



NVAO • THE NETHERLANDS

## INITIAL ACCREDITATION

HBO-MASTER

APPLIED QUANTUM TECHNOLOGY (JOINT  
DEGREE)

Amsterdam University of Applied Sciences,  
Fontys University of Applied Sciences,  
Saxion University of Applied Sciences, and  
The Hague University of Applied Sciences

FULL REPORT

17 DECEMBER 2024

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## 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](http://www.nvao.net). There you can also find more information on NVAO and peer reviews of new programmes.

## 2 New programme

### 2.1 General data

<b>Institutions</b>	Amsterdam University of Applied Sciences, Fontys University of Applied Sciences, Saxion University of Applied Sciences, The Hague University of Applied Sciences
<b>Programme</b>	HBO-Master Applied Quantum Technology (joint degree)
<b>Variants</b>	Fulltime: Yes. Parttime: No. Dual: No.
<b>Degree</b>	Master of Science
<b>Locations</b>	Amsterdam, Eindhoven, Enschede, Delft
<b>Study load</b>	120 EC <sup>1</sup>

### 2.2 Profile

The professional master Applied Quantum Technology (AQT) is a joint degree offered by Amsterdam University of Applied Sciences (AUAS), Fontys University of Applied Sciences, Saxion University of Applied Sciences, and The Hague University of Applied Sciences. Quantum technology is an emerging and rapidly evolving field of technology. The state-of-the-art research developments are currently translated to practical applications. Quantum technology will enable new ways of computing, communication and measurement at a much faster pace and with increased precision. The AQT professional master programme aims to educate quantum engineers in one of three specialisations: the *electronics quantum engineer*, the *photonics quantum engineer* and the *software quantum engineer*. During the programme students of all specialisations are trained to be skilled quantum engineers who are of direct value to industry. Students will be able to contribute to cutting-edge projects within high-tech industry and/or supporting research at the intersection of quantum computing, quantum sensing and quantum communication. The programme's educational approach focuses on practice-oriented research within quantum technology. The learning outcomes are based on the engineering cycle, skills concerning realisation and validation, and a set of professional skills. There is attention for *design*, starting from establishing a project plan through modelling and analysis. Graduates learn *realisation and validation* and will be able to create or update a product based on an existing design. The programme's explicit attention for professional skills will enable graduates to work effectively in a professional environment. The professional skills set includes communication, adaptability, environmental awareness, and ethical, legal and societal aspects. A last skill concerns self-directed learning, which is important considering the rapidly evolving quantum domain. The coordinating applied university of this joint degree is the AUAS, but all four applied universities act as equal partners in this joint degree.

### 2.3 Panel

#### Peer experts

Prof. dr. M.J. (Margriet) Van Bael (chair), full professor at the Department of Physics and Astronomy also Vice Dean of Education of the Faculty of Science at KU Leuven (Belgium)

Dr. P.J.S. (Peter) van Capel (member), assistant professor/ practical Leader at the Julius Institute, Department of Physics, Faculty of Science, Universiteit Utrecht (the Netherlands)

Dr. Ing. A. (Alessandro) Bruno (member), CTO at QuantWare B.V., Delft (the Netherlands)

S. (Simon) Veld BSc (student-member), student MSc Technical Medicine at the University Twente (the Netherlands)

#### Assisting staff

Drs. Miranda Valkenburg (secretary)

Eva de Haan MSc MEd (secretary)

Anne Klaas Schilder MA (NVAO policy advisor and process coordinator)

#### Site visit

Amsterdam, 20 November 2024

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<sup>1</sup> European Credits

### 3 Outcome

The NVAO approved panel reaches a positive conclusion regarding the quality of the master programme Applied Quantum Technology (joint degree) offered by Amsterdam University of Applied Sciences, Fontys, Saxion, and The Hague University of Applied Sciences. The programme complies with all standards of the limited NVAO framework.

The master AQT is a professional master programme that specialises in quantum technologies. Students will become quantum professionals with advanced knowledge in one of the three application fields: the electronic quantum engineer, the photonics quantum engineer and the software quantum engineer. The master is a joint degree between four applied universities which have signed a cooperation agreement. The intention of the four partners is to distribute efforts equally between them.

The proposed curriculum for the AQT programme is extensive and complete and covers the intended learning outcomes. The panel finds that the intended learning outcomes are well described and meet the national and international standards for a professional master on quantum technology. The curriculum has explicit attention for professional skills and has a strong connection to industry. The graduation project with a load of 45 EC will enable students to have an in-depth applied research experience during their studies. This further solidifies the strong applied quantum engineer profile of AQT graduates.

The master AQT is run by a group of enthusiastic and professional lecturers. Most lecturers have a research appointment as well. This connects the master AQT to the rapidly evolving research within the realm of quantum technology. The programme also fosters a close connection to industry by the applied nature of the courses, by the internship or end project and by the involvement of the industry advisory board. The panel agrees that the English language as the language of instruction is the logical choice for the AQT programme. Textbooks and articles on quantum engineering are almost exclusively available in English and the work field is strongly internationally oriented. The programme intends to welcome international students, making English the necessary daily language of the programme.

The proposed duration for the AQT programme is two years (120 EC). The panel agrees with the applicants that the extent and complexity of the master programme cannot be achieved in one year. Students come into the programme from different backgrounds and need time to get acquainted with the other disciplines within the programme and with the foundations of quantum technology. After this, students need to specialize and get sufficient practical experience to reach the master level. The panel therefore recommends granting the applicants the right to offer the AQT master as a two-year master programme.

Through the information in the information dossier and the extensive discussions during the site visit, the panel concludes that the AQT master meets the quality level required by NVAO. The panel is convinced of the quality of the proposed AQT programme and assesses it as positive.

Standard	Judgement
1. Intended learning outcomes	meets the standard
2. Teaching-learning environment	meets the standard
3. Student assessment	meets the standard
<i>Conclusion</i>	<i>Positive</i>

## 4 Commendations

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

1. Skilled and passionate staff: All four applied universities appoint existing staff members to the programme who are skilled and passionate in both education and applied research. The research expertise of the lecturers helps to bridge the gap between education and applied use of quantum knowledge in research and industry.
2. Close collaboration with industry: The industry need for graduates in quantum technology is clear. Industry partners within the domain of quantum technology have been asked for feedback on the curriculum and regular contacts and advice will be established through the industry advisory board. They will also supervise internship projects and are closely connected to the students in the final phase of their programme.
3. Facilities for students: Students use facilities in all four locations of the programme. They can benefit from the facilities that are closest to them, but also from the expertise of the other applied universities. This concerns both technical lab facilities as well as facilities in student support.
4. Examinations Board: The panel commends the programme for the fact that each applied university is represented by a member within the Examinations Board. This will help students and staff at each location to have a close point of contact to the Examinations Board. The Examinations Board has knowledge of all the different local procedures and regulations.
5. Uniform online student environment. The programme will use a single online student environment. This uniformity will enable students to have all the study information in one place despite having different physical locations.
6. Mentor for students: Students will be appointed a mentor, who can help navigate the complexities of a joint degree on multiple locations.

## 5 Recommendations

For further improvement to the programme, the panel recommends a number of follow-up actions. These recommendations do not detract from the positive assessment of the programme's quality.

1. Travel time and costs for students – Minimise travel time and costs for students where possible and communicate realistic travel time and costs to prospective students.
2. Guidelines for the use of generative AI – Develop and communicate clear policy on the use of generative AI within the programme in both education and assessment.
3. Fostering student community – Emphasize community building across all locations. Because students live far from each other it is extra important to foster a sense of community across and between all locations.
4. Attention for diversity and inclusion – Diversity and inclusion should receive sustained attention from admission to graduation.
5. Harmonizing student support – Harmonize the application process for extra facilities for students with extra support need across locations and communicate this clearly to students.
6. Industry Advisory Board - Represent all three orientations and all regions within the industry advisory board.

## 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**

##### *Intended learning outcomes*

The intended learning outcomes (ILOs) of the programme are clear and well-defined. The master offers a solid combination of foundational courses and applied specialisation courses. The courses have both theoretical and practical components. The ILOs are based on the engineering cycle, pertaining to design, realisation and validation. The ILOs also have sufficient attention for professional skills, including communication, ethics, legal and societal aspects. The education provided teaches students all aspects of professional engineering within the field of quantum technology. This starts with designing a product, and proceeds to prototyping and experimenting, to communication and delivery of the product. Following the engineering cycle ensures that graduates of the programme are able to work in the industry as professional applied quantum engineers.

The ILOs are aligned with the professional master standard as defined by the Vereniging Hogescholen (VH). The VH articulated the master level in four pillars in the report 'the professional master standard'. These pillars are mastery, research competence, interprofessional conduct and impact. According to these four pillars the master level is achieved by fulfilling the core professional tasks and their corresponding learning outcomes. Throughout the curriculum the course level increases as described by the ILOs. The curriculum ends with a graduation project at master level. The panel finds that the proposed ILOs for the AQT programme align well with the VH guidelines.

The curriculum is aligned with all eight pillars of the European competence framework for quantum technologies (EU QTedu). In 2024 an updated version of the competence framework for quantum technologies was published. In the information dossier a matrix of the ILOs matched to the eight pillars was provided. The framework concerns the knowledge domains for quantum technologies from concepts and foundations, to enabling technologies and techniques, quantum hardware, quantum computing and simulation, quantum communication and networks, quantum sensors and imaging systems and valorisation. Within this framework the C1 master level is defined, which has been used as a basis for the AQT programme. The panel clearly sees the alignment between the EU QTedu framework in the ILOs of the AQT programme.

The programme defines eighteen learning outcomes, divided in four sub-sections. These subsections follow the engineering cycle of design, realisation and validation, professional skills. On top of the engineering cycle, there is a body of knowledge of quantum technologies defined. The ILOs are represented at the appropriate level in the three specializations: the *electronics* quantum engineer, the *photonics* quantum engineer and the *software* quantum engineer. Students choose one application field and specialize with coursework and internships in their chosen field. The panel is confident that graduates are able to understand, explain and use state-of-the-art quantum technologies and their implementation in industry. Both the ILO's and the derived activities demonstrate that students are trained to become quantum professionals. The differentiation in learning outcomes for the three specializations allows for students from different backgrounds to specialize in a chosen subfield: electronics, photonics or software.

According to the panel, the ILOs are well-defined and appropriate. This is further supported by the alignment with national and international frameworks, including the eight pillars of the EU QTedu framework. The panel agrees that making professional skills explicit within the programme is important and well done.

##### *Professional field*

The programme was developed after consultations with companies in or related to the quantum industry. During the site visit, the panel spoke with industry experts and researchers who were involved in the development of the

master. They indicated a strong demand for AQT graduates. Currently there are no professional master programmes geared towards educating (applied) quantum engineers in the Netherlands. Both the multidisciplinary aspect and the application of quantum engineering are vital for graduates. From the discussions with the industry representatives, the panel finds that the ILOs are properly aligned with the demands of the labour market. The core courses in quantum information and algorithms, hardware, optics, electronics, communication, sensing, and cryptography align well with current and future industry needs. For the field of quantum technology it is important to closely monitor the rapid developments in industry. The programme will establish an industry advisory board. Staff and industry representatives can help define projects in courses and provide internships in collaboration. When installing the industry advisory board, it is recommended to make sure the different specializations are represented, as well as the different regions involved in the programme.

#### *International perspective*

The panel is confident that the presented curriculum will achieve the goal of first strengthening the different backgrounds towards the required starting level and then bringing the students to the required master level. The learning objectives are well constructed in accordance with national and international standards, such as the VH standard for professional masters and the EU QTEdu framework for education in quantum technology. In this way the AQT programme meets the international expectations for educating quantum engineers. It is clear that the programme management and lecturers have a good connection with industry and also used industry feedback on the intended learning outcomes. The quantum industry is inherently internationally connected and English is used as the standard language within most companies in the field of quantum technology.

In summary, the four applied universities offer a challenging professional master in quantum technology. The master specializes in three relevant application fields of quantum technology. The site visit demonstrated to the panel that the four partners are engaged with the programme on all levels and have set up a cooperative structure. The ILOs are in accordance with national and international standards. Industry has been appropriately involved in the making of the curriculum. The programme maintains good connection to industry through the internships or end projects and through the industry advisory board. Graduates of the AQT master will be able to work at the forefront of cutting-edge quantum technology and its applications.

## 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 AQT aims to educate students in the relatively new field of quantum engineering. Quantum technology will enable new ways of computing, communication and measurement. Quantum technology builds on knowledge from physics, mathematics, computer science, electronics and engineering. At this moment quantum technology is rapidly developing from research activity to the first small-scale applications. Large-scale applications and commercial use are to become available within the next few years. These developments focus on quantum computing, quantum sensing and quantum communication and are expected to have a big impact on society. Companies in quantum hardware, quantum communication, as well as applied fields such as cryptography and banking express a great and urgent interest in professional applied engineers. All four applied universities have both staff and facilities to facilitate education in this field. Combining the staff and facilities of the four partners leads to a rich environment for AQT students. The panel spoke to potential students who welcome access to location-specific high-level lab facilities.

### *Curriculum*

The curriculum is clear and balanced and comprises four consecutive stages. First there is common ground (15 EC), then the quantum core (20 EC) with quantum design project (10 EC), followed by specialization courses (30 EC) and a graduation project (45 EC). Next to these four stages, there is a transversal learning path on professional skills. The programme features an educational approach in which the students evolve from acquisition of basic

quantum knowledge to a professional quantum engineer. This is done in rich and increasingly realistic learning settings.

Students entering the master AQT will come from a professional or academic bachelor in one of the following disciplines: (applied) physics, (applied) mathematics, (applied) computer science or ICT, and electrical engineering. The students will need to acquaint themselves with knowledge from the other disciplines. As part of the admission process, students are required to complete a formative knowledge assessment on the topics of physics, mathematics and programming. This knowledge assessment will help students identify gaps in their prior knowledge. These gaps will be addressed in the homologation phase of the programme. In this first phase of the programme the students will receive education on the different disciplines within the programme. In this way, students will learn the necessary background knowledge from the disciplines that are not their own bachelor background.

The common ground in Q1 of the programme consists of homologation and project work. In the common ground students will learn basic concepts from the four disciplines that are necessary to understand quantum technology. The project is called the quantum experience (5 EC) where students work in a multidisciplinary project on a quantum game or experiment. They will also take part in an intensive introduction programme for all four locations. This will help build community among the students from different locations and different backgrounds. Fostering a sense of community is extra important in light of the joint character of the degree. From the discussions with the programme management, it is clear to the panel that all four applied universities are motivated to foster an online and in-person community for AQT students.

The programme puts a strong focus on teamwork and peer-to-peer learning. In the information dossier an example of blended learning within the quantum hardware and quantum design project was provided. This shows the motivation and effort for well-designed blended education among programme management and lecturers. A joint degree across several locations needs to be clear on what parts can be done at home or hybrid and what parts require on site student attendance. The programme shows awareness of this by scheduling lectures as hybrid, but lab work on site. When possible, tutorials are offered in more than one location. This helps minimise student travel, which is necessary to keep the curriculum studyable for students from all locations.

In the quantum core the two 10 EC courses are taken by all students: Quantum Hardware and Quantum Information and Algorithms. After the common ground, students are equipped to follow these courses and get familiar with the main concepts of quantum technology. Parallel to the quantum core courses, student will work on a quantum design project. This project will follow the engineering cycle and focuses on a real-world problem introduced by a quantum research group or quantum company.

Through the common ground, the programme takes into account the different backgrounds of the students. This starts in the homologation phase, where students learn background knowledge from the other disciplines. The programme embraces the diversity of students and promotes peer-to-peer learning. The programme management and the lecturers emphasized the added value of having a diverse student population. To further make sure all students feel welcome, a mentor system is in place. The mentor plays a role in providing a safe and inclusive atmosphere for all students. Furthermore, the diversity of student backgrounds will be of added value in the team projects. The panel spoke to students who highly appreciate the multidisciplinary team projects within the proposed curriculum.

#### *Joint degree*

The four applied universities have been in collaboration for three years and signed a cooperation agreement. The panel got the impression that the four applied universities act as equal partners and work well together. The four partners are equally represented within the group of core lecturers for the AQT programme. In the Examinations Board there is also equal representation from all four applied universities. The panel finds it important to uphold this equal representation throughout the programme. Since the locations involved are far apart from each other, it is important that staff and students have a point of contact at their home institution. The institutions are all embedded in an environment with specific specialisations and facilities. The complementary knowledge and facilities are a clear benefit of the joint character of the master programme. A lot of attention is paid to calibration among the different institutes, the regulations of the coordinating applied university are followed by default.

There is one online environment for students used throughout the programme across the four applied universities. This helps provide uniformity and clarity to AQT students.

The benefits and requirements of organizing this applied quantum technology programme as a joint degree with the four applied universities have been justified and recognized by all stakeholders. There is a strong and long-term commitment from the four partners to make the AQT master successful.

#### *Travel time and costs*

Because the master AQT is a joint degree between four applied universities, traveling is needed. The distance between the locations is relatively large and poses a challenge for students. Realistic (door-to-door) public transport schedules need to be considered when scheduling lectures to ensure a feasible and healthy combination of traveling, studying and living for students. Very clear and timely communication for prospective students will be needed in advance of the start of the programme. It is necessary to supply realistic information on the required travelling time and costs. The panel advises the programme to investigate mitigating costs for travel, especially for those students who do not have a free public transport product.

The panel recommends limiting student travel between institutions where possible. It is recommended to facilitate students at the location closest to them where possible. This can be done through hybrid lectures and facilitating study places in each location. If students need to travel, because a form of education is not available in the other locations, travel time should be considered within the schedule. The panel spoke to students about the travel aspect of the programme. They suggested that if travel can be combined with community-building events, this will have a positive effect on student motivation.

#### *Staff*

The panel has seen a very enthusiastic and competent team of teachers. The AQT teaching staff has a strong connection among the different institutes. In the information dossier a list of core lecturers and their teaching qualifications is provided. Teaching expertise of the staff is demonstrated through didactic qualifications (BDB, BKE, BKO). Staff has a strong connection with relevant research through the lectorates. Almost all staff has a PhD, further proving the strong connection to research. Teachers are active and engaged and welcome connections with colleagues from other institutions.

#### *Student support*

The multiple location setup requires clear communication about student support channels, such as support for students with specific needs. Students will be appointed a mentor. The panel recognizes the importance of the mentor in helping students with support on all locations. For students who need special facilities there needs to be a clear and easy procedure on how to apply for this across locations. The panel recommends the programme to give attention to harmonizing student support across locations.

#### *Diversity and inclusion*

The four applied universities already take various actions to promote a diverse inflow of students for their existing programmes. It is advised that the joint AQT program sustains specific attention for the diversity of their student population. This starts with making this a priority when advertising the programme. Once students enter, the staff should keep focus on inclusion of all students. The panel spoke to a diverse pool of lecturers who are motivated to promote diversity and inclusion.

#### *Language*

Within the field of quantum technology English is used as a standard language. Textbooks and other materials on quantum technology are often only available in English. Graduates are expected to work in an international environment where English is the working language. The choice for the English language is further confirmed as necessary by the consulted industry professionals. The panel agrees that English is the logical choice as the main language of instruction for the AQT programme. By extension, the panel also supports the English name of the programme. Since the programme also expects enrolment of international students, English should consistently be used as the daily language. English as the standard language will promote inclusion of international students in the programme.

#### *Extended study duration*

The information dossier provided a comparison to 11 other quantum technology focused master programmes within the European Union that comprise of 120 EC. This international comparison shows that within the field it is agreed that a two-year master is necessary for the topic of quantum technology.

Students from different bachelor backgrounds in physics, mathematics, computer science and electrical engineering are admitted to the programme. They first need to get acquainted with the concepts from the other disciplines. Subsequently, students specialize in one of the three orientations and become a specialised quantum engineer. In order to get students from the start level to the C1 master level, a two-year master programme is necessary. Based on this argument, in combination with the international comparison, the need for a two-year programme is clear. The panel supports the application for extended study duration of the AQT programme.

### 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**

##### *Forms of assessment*

The curriculum covers all learning objectives and does so with a variety of forms of assessment. An overview of the assessment programme is provided in the information dossier. There is a good balance between knowledge assessment, assessment of professional products and practical assignments. The principle of constructive alignment is used throughout the programme. This means that learning goals, learning activities and assessment are aligned. The programme uses a four-eyes principle to ensure the quality of assessment. Standardized rubrics are used throughout the programme, making assessment transparent. The panel sees that the programme has strong attention for valid, transparent and reliable evaluation.

In almost all courses there are several methods of assessment used. The programme considers assessment as an opportunity for learning and makes good use of formative assessment. Formative activities such as weekly quizzes or experiments provide students with frequent feedback. All courses are concluded with a summative assessment that mirrors the learning activities and reflects the learning objectives of the course.

##### *Professional products*

The start of the programme focuses on the theoretical foundations of quantum technology. In this phase knowledge assessments and assignments are used for assessment. After this phase the focus shifts to authentic assessments based on professional products. These professional products can take the form of software code, a prototype, or an implementation plan. In this phase the involvement of industry becomes more prominent and important. In the information dossier it is noted that the quality standards for professional products are established in consultation with the professional field. Within the projects and internship the company supervisor has an advisory role in the assessment of the project.

##### *Use of generative AI*

The panel spoke with lecturers, students and proposed members of the Examinations Board about the use of new technologies such as generative AI in education and assessment. Generative AI offers opportunity for learning if used correctly, but can also harm learning and assessment if used incorrectly. Some forms of assessment are prone to the influence of generative AI, such as text-based take home assignments. It needs to be made clear to students when they can and cannot make use of generative AI within their education and assessment. It is advised that the programme develops a joint policy on how to deal with new evolving technologies such as generative AI.

##### *Quality assurance*

The assessment within the AQT programme follows a Plan Do Check Act (PDCA) cycle for quality assurance. After the course the teaching teams evaluate the course and its assessment. The teaching team considers whether the

results are reason to adjust the teaching or assessment of a course. There will be formal course evaluations carried out. The results of this will be reviewed by the Education Committee.

#### *Examinations Board*

The Examinations Board for the AQT programme has one member from every applied university. This is important as the regulations and culture around assessment is not necessarily equal across the applied universities. The Examinations Board will use the regulations from AUAS as the default for the AQT programme. The AUAS standards may not be known to all lecturers. The panel agrees that it is therefore important to have representation of each applied university in the Examination Board. The member of the relevant applied university can play an important role in communication of standards and differences between the home applied university and the AUAS regulations. A common language between the applied universities needs to be developed, which will take time. The panel is convinced of the commitment and ability of all four partners to develop this.

The panel spoke with lecturers and the Examination Board about calibration sessions. In these sessions the assessment for projects will be calibrated. There is extra necessity for this because the four applied universities are used to their own procedures. For the AQT master, all students need to be assessed in the same way. It is especially important to calibrate the graduation projects. The Examination Board needs to provide clear guidelines and calibration methods for this. The Examinations Board plans to have thorough course evaluations done of all AQT courses within three years after the start of the programme.

The panel is convinced of the quality of assessment within the AQT programme. The principle of constructive alignment is known and used by all four applied universities. The four-eyes principle, as well as formal test analyses, will contribute to high-quality assessment. The information dossier provided a clear set of exam regulations for the AQT programme. Because the AUAS exam regulations are primarily in use, it is important to ensure that lecturers across all locations are familiar with the AQT rules and regulations concerning testing and assessment.

#### 6.4 Degree

The panel advises awarding the following degree to the new programme: Master of Science

## Abbreviations

AUAS – Amsterdam University of Applied Sciences

AQT – Applied Quantum Technology

BDB – Basiskwalificatie Didactische Bekwaamheid (Basis qualification Didactics)

BKE – Basiskwalificatie Examinering (Basis qualification Examination)

BKO – Basiskwalificatie Onderwijs (Basis qualification Education)

EC – European Credits

EU QTedu – European Union Quantum Technology Education

ILO – Intended Learning Outcome

PDCA – Plan Do Check Act

VH – Vereniging Hogescholen

The full report was written at the request of NVAO and is the outcome of the peer review of the new programme hbo-master Applied Quantum Technology (joint degree) of Amsterdam University of Applied Sciences, Fontys University of Applied Sciences, Saxion University of Applied Sciences, The Hague University of Applied Sciences

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