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B Marine Technology
M Marine Technology
TU Delft

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Contents

Summary

Standard 1. Intended learning outcomes

Based on the reviewed documents and discussions during the site visit, the panel concludes that the *bachelor's programme Marine Technology* has a clear science and design orientation, providing students with foundational skills and knowledge to design and build all kinds of floating structures on the water. The panel appreciates the focus on the future of the maritime industry, with an eye on the latest (international) research challenges in the field, as well as the attention to sustainability.

In addition, the panel concludes that the *master's programme Marine Technology* has a clear content-oriented focus, providing students with scientific knowledge and skills to deal with challenges in design, construction and operation of floating systems, while promoting environmental responsibility and societal perspectives. The panel appreciates the multidisciplinary profile of the programme with the five disciplines (hydromechanics, structural engineering, marine engineering, maritime operations & management and ship design). In addition to acquiring fundamental and engineering knowledge, students are encouraged to develop a mindset of innovation and personal growth.

The panel is also positive about the balance between knowledge and skills, such as digital and collaboration skills, as well as the explicit attention for sustainability issues and social impact in both programmes. Both programmes are unique in the Netherlands. Furthermore, the programmes are very attentive to contemporary academic and societal questions, due to their strong connections with the professional and societal field. The panel considers the ILOs to be appropriate to an academic bachelor's and master's level respectively, and in alignment with expectations in the academic and professional field. In response to the name change of the faculty, the panel advises the faculty to be mindful of the distinct identity of the MT programmes and their visibility within the maritime industry.

Standard 2. Teaching-learning environment

The panel considers the curricula of both programmes to be well-structured and coherent. The curricula cover all ILOs and provide students with a comprehensive foundation in marine technology. The updated curriculum of the *bachelor's programme Marine Technology* has led, amongst others, to a greater emphasis on current themes such as sustainability, as well as on technical and transferable skills. The panel appreciates the emphasis on practical applications during projects, the increase of multidisciplinarity within the curriculum, and the additional opportunities for research involvement during the Bachelor End Project (BEP). The *master's programme Marine Technology* offers a unique programme in the Netherlands for the international maritime industry. The panel is positive about the new, clear structure of the programme, with relevant specializations, which foster synergy among the research groups. The added flexibility with (star) electives enables students to develop both an in-depth and broad profile. The panel is pleased with the programme's strong emphasis on socialization and personal skills development, as well as the plans to further increase the focus on soft skills. The panel determines that the actors within the programmes are well aware of sustainability developments. Nonetheless, their integration into the curricula needs additional focus.

The panel appreciates how the curricula are continuously updated in response to developments in the professional and academic fields. For both programmes, there is a need for improved monitoring through the PDCA (Plan-Do-Check-Act) cycle, particularly in relation to the connection with the ILOs. To facilitate this process, the panel believes that the role of programme directors could be strengthened. While it values the

formal and informal evaluation of courses, the panel is of the opinion that more attention could be paid to data driven evaluation and providing feedback on students' feedback.

The panel is positive about the student-centred learning environment of both programmes, providing opportunities for the development of an academic community, and the active role of the study association. The courses offer varied teaching methods, with a growing focus on (multi- and interdisciplinary) project-based learning and experiential education, and an appropriate balance between theoretical knowledge and practical skills. The panel highlights the importance of keeping a focus on AI in both programmes. Student awareness could be increased by (further) integrating AI into teaching.

In the *bachelor's programme Marine Technology*, the panel values the integration projects, as well as the strategies incorporated in the curriculum to increase knowledge retention. The panel is impressed with these strategies, but recommends close monitoring of the results and taking follow-up steps if necessary. In the *master's programme Marine Technology*, the collaborative group projects are appreciated, as is the Joint Interdisciplinary Project (JIP). Attention for scientific research in the curriculum is reflected, amongst others, in research-led projects, individual research assignments and graduation projects. According to the panel, students are well-supported throughout the programmes. In the *bachelor's programme Marine Technology*, the panel particularly values the mentoring programme for first-year students, as well as the efforts to increase study success rates, including the mandatory study choice check, and to further strengthen study support mechanisms. In the *master's programme Marine Technology*, staff are intensively involved in guiding students. The panel concludes that all students receive adequate guidance and support. Furthermore, the admission criteria, the information provided to students, and the facilities available for students with disabilities are all satisfactory.

The panel considers the curricula of both programmes to be feasible, although study duration needs further attention, building upon the progress made in recent years. The panel supports the efforts of the programmes to address this issue. It emphasizes the importance of closely monitoring drop-out rates and suggests a more thorough follow-up on the duration of studies. In this context, the panel appreciates the introduction of a progress monitoring system. Additionally, the panel recommends evaluating the adequacy between course workload and allocated ECs for specific courses and closely monitoring the workload for each course.

The panel is impressed with the quality and enthusiasm of the teaching staff of both programmes, who come from a variety of (international) backgrounds. They are all pedagogically qualified and are experts in their field, covering the academic scope of the programmes. The majority of the staff members engage in research and have strong connections with the professional and societal field through their research activities, thus providing a research-intensive environment. In addition, the panel appreciates that lecturers value personal contacts with students; they are easily accessible and are dedicated and responsive towards students. Furthermore, the involvement of junior teachers and teaching assistants is greatly valued. The panel does not see any urgent issues regarding the quantity of staff.

The English-taught *master's programme Marine Technology* is internationally oriented, which is reflected in the international community of students and staff. According to the panel, the choice of an English name and language of instruction is well substantiated and aligns well with the international nature of the professional and academic field.

Standard 3. Student assessment

The panel concludes that the assessment system of both programmes is transparent and well designed. Adequate procedures, such as the four-eyes principle, are in place to ensure and enhance the quality of assessment. The assessment methods used are diverse and appropriate, and include assessment of skills. Amongst others, the panel appreciates the attention for constructive alignment, the standard rubrics for the literature research and MSc thesis, and the support offered by ESA.

The panel appreciates that in the *BSc MT programme* several first year courses include a midterm test as a formative assessment. The Bachelor Final Project (BEP) covers all ILOs of the programme at an individual level. The panel considers the BEP assessment procedure to be well thought out, and the grades awarded to be sufficiently substantiated. Procedures, such as a logbook for project work per student and assessment of individual performance, ensure that all students individually meet the requirements for the BEP. Even so, the individual component in the BEP could be better developed. The panel recommends strengthening the BEP process, and documenting and validating individual assessments by equipping examiners with additional tools to differentiate between students. The Board of Examiners is very aware of this issue; following their recommendations, the panel encourages the programme to take further action in this regard. Additionally, the panel recommends implementing sufficient training and coaching for students in feedback literacy, to facilitate peer assessment.

The graduation project covers all ILOs of the *MSc MT programme* at an individual level. The panel appreciates the set-up of the thesis project and the way it is evaluated according to uniform assessment criteria, set out in a clear rubric. According to the panel, the grades awarded are sufficiently substantiated. As for the duration of the graduation project, the panel encourages the programme to streamline processes and ensure consistency across supervisors, while pursuing stricter adherence to the thesis rubrics and guidelines. According to the panel, establishing a clear timeline and providing more intensive guidance would help students successfully finish their thesis within 7 months. The panel acknowledges that the programme is doing better than most other programmes in the faculty in this respect. In addition, the panel encourages the programme management and Board of Studies to ensure that students receive their grades in a timely manner. Furthermore, the panel encourages the programme to calibrate more often regarding thesis assessment, to promote consistency.

According to the panel, the Board of Examiners proactively contributes to the quality of assessment in the programme. It has a clear task and safeguards the quality of the assessment in the programme in various ways, including the continuous evaluation of the quality of examinations.

Standard 4. Achieved learning outcomes

Based on the examination of a selection of end projects and theses from the programmes, the panel concludes that the level of the Bachelor End Projects and theses is appropriate for an academic bachelor's and master's programme, respectively. They demonstrate the achievement of the ILOs. The documentation and interviews show that alumni are generally content with the programmes and are well prepared to perform successfully in the professional field in the Netherlands and abroad.

Score table

The panel assesses the programmes as follows:

Bachelor's programme Marine Technology	
Standard 1: Intended learning outcomes	meets the standard
Standard 2: Teaching-learning environment	meets the standard
Standard 3: Student assessment	meets the standard
Standard 4: Achieved learning outcomes	meets the standard
General conclusion	positive
Master's programme Marine Technology	
Standard 1: Intended learning outcomes	meets the standard
Standard 2: Teaching-learning environment	meets the standard
Standard 3: Student assessment	meets the standard
Standard 4: Achieved learning outcomes	meets the standard
General conclusion	positive

Prof. dr. ir. Tine Baelmans, chair

Carlijn Braam MA, panel secretary

Date: 13 March 2025

Introduction

Procedure

Assessment

On 5, 6 and 7 November 2024, the bachelor's programmes Mechanical Engineering and Marine Technology of the TU Delft, and the master's programmes Mechanical Engineering, Marine Technology, Offshore and Dredging Engineering, and Materials Science and Engineering were assessed by an independent peer review panel as part of the cluster assessment Mechanical Engineering. The assessment cluster consisted of 12 programmes, offered by the University of Twente, the University of Groningen, the TU Delft and the TU Eindhoven. 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 Mechanical Engineering. Peter Hildering acted as coordinator and panel secretary. Yannick Slagter and Carlijn Braam also acted as secretaries in the cluster assessment. They have been certified and registered by the NVAO. Carlijn Braam acted as panel secretary in the site visit of the TU Delft.

Preparation

Academion composed the peer review panel in cooperation with the institutions and taking into account the expertise and independence of the members as well as consistency within the cluster. On 27 June 2024, the NVAO approved the composition of the panel. The coordinator instructed the panel chair on her role in the site visit according to the Panel chair profile (NVAO 2016).

The programmes composed a site visit schedule in consultation with the coordinator (see appendix 3). The programmes selected representative partners for the various interviews. They 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 bachelor's and master's programme Marine Technology provided the coordinator with lists of graduates over the period between September 2021 (M MT)/ March 2023 (B MT) and August 2024. In consultation with the coordinator, the panel chair selected 4 group projects of the BSc containing 16 students in total, and 15 individual theses of the MSc. She took the diversity of final grades and examiners into account. 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 self-evaluation reports and additional materials (see appendix 4).

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

Site visit

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

Report

The secretary wrote the draft reports based on the panel's findings and submitted them to the coordinator for peer assessment. Subsequently, the secretary sent the reports to the panel for feedback. After processing this feedback, the secretary sent the draft reports to the programmes in order to have them checked for factual irregularities. The secretary discussed the ensuing comments with the panel chair and changes were implemented accordingly. The panel then finalized the reports, and the coordinator sent them to the Faculty of Mechanical Engineering and the TU Delft.

Panel

The following panel members were involved in the cluster assessment:

- Prof. dr. ir. M. (Tine) Baelmans, full professor at the Department of Mechanical Engineering of the KU Leuven (Belgium) [chair];
- Prof. dr. S. (Sören) Östlund, professor of Packaging Technology at the KTH Royal Institute of Technology (Sweden);
- Drs. J.J. (Jan) Steen, independent educational consultant;
- Prof. dr. A. (Atul) Bhaskar, professor in Applied Mechanics at the Department of Mechanical Engineering of the University of Sheffield (United Kingdom);
- Prof. dr. E. (Eilif) Pedersen, professor in Marine Technology at the Department of Marine Technology of the Norwegian University of Science and Technology (Norway);
- Prof. dr. D.J. (Daniel) Rixen, professor in Applied Mechanics at the Technische Universität München (Germany);
- Prof. dr. A.S.J. (Akke) Suiker, professor in Applied Mechanics at the Department of the Built Environment of the TU Eindhoven;
- Prof. dr. K. (Kari) Tammi D.Sc., Lic.Sc., M.Sc., professor in Design of Mechatronic Machines at Aalto University (Finland);
- T.W.C. (Thijs) Haartmans BSc., master's student Mechanical Engineering at the TU Eindhoven [student member];
- M.A. (Maartje) Janszen BSc., master's student Mechanical Engineering at the TU Delft [student member].

The panel assessing the bachelor's programmes Mechanical Engineering and Marine Technology and the master's programmes Mechanical Engineering, Marine Technology, Offshore and Dredging Engineering, and Materials Science and Engineering at the TU Delft consisted of the following members:

- Prof. dr. ir. M. (Tine) Baelmans, full professor at the Department of Mechanical Engineering of the KU Leuven (Belgium) [chair];
- Prof. dr. S. (Sören) Östlund, professor of Packaging Technology at the KTH Royal Institute of Technology (Sweden);
- Drs. J.J. (Jan) Steen, independent educational consultant;
- Prof. dr. E. (Eilif) Pedersen, professor in Marine Technology at the Department of Marine Technology of the Norwegian University of Science and Technology (Norway);
- Prof. dr. D.J. (Daniel) Rixen, professor in Applied Mechanics at the Technische Universität München (Germany);
- Prof. dr. A.S.J. (Akke) Suiker, professor in Applied Mechanics at the Department of the Built Environment of the TU Eindhoven;
- T.W.C. (Thijs) Haartmans BSc., master's student Mechanical Engineering at the TU Eindhoven [student member].

All panel members, the secretary and the institution have signed a statement on impartiality and can confirm that the assessment was carried out in complete independence.

Information on the programmes

Name of the institution:	TU Delft
BRIN-number:	21PF
Address:	Postbus 5, 2600 AA Delft
Status of the institution:	Publicly funded institution
Result institutional quality assurance assessment:	Positive

Programme name:	B Marine Technology
ISAT number:	56957
Level:	Bachelor
Orientation:	Academic
Number of credits:	180 EC
Location:	Delft
Mode(s) of study:	Fulltime
Language of instruction:	Dutch
Awarded degree:	BSc.
Submission date NVAO:	1 May 2025

Programme name:	M Marine Technology
ISAT number:	66957
Level:	Master
Orientation:	Academic
Number of credits:	120 EC
Location:	Delft
Mode(s) of study:	Fulltime
Language of instruction:	English
Awarded degree:	MSc.
Submission date NVAO:	1 May 2025

Description of the assessment

Organization

The bachelor's and master's programmes in Marine Technology are provided by the Faculty of Mechanical Engineering (ME) of Delft University of Technology (TUD). This faculty also offers the bachelor's and master's programmes Mechanical Engineering, the master's programme Materials Science and Engineering and the master's programme Offshore and Dredging Engineering (ODE), which are all being assessed in this cluster assessment. The ME faculty also offers the bachelor's and master's programmes Technical Medicine and the master's programmes Biomedical Engineering, Robotics and Systems and Control Engineering. Until January 2024, the faculty was known as the Faculty of Mechanical, Maritime, and Materials Engineering (3mE). The new faculty name encompasses the scope and content of all research, application and education disciplines, thus strengthening cohesion in the faculty.

Recommendations previous accreditation panel

The last formal external assessment of the bachelor's and master's programmes in Marine Technology of the TUD took place in December 2018. In the self-evaluation reports of the current assessment, the programmes described the actions undertaken in response to the recommendations. Also, several improvements were discussed in the interviews during the site visit. The improvements include adjustments to the mentorate, which now incorporates study skills, and an adaptation of the curriculum in 2023 to ensure a more balanced study load in the bachelor's programme. In the master's programme, the improvements include providing challenging courses with increased attention for current scientific research in Marine Technology and academic skill development. The panel concludes that the recommendations have been seriously acted upon by the programme and is generally satisfied with the improvement measures taken.

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 **bachelor's programme Marine Technology (MT)** aims to provide students with the foundational skills and knowledge for meaningful contributions to the future of the maritime industry, producing knowledgeable, flexible, independent and responsible academic engineers who not only excel in technical proficiency but also possess a deep understanding of societal needs and environmental responsibility. The programme is unique in the Netherlands and provides a broad spectrum of domain-specific topics. During the BSc MT, students learn the basics to be able to design and build all kinds of floating structures on the water. This encompasses not only ships, but also floating wind farms, solar panels, seaweed farms, offshore ports and the specialised vessels to install and maintain these. The programme promotes a culture of innovation and collaboration while keeping up-to-date with the latest research challenges in the field, primarily concentrating on the energy transition. Additionally, in response to industry demands, data awareness has gained prominence in the programme. The programme recognizes the importance of professional skills, including digital and programming skills, along with transferable skills such as reporting, presenting research, and collaborating in interdisciplinary teams. The panel is positive about the updated profile of the programme with a science and design orientation, in line with the TUD's and the faculty's vision. Its international focus and attention to sustainability are appreciated, as well as the balance between

knowledge – with an emphasis on fundamental subjects such as mathematics and physics – and skills. The panel appreciates the recent programme overhaul, which focuses on engineering for a future on water, in contrast to the historical emphasis on a broad knowledge of maritime technology and fundamental engineering sciences for the design of ships.

It is one of the smallest BSc programmes at the TUD. Female intake remains low but has increased from around 5-10% to around 15-20%. The panel notes that to draw in more students, it could perhaps be beneficial to highlight the programme's emphasis on high-tech and societal themes in its title, thereby creating a clearer profile.

The **master's programme Marine Technology (MT)** aims to educate highly skilled engineering professionals in maritime technology who not only excel in technical proficiency but also possess a deep understanding of societal needs and environmental responsibility. With a primary focus on content mastery, students are educated to obtain the scientific knowledge and skills to deal with challenges in design, analysis, construction and operation of floating systems, driving innovation in the maritime sector. The MSc MT programme is the only maritime technology programme at a research university at master level in the Netherlands. The master is concerned with all aspects of designing, building, analyzing, and operating high-tech ships (at sea) and other floating structures. It challenges students to integrate various fields of mathematical and physical sciences and to apply fundamental engineering knowledge in a maritime context. The programme is content-oriented and involves five disciplines: Ship Hydromechanics; Ship and Offshore Structures (structural engineering); Marine Engineering; Ship Design; and Maritime Operations and Management. The panel values that students can graduate in one or 'in between' these research disciplines, as some research questions require a mono-disciplinary approach and some a more multi-disciplinary approach. In addition to acquiring fundamental and engineering knowledge, students are encouraged to develop a mindset of innovation and personal growth. They build networks for their future, develop teamwork skills and are encouraged to become self-reliant decision-makers. The panel appreciates the clear vision and profile of the programme emphasizing a science approach to marine technology, the attention to sustainability and the balance between knowledge and skills. Graduates are well prepared for a career as scientist or engineer at an advanced professional level; at a university, research institute, in the internationally well-known Dutch shipbuilding industry, shipping and/or maritime contracting industry or abroad in the maritime sector.

The intake of students in the MSc MT programme has decreased in the past years from 62 in '21-'22 to 48 students in '23-'24. International students constitute approximately 20-30% of the overall enrolment, whereas female students comprise an average of around 15% of the intake. The panel appreciates the efforts being made to increase the student influx, particularly from the TUD BSc Mechanical Engineering and BSc MT programmes. Furthermore, public information on the programme has been improved.

Both programmes clearly stimulate students to become well-trained professionals and to be adequately prepared to continue their studies at MSc level or to conduct research at PhD level respectively. The panel values the level of self-reflection of the programmes. According to the panel, the programmes are highly responsive to developments in the dynamic field and contemporary academic and societal debates. Both programmes are well-connected to the professional field, facilitated by numerous interactions in the context of guest lectures, research assignments, (interdisciplinary) projects, the MSc thesis, and career-related events. Further alignment with the field is pursued per programme through the Industrial Advisory Board, which for the MSc MT is shared with the MSc Offshore and Dredging Engineering. The panel was pleased to learn that the Advisory Board has a clear view on the academic level of the programmes. It is actively involved in the development of the programmes and advises them on developments within the domain as

well as the needs of society and the professional field that are relevant to the content of the programmes. The professional field representatives that the panel interviewed generally feel that their input is taken into account and indicated that they value the mutual exposure.

From interviews with students, the panel observes that the recent name change of the faculty is not viewed favourably by MT students. BSc students in particular express a sense of diminished importance following the removal of MT from the faculty's name. The panel acknowledges the potential risk of MT losing its separate identity in the faculty and merging into ME. It advises the faculty to remain aware of this concern in order to maintain a distinct cohort identity and ensure visibility within the maritime industry.

Intended learning outcomes

The final qualifications of both programmes are based on the Meijer's Criteria for 4TU programmes, which cover the Dublin descriptors. These criteria are defined in terms of seven broad competence areas, namely: 1) Competence in one or more scientific disciplines, 2) Competence in conducting research, 3) Competence in designing, 4) Scientific approach, 5) Basic intellectual skills, 6) Competence in cooperating and communicating, and 7) Consideration of the temporal and social context. In general, the panel is positive about the ILOs.

The **BSc MT programme's** intended learning outcomes are spread over the seven competence areas and describe the knowledge and skills that the programme deems essential. The final qualifications of the BSc MT programme have not been altered, with adjustments in the programme according to the value attributed to each final qualification. This realignment reflects the renewed vision described under the programme profile. Specific learning goals have been updated, enhancing the visibility of sustainability, autonomy and digitization in the programme. The panel considers the ILOs of the BSc MT programme to be well-defined and appropriate for the academic bachelor's level. They are formulated in accordance with the Dublin Descriptors and the domain-specific framework and cover all relevant aspects of the bachelor's programme.

The **MSc MT programme's** intended learning outcomes are spread over the seven competence areas, and describe the knowledge and skills that the programme deems essential. The panel considers the ILOs of the MSc MT programme to be appropriate for the academic master's level. They are formulated in accordance with the Dublin Descriptors and the domain-specific framework and cover all relevant aspects of the master's programme. The panel values the ILOs related to 'consideration of the temporal and social context', as well as the high cognitive level associated with 'competence in conducting research'. The professional competences as part of the ILOs are appreciated; they could be emphasized even more.

Considerations

Based on the reviewed documents and discussions during the site visit, the panel concludes that the **bachelor's programme Marine Technology** has a clear science and design orientation, providing students with foundational skills and knowledge to design and build all kinds of floating structures on the water. The panel appreciates the focus on the future of the maritime industry, with an eye on the latest (international) research challenges in the field, as well as the attention to sustainability.

In addition, the panel concludes that the **master's programme Marine Technology** has a clear content-oriented focus, providing students with scientific knowledge and skills to deal with challenges in design, construction and operation of floating systems, while promoting environmental responsibility and societal perspectives. The panel appreciates the multidisciplinary profile of the programme with the five disciplines (hydromechanics, structural engineering, marine engineering, maritime operations & management and ship

design). In addition to acquiring fundamental and engineering knowledge, students are encouraged to develop a mindset of innovation and personal growth.

The panel is also positive about the balance between knowledge and skills, such as digital and collaboration skills, as well as the explicit attention for sustainability issues and social impact in **both programmes**. Both programmes are unique in the Netherlands. Furthermore, the programmes are very attentive to contemporary academic and societal questions, due to their strong connections with the professional and societal field. The panel considers the ILOs to be appropriate to an academic bachelor's and master's level respectively, and in alignment with expectations in the academic and professional field. In response to the name change of the faculty, the panel advises the faculty to be mindful of the distinct identity of the MT programmes and their visibility within the maritime industry.

Conclusion

The panel concludes that the bachelor's programme Marine Technology meets standard 1.
The panel concludes that the master's programme Marine Technology meets standard 1.

Standard 2. Teaching-learning environment

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

Findings

Curriculum

The **BSc MT programme** consists of 180 EC and is offered as a fulltime three-year programme. The programme consists of five subdisciplines – ship hydromechanics, ship structures, marine engineering, ship design, and maritime operations & management, encompassing maritime finance, business and law – which are integrated as learning lines within the curriculum. The panel appreciates the fundamental courses early in the curriculum; courses start with a comprehensive introduction, such as the newly developed Intro MT course in the first year, providing a broad overview of the field. It also values the integration projects (Integration and Skills 1-3), which consolidate all acquired knowledge, as well as the strategies incorporated in the curriculum to increase knowledge retention, such as active learning, real-world applications and regular feedback. Most courses require a nominal effort of 6 EC, with the exception of a few 4 EC courses in the first year, and two 12 EC courses: the extensive third Integration and Skills course and the Bachelor End Project (BEP). The first half of the 3rd year comprises a minor of 30 EC, as in all TUD BSc programmes. Students can choose from a wide variety of thematic minors offered by TUD and partner universities Erasmus University Rotterdam and Leiden University, broadening their knowledge base. It is also possible to follow a so-called free minor, made up of a cohesive set of courses, or a minor course abroad at one of the international partner universities.

The Bachelor End Project (BEP) has the character of a graduation project and is scheduled as a 12 EC course. In the BEP, the students execute their first large practical research assignment. The projects focus on collaboration, academic approach, design, modelling and research skills, and are carried out in self-selected teams of four students. The panel is positive about the variety of labs and research directions available for students, providing flexibility in defining research or design projects. All assignments for the BEP are reviewed by the BEP coordinator; they are linked to research of professors or are requests for research from companies in their network, and combine at least two disciplines within MT. About 50% of the BSc students perform their BEP in cooperation with one or more companies. Students indicated to the panel that they

appreciate the group projects. The panel suggests that offering training in collaborative work and group management at the start of projects could enhance team dynamics.

The panel considers the curriculum of the **BSc MT programme** to be well-structured and coherent, with strong links between the courses. The curriculum covers all ILOs, as is demonstrated in the tables included in the self-evaluation report. The design of the curriculum makes sure that courses build upon each other in terms of knowledge and skills. The group projects are particularly appreciated.

The panel was informed that an updated curriculum was implemented in 2023, which for a large part resembles the previous curriculum. This was done for several reasons: to balance the workload and difficulty level of courses and projects more evenly; to place greater emphasis on applied skills, with learning lines for both maritime technical skills and transferable skills; to align the programme with current themes (sustainability, energy transition, Artificial Intelligence), and to decrease the dropout rate in the first year, by including improved student guidance with attention for study skills and motivating content. Training in skills education has been made more prominent in project work and has been integrated into courses in the second year, focusing on argumentation, reporting skills, and scientific writing. Whenever feasible, multiple learning lines are integrated into a single course, resulting in several multidisciplinary courses. Additionally, based on student feedback, the order of the courses was adjusted to ensure that the mathematics and physics courses are taught prior to the MT content, also allowing for a more evenly distributed study load throughout the year. Most of the MT-specific courses build on fundamental engineering principles and mathematics. These MT-specific courses (around half of the courses in years 1 and 2) are shared with the faculty's BSc Mechanical Engineering (Wb) programme, which is now also being revised. The panel was informed that this revision is not expected to impact the newly developed MT courses, apart from the timing of courses. The panel believes that the actions taken to improve the curriculum are all very relevant. It appreciates the incorporation of engineering skills into disciplinary courses and projects, as well as the increase of multidisciplinarity within the curriculum.

During the interviews, the panel learnt that sustainability issues and social impact are addressed as part of several courses and (guest) lectures, and as part of the BEP, where students have to explain the (potential) societal impact of their proposed research. As responsible teachers educate responsible engineers, teachers play an exemplary role by incorporating sustainability into their work. Additionally, ethics is integrated into various courses, including all maritime construction and integration and skills courses, fostering the ability to make ethical decisions. The panel appreciates this emphasis. The panel agrees with the professional field representatives that design projects are a positive element of the programme; they add to the practical experience and contribute to the acquisition of skills by students.

The panel is positive about the curriculum reform and the fact that the courses have been revised to include updated specific learning objectives, which also improve the prominence of sustainability within the programme, although this could be even further developed. Students also see an improvement regarding overlap between courses. Earlier, students noted occasional overlap between courses organized by MT and ME staff resulting from limited coordination between the lecturers, while overlap has now been reduced to a minimum. Nevertheless, the programme concludes that alignment between courses could be further improved with a focus on alternating intermediate deadlines between the courses to prevent peaks in workload for students. According to the panel, the development of the programme is done with great care, although monitoring the effects of curriculum changes is important. The panel appreciates that input from the professional field is explicitly taken into account in the renewal process. Students indicate that, although they are not directly involved in the renewal of the programme, their feedback is taken into account.

Students are satisfied with the updated curriculum and the responsiveness of programme management to student's feedback.

The **MSc MT programme** consists of 120 EC and is offered as a fulltime two-year English language programme, structured into eight quarters of 15 EC. The curriculum is designed to provide robust theoretical grounding and practical competencies, with a focus on innovations in ship design, ship systems, maritime structures and hydromechanics. A recent curriculum reorganization created more flexibility and choice for students, as the previously existing tracks were abandoned and so-called star-elective courses were introduced, while strengthening the focus on maritime technology. The current curriculum consists of mandatory courses (25 EC), star elective courses, electives and the graduation project. The mandatory MT courses are divided over five courses of 5 EC, which represent the five specializations or research disciplines. Four of these courses are offered in the first semester; the mandatory course on Ship Design was moved to Q3 to avoid an excessively high workload in Q1. This allows students ample time to make an informed decision about their specialization and develop their Individual Study Programme (ISP) by the end of the second quarter. The Individual Study Programme (ISP) is created by selecting at least five so-called star-elective courses from a short list of 20 programme-specific elective courses and additionally one star-elective ethics course. The star-elective courses are also linked to one or more of the specializations. To ensure that students acquire adequate specialized knowledge before beginning their graduation project in one of (or 'in between') the five disciplines, each student must select at least three star-elective courses related to a specific specialization. Additionally, students can choose free elective courses. Students may take up to 6 EC of non-technical courses, which includes the mandatory star-elective ethics course. In recent years, there is increased attention to current scientific research in maritime technology, ensuring that students benefit from research insights and interdisciplinary perspectives. In addition, there is a stronger focus on project-based learning and academic skill development, providing students with ample opportunities to engage collaboratively in real-world like projects. In year 2, students can also opt for a semester abroad of 30 EC.

The panel is positive about the new structure of the programme, with relevant specializations and the possibility for students to build both a deep and broad, multidisciplinary competence profile. The panel describes the Study Guidelines, with detailed information on the curriculum to support students with the choices they make, as very informative and an example for others. Students appreciate the increased flexibility to customize the programme according to their interests through star-electives and electives, viewing this as a key advantage of the programme. The connection between specializations and the chairs provides a clear structure. While each specialization has its distinct focus, the fluidity between the boundaries of the subjects fosters strong synergy among the research groups. The absence of a chair in some research groups is not perceived as an issue, as there is ample expertise available. Furthermore, the panel is positive about the mandatory star-elective ethics course. Additionally, the compulsory MT courses representing the five specializations are appreciated, as well as the provision of courses for non-MT BSc students during the first two quarters.

In line with the TU Delft guidelines, the first quarter of the second year is available for an individual research assignment/Joint Interdisciplinary Project (JIP), a semester abroad (30 EC) or (star) electives (15 EC). The panel appreciates the possibility to use 15 EC for a Joint Interdisciplinary Project (JIP), where students from different faculties cooperate to solve an assignment from an industrial partner of the TUD. The panel learnt that most students do not opt for an internship, and that this is often also not actively encouraged by teaching staff members. Most feel that as students often do their graduation project in collaboration with industry and get to experience the working environment here, there is no need for an additional internship. The panel understands this but also notes that an internship of several months can promote students' professional skills development, which are included in the ILOs, more than an academic project.

Furthermore, the second year of the programme consists of a literature survey and problem analysis (10 EC), and a 35 EC thesis, which builds on the literature survey. In the thesis project, each student is paired with a supervisor from the scientific staff of the Maritime and Transport Technology (M&TT) department, with whom they hold regular meetings. The supervisor monitors the progress and quality of the graduation project and may involve PhD students or postdocs in the supervision. Projects are always related to the supervisor's research discipline and have to be approved by the supervisor. Students have the option to conduct their graduation projects either within the department or in collaboration with a company or research institute; around 80% of students opt for the latter, in which case they also have an external supervisor next to their TUD supervisor. In the thesis, students explore a research or development topic in depth and generate new knowledge or develop a new design.

The panel considers the curriculum of the **MSc MT programme** to be well-structured and coherent, with strong links between the courses. The curriculum covers all ILOs, as is demonstrated in the tables included in the self-evaluation report. The design of the curriculum makes sure that courses build upon each other in terms of knowledge and skills.

The panel appreciates how **both programmes** continually reflect on the content of the curricula in light of the professional and academic field and are keen on incorporating new relevant areas. This responsive attitude is also reflected in the ongoing incremental changes implemented in the courses. According to the panel, the structural incorporation of sustainability in both curricula requires further attention by including both a system perspective and interdisciplinary approaches, in alignment with the professional field.

The panel observes that in general, every course is evaluated once every three years. This evaluation, as well as individual feedback from students, serves as a signal for lecturers. At the end of each quarter the study load, amongst others, is assessed through a survey. In addition, midterm panel discussions are arranged with the study associations to collect feedback during each quarter. On the basis of these evaluations, actions are planned and taken. The results and follow-up of evaluations are reported to the study associations, which relay this information to the students. The panel values the formal and informal evaluation of courses. Yet, based on signals from students during the interviews, it recommends that the programmes place greater emphasis on responding to student feedback. For instance, at the beginning of each course, last year's feedback and follow-up steps could be shared with students.

The Education and Student Affairs (ESA) department is currently enhancing its use of various evaluation data for monitoring purposes, supported by a recently implemented dashboard. The panel supports this development, as it thinks that the current PDCA (Plan-Do-Check-Act) cycle, the check and act phases in particular, could benefit from a more structural approach. This includes for instance formulating explicit goals, determining the necessary steps to achieve these and monitoring the impact of measures. According to the panel, the ILOs should be the basis of this approach: all improvements should ultimately contribute towards equipping students better to achieve the learning outcomes. It recommends the programmes to continue onto the path of structural use of evaluation data. To aid programme directors in the continuous improvement of the programme, the panel suggests that their attendance at Board of Studies meetings be established as a standard practice.

Learning environment

Following the faculty's vision on education, the programmes strive to offer students a student-centred learning environment, where they take responsibility for their own learning and development as maritime engineers (self-leadership). This occurs in dialogue with developments in society. Design-based learning is

therefore integrated into the educational concept of the reflective engineer. In the (multi- and interdisciplinary) project-based education, students learn to apply knowledge, design, collaborate in (international) teams, and find solutions to societal challenges.

The **BSc MT programme's** curriculum integrates theory with practical application to enhance learning and accommodate diverse learning styles. Theoretical knowledge is reinforced through real-world experiences. A collaborative learning environment is fostered through regular interactions between students and instructors. Students develop specific MT skills as well as general academic (transferable) skills such as oral and written reporting and presentation, programming, teamwork and project management, along with problem-solving abilities. The courses combine lectures with workshops, practicals and design projects. Several components of the previous curriculum were kept, such as larger courses and moments of content integration. The curriculum comprises both individually graded courses, smaller research assignments and group projects. The panel appreciates that the programme has been actively considering ways to enhance students' knowledge retention and has adjusted the curriculum accordingly. It encourages close monitoring of the results and taking follow-up steps if necessary.

The **MSc MT programme** emphasizes a content-rich education that blends theoretical concepts with practical applications and implications. The curriculum incorporates skills development in various ways, such as collaborative group projects. Socialization is facilitated through the study association and extracurricular activities, fostering a sense of community, networking opportunities and collaboration among students. The panel is pleased with the programme's strong emphasis on socialization and personal development, while also recognizing the potential to highlight personal development aspects more prominently within the curriculum. During the site visit, students confirmed that they appreciate the sense of community within the programme, both among their peers and with the teaching staff, although there is room for improvement in the focus on soft skills, such as critical thinking and self-reflection skills.

The MSc courses combine lectures with workshops and hands-on projects. There has been a growing focus on innovative approaches such as project-based learning and experiential education, fostering both individual growth and collaborative teamwork, and preparing students for the modern maritime engineering practice. Students are encouraged to participate in group discussions and interdisciplinary projects such as the Joint Interdisciplinary Project (JIP), which is considered a good preparation for working in interdisciplinary teams on subjects that need a multidisciplinary approach. The increased attention for scientific research in the curriculum is reflected, amongst others, in the incorporation of more research-led projects and the active involvement of PhD candidates in education. Students are also actively engaged in scientific research through graduation projects and individual research assignments. Opportunities to enrich the programme further were highlighted as well, for example, by collaborating even more closely with the industry and research partners, thus providing students with real-world experiences and opportunities to engage in research and development projects.

The panel values the student centredness of **both programmes** and is positive about the learning environment. It is of the opinion that the programmes offer varied teaching methods, and an adequate balance between theoretical knowledge and practical skills. The panel notes that while the existing AI policy is clear, there is an opportunity to enhance student awareness of it, for example by (further) integrating AI into teaching, to educate students on the use of AI as a tool.

The panel observes that the facilities available are of a high standard, encompassing state-of-the-art equipment, labs and computational resources for teaching and research. Students have access to the

education facilities in the ME faculty and other locations on campus. They also benefit from additional investments in research facilities by the Maritime &Transport Technology (M&TT) research department.

Feasibility

The **BSc MT programme** aims to attract Dutch students with a vwo-degree including mathematics-B and physics, or with a relevant propaedeutic degree from a university of applied sciences, as well as international students, after having passed an entrance level test in Dutch language proficiency. Since the programme is taught in Dutch, only a few students from abroad enter the programme. There has been a decline in enrolment from 2018 (86) to 2023 (61), amounting to a 30% decrease. This trend may have been an unintended consequence of the efforts to enhance the BSA process through the mandatory Study Choice Check (SKC).

The BSc MT programme has a low rate of students meeting their binding study advice (BSA) in the first year, along with a relatively high average study duration of 4,5 years. After the last site visit, where these aspects were highlighted, a number of critical issues were identified and addressed. Notably, a stronger emphasis was placed on the mathematical aspects of the programme in the information provided to new students. Additionally, onboarding activities were revised to enhance the support structure for new students, which included an adapted mentorship programme and the introduction of junior lecturers. Furthermore, to improve matching between students and programme and reduce dropout rates, a mandatory study choice check was introduced two years ago. As a result of these combined efforts, the BSA success rate has increased from below 50% to around 55% over the past 2-3 years. However, the programme still has a significant first-year dropout rate of around 32% over recent years. Moving forward, the programme intends to explore alternative strategies to further strengthen study support mechanisms and facilitate faster completion, also looking at peer institutions. The panel appreciates the initiatives taken to improve passing rates as well as the diverse range of programme-specific tools including the mandatory student check, the mentorship programme and the introduction of a progress monitoring system. It was pleased to learn that the initiatives have indeed led to improvements in passing rates for the BSc MT programme. Furthermore, the project workload in the first year has been reduced from 24 EC to 8 EC. Students conveyed to the panel that the BSc MT programme is challenging due to its high workload, particularly for students lacking prior knowledge. Since certain (assignment-based) courses are perceived to require more effort than what the number of EC would imply, such as the Integration and Skills projects, the panel advises the programme to look into the distribution of workload across courses and quarters.

Despite an increase in overall success rates (less dropout), the average completion time has extended to 52 months, with about 50% of students finishing in under 4 years. In part, this is caused by the involvement in extracurricular activities of many students, such as participating in student challenges. Since this contributes to their socialization and self-development, there seems to be a focus on a 4-year completion rather than the nominal three years. Study advisors recommend that students refrain from enrolling in more than 15 EC per quarter, which would result in a nominal study duration. This implies that students may take longer to complete their studies if they need to make up for lost progress. The panel concludes that although the curriculum as such is feasible, the average programme's study duration could be improved. It noted with appreciation that this is being addressed by the programme management. The panel emphasizes the importance of closely monitoring drop-out rates. Additionally, it advocates for a shift in the perception throughout the programme that a four-year study duration is standard. While the panel acknowledges the value of extracurricular activities and student challenges, it stresses that MT is a full-time programme and should be recognized as such.

The **MSc MT programme** aims to attract Dutch students with an academic BSc degree, Dutch students with a BEng degree from a university of applied sciences, and international students from inside or outside the EU. The admission requirements hold for both national and international students. Students have typically completed a BSc in Maritime Technology or a related field. Around 80% of the internal (faculty) intake comes from the BSc MT, and another 5-20% from the BSc Mechanical Engineering.

After the last accreditation, where the panel mentioned that the study yield could be improved, the panel notes several initiatives within the MSc MT programme aimed at improving student performance and timely completion of the programme. Data are yet inconclusive, however, there has been a significant rise in student satisfaction. The panel is positive about these initiatives. It was informed that at the moment, the study yield of the MSc MT programme is relatively good when compared to other MSc programmes, and the drop-out rate is below average compared to the other programmes in the faculty. The panel inquired after the possibility of studying abroad for 30 EC, which includes an extracurricular additional 15 EC, and how this would fit into the programme. It was informed that this decision is made on a case-by-case basis and assessed per student; generally, students may take longer to finish the programme, but they will gain valuable extra experience.

Additionally, the length of the graduation project was discussed. The panel learnt that the literature survey and thesis project, which together amount to 45 EC, typically require about 9 months to complete, although some students may take longer, partly due to additional commitments. The panel notes that in principle, 45 EC should not exceed approximately 7 months of full-time study activity, and exceptions should not be supervisor-dependent. The programme recognizes this issue and is testing various strategies to motivate students to complete their work on schedule, for example with a midterm review that is part of the grade. The panel acknowledges that the programme is doing better than most other programmes in the faculty this respect. Nonetheless, it believes that it is crucial to support students in completing their work in time, given the extensive scope of their thesis, and to monitor this. In this regard, it is positive that a progress monitoring system (MyCase) is currently being implemented to track student progress during their thesis work and offer targeted support. Moreover, the programme management sees opportunities to use the monitoring systems more effectively to be able to intervene proactively and improve the study yield.

The panel considers the curricula of both programmes to be feasible, although actual study duration needs further attention, building upon the progress that has been made in recent years. The panel suggests a more thorough follow-up on the duration of studies, particularly concerning MSc theses. It is important to establish clear and uniform guidelines for thesis completion. The panel acknowledges that there is a system in place (Evasys) for monitoring, amongst other things, the perceived workload for each course. Still, it recommends improving the monitoring of workload across courses and academic quarters, as well as reassessing the allocation of ECs for certain courses with respect to their workload. Since any changes to the workload of courses must be submitted by March for implementation in the subsequent academic programme, it is essential to promptly follow up on student feedback.

Guidance

The panel views the guidance provided to students during **both programmes** and the accessibility of programme-specific services and facilities positively, providing ample opportunities for the development of an academic community. In the **BSc MT programme**, these include an introductory weekend for new students organized by the study association and information sessions for first year students on where to find support. The BSc MT has chosen to prioritize direct interaction between lecturers and students, minimizing reliance on teaching assistants to provide instruction and assistance to students. The panel particularly values the updated mentoring programme for first-year students, introduced in 2019, where senior BSc and

MSc students act as student mentors for project groups to assist first-year students in adapting to the academic environment. The programme includes, amongst others, group activities, attendance monitoring, regular study assignments, and tutorial classes. In addition, there are weekly sessions that focus on developing basic learning skills. The student mentors are supervised by junior lecturers, who support the lecturers of MT courses in the first year. Additionally, the panel appreciates the hiring of an education advisor in 2022 with a focus on student support to further improve and coordinate the mentorship programme, as well as the mandatory training mentors receive beforehand to prepare them for their diverse responsibilities. In the second and third year of the BSc MT-programme, students are expected to take responsibility for organizing study groups themselves, as mathematics and disciplinary courses shift to plenary sessions and project teams become more autonomous.

In the **MSc MT programme**, students are introduced to the organization of the programme and its specializations during an introductory week. In addition, an introduction is provided into 'culture maps', which assist students in understanding how to work effectively and professionally with their peers. Students receive coaching from the staff and PhD students within the courses and from a daily supervisor during their graduation project, while the assistant master coordinator serves as the primary point of contact for any questions or challenges that may arise. Student progress is also monitored by the programme management. Students conveyed to the panel that the increased flexibility of the programme requires thorough planning. The panel observes that students feel well-supported throughout the programme. It appreciates the introductory week, the heavy involvement of faculty in guiding students, as well as the high student/staff ratio. In addition, the programme identifies opportunities to further improve its quality by actively engaging alumni, for instance as mentors via the study association.

Academic counsellors play a key role in referring BSc and MSc students to the right resources. For example, students with mental health issues can see student psychologists or attend training sessions on personal well-being. Furthermore, the panel noted that the study association William Froude, as well as the master society (SMT), which is part of the association, take an active role in supporting students to find their way, amongst others by organizing a variety of academic and social activities. The association is also actively involved in advisory bodies such as the Board of Studies, which advises the director of studies on the quality of the MT study programmes. At the faculty level, Gezelschap Leeghwater promotes the interests of the students.

The panel acknowledges that **both programmes** effectively provide information to students through the digital learning environment Brightspace in an accessible and timely way. This platform also features tools like Buddy Check. Additionally, the programmes consider the needs of all students, including those with functional impairments. In alignment with the TUD Note on "Duty of Care", this includes personal and/or separate provisions such as extra time for exams or separate exam settings, and adjusted schedules.

Teaching staff

The teaching staff in the **BSc MT programme** have a background in one of the research disciplines of the programme. The staff includes 5 full professors, 10 associate professors, 6 assistant professors and 2 teachers. In addition, first and second year BSc MT students are taught by ME staff in courses that are shared with the BSc Mechanical Engineering. The panel appreciates that the staff has been increased with the hiring of junior teachers, who are involved in the supervision of student mentors and serve as the primary point of contact for most first-year students. They are appointed for three years and dedicate half of their time to obtaining a first-degree teaching qualification to become a secondary school STEM-teacher, while working in the faculty for the other half. The panel learnt that there are around 20 junior teachers in total for the seven departments. Additionally, the staff is supported by teaching assistants, although to a lesser extent than in

other programmes. The panel is positive about the involvement of junior teachers; it sees the teacher programme as beneficial, enhancing student-staff interactions as well as didactic skills among educators. However, it observes the potential risk of future funding cuts and the possible impact this may have on teachers' workload. It was reassured by faculty management that decreasing finances will not affect junior teachers. The MT programme will be less impacted by a decreasing role of teaching assistants caused by future funding cuts, since they are less dependent on teaching assistants.

Staff members engage in research and actively contribute to the development of their disciplines, often also teaching in the MSc MT and MSc ODE programmes. The panel was made aware that the teaching workload is significant, although this may vary per quarter, and teachers appear to manage it effectively. To help manage the workload, external guest lecturers, including industry professionals, are occasionally invited to assist with teaching specific courses. These guest lecturers bring unique and diverse experiences from various fields, provide additional capacity and often share practical experience, which is appreciated by students. Students feel that MT staff are personally invested in students, which they highly value. They report that they experience a difference for larger shared ME courses, where it can be challenging to reach out to lecturers, who according to the students are less available.

The **MSc MT programme's** staff have a background in one of the research disciplines of the programme. The staff includes 9 full professors, 12 associate professors, 16 assistant professors and 2 teachers. Supporting the international orientation of the programme, approximately one third of the teaching staff at MT is of international origin. All staff members engage in research and actively contribute to the development of their disciplines. The panel appreciates the excellent scientific quality of the staff, as well as the high level of completed UTQ training (37 of the 39 lecturers). Several staff members have additional teaching certificates, such as the Senior Teaching Qualification and/or Educational Leadership Programme.

In the interviews, the panel has seen experienced, well-organized and engaged teams that cover the academic scope of **both programmes**. Almost all primary responsible lecturers hold PhDs, aligning with faculty policy. The lecturers have strong connections with the professional and societal field through their own research activities, providing a research-intensive educational programme. In addition, the panel appreciates that lecturers cultivate individual contacts with students; students report that they are easily accessible, dedicated and responsive. Moreover, the professional field values the drive and positive attitude of the staff, who are very motivated to improve the programmes. The panel notes with appreciation that teaching quality is ensured through an academic development policy that focuses on both teaching and research qualifications. Most responsible lecturers have completed their University Teaching Qualification (UTQ), and new staff members are required to complete the UTQ within three years. Staff members are updated on educational developments during regular section meetings. An Education Day is organized twice per year for all faculty teaching staff, where the latest developments in education and in professional practices are discussed.

Internationalization

The **MSc MT programme** has an inherently international orientation, as the maritime technology sector has a global character and increasingly international labour market. The panel approves of the choice and underlying argumentation for an English name and language of instruction. According to the panel, this aligns well with the international nature of the professional and academic field. Through the international focus, students are exposed to different perspectives and gain experience in collaborating within international teams. Thus, they are prepared to work in an international context.

The diverse background of both teachers and students supports a globally oriented educational environment. The university has adequate professionalization policies in place for ensuring lecturers' proficiency in English. Students with international prior education must demonstrate proof of English-language proficiency. The panel appreciates the opportunity for students to follow part of the programme abroad. It is also positive about the attention to intercultural collaboration, and the careful monitoring of English proficiency levels of both staff and students.

Considerations

The panel considers the curricula of both programmes to be well-structured and coherent. The curricula cover all ILOs and provide students with a comprehensive foundation in marine technology. The updated curriculum of the **bachelor's programme Marine Technology** has led, amongst others, to a greater emphasis on current themes such as sustainability, as well as on technical and transferable skills. The panel appreciates the emphasis on practical applications during projects, the increase of multidisciplinarity within the curriculum, and the additional opportunities for research involvement during the Bachelor End Project (BEP). The **master's programme Marine Technology** offers a unique programme in the Netherlands for the international maritime industry. The panel is positive about the new, clear structure of the programme, with relevant specializations, which foster synergy among the research groups. The added flexibility with (star) electives enables students to develop both an in-depth and broad profile. The panel is pleased with the programme's strong emphasis on socialization and personal skills development, as well as the plans to further increase the focus on soft skills. The panel determines that the actors within the programmes are well aware of sustainability developments. Nonetheless, their integration into the curricula needs additional focus.

The panel appreciates how the curricula are continuously updated in response to developments in the professional and academic fields. For **both programmes**, there is a need for improved monitoring through the PDCA (Plan-Do-Check-Act) cycle, particularly in relation to the connection with the ILOs. To facilitate this process, the panel believes that the role of programme directors could be strengthened. While it values the formal and informal evaluation of courses, the panel is of the opinion that more attention could be paid to include monitoring data with, amongst others, study progress, student number evolutions and course success rates, and by providing feedback on students' feedback.

The panel is positive about the student-centred learning environment of **both programmes**, providing opportunities for the development of an academic community, and the active role of the study association. The courses offer varied teaching methods, with a growing focus on (multi- and interdisciplinary) project-based learning and experiential education, and an appropriate balance between theoretical knowledge and practical skills. The panel highlights the importance of keeping a focus on AI in both programmes. Student awareness could be increased by (further) integrating AI into teaching.

In the **bachelor's programme Marine Technology**, the panel values the integration projects, as well as the strategies incorporated in the curriculum to increase knowledge retention. The panel is impressed with these strategies, but recommends close monitoring of the results and taking follow-up steps if necessary. In the **master's programme Marine Technology**, the collaborative group projects are appreciated, as is the Joint Interdisciplinary Project (JIP). Attention for scientific research in the curriculum is reflected, amongst others, in research-led projects, individual research assignments and graduation projects. According to the panel, students are well-supported throughout the programmes. In the **bachelor's programme Marine Technology**, the panel particularly values the mentoring programme for first-year students, as well as the efforts to increase study success rates, including the mandatory study choice check, and to further strengthen study support mechanisms. In the **master's programme Marine Technology**, staff are

intensively involved in guiding students. The panel concludes that all students receive adequate guidance and support. Furthermore, the admission criteria, the information provided to students, and the facilities available for students with disabilities are all satisfactory.
The panel considers the curricula of **both programmes** to be feasible, although study duration needs further attention, building upon the progress that has been made in recent years. The panel supports the efforts of the programmes to address this issue. It emphasizes the importance of closely monitoring drop-out rates and suggests a more thorough follow-up on the duration of studies. In this context, the panel appreciates the introduction of a progress monitoring system. Additionally, the panel recommends evaluating the adequacy between course workload and allocated ECs for certain courses and closely monitoring the workload for each course.

The panel is impressed with the quality and enthusiasm of the teaching staff of **both programmes**, who come from a variety of (international) backgrounds. They are all pedagogically qualified and are experts in their field, covering the academic scope of the programmes. The majority of the staff members engage in research and have strong connections with the professional and societal field through their research activities, thus providing a research-intensive environment. In addition, the panel appreciates that lecturers value personal contacts with students; they are easily accessible and are dedicated and responsive towards students. Furthermore, the involvement of junior teachers and teaching assistants is greatly valued. The panel does not see any urgent issues regarding the quantity of staff.

The English-taught **master's programme Marine Technology** is internationally oriented, which is reflected in the international community of students and staff. According to the panel, the choice for an English name and language of instruction is well substantiated and in alignment with the international nature of the professional and academic field.

Conclusion

The panel concludes that the bachelor's programme Marine Technology meets standard 2.
The panel concludes that the master's programme Marine Technology meets standard 2.

Standard 3. Student assessment

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

Findings

Assessment system

Assessment in the programmes is aligned with the Education and Examination Regulations and the educational vision of the TUD as well as the faculty, embracing the constructive alignment principle of education. This includes a combination of formative and summative assessment in each course, with a gradual reduction in the number of formative tests as students take greater control of their own learning. The faculty aims to adjust and align its quality assurance handbook and assessment policy with the TUD assessment framework, published last year, by the end of 2024. In programme-specific assessment plans, all assessments and courses are aligned with the ILOs of the programmes. The panel observes that there is a well-defined university-wide assessment policy and sufficient standardization, for example through standard rubrics for the literature research and MSc thesis. Also, students are properly informed about the examination procedures and assessment criteria.

In the **BSc MT programme** ILOs are assessed based on a variety of assessment methods, including oral and written exams, individual and group exams, in the form of practical assignments, digital assessment, projects, and mandatory practicals. Assessments are mostly summative with formal formative testing mainly done in the first year. In principle, every course or project unit contains at least one summative test at the end of each quarter. However, practical courses consist of one or multiple individual or group assignments and do not have an exam at the end. The panel characterizes the assessment in the programme as well thought out. The panel appreciates that during the first year, several courses include a midterm test as a formative assessment, which is used as a bonus in the final exam. The introductory course is the only course with a traditional exam. Other courses use smaller group assignments to support the early activation of students. Since there is more focus on individual assessment in the new curriculum, this is sometimes combined with a small test in the exam period. According to the students, these changes help in spreading the study load over the period and increase the opportunities for feedback.

The **MSc MT programme** also employs various methods for both formative and summative assessment: written exams, oral exams, such as presentations, individual and group project work, as well as homework assignments. Every course contains at least one summative test. In recent years, there has been a growing trend to incorporate group assignments for summative assessment, fostering relevant collaboration skills. The programme aims for a balance between group work assessments and traditional individual exams. By incorporating a mix of individual and group assignments across courses, students can benefit from both independent study and collaborative problem-solving experiences. The panel noted that students often face extended waiting periods of up to 3 to 4 weeks for their grades. This delay can result in limited time for them to prepare for a resit. The panel urges the programme management and Board of Studies to proactively address this issue and ensure that students receive their grades in a timely manner.

The panel considers the assessment system of **both programmes** to be well-designed and coherent, with assessment methods that are appropriate for the courses' learning goals and sufficient attention to skills. It appreciates the assessment plan linked with the ILOs and the diversity in assessment methods used. The panel observes that appropriate procedures are in place to ensure and enhance the quality of assessment. For example, examiners apply the four-eyes principle when constructing tests. Furthermore, the panel notes that new lecturers are not designated as examiners for major courses in their first three years of service and are paired with senior colleagues who act as mentors. An educational advisor with assessment expertise monitors the quality of assessment by providing regular feedback on the assessment for all courses, focusing on issues such as reliability, validity, construction and the safeguarding of learning goals. Additionally, a bi-weekly walk-in session and a two-monthly workshop for teachers were initiated to improve communication with teachers about assessment quality. The panel acknowledges the enhancements that have been implemented and values the assistance provided by ESA in this regard.

Final assessment

The final product of the **BSc MT programme** is the Bachelor Final Project (BEP) of 12 EC, which covers all intended learning outcomes at an individual level. The BEP is organized in groups of 4 students and consists of both an individual and group assessment. The project may involve the design of a complete ship, part of a ship or a process that is related to shipbuilding or shipping, and combines at least two disciplines within MT. As topics are related to ongoing faculty research, subjects deal with sustainability, digitization or other key subjects for the maritime sector. The assignment for the project is different for each group, but in all cases contains both a multidisciplinary design and/or analysis component and an in-depth research component, each comprising at least about 25% of the total workload. The panel was informed that students get grades for individual performance as well as group performance. To ensure that the students get an objective

assessment, each group has two supervisors: the primary supervisor, who has proposed the assignment, and a secondary supervisor, who advises the primary supervisor on the grades.

The final qualifications are tested based on the assessment rubric for the BEP. Students are individually assessed based on, amongst others, 1) their individual contribution to the final report; 2) a plan of approach including the (potential) societal impact of their proposed research, and a review of the plan of approach of another group; 3) a scientific article of the group about their work; 4) the independence and proactiveness of the team as well as the student's individual contribution to the team, based on the regular meetings of the supervisors with the group, and a peer- and self-evaluation of each student at the end of the project; and 5) an individual grade for presenting the research.

As part of the accreditation process, the panel reviewed a selection of 4 BEP projects (16 students) from the BSc MT programme, including the corresponding assessment forms. The rubric for the BEP specifies the assessment criteria based on the ILOs and serves as a basis for grading. The panel agrees with the grades awarded to the projects, which are generally of expected quality. The panel learnt that in general, the Board of Examiners is pleased with the BEP procedure. However, the Board of Examiners observes – as also mentioned in their annual report – that the individual assessment of the students could be improved, and the current rubric is not sufficiently suitable for this purpose. For this reason, it recommended modifying the existing rubric or adding a rubric, in order to put more emphasis on individual assessment. The panel shares the Board of Examiners' view that the individual component of the BEP could be better developed. Yet, according to the panel, there is a clear procedure in place. Elements have also been built in as input for the individual assessment, namely a logbook for project work per student – which the panel is positive about – and the final presentation. This ensures that all students individually meet the minimum requirements for graduation and cannot freeride on the final project. In practice, though, this procedure seems to leave a lot of freedom for individual assessors, frequently leading to group members all receiving the same grades. Therefore, the panel recommends that the programme strengthen the BEP process, and carefully document and validate the individual assessments by providing examiners with more tools to differentiate between individual students. For example, by creating a separate rubric for individual assessment with room for feedback, and/or by questioning students individually about the report more systematically in the defence (i.e. an individual oral examination). Furthermore, the panel is of the opinion that peer assessment, as part of the BEP, requires adequate training and coaching of students in feedback literacy.

The **MSc MT programme** is completed with a thesis project of 35 EC. The programme informed the panel that it puts a strong emphasis on the quality and level of thesis projects, which the panel appreciates. A literature survey (10 EC), in the form of a report, is aimed to contribute to the final thesis. It is presented to the supervisor(s) and chair of the graduation committee and assessed separately by the supervisor. The thesis work may also draw inspiration from challenges encountered in the industry. Students have to write a structured scientific report, present their findings at a public colloquium, and defend their work before a graduation committee. Industrial partners can take part in the committee as guests. The thesis work is assessed according to uniform assessment criteria, set out in the Master Thesis Grading Rubric. This includes criteria about time management and planning (transferable skills). External supervisors have an advisory role in the assessment of students, whereas the formal assessment is conducted by the TUD examiners. The panel reviewed a selection of 15 MSc theses, including the corresponding assessment forms. The rubric specifies the assessment criteria based on the ILOs, is well-defined and consistently used; it is also available for students. The panel agrees with the grades awarded to the theses and found the grades to be well substantiated. The theses are generally of expected quality, present a good mix of theory and application, and deal with highly relevant topics. Students reported to the panel that they receive feedback following their literature review and the presentation/ defence of their thesis. However, they do not consistently

receive an explanation of the completed rubric; the panel advises the programme to pay attention to more consistent feedback on rubrics.

As for the duration of the graduation project, the panel learnt that faculty management is looking to streamline processes and ensure consistency across programmes and supervisors; stricter compliance with the thesis rubric and guidelines is considered crucial. The panel fully supports the focus on this matter. It finds it essential to pursue further action to avoid a 'grey area'. Currently, extending the graduation project may occasionally result in a higher grade, while in other situations it could lead to a grade reduction, irrespective of the particular circumstances related to the delay. According to the panel, a more defined timeline with specific start and end dates and further intensified guidance would be beneficial for students, as it would help eliminate prolongation, especially when this is caused by enthusiastic supervisors that focus on project results and lose sight of the envisioned timeline. Furthermore, the panel is of the opinion that there is room for improvement regarding the calibration of thesis assessments. While some calibration appears to exist in specific instances, such as for cum laude distinctions, more frequent discussions about assessment are recommendable to promote consistency in grading.

Board of Examiners

The ME programmes fall under the responsibility of the ME Board of Examiners, one of the two faculty-wide Boards of Examiners. Based on the documentation and the interviews during the site visit, the panel concludes that the Board of Examiners adequately safeguards the quality of assessment in the programme. It proactively controls the quality of assessment in various ways, such as appointing examiners (holding a UTQ or in the process of obtaining a UTQ), and assessing the quality of examinations through a random sampling of exams and final projects. It inspects the thesis works and accompanying assessment forms twice a year and assesses whether the graduation committees made fair judgements leading to the final grades, as well as the distribution of grades. The panel commends the Board of Examiners for their thorough evaluation of the BEP procedure and their valuable advice. They encourage the Board of Examiners to ensure that these matters are appropriately addressed by the BSc MT programme. Furthermore, the Board of Examiners has set strict rules for the compilation of graduation committees and for graduating with distinction. The rules for graduation committees have been revised and now include a mandatory member with experience in assessment. Moreover, one of the staff members needs to be independent, not having been involved in the graduation project. One extra scientific staff member, employed in another department, is added to the committee in cases where the candidate is eligible for the designation cum laude.

The Board of Examiners also deals with reports of suspicions of fraud and complaints. Complaints regarding courses (approximately 30 per year) are forwarded to the responsible lecturers or addressed through mediation. There are virtually no complaints regarding thesis grades. The Board of Examiners believes this is likely connected to the 'green light meetings,' during which students are given a go/no go decision for their thesis; in case of a 'no go', students can either make repairs or start over. The Board of Examiners has regular meetings with the Dean, the director of education, the head of the ESA department, the educational advisor on assessment and the quality assurance department. It also meets with other TUD Boards of Examiners to discuss common concerns and to improve assessment. The panel is pleased to see that the Board of Examiners clearly contributes to the quality of assessment in the programme.

Considerations

The panel concludes that the assessment system of both programmes is transparent and well designed. Adequate procedures, such as the four-eyes principle, are in place to ensure and enhance the quality of assessment. The assessment methods used are diverse and appropriate, and include assessment of skills.

Amongst others, the panel appreciates the attention for constructive alignment, the standard rubrics for the literature research and MSc thesis, and the support offered by ESA.

The panel appreciates that in the **BSc MT programme** several first year courses include a midterm test as a formative assessment. The Bachelor Final Project (BEP) covers all ILOs of the programme at an individual level. The panel considers the BEP assessment procedure to be well thought out, and the grades awarded to be sufficiently substantiated. Procedures, such as a logbook for project work per student and assessment of individual performance, ensure that all students individually meet the requirements for the BEP. Even so, the individual component in the BEP could be better developed. The panel recommends strengthening the BEP process, and documenting and validating individual assessments by equipping examiners with additional tools to differentiate between students. The Board of Examiners is very aware of this issue; following their recommendations, the panel encourages the programme to take further action in this regard. Additionally, the panel recommends implementing sufficient training and coaching for students in feedback literacy, to facilitate peer assessment.

The graduation project covers all ILOs of the **MSc MT programme** at an individual level. The panel appreciates the set-up of the thesis project and the way it is evaluated according to uniform assessment criteria, set out in a clear rubric. According to the panel, the grades awarded are sufficiently substantiated. As for the duration of the graduation project, the panel encourages the programme to streamline processes and ensure consistency across supervisors, while pursuing stricter adherence to the thesis rubrics and guidelines. According to the panel, establishing a clear timeline and providing more intensive guidance would help students successfully finish their thesis within 7 months. In addition, the panel encourages the programme management and Board of Studies to ensure that students receive their grades in a timely manner. Furthermore, the panel encourages the programme to calibrate more often regarding thesis assessment, to promote consistency.

According to the panel, the Board of Examiners proactively contributes to the quality of assessment in the programme. It has a clear task and safeguards the quality of assessment in the programme in various ways, including the continuous assessment of the quality of examinations.

Conclusion

The panel concludes that the bachelor's programme Marine Technology meets standard 3.
The panel concludes that the master's programme Marine Technology meets standard 3.

Standard 4. Achieved learning outcomes

The programme demonstrates that the intended learning outcomes are achieved.

Findings

Theses

The Bachelor End Project (BEP) is regarded as the **BSc MT programme's** final project in which students demonstrate that they achieved the BSc programme's ILOs at an individual level. In the **MSc MT programme's** graduation project (thesis), students demonstrate that they achieved the MSc programme's ILOs at an individual level. In preparation for the site visit, the panel examined the final projects of 16 BSc students (4 projects) and 15 MSc theses. In the selection, a proper distribution across grades was ensured. In the opinion of the panel, the level of the examined BEP's and theses is appropriate for an academic

bachelor's and master's programme, respectively. The end projects and theses demonstrate the achievement of the ILOs. In general, they are of expected quality.

Alumni
The panel is pleased with the significant number of students successfully pursuing a master's degree. After graduation, most **BSc MT programme's** graduates continue with the TUD programme MSc Marine Technology. Another 30% opt for the MSc Offshore & Dredging Engineering. Students rarely choose another master or start working after completing their BSc degree, although these numbers are increasing slightly. The panel observed that students feel that the knowledge they acquired is highly relevant to their future careers. They particularly value the close relation with the professional field, both in the context of courses and through extracurricular activities, and the practical experience gained during projects, which benefits their learning experience. The programme also gains from the feedback of external supervisors, as it offers insights into how the professional field views the students' performance.

The panel appreciates how in the **MSc MT programme** students are stimulated through numerous activities to become more acquainted with the future labour market. These include guest lectures, research assignments, (interdisciplinary) projects, the MSc thesis, and career-related events organized by the study association, such as an annual career fair. Career orientation is further supported by the Career Centre TUD. MSc MT students view their career prospects following the programme positively. A recent survey (2023) shows that the respondents consider the programme a good start for their careers. As the combination of competences is highly sought after by industry and research institutes, graduates easily find jobs. Students are prepared for a career as scientist or engineer in the maritime sector at an advanced professional level. They find employment at, for example, shipyards, the Dutch Ministry of Defence (Royal Netherlands Navy), marine contractors, but also in other (maritime) fields, including cargo transport, design and engineering companies, and research institutes in the Netherlands and abroad. Other alumni pursue an academic career by continuing with PhD research. The panel is positive about the fact that most alumni found professional positions that match the programmes' content and level.

The panel observes that alumni of **both programmes** are generally positive about the programme and often secure relevant positions after graduation. As they indicated during the site visit and in the most recent alumni survey, alumni developed valuable knowledge and skills during the programmes and feel well prepared for the labour market. During the site visit, the professional field representatives informed the panel that TUD alumni possess good modelling and problem solving skills as well as a solid knowledge basis. They are highly motivated and show leadership qualities. They do require coaching in time management and collaboration skills, such as engaging with stakeholders. However, according to the panel this is a broader trend that extends beyond just TUD alumni. The panel concurs with the programme that there is an opportunity to improve alumni engagement and feedback, as they can significantly contribute to the programme's quality, relevance and visibility. This could be achieved through initiatives such as mentorships, workshops, and networking events.

Considerations
Based on the examination of a selection of end projects and theses from the programmes, the panel concludes that the level of the Bachelor End Projects and theses is appropriate for an academic bachelor's and master's programme, respectively. They demonstrate the achievement of the ILOs. The documentation and interviews show that alumni are generally content with the programmes and are well prepared to perform successfully in the professional field in the Netherlands and abroad.

Conclusion

The panel concludes that the bachelor's programme Marine Technology meets standard 4.
The panel concludes that the master's programme Marine Technology meets standard 4.

General conclusion

The panel's assessment of the bachelor's programme Marine Technology is positive.
The panel's assessment of the master's programme Marine Technology is positive.

Recommendations

Bachelor's programme Marine Technology

1. Monitor the effects of the initiatives to improve students' knowledge retention, and take follow-up steps if necessary.
2. Provide adequate training and coaching to help students develop their feedback literacy skills.
3. Strengthen the BEP process, and carefully document and validate the individual assessments by providing examiners with more tools to differentiate between individual students.

Master's programme Marine Technology

4. Establish a more defined timeline for the thesis project and enhance the support provided to students to avoid delays.
5. Encourage uniformity in thesis assessment practices by conducting regular calibration sessions.

Both programmes

6. Enhance the integration of sustainability in the MT curricula, by including both a system perspective and interdisciplinary approaches.
7. Increase students' awareness of the AI policy by incorporating AI more extensively into the teaching process.
8. Enhance the monitoring of workload across courses and academic quarters and reassess the allocation of ECs for certain courses with respect to their workload.
9. Conduct a more comprehensive follow-up on the duration of studies, especially regarding MSc theses.

Appendix 1. Intended learning outcomes

Bachelor's programme Marine Technology

A graduate in Mechanical Engineering is able to...

1. Skilled in the scientific discipline of mechanical engineering
   - 1A ... solve problems of medium difficulty in the fundamental engineering sciences that form the basis of mechanical engineering: mechanics, thermodynamics, transport phenomena, materials science, control engineering and mechatronics and mathematics, especially analysis and algebra.
   - 1B ... solve elementary problems in related fields: electricity and magnetism, electronics, computer science and chemistry.
   - 1C ... solve problems of medium difficulty in the main application areas of mechanical engineering: mechanical systems, production technology, process and power technology and robotics.
2. Proficient in doing research
   - 2A ... apply knowledge and skills in the field of mechanical engineering to investigate mechanical systems.
   - 2B ... apply common methods and tools to model, simulate and investigate mechanical systems.
   - 2C ... document used research methods and results in a scientific report or article.
3. Proficient in design
   - 3A ... apply knowledge and skills in the field of mechanical engineering to design mechanical systems.
   - 3B ... develop complex mechanical systems using a systematic mechanical design process tailored to the specific design problem and context.
   - 3C ... develop innovative contributions to the field of mechanical engineering using multiple creative techniques including
   - the Abstract & Categorize, Reflect, Reformulate & Extend – strategy (ACRREx).
4. A scientific approach
   - 4A ... define and analyse problems, from academic and basic to industrial and applied.
   - 4B ... develop innovative solutions to problems and evaluate the feasibility and limitations of these solutions.
5. Basic intellectual skills
   - 5A ... systematically gather relevant information to solve problems.
   - 5B ... maintain and expand own knowledge and skills through self-study.
   - 5C ... reflect critically on own knowledge, skills and attitude.
   - 5D ... take a rational position on a scientific or technical discussion in the field of research and/or design.
   - 5E ... plan independently and evaluate and reflect on it in a timely manner.
6. Proficient in collaboration and communication
   - 6A ... work individually and with a high degree of independence.
   - 6B ... work in teams and divide sub-tasks within a team.
   - 6C ... explain and defend research and design results to specialists and colleagues from academia and industry.
   - 6D ... present and report work in Dutch according to the prevailing standards of style, structure and care.
7. Takes temporal and social context into account
   - 7A ... evaluate and assess the technological, ethical and social impact of own work.
   - 7B ... act responsibly with regard to sustainability, economy and social welfare.

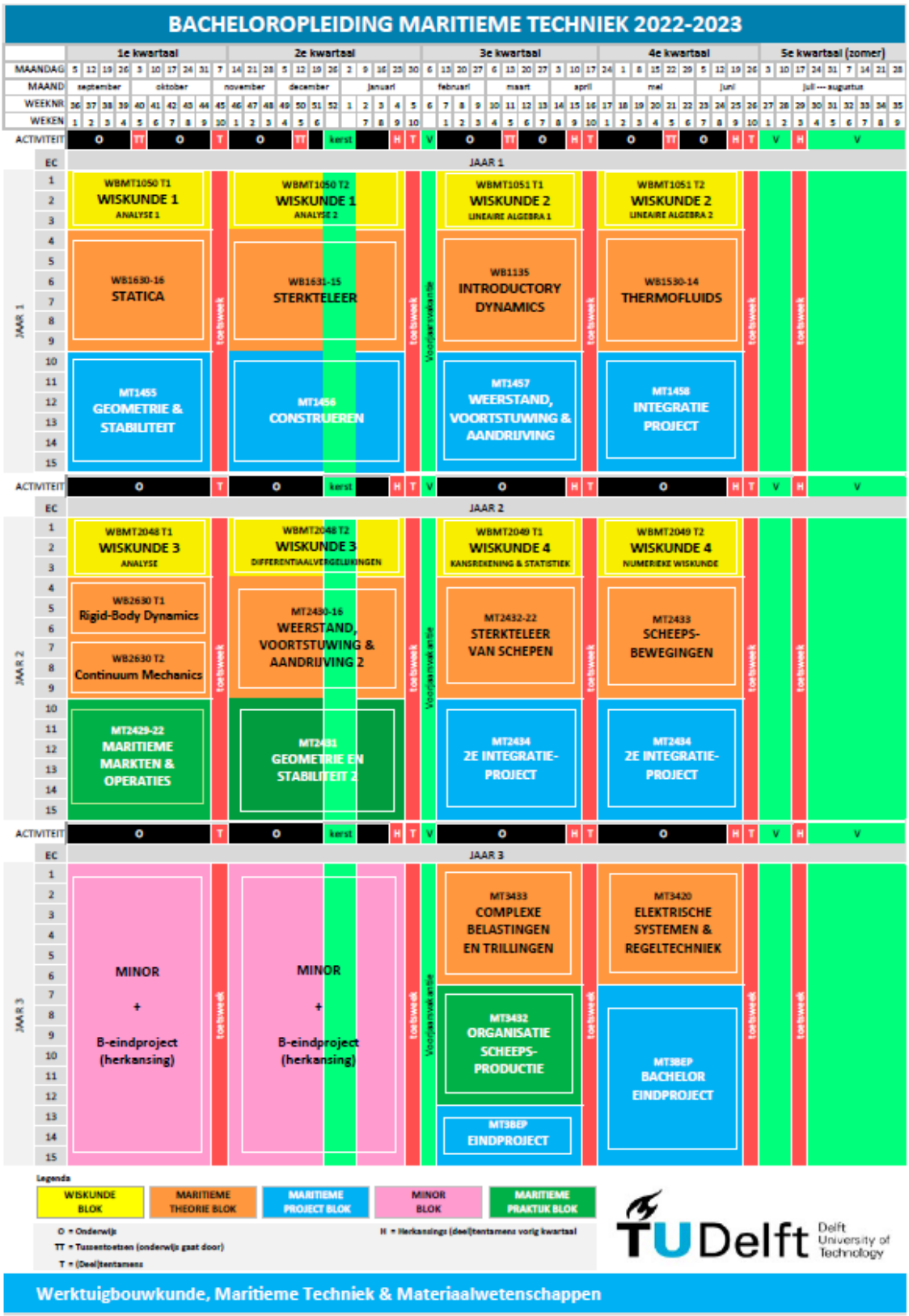
Master's programme Marine Technology

A graduate in MSc Maritime Technology is able to...

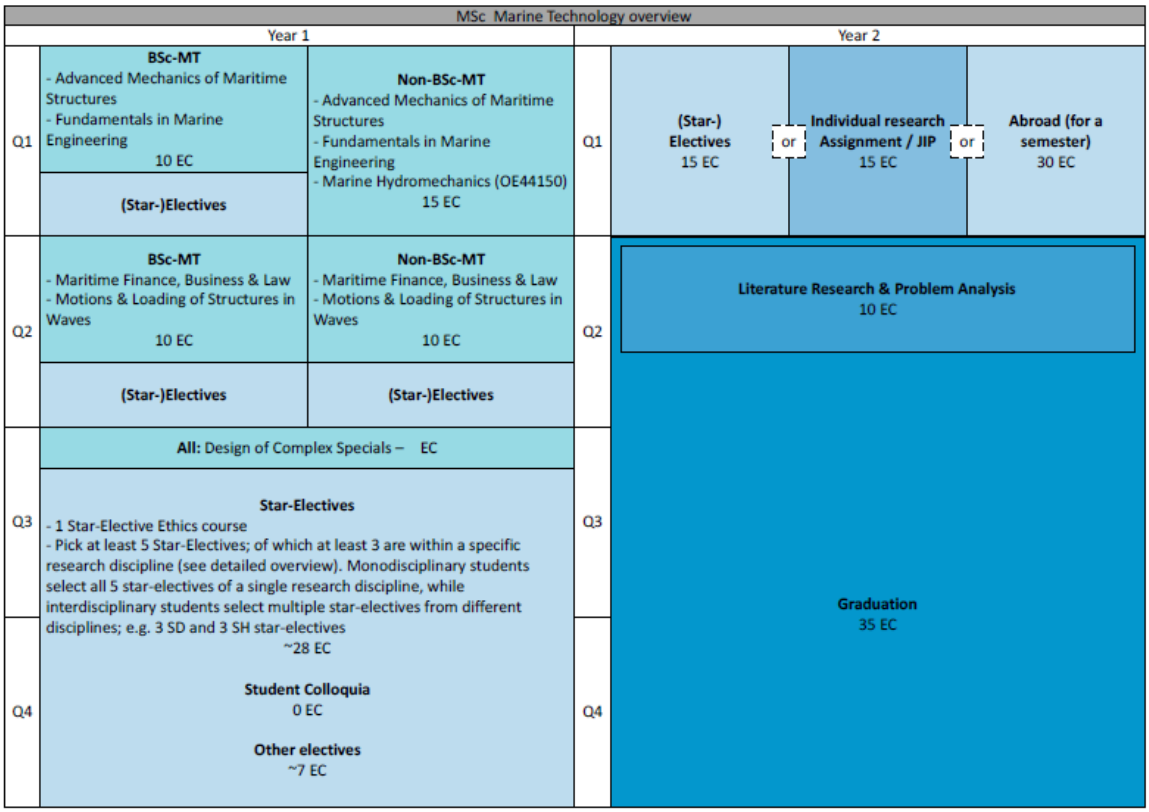
1. Competent in the scientific discipline Marine Technology
   - 1A ...apply advanced physics and mathematics in maritime systems.
   - 1B ...design, carry out and evaluate experiments.
2. Competent in doing research
   - 2A ...study a topic by critically selecting relevant scientific literature.
   - 2B ...write a scientific report about own research.
   - 2C ...analyse maritime systems at various levels of abstraction.
   - 2D ...generate knowledge within the discipline of Marine Technology.
3. Competent in designing
   - 3A ...take into account the impact on other disciplines of Marine Technology.
   - 3B ...systematically design complex parts of a ship and its systems.
   - 3C ...generate innovative contributions to the discipline of Marine Technology.
4. A scientific approach
   - 4A ...apply paradigms, methods and tools to (re)design parts of a ship and its systems.
   - 4B ...manage own scientific research independently.
   - 4C ...analyse problems and use modelling, simulation, design and integration towards solutions.
5. Basic intellectual skills
   - 5A ...analyse and solve technological problems in a systematic way.
   - 5B ...plan and execute research and design in changing circumstances.
   - 5C ...integrate knowledge in an R&D project, considering ambiguity, incompleteness and limitations.
   - 5D ...identify and acquire lacking expertise.
   - 5E ...critically reflect on own knowledge, skills and attitude.
   - 5F ...remain professionally competent.
   - 5G ...take a standpoint with regard to a scientific argument within the research area.
6. Competent in operating and communicating
   - 6A ...work both independently and in multidisciplinary teams.
   - 6B ...present and report in good English.
   - 6C ...explain and defend outcomes from the research area to academia and industry, to specialists and laymen.
7. Considering the temporal and social context
   - 7A ...evaluate and assess the technological, ethical and societal impact of own work.
   - 7B ...act responsibly with regard to sustainability, economy and social welfare.

Appendix 2. Programme curriculum

Bachelor's programme Marine Technology



Master's programme Marine Technology



Appendix 3. Programme of the site visit

Day 1: Tuesday 5 November

08.45 – 09.00	Welcome
09.00 – 09.30	Preliminary internal panel meeting
09.30 – 10.00	Session faculty management
10.00 – 10.45	Session programme directors
10.45 – 11.15	Break
11.15 – 12.00	Session bachelor's students Maritime Technology
12.00 – 12.45	Session master's students Marine Technology
12.45 – 13.45	Lunch break
13.45 – 14.30	Session teaching staff BSc + MSc MT
14.30 – 14.45	Break
14.45 – 15.30	Session Board of Examiners
15.30 – 15.45	Break
15.45 – 16.15	Theme session BSc Maritime Technology
16.15 – 16.45	Theme session MSc Marine Technology
16.45 – 17.15	Session programme directors BSc + MSc MT
17.15 – 17.45	Internal panel review meeting (BSc + MSc MT)

Day 2: Wednesday 6 November

08.45 – 09.00	Preliminary internal panel meeting
09.00 – 09.45	Session bachelor's students Mechanical Engineering
09.45 – 10.30	Session master's students Mechanical Engineering
10.30 – 11.00	Break
11.00 – 12.00	Session teaching staff BSc + MSc Mechanical Engineering
12.00 – 13.00	Lunch break
13.00 – 14.00	Theme session BSc Mechanical Engineering
14.00 – 14.30	Theme session MSc Mechanical Engineering
14.30 – 15.00	Break
15.00 – 15.45	Faculty tour
15.45 – 16.15	Session programme directors BSc + MSc ME
16.15 – 16.45	Internal panel review meeting (BSc + MSc ME)
16.45 – 17.30	Session alumni / professional field master's programmes (ME, MSE, MT, ODE)
17.30 – 18.00	Internal panel review meeting (BSc + MSc ME)

Day 3: Thursday 7 November

08.45 – 09.00	Preliminary internal panel meeting
09.00 – 09.30	Session master's students Materials Science and Engineering
09.30 – 10.00	Session teaching staff MSc Materials Science and Engineering
10.00 – 10.15	Break
10.15 – 10.45	Theme session MSc Materials Science and Engineering
10.45 – 11.00	Session programme director MSc MSE
11.00 – 11.30	Internal panel review meeting (MSc MSE)
11.30 – 12.00	Session master's students Offshore and Dredging Engineering
12.00 – 12.30	Session teaching staff MSc Offshore and Dredging Engineering
12.30 – 13.15	Lunch break
13.15 – 13.45	Theme session MSc Offshore and Dredging Engineering
13.45 – 14.00	Session programme director MSc ODE
14.00 – 14.30	Internal panel review meeting (MSc ODE)
14.30 – 15.00	Final session faculty management
15.00 – 16.30	Concluding panel session
16.30 – 16.45	Oral feedback session
16.45 – 18.00	Drinks

Appendix 4. Materials

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

The panel also studied other materials, which included:

- Self-evaluation report BSc Marine Technology, including the following appendices:
    - Recommendations from the previous accreditation and midterm actions
    - Final Qualification BSc MT
    - Relation between final qualifications and BSc MT curriculum
    - TU Delft Note on "Duty of Care"
    - Overview of the BSc MT curriculum 2022-2023
    - Assessment Programme BSc MT
    - Evaluation guide for Bachelor End Project supervisors
    - Overview of BSc MT teaching staff
    - Results National Student Survey 2023

- Self-evaluation report MSc Marine Technology, including the following appendices:
    - Overview NVAO and midterm recommendations and measures taken
    - TU Delft Note on "Duty of Care"
    - Overview MSc MT curriculum 2023-2024
    - Relation between Final Qualifications and MSc MT Curriculum 2023-2024
    - Results National Student Survey 2023
    - Overview of MSc MT teaching staff
    - Master Thesis Grading Rubric

Also included were:

- TU Delft Vision on Education
- Faculty ME Vision on Education
- Videos Vision on Education
- Annual Reports BSc and MSc MT 2022-2023
- Assessment framework TUD
- Assessment in ME (including assessment programme)
- Teaching and Examination Regulations BSc MT and MSc MT 2023-2024
- Rules and Guidelines Board of Examiners
- Annual reports Board of Examiners
- BEP Handbook and Supervisor guidance
- Overview of BSc MT graduation works
- Selected BSc graduation projects and rubrics
- MT-MSc Guidelines
- Overview of master theses
- Selected MSc thesis works and rubrics