NVAO • THE NETHERLANDS

INITIAL ACCREDITATION

MSC MOLECULAR IMAGING AND ENGINEERING

Maastricht University

FULL REPORT

18 NOVEMBER 2021

Content

1 Peer review

The Accreditation Organisation of the Netherlands and Flanders (NVAO) determines the quality of a new programme on the basis of a peer review. This initial accreditation procedure is required when an institution wishes to award a recognised degree after the successful completion of a study programme.

The procedure for new programmes differs slightly from the approach to existing programmes that have already been accredited. Initial accreditation is in fact an ex ante assessment of a programme. Once accredited the new programme becomes subject to the regular review process.

The quality of a new programme is assessed by means of peer review. A panel of independent peers including a student reviews the plans during a site visit to the institution. A discussion amongst peer experts forms the basis for the panel's final judgement and the advisory report. The agenda for the panel visit and the documents reviewed are available from the NVAO office upon request.

The outcome of this peer review is based on the standards described and published in the limited NVAO Assessment framework for the higher education accreditation system of the Netherlands (Stcrt. 2019, nr. 3198). Each standard is judged on a three-point scale: meets, does not meet or partially meets the standard. The panel will reach a conclusion about the quality of the programme, also on a three-point scale: positive, conditionally positive or negative.

NVAO takes an accreditation decision on the basis of the full report. Following a positive NVAO decision with or without conditions the institution can proceed to offer the new programme.

This report contains the findings, analysis and judgements of the panel resulting from the peer review. It also details the commendations as well as recommendations for follow-up actions. A summary report with the main outcomes of the peer review is also available.

Both the full and summary reports of each peer review are published on NVAO's website www.nvao.net. There you can also find more information on NVAO and peer reviews of new programmes.

Because of COVID-19 temporary measures apply for this peer review.

2 New programme

2.1 General data

Institution	Maastricht University
Programme	MSc Molecular Imaging and Engineering
Variants	Full time
Degree	Master of Science
Tracks	Instrumentation imaging engineering Molecular imaging engineering
Locations	Maastricht
Study load	120 EC[1]
Field of study	Cross-sectoral (confirmed by panel)

2.2 Profile

Maastricht University (UM) intends to educate students of the Master of Science (MSc) in Molecular Imaging and Engineering to become engineering professionals who can bridge the gap between the molecular and instrumentation aspects of the interdisciplinary field of imaging engineering. The proposed programme offers students a broad basis, which they complement with a specialisation in one of two tracks, called "instrumentation imaging engineering" and "molecular imaging engineering". The programme thereby answers to a demand from academia and industry for interdisciplinary top-level specialists who can integrate relevant aspects of imaging engineering in areas such as mass spectrometry and microscopy. Graduates are able to understand and address fundamental research questions, interpret results for innovation and research advancement and use, optimize and/or design the instruments and technologies for the specific task at hand, depending on their specialisation. They are prepared for a career in industry or academia, including a variety of PhD trajectories in engineering and the natural sciences. The proposed programme is offered by the Faculty of Science and Engineering (FSE), which was established in 2018 to reflect the growing focus on STEM (Science, Technology, Engineering and Mathematics) research and education at UM. Research and education at FSE are characterized by its interdisciplinary nature, as well as its close collaboration with business, and local, regional and national government.

2.3 Panel

Peer experts

- Prof. dr. Jurriaan Huskens, (chair), Professor of Supramolecular Chemistry & Nanofabrication, Molecular Nanofabrication group (MnF), University of Twente, Enschede;
- Prof. dr. Thomas Rizzo, Professor of Physical Chemistry and Chair of the Laboratory of Molecular Physical Chemistry, École Polytechnique Fédérale de Lausanne (EPFL), Lausanne, Switzerland;
- Dr. Ellen Wehrens, scientific writer to the Rios Group at Princess Máxima Center for Pediatric Oncology, Utrecht;
- Willem Gommans BSc, Student MSc Construction Management & Engineering, Eindhoven University of Technology (TU/e).

Assisting staff

- Aurelie van 't Slot MA (secretary)
- Lotte Ninaber van Eijben MSc (NVAO policy advisor and process coordinator)

Site visit (online)
13 October 2021

[1] European Credits

3 Outcome

The NVAO approved panel reached a positive conclusion regarding the quality of the MSc Molecular Imaging and Engineering offered by Maastricht University.

Maastricht University offers a two-year interdisciplinary programme in molecular imaging and engineering at academic master's level. Its graduates will be trained in the theoretical, technical and practical aspects of high-end imaging research and instrumentation engineering. The programme clearly answers to call from academia and industry for interdisciplinary top-level specialists who can integrate relevant aspects of imaging engineering in areas such as mass spectrometry and microscopy. The panel is of the opinion that the title of the programme, and that of one of its specialisations, misrepresents its content and therefore strongly advises to reconsider it. In the first semester, students are provided with a broad basis in molecular imaging and engineering, imaging techniques and instrumentation, molecules and structures and imaging informatics, before they develop more fundamental knowledge, insight and skills in either "instrumentation imaging engineering" or "molecular imaging engineering" as their chosen specialisation.

The interdisciplinary approach and connection to real-life problems and challenges are strong points: students take part in two research projects and work in interdisciplinary teams where they are exposed to different backgrounds. The projects facilitate the integration and application of acquired knowledge, understanding and skills by addressing real-life interdisciplinary research and engineering challenges in the field of molecular imaging and engineering. Students conclude the programme with a master thesis, which can be carried out at UM, at other universities, research institutes or companies in the Netherlands or abroad. The programme thus offers many opportunities for interaction with industry, academia and/or participation in the (inter)national R&D and engineering community. The design and content of the programme is well thought through: courses address timely and relevant issues and the option to specialize befits the relatively broad influx of students. The teaching staff is highly qualified and clearly committed to the success of the programme. The programme has a sound and transparent system of assessment in place and makes use of a wide variety of assessment methods, which is appropriate considering its interdisciplinary nature. The Board of Examiners plays an active role in ensuring the quality of assessment.

Maastricht University proposes that the programme has a duration of two years totalling 120 European Credits (EC). The arguments of the programme management concern (inter)national engineering standards, as well as the content of the curriculum, in terms of the required knowledge, skills, research and engineering experience. The panel agrees that the qualifications graduates should have in order for them to be competitive in the (inter)national job market is unachievable in a programme of less than two years. The panel advises to grant the programme the right to offer a two-year master programme (120 EC).

In conclusion, the panel is convinced of the quality of the proposed programme and expects that the MSc Molecular Imaging and Engineering will be an attractive programme fulfilling a clear industry need. All in all, the panel assesses the quality of the programme as positive.

Standard	**Judgement**
1. Intended learning outcomes	meets the standard
2. Teaching-learning environment	meets the standard
3. Student assessment	meets the standard
Conclusion	*positive*

4 Commendations

The programme is commended for the following features of good practice.

1. Key technological field – Molecular imaging and engineering is a key technological field. The panel applauds Maastricht University's integrated approach and considers it a timely and much needed programme.

2. Teaching staff – The teaching staff are enthusiastic, motivated and show a great collaborative spirit. The staff members bring in a wide array of expertise from various disciplines. They constitute a strong team, committed to educating future engineering professionals

3. Interdisciplinary projects – Students take part in two research projects and work in interdisciplinary teams where they are exposed to different backgrounds. The projects facilitate the integration and application of acquired knowledge, understanding and skills by addressing real-life interdisciplinary research and/or engineering challenges in the field of molecular imaging and engineering.

5 Recommendations

For further improvement to the programme, the panel recommends a number of follow-up actions.

1. Title of the programme – Reconsider the title of Molecular Imaging and Engineering to accurately represent the distinct profile of the programme[2]. Also reconsider the title of the specialisation Instrumentation Imaging Engineering .

2. *Molecular Engineering for Imaging* course – Ensure the course is optimally aligned with the goals of the programme. In the current set-up, the course does not sufficiently emphasize issues related to imaging, such as molecular probes and other types of labels and their incorporation into molecular systems suited for optical detection.

[2] Following the site visit, on November 10th 2021, the programme announced that it will choose the following name: Imaging Engineering. In this advisory report, Molecular Imaging and Engineering remains the name of the programme, as this name is part of the application. The NVAO accreditation decision will use the new name as the first name of the programme so that CROHO registration takes place accordingly.

6 Assessment

6.1 Standard 1: Intended learning outcomes

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

Judgement
Meets the standard.

Findings, analysis and considerations
The main objective of the MSc Molecular Imaging and Engineering is to train students in the theoretical, technical and practical aspects of high-end imaging research and instrumentation engineering. Students learn to identify, apply, integrate and develop knowledge, models, methods and techniques in engineering, mathematics, physics and (bio- and process) chemistry. Graduates are equipped with the knowledge, skills and understanding to answer questions and challenges in industry and academia in the field of existing and new imaging technologies and applications. Specifically, they are able to combine their knowledge and understanding within the interdisciplinary field of molecular imaging and engineering. The interdisciplinary nature of the programme reflects the Community at the CORE (Collaborative Open Research Education) strategy of the UM, which aims to address the most pressing problems in society by integrating research and education from various disciplines and research groups. According to the panel, the programme connects to timely problems and developments in academia and industry. It answers to a call for interdisciplinary top-level specialists who can integrate relevant aspects of imaging instrumentation engineering and molecular imaging engineering. Representatives of the professional field whom the panel spoke with echoed this call.

The profile of the programme was translated into 22 intended learning outcomes (ILOs) based on the Faculty of Science and Engineering (FSE) model of ILOs for master programmes. These learning outcomes are constructed in a matrix (i.e., the assessment programme), matching individual courses and the programme. The panel has established that the ILOs are in line with the Dublin descriptors at master level, as well as other national and international scientific and professional engineering standards. Such standards include the Accreditation Board for Engineering and Technology criteria (ABET), the Conceive Design Implement Operate framework (CDIO) and the Dutch 'Criteria for Academic Bachelor's and Master's Curricula' of the 4TU Federation.

Upon reading the application file, the panel questioned to what extent molecular imaging and engineering can be considered an established field, with a connection to industry stakeholders that provides interaction, context and community. The discussions with programme management and teaching staff showed that those involved recognize that the field is less well-defined and draws upon several related disciplines. On the one hand, the programme will train students that are capable of understanding and changing the actual instrumentation in the field of imaging. On the other hand, it will train students that are more molecularly oriented to understand how to use these instruments in the contexts of complex chemical, materials and/or biological/biomedical systems. As such, graduates will be able to make connections between different fields. The panel felt that this vision on the field of molecular imaging and engineering was very well explained during the various discussions.

The master programme is proposed under the title Molecular Imaging and Engineering. The panel is of the opinion this implies the curriculum to cover both molecular imaging and molecular engineering. However, the latter is not intended to be a focus of the programme. To avoid misrepresentation of the programme and misleading potential students, the panel strongly advises the programme management to reconsider the title. A solution could be to drop the 'and' in the title and simply refer to the programme as Molecular Imaging Engineering. Similarly, the panel encourages the programme management to rethink Instrumentation Imaging Engineering as the title of one of the specialisations. The panel is convinced that the current name does not represent the intended meaning, and therefore suggests that Imaging Instrumentation Engineering would be a clearer reflection of what the specialisation intends to cover.

According to the application file, the programme is developed in conjunction with the Maastricht Imaging Valley, a joint venture between UM, the Maastricht University Medical Centre, Brightlands and

Scannexus, that aims to create a hub for imaging expertise, techniques and instrumentation. In addition, students may benefit from collaborations with public and private partners on the Brightlands campuses, which offer an international ecosystem to address technical challenges. The panel applauds the strong regional connection of the programme. It was also pleased to hear industry involvement is further formalized through the Industrial Advisory Board. Its members are professionals in leadership positions and were selected from the professional network of the programme management. The Industrial Advisory Board was not only consulted during the development of the programme, but will remain involved through an annual review of the curriculum. The panel is positive this will help further refine the programme and ensure its relevance to future industry needs and demands. The discussion with industry representatives made clear that they are highly supportive of this master programme. The type of interdisciplinary graduate the programme envisions is well-tailored to their expectations.

Based on the discussions with programme representatives and the materials presented, the panel concludes that it is highly appreciative of the initiative by UM to bring an integrated and innovative perspective to the study of molecular imaging and instrumentation engineering. The vision on the field is laudable and the panel recognizes its relevance to societal challenges and developments. Considering molecular imaging engineering is a key technology, the programme fills an important need by training students with the ability to design imaging instrumentation and/or devise new imaging methodologies. The panel positively evaluates how the programme aims to connect to industrial questions with active involvement of the region and the Industrial Advisory Board. To accurately represent the distinct profile of the programme, the panel strongly advises the programme management to reconsider the current title of Molecular Imaging and Engineering. Taking into account these considerations, the panel judges this standard as met.

6.2 Standard 2: Teaching-learning environment

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

Judgement
Meets the standard.

Findings, analysis and considerations
The master programme in Molecular Imaging and Engineering is a full-time programme of 120 EC, divided into four semesters. In the first year, each semester consists of three periods of 8-8-4 weeks. The 8-week periods are devoted to theoretical courses and skills training courses, whilst research projects are organized in the 4-week periods. The curriculum is built up in such a way to first provide all students with a solid background relevant for molecular imaging engineering and instrumentation imaging engineering in four mandatory courses (24 EC). After completing the four core courses and an elective project, students choose to specialize in instrumentation imaging engineering or molecular imaging engineering through three mandatory specialisation courses (18 EC) and a second project on a topic that fits their specialisation (6 EC). The two specialisations provide students with the required in-depth knowledge in a more distinct discipline, based upon which they can make substantial contributions to the interdisciplinary field of molecular imaging and engineering. In addition to the mandatory courses, students may tailor their curriculum to their interests and professional ambitions in three elective courses (18 EC). Both the mandatory and elective courses include practical components in the form of skills training sessions.

The panel reviewed the course manuals and found most of the courses well-designed and their content up to date. Timely and challenging subjects are addressed, and integration with state-of-the-art data processing and analysis provides a strong preparation for current needs. In the opinion of the panel, the *Molecular Engineering for Imaging* course is not optimally aligned with the goals of the programme. In the current set-up, the course does not sufficiently emphasize issues related to imaging, such as optical probes and other types of labels, and their incorporation into molecular systems suited for optical detection. The panel advises the programme management to review the content of this course.

A research and engineering project concludes each of the two semesters of year 1, of which the second project is on a topic within their specialisation (12 EC). The aim of the projects is to facilitate the integration and application of acquired knowledge, understanding and skills by addressing real-life

interdisciplinary research and engineering challenges in the field of molecular imaging and engineering. The real-life aspect is secured by involving companies, (non-)profit organisations and research institutions, such as those associated with the Brightlands Campuses. This interaction benefits students in their learning and offers direct connections to industry and/or participation in the (inter)national R&D and engineering community. The panel considers these projects a strength of the programme, not only because students get a chance to interact with real-world problems, but also because they will work in interdisciplinary teams where they encounter different backgrounds. The panel learned that it is occasionally possible to expand an elective project into a master thesis. This is dependent on the personal involvement and active attitude of the student. As a general rule, however, students are encouraged to explore different topics in order to expose themselves to various fields.

Students conclude the programme with a master thesis (48 EC), which enables them to realize their academic profile and prepare for their future careers through an integrated research or research-based engineering project. The thesis may be carried out at UM, or other universities, research institutes or companies. The panel positively evaluates the set-up of the thesis and found the scientific level to be guaranteed in all settings by appointing a UM thesis advisor.

Education in the MSc Molecular Imaging and Engineering is built on the principles of PBL. Students work in small tutorial groups of less than fifteen students and engage in interaction with each other and the academic staff. The application file describes PBL as a constructive, collaborative, contextual and self-directed learning approach, leading to better problem-solving and interpersonal skills. In addition to PBL, the programme will employ the 'learning by simulation' concept as part of its Research-Based Learning (RBL) approach. According to the panel, the ways in which PBL and RBL are applied to the programme are clear and very valuable to the interdisciplinary nature of the programme.

The language of instruction is English. The programme management substantiates its choice by arguing that the educational nature and profile of the programme, international background of the academic staff, and the internationally diverse influx of students who will participate in the globalized research and engineering community, necessitate an English-taught programme. Teaching staff that teach more than 10% of their appointment and that are non-native speakers are required to have a minimum English language proficiency of C1 (CEFR). The panel supports the choice for an English-taught programme.

The panel considers the admission requirements appropriate in light of the programme level and field. The MSc Molecular Imaging and Engineering is a selective master's programme. In addition to the admissions requirements of a diploma in a relevant discipline, 15 EC of mathematics courses at the bachelor's level and a language certificate, applicants have to provide a letter of motivation. The Board of Admission, consisting of three members of the academic staff, checks the motivation letter to establish an initial match between the knowledge, interests and future ambitions of the student and the programme. This step is followed by an admissions interview, during which the candidate is evaluated using standardized rubrics. In the case where the Board of Admission detects a strong match, the interview can be waived. Students who do not fulfil the admission requirements, can complete a pre-master programme to obtain the required credentials. The panel finds the selection procedure well-thought-out. The discussions with the programme management clarified some of the choices made, such as the single entry moment and the design of the pre-master programme. The range of bachelor degrees accepted for admissions is broad, yet realistic considering the goals of the programme.

Once students are admitted, they are assigned a dedicated academic advisor who gives guidance in selecting their elective courses, projects and a suitable thesis topic and location. Academic advisors are staff members of the programme, embedded in research in the field of molecular imaging. In addition to the academic advisor, students may turn to their study advisor who can provide advice on all matters pertaining to the study plan, study delay and non-study related issues. The panel is of the opinion that the level of study guidance is appropriate for a master degree.

The panel considers the programme management and teaching staff well-equipped to implement and coordinate the programme. All dedicated academic staff members have a solid background in engineering physics, imaging, data science, (analytical) chemistry and/or chemical technology. Recent hires are highly qualified and had a say in the development of the programme. Teaching staff are systematically trained in their teaching and assessment skills through the University Teaching Qualification (UTQ).

This includes learning how to create an active learning environment using the PBL approach. The content of the MSc Molecular Imaging and Engineering is strongly embedded in the ongoing research at FSE. When speaking to representatives of the teaching staff, the panel was met with enthusiasm and a great collaborative spirit. The panel has no doubt that the teaching staff constitute a strong team, committed to educating future engineering professionals.

Since the site visit was conducted online, the panel was unable to have a tour of the facilities. Instead, the programme provided the panel with a promotional video of FSE and an impression video of the programme-specific facilities. These include state-of-the-art laboratories and design facilities at the Maastricht MultiModal Molecular Imaging Institute and the Brightlands Campuses. In addition, a dedicated imaging engineering laboratory for the programme has recently been developed. The panel is convinced that the proper infrastructure is in place for students to gain the required practical insights and skills.

In summary, the panel is of the opinion that the programme offers a strong and inspiring teaching-learning environment. The set-up of the programme, including the combination of courses and their division in specialisations, is coherent. Strong elements are the didactical principles of PBL and RBL that support the interdisciplinary profile of the programme; the research and engineering projects that allow students to apply their knowledge and skills to real-life challenges in the field of molecular imaging and instrumentation engineering; and the highly motivated teaching staff with valuable fields of expertise. The panel finds the admission criteria and procedure suitable to attract the right group of students. The curriculum, state-of-the-art facilities and the quality of the teaching staff will enable incoming students to achieve the intended learning outcomes. The panel therefore judges this standard as met.

6.3 Standard 3: Student assessment

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

Judgement
Meets the standard.

Findings, analysis and considerations
The system of assessment of the master programme in Molecular Imaging and Engineering is guided by the FSE assessment policy, which the panel found well-thought-out. Assessment is seen as an integral part of education: a tool to develop and test knowledge and to support and enhance learning. Four elements form the backbone of the vision on assessment:

- First, constructive alignment of the ILOs, both at programme level (visualized in an assessment programme) and at course level. Examiners (usually the course coordinator) design a course assessment plan, based on the requirements that assessments are authentic and relevant, embedded in teaching and learning activities, a balanced mix of formative and summative assessments, and focus on the ability to use and apply the range of knowledge, understanding and skills.
- Second, assessment is not only used to determine whether a student has mastered the course objectives (assessment of learning), but also to enhance their learning by providing feedback (assessment for learning). Further, assessment and instructional design are aligned in terms of content, form and cognitive complexity (assessment as learning).
- Third, assessment is continuously adjusted based on evaluations and developments in the subject domain.
- Fourth, student engagement is stimulated by using self- and peer assessment, organizing inspection hours for exams, providing appropriate feedback forms and clear rubrics and collecting student feedback through evaluations.

Different assessment methods are used, as could be verified from the course descriptions. Examples include written exams with multiple-choice or open questions and/or mathematical and technical problem solving, as well as computer-based exams, reports, proposals and papers. The panel reviewed several assessment samples and was satisfied with their overall quality. Besides regular course assessments, the programme also makes use of project assessments. This is done at both the individual and team level, including self-evaluation, peer evaluation, input from academic staff members and/or company

representatives. The panel is pleased with the way in which individual assessment is performed through peer evaluation, with adequate measures in place to avoid malpractice amongst students.

The assessment of the master thesis consists of five components that evaluate the execution of the entire scientific and/or engineering design cycle: thesis proposal, midterm evaluation, final evaluation, written thesis and presentation/defence. Each component is assessed independently by the thesis first examiner, who assists the student in defining the thesis topic and oversees the research and design process. Next to the first examiner, a second examiner also evaluates the thesis. At the programme level, the thesis coordinator is responsible for the overall quality of the theses and ensures consistency of feedback and grading. When the thesis is carried out in an industrial environment (i.e., external), an institutional examiner is always appointed as the first examiner. This person is responsible for staying in contact with both the student and the external supervisor. The level of scientific depth is assured by regular discussions between both the student and the institutional supervisor, as well as by reviewing the research and engineering questions that are part of the thesis proposal. The panel is confident that the programme has proper measures in place to guarantee the scientific depth of the research component.

The validity, reliability and transparency of assessment are ensured through the use of course assessment plans. These are evaluated by the Programme Director for constructive alignment purposes and by the Board of Examiners (BoE) from a quality assurance point of view. Within a course, grading rubrics and multiple moments of feedback safeguard reliability. Transparency is achieved by full information on assessment in the course manuals. All teaching staff is systematically trained within the UTQ and Continuing Professional Development (CPD) programmes. Constructive alignment and assessment form important parts of both teacher professionalization programmes. Expert advice and written resources are available for further support. The panel is positive that these measures help to assure the quality of assessment.

The MSc Molecular Imaging and Engineering will fall under the responsibility of the existing BoE for the master's programmes Biobased Materials and Systems Biology. The programme is not yet represented in the composition of the BoE, but the panel was told a new member will be appointed by the end of the year. Members of the BoE explained that they monitor the quality of assessment by reviewing the assessment plans. They were able to give their advice in the development of the assessment plans, ensuring that their vision on assessment was properly deployed within the programme. The panel established that the BoE has the necessary level of independence and fulfils its tasks in line with its statutory duties.

The panel concludes that the programme has a sound and transparent system of assessment in place. It is characterised by a wide variety of assessment methods, which the panel finds appropriate considering the interdisciplinary nature of the programme and the emphasis placed on the development of research, engineering and (inter)personal skills. The panel considers the teaching staff well-equipped to carry out the system of assessment. The BoE plays an important role in ensuring the quality of assessment. As a result, the panel concludes that this standard is met.

6.4 Degree and field of study

The panel advises awarding the following degree to the new programme: Master of Science
The panel supports the programme's preference for the following field of study: cross-sectoral

6.5 Programme extension

Maastricht University proposes that the master programme in Molecular Imaging and Engineering has a duration of two years (120 EC). The faculty management gave arguments concerning (inter)national engineering standards, as well as the content of the curriculum, allowing graduates to operate on an (inter)national level playing field with peers who completed similar master programmes in the Netherlands or abroad.

The panel has assessed these arguments, using the criteria put forward in the Protocol for programme extension of NVAO, published on 8 October 2003.

Findings, analysis and considerations
First, the panel is of the opinion that the programme has convincingly shown that in order for the ILOs to be consistent with the international engineering standards (including the international ABET standards, the internal CDIO standards and the Dutch 'Criteria for Academic Bachelor's and Master's Curricula' of the 4TU Federation), the programme must have a duration of two years (120 EC). The comprehensive list of comparable national and international programmes provided to the panel shows that all similar programmes have at least a two-year curriculum.

Second, the panel is convinced that the extensive knowledge and expertise development in skills training sessions, projects and independent research and/or engineering in the master thesis is essential for the programme to optimally prepare professionals for their future career. The two-year curriculum is designed to allow for fulfilment of the ILOs, providing students with training on the interplay of fundamental, technological and applied science and engineering to achieve optimal design, desired measurement capabilities and final application. The panel strongly feels that the qualifications the graduates should have to be competitive in the international job market cannot be achieved in a programme of less than two years.

Conclusion
Given these strong arguments in favour of a two-year curriculum, the panel advises to grant Maastricht University the right to offer a two-year master programme (120 EC).

Abbreviations

4TU	Federation of Dutch universities of technology (Delft, Eindhoven, Twente, Wageningen)
ABET	Accreditation Board for Engineering and Technology
BoE	Board of Examiners
CEFR	Common European Framework of Reference for Languages
CORE	Collaborative Open Research Education
CDIO	Conceive Design Implement Operate
CPD	Continuing Professional Development
EC	European Credit
FSE	Faculty of Science and Engineering
ILO	Intended learning outcomes
MSc	Master of Science
NVAO	Netherlands Flanders Accreditation Organisation
PBL	Problem-Based Learning
RBL	Research-Based Learning
STEM	Science, Technology, Engineering and Mathematics
UM	Maastricht University
UTQ	University Teaching Qualification

The full report was written at the request of NVAO and is the outcome of the peer review of the new programme MSc Molecular Imaging and Engineering of Maastricht University

Application no: AV-1078

NVAO

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