

## Besluit

### Besluit strekkende tot het verlenen van accreditatie aan de opleiding wo-master Applied Physics van de Technische Universiteit Delft

	<b>Gegevens</b>	
<b>datum</b>	31 december 2014	Naam instelling : Technische Universiteit Delft
<b>onderwerp</b>	Definitief besluit accreditatie wo-master Applied Physics van de Technische Universiteit Delft (002637)	Naam opleiding : wo-master Applied Physics (120 ECTS) Datum aanvraag : 9 januari 2014 Variant opleiding : voltijd Afstudeerrichtingen : Bionanoscience Transport Phenomena and Fluid Flow Imaging Physics Quantum Nanoscience Radiation Science and Technology Erasmus Mundus Optics Science and Technology
<b>uw kenmerk</b>	O&S-UIT-927/EL/LV	Locatie opleiding : Delft
<b>ons kenmerk</b>	NVAO/20144128/ND	Datum goedkeuren : 27 januari 2014
<b>bijlagen</b>	3	Datum locatiebezoeken : 28 en 29 januari 2014 Datum visitatierapport : 30 april 2014 Instellingstoets kwaliteitszorg : ja, positief besluit van 21 november 2011

#### Beoordelingskader

Beoordelingskader voor de beperkte opleidingsbeoordeling van de NVAO (Stcrt. 2010, nr 21523).

#### Bevindingen

De NVAO stelt vast dat in het visitatierapport deugdelijk en kenbaar is gemotiveerd op welke gronden het panel de kwaliteit van de opleiding voldoende heeft bevonden.

#### Inlichtingen

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Samenvatting bevindingen en overwegingen van het panel (hierna ook: the committee).

*Standard 1: Intended learning outcomes*

The master's programme Applied Physics at TUD aims to distinguish itself from the physics programmes at general universities in the Netherlands by its emphasis on transferable skills that are particularly useful for positions in the private sector. Its focus is on physics topics that are applicable in devices, industrial plants, medicine, etcetera.

The committee has studied the Domain Specific Framework of Reference as established by the national council of programme directors. It agrees with the requirements the Framework sets for the intended learning outcomes of master's programmes in (applied) physics. Furthermore, it has established that the programme's intended learning outcomes adequately fulfil the requirements of the Framework and meet the criteria for level and domain of an academic master's degree programme. The committee encourages the programme to further strengthen the applied profile of its intended learning outcomes by explicitly relating its learning outcomes to the criteria for Academic Competences and Quality Assurance (ACQA), as formulated by the three Dutch technical universities.

*Standard 2: Teaching-learning environment*

The master's programme Applied Physics consists of five different tracks, eight specializations and three special programmes. The committee was impressed with the broad spectrum of choices the programme offers and appreciates the special options for students who are considering to pursue a PhD project. Students are well aware of the options available to them. Some of the choices available are less popular, which sometimes results in pragmatic solutions for courses with less than five students. The viability of those options should be monitored.

The committee has established that the majority of the learning outcomes are translated well into the curriculum, but that design skills should be more visibly and structurally incorporated into the programme. The committee has concluded that students and alumni are content with the way the academic and professional orientation of the programme is balanced in the curriculum.

The programme's study load and average study duration are acceptable. The committee established that some students take more time for their final research project, despite actions already taken to prevent delays. It advises the project supervisors to make an agreement with students about time path and mutual expectations prior to the start of the project.

The committee is positive about the expertise, engagement and approachability of the teaching staff. Although BKO training for existing staff and other activities to improve the didactic skills of lecturers started relatively late, the programme is now making good efforts to catch up. The study advisor and tutors help students to find their way through the programme. The committee was impressed with the active role the Board of Studies plays in advising the programme director about all issues concerning the quality of the programme. The system of evaluation functions adequately in signaling and resolving issues or bottlenecks within the programme.

Pagina 3 van 7 Based on those considerations , the committee concludes that the master's programme fulfils the requirements for the teaching and learning environment.

*Standard 3: Assessment and achieved learning outcomes*

The programme works with a variety of tests during the courses, like assignments, reports and presentations. Final tests consist of oral and written exams; often, courses work with combinations of test methods. Tests are designed by at least two staff members in collaboration.

The committee established that the tests used are sufficiently varied and adequately address the course contents. The committee appreciates the use of oral exams in the master's programme as a valid and efficient way of testing certain designated learning objectives. As the recently developed test matrices show, testing could more systematically be attuned to the intended learning outcomes per course.

The Board of Examiners is well aware of its tasks as assigned by the 2010 Law on Higher Education and has phased in appropriate measures. The assessment committee approves of this working method. The committee appreciates the measures taken and plans for the coming years . It advises the Board to further systematize its controls and checks for plagiarism and fraud. Furthermore, it urges the Board of Examiners to pay special attention to the achieved learning outcomes within the Erasmus Mundus OpSciTech programme.

Students finish their final research project by writing a master thesis. They then have an exam consisting of a public presentation and a private defense in front of an examination committee consisting of at least four staff members . After the defense, the committee decides in a closed session on the final mark.

The committee concludes positively about the way the final projects and the resulting master theses are carried out and assessed. It particularly appreciates the assessment forms used by the examiners. Based on the master theses the committee has studied and the extra session with the examiners, the committee has established that the achieved learning outcomes of the master's programme are satisfactory.

**Aanbevelingen**

De NVAO onderschrijft de aanbevelingen van het panel.

Ingevolge het bepaalde in artikel 5a.10, derde lid, van de WHW heeft de NVAO het college van bestuur van de Technische Universiteit Delft te Delft in de gelegenheid gesteld zijn zienswijze op het voornemen tot besluit van 3 november 2014 naar voren te brengen. Bij e-mail van 9 december 2014 heeft de instelling ingestemd met het voornemen tot besluit.

De NVAO besluit accreditatie te verlenen aan de wo-master Applied Physics (120 ECTS; variant: voltijd; locatie: Delft) van de Technische Universiteit Delft te Delft. De opleiding kent de volgende afstudeerrichtingen: Bionanoscience; Fluid Flow and Transport Phenomena; Imaging Physics; Quantum Nanoscience; Radiation Science and Technology. De NVAO beoordeelt de kwaliteit van de opleiding als voldoende.

Dit besluit treedt in werking op 31 december 2014 en is van kracht tot en met 30 december 2020.

Den Haag, 31 december 2014

De NVAO  
Voor deze:

A handwritten signature in black ink, appearing to be 'Ann Demeulemeester', with a small 'be' written below it.

Ann Demeulemeester  
Vicevoorzitter

Dr. A. H. Flierman  
(voorzitter)

Tegen dit besluit kan op grond van het bepaalde in de Algemene wet bestuursrecht door een belanghebbende bezwaar worden gemaakt bij de NVAO. De termijn voor het indienen van bezwaar bedraagt zes weken.

Onderwerp	Standaard	Beoordeling door het panel
<b>1. Beoogde eindkwalificaties</b>	De beoogde eindkwalificaties van de opleiding zijn wat betreft inhoud, niveau en oriëntatie geconcretiseerd en voldoen aan internationale eisen	<b>Voldoende</b>
<b>2. Onderwijsleeromgeving</b>	Het programma, het personeel en de opleidingsspecifieke voorzieningen maken het voor de instromende studenten mogelijk de beoogde eindkwalificaties te realiseren	<b>Voldoende</b>
<b>3. Toetsing en gerealiseerde eindkwalificaties</b>	De opleiding beschikt over een adequaat systeem van toetsing en toont aan dat de beoogde eindkwalificaties worden gerealiseerd	<b>Voldoende</b>
<b>Eindoordeel</b>		<b>Voldoende</b>

De standaarden krijgen het oordeel onvoldoende, voldoende, goed of excellent. Het eindoordeel over de opleiding als geheel wordt op dezelfde schaal gegeven.

**Tabel 1: Rendement.**

Cohort	2010	2011	2012
Rendement	89%	n.b%	

**Tabel 2: Docentkwaliteit.**

Graad	Ma	PhD	BKO
Percentage	100%	100%	48%

**Tabel 3: Student-docentratio.**

Ratio	4:1
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**Tabel 4: Contacturen.**

Studiejaar	1	2 <sup>1</sup>
Contacturen	12.5	-

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<sup>1</sup> Het tweede jaar bestaat in het algemeen uit een bedrijfsstage en het thesisproject. Het aantal contacturen daarbij is moeilijk vast te stellen.

- Dr. Henk Blok, retired associate professor at the Faculty of Sciences of VU University Amsterdam (chair);
- Prof. dr. Wim de Boer, professor of Physics at the University of Karlsruhe (DE);
- Dr. ir. Jaap Flokstra, retired associate professor Nanotechnology at University of Twente;
- Christianne Vink MSc, didactic coach, educational advisor / trainer and partner of Academie Factory;
- Dr. Jan Hoogenraad, owner of Spoorgloren BV for change management en quantitative service in public transport;
- Carmen van Schoubroeck, student bachelor Mathematics and bachelor Physics and Astronomy, Radboud University Nijmegen.

Het panel werd ondersteund door Kees-Jan van Klaveren MA, secretaris (gecertificeerd).