contribute to research projects, apply research findings, stay aware of current trends and drive further developments in software technology.
(2) ST graduates have specialised knowledge and deep understanding of key subfields or aspects of software technology, enabling them to contribute effectively to advancements in this field.
(3) ST graduates have a comprehensive understanding of various aspects of software engineering, including its mathematical foundations, software management, quality assurance, architectural and detailed design, software construction, testing and verification.
(4) ST graduates are skilled in applying software engineering methods and tools for the development and validation of large-scale systems, integrating theoretical knowledge with practical experience.
(5) ST graduates possess in-depth knowledge of all phases of the software development lifecycle, including requirements engineering, architectural and detailed design, construction and quality assurance, recognising software development as both a scientific and design discipline.
(6) ST graduates can evaluate trade-offs among alternative software engineering techniques and make informed decisions throughout the software lifecycle.

1.5 SILOs of Internet Science and Technology
(1) Graduates have practical experience in conducting scientific research within the field of internet science and technology, enabling them to contribute to research projects, apply research findings, stay aware of current trends and drive further developments in internet science and technology.
(2) IST graduates have specialised knowledge and deep understanding of key subfields or aspects of internet science and technology, enabling them to contribute effectively to advancements in this field.
(3) IST graduates possess in-depth knowledge and understanding of both wired and wireless communication devices, networks and systems, in terms of both fundamental principles and contemporary technologies.
(4) IST graduates are proficient in designing and assessing wired and wireless communication devices, networks and systems, considering both detailed component aspects and overarching system-wide factors such as security and management.
(5) IST graduates are capable of quantitatively evaluating the performance of networked systems and verifying their formal correctness using analytical methods and computational tools.

Appendix 2. Programme curriculum

BSc Technical Computer Science

The table shows the B-TCS curriculum with the course code of modules and study units, furthermore the year and quartile they are offered, and finally, some additional prerequisites.

Course code M	Module (15EC)	Course code	Study Units		Q
B1 phase (Year 1)					
202500330	Diamonds of Computer Science Module	202500331	Software Diamond	3EC	Q1
		202500332	Information Diamond	3EC	
		202500333	Hardware Diamond	3EC	
		202500334	Cybersecurity and Law Diamond	2EC	
		202001190	Introduction to Mathematics + Calculus 1A	4EC	
202500340	Software Systems Module	202500341	Software Design and Modelling	3EC	Q2
		202500342	Introduction to programming	3EC	
		202500343	Advanced programming	3EC	
		202001197	Calculus 1B for CS	3EC	
202500345	Network Systems Module	202500346	Network Systems Part 1	3EC	Q3
		202500347	Network Systems Part 2	3EC	
		202500348	Network Systems Part 3	3EC	
		202400362	Network Systems Project	3EC	
		202001205	Linear Algebra for CS	3EC	
202500350	Data & Information Module	202500351	Secure Web Development	3EC	Q4
		202500352	Databases	3EC	
		202500353	Agile Project Process Development	3EC	
		202500354	Agile Project Technical Development	3EC	
		202001233	Probability Theory for CS/BIT	3EC	
B2 phase (Year 2)					
202500355	Computer Systems Module	202500356	Computer Architecture and Organisation	4EC	Q1
		202500357	Operating Systems	4EC	
		202500358	Computer Systems Project	4EC	
		202001234	Discrete Mathematics	3EC	
202500360	Design of Interactive Technologies	202500360	Introduction to AI and ML	6EC	Q2
		202500362	UX Design	6EC	
		202001033	Statistical Methods for Data Analysis	3EC	
202500365	Discrete Structures & Efficient Algorithms	202500366	Algorithmic Discrete Mathematics	3EC	Q3
		202500367	Algorithmic Design and Analysis	3EC	
		202500368	Languages & Machines	3EC	
		202500369	Algebra	3EC	
		202001363	Implementation Project on Graph Isomorphisms	3EC	
xxxxxxxxx	Minor/Elective module			15EC	Q4
B3 phase (Year 3)					
xxxxxxxxx	Minor/Elective module			15EC	Q1
xxxxxxxxx	Minor/Elective module			15EC	Q2
202400005	Design Project Module	202400006	Design Project Core	15EC	Q1 or Q3
202300105	Research Project Module	202300106	Research Project Core	15EC	Q2 or Q4
202400608	Engineering Project	202400608	Internship TCS	15EC	Q1 or Q2 or Q4

Elective modules

The table shows the modules that are available to students as elective modules (students are to choose one).

Elective modules can also be taken as a minor.

Course code M	Elective/minor Module	Course code	Study units		Q
202001040	Smart Spaces Module	202001041	Smart Spaces Core	15EC	Q1
202200020	Data Science & Artificial Intelligence	202200021	Machine Learning for Datatypes	3,5 EC	Q1
		202200022	Knowledge Representation and Reasoning	4,5 EC	
		202200023	Explainable AI & Ethics	3 EC	
		202200024	DS&AI Project	4 EC	
202400590	Cyber-Physical Systems Module	202400591	Cyber Physical Systems Core	15EC	Q2
202001044	Web Science Module	202001045	Social Network Structure and Dynamics	6,5EC	Q2
		202001046	Games, Auctions and Voting	6,5EC	
		202001047	Web Science final project	2EC	
202200190	Programming Paradigms module	202200191	Functional and Logic Programming	5 EC	Q4
		202200192	Concurrency and Compiler Construction	10 EC	
202200200	Intelligent Embedded Systems	202200201	Software Engineering Embedded Systems	5 EC	Q4
		202400783	Embedded Architectures and Tools	6 EC	
		202200203	IES Project	4 EC	

2025-2026: Computer Science GENERAL

- CS CORE: Computer Ethics (5EC, Q2)
- CORE SPECIALIZATION COURSES (20 EC): 4 mandatory courses
- ADVANCED SPECIALIZATION COURSES (at least 20 EC): Choice 4 out of x
- PROFILING SPACE (+/- 0-35 EC): More ADVANCED courses, other specializations courses or courses from related MSc programmes (EE, EMSYS, BIT, ITECH, AM, ROB), Internship, Exchange. *Note*. Some specializations have additional requirements, e.g. ST orientation
- GRADUATION (40 EC): Research Topics (10EC) (preparation) + Final project (30EC) (project)

NOTE! **This is a simplified overview. For a more complete overview and info on additional courses/electives, EIT Digital/SPECTRO and requirements:**

Cyber Security: www.utwente.nl/en/cs/programme/specialisations/cyb
Software Technology: www.utwente.nl/en/eemcs/fmt/education/st/
Data Science & Technology: www.utwente.nl/en/cs/programme/specialisations/dst
Internet Science & Technology: www.utwente.nl/en/cs/programme/specialisations/ist

Quartiles: 1 (Sep-Nov), 2 (Nov-Feb), 3 (Feb-Apr), 4 (Apr-Jul); Year = can be started anywhere during the year; Sem = runs over a semester

SPECIALIZATION SOFTWARE TECHNOLOGY

Mandatory core (20 EC)	
System Validation	1
Design of Software Architectures	2
Software Testing and Risk Assm.	3
Software Evolution	4

Advanced (at least 4)	
ADSA-Model driven engineering	1
Modeling and Analysis of Concurrent Systems	1
Graph Algorithms and Complexity	2
Interactive Theorem Proving	2
Service-oriented Architecture with Web services	3
Quantitative evaluation of Systems	3
Software Management	4
Advanced Logic	4

Design orientation (10 EC)	
Industrial Software Engineering project	Sem 1
Research orientation (10 EC)	
Software Science (13,14,15,16) Alternate, each offered every two years	3, 4
Capita selecta ST	Year

SPECIALIZATION CYBER SECURITY

Mandatory core (20 EC)	
Security & cryptography	1
Cyber risk management	1
Software Security	2
Internet security	3

Advanced (at least 4)	
Secure Data Management	1
Secure Cloud Computing	1
System Validation	1
Economics of Cyber Security	1
Intr. to Biometrics	1
Quantum Computing and Post-Quantum Cryptography	2
Emp. Security Analysis & Eng.	2
Privacy Enhancing Tech. Bootcamp	2
Blockchain and distr. ledger techn	3
E-Law	4
Security Services for IoT	4
System Security	4
Cyber Data Analytics	4
Automated Vulnerability Research and Mitigation	4
Security Verification	Year

SPECIALIZATION DATA SCIENCE AND TECHNOLOGY

Mandatory core (20 EC) DST	
Machine learning 1	1
Managing big data	2
Data science	2, 3
Information theory and statistics	3

Advanced (at least 4)	
FAIR Data Engineering	1
Foundations of IR **or** Natural Language Processing	1
Image Processing and Computer Vision	1
Deep Learning – theory to practice	2
Architectures of IS	2
Multimodal Machine Learning	2
Probabilistic programming	3
Ontology-Driven Conceptual Modeling	4
Foundation Models	4

SPECIALIZATION INTERNET SCIENCE AND TECHNOLOGY

Mandatory core (20 EC)	
Internet of Things	1
Performance evaluation	2
Mobile and wireless networking	3
Internet security	3

Advanced (at least 4)	
Advanced Networking	1
Empirical Security Analysis and Engineering	2
Cloud Networking	2
Service-oriented Architecture with Web services	3
Pervasive Computing	3
Ad-Hoc Networks	4
Internet Measurements	4
Distributed Systems	4
Security Services for IoT	4
Automated Vulnerability Research and Mitigation	4
Dependable Networking	Year

If a link does not work, the 2025 description is not available yet; replace 2025 in the URL with 2024 to read the previous description. Vice versa, if the link refers to 2024, replace with 2025 to read the most recent description.

Appendix 3. Programme of the site visit

Monday 8 December 2025

09:00 09:30	Welcome and panel preparation
09:30 10:15	Interview programme management
10:15 10:30	Break
10:30 11:15	Interview BSc students
11:15 11:30	Break
11:30 12:15	Interview BSc teaching staff
12:15 13:15	Lunch break
13:15 14:00	Interview MSc students
14:00 14:15	Break
14:15 15:00	Interview MSc teaching staff
15:00 15:15	Break
15:15 16:00	Interview Board of Examiners
16:00 17:30	Internal panel meeting

Tuesday 9 December 2025

09:00 09:15	Panel arrival and preparation
09:15 10:00	First thematic session
10:00 10:15	Break
10:15 11:00	Second thematic session
11:00 11:15	Break
11:15 12:00	Internal panel meeting
12:00 12:30	Lunch break
12:30 13:00	Concluding session programme management
13:00 13:30	Concluding panel session
13:30 15:00	Oral report panel and drinks

Appendix 4. Materials

Prior to the site visit, the panel studied the final products of 16 bachelor's students and 15 master's students. Information on the theses is available from Academion upon request.

The panel also studied other materials, which included:

- SWOT Analysis
- Student Chapter
- Report previous accreditation
- Programme Development Plans 2019-2025
- Educational Vision BSc and MSc
- Programme Intended Learning Outcomes BSc and MSc
- Domain-Specific Framework of Reference
- UT Vision on Education
- BSc and MSc Facts & Figures
- BSc TCS old and new curriculum overview
- Information on TOM
- MSc curriculum overview
- Documents on guidance and study advice
- Grading forms final projects
- Assessment policies
- AI Policy in CS
- Education and Examination Rules (EER) BSc and MSc
- Annual reports Exam Board
- BSc and MSc graduation project manuals
- Grade analysis and thesis carousel BSc and MSc