

## Besluit

### Besluit strekkende tot het verlenen van accreditatie aan de opleiding wo-master Materials Science and Engineering van de Technische Universiteit Delft

#### Gegevens

<b>datum</b>	Naam instelling	: Technische Universiteit Delft
26 juni 2013	Naam opleiding	: wo-master
<b>onderwerp</b>		Materials Science and Engineering (120 ECTS)
Definitief besluit	Datum aanvraag	: 27 december 2012
accreditatie wo-master	Variant opleiding	: voltijd
Materials Science and	Afstudeerrichtingen	: Metals Science and Technology
Engineering van de Technische		Advanced Functional Polymers
Universiteit Delft		Advanced Construction Materials: Roads & Buildings
(001379)		Materials for Energy and Environmental Impact
<b>uw kenmerk</b>	Locatie opleiding	: Delft
O&S-UIT-698/EL/dt	Datum goedkeuren	
<b>ons kenmerk</b>	panel	: 10 juli 2012
NVAO/20131671/ND	Datum locatiebezoeken	: 20 en 21 september 2012
<b>bijlagen</b>	Datum visitatierapport	: 30 november 2012
3	Instellingstoets kwaliteitszorg	: ja, positief besluit van 21 november 2011

#### Aanvullende informatie

De NVAO heeft bij brief van 1 maart 2013 de instelling aanvullende informatie gevraagd over een aantal zaken die naar voren kwamen bij de opleidingen uit het cluster Werktuigbouwkunde. Bij brief van 9 april 2013 heeft de NVAO de aanvullende informatie ontvangen.

#### Beoordelingskader

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

#### Bevindingen

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

#### Inlichtingen

Frank Wamelink  
+31 (0)70 312 23 43  
f.wamelink@nvaonet

Parkstraat 28 | 2514 JK | Postbus 85498 | 2508 CD Den Haag  
P.O. Box 85498 | 2508 CD The Hague | The Netherlands  
T + 31 (0)70 312 2300 | F + 31 (0)70 312 2301  
info@nvaonet | www.nvaonet

Samenvatting bevindingen en overwegingen panel.

### **Standard 1**

Materials Science and Engineering (MSE) is an interdisciplinary field covering the study of the physical, chemical and mechanical aspects of material properties. It combines this with training in production techniques and material selection for a wide range of applications. Students learn to understand the behaviour of materials under different conditions and assess their suitability in products and industrial processes. The profile of the master's programme MSE of the TU Delft is unique, strongly related to the Delft engineering profiles and of academic level.

The domain-specific framework of reference describes adequately what is expected of students graduating. The international standards for the master's level are reflected in the intended learning outcomes, both in general terms and for the domain Materials Science. The intended learning outcomes are transparent and specific and in line with the ambitions of the programmes. The master's programme, therefore, meets the criteria for standard 1 of the assessment framework.

### **Standard 2**

The committee established that the curriculum, staff and programme-specific services and facilities enable the master's students to achieve the intended learning outcomes.

The master's programme is well structured and uses appropriate modes of instruction. The curriculum contains a Generic Course, with a study load of 60 EC, that runs throughout the first year and contains compulsory modules for all students, focusing on Materials Science and Engineering fundamentals and applications; a Specialisation Course, to be chosen from four pre-defined alternatives (14 EC); electives (6 EC) and a master's thesis project (40 EC).

Two main educational forms are used: course based education, i.e. lectures in combination with workshops, and small projects and assignments for practicals, the optional elective internship in industry or a research institute and the final Master's Thesis Project. Although many students take longer than two years to finish their programme, the opinion of the committee is that the programme is feasible, the study load is appropriate and the programme can be done within the scheduled time.

The committee thinks that the academic staff involved in the programme is at an appropriate level. The teachers involved are dedicated to teaching. Student evaluations show that the staff is considered to be approachable and knowledgeable on their subjects. The committee has seen that the MSE department provides the students with sufficient guidance and supervision. The study facilities are according to the committee at a sufficient level.

The committee recommends the programme to work seriously on the implementation and involvement of the Education Committee in the quality assurance system.

### **Standard 3**

The committee has looked into the assessment system and the theses in order to answer the question if the intended learning outcomes are achieved. The committee is convinced that the assessment system is sufficiently valid and reliable. The committee has seen that the Board of Examiners is in control and has made a start with the implementation of an

Pagina 3 van 7 updated, adapted to renewed legislation, test policy and with achieving uniformity of the master's theses assessment forms.

The system to assess the master's theses guarantees that the level and orientation of the theses is as required, the theses are of an academic master's level. The committee has established that graduates achieve the intended learning outcomes.

#### **Aanbevelingen**

De NVAO onderschrijft de aanbevelingen om de opleidingscommissie degelijk te implementeren. Daarnaast is beleid noodzakelijk om de grote uitval terug te dringen.

#### **Besluit**

Ingevolge het bepaalde in artikel 5a.10, tweede 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 mei 2013 naar voren te brengen. Bij e-mail van 7 juni 2013 heeft de instelling gereageerd op het voornemen tot besluit. Dit heeft geleid tot aanvulling van bijlage 2 in het definitieve besluit.

Op grond van het voorgaande besluit de NVAO accreditatie te verlenen aan de wo-master Materials Science and Engineering (120 ECTS; variant: voltijd; locatie: Delft) van de Technische Universiteit Delft te Delft. De opleiding kent de volgende afstudeerrichtingen: Metals Science and Technology, Advanced Functional Polymers, Advanced Construction Materials: Roads & Buildings, Materials for Energy and Environmental Impact. De NVAO beoordeelt de kwaliteit van de opleiding als voldoende.

Dit besluit treedt in werking op 1 januari 2014 en is van kracht tot en met 31 december 2019.

Den Haag, 26 juni 2013

Nederlands-Vlaamse Accreditatieorganisatie



Lucien Bollaert  
(bestuurder)

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 <i>voltijd</i>
<b>1. Beoogde eindkwalificaties</b>	De beoogde eindkwalificaties van de opleiding zijn wat betreft inhoud, niveau en oriëntatie geconcretiseerd en voldoen aan internationale eisen	G
<b>2. Onderwijsleeromgeving</b>	Het programma, het personeel en de opleidingsspecifieke voorzieningen maken het voor de instromende studenten mogelijk de beoogde eindkwalificaties te realiseren	V
<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	V
<b>Eindoordeel</b>		V

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

**Tabel 1: Rendement**

It is not possible to give a reliable overview of the intake of Master's students in the programme. For graduates from the 3mE's Bachelor's programme it is often difficult to determine when they commenced the Master's programme. A lot of them participated in master's courses (long) before they have passed their bachelor's graduation. The Bachelor before-Master rule (Harde Knip) introduced in 2010 will put an end to this.

Table 3 shows the intake and study results of students in the master's programme MSE for the cohorts 2005 - 2011. Table 4 shows the intake and study results over the period 2005-2011 of international bachelors, academic bachelors and bachelors from Colleges of Professional Education.

[Table 3] Intake and results per student cohort.

Cohort	Intake	Stopped	Studying	Graduated	Study months
2005	8	3	0	5	27.2
2006	10	2	0	8	28.4
2007	12	5	0	7	34.9
2008	12	3	2	7	30.3
2009	9	2	4	3	25.0
2010	13	1	12	0	--
2011	17 <sup>1</sup>	1	16	0	--
<b>2005-2011</b>	<b>81</b>	<b>17</b>	<b>34</b>	<b>30</b>	<b>29.8</b>

<sup>1</sup> This includes 4 students from the former five year programme Technische Materiaalwetenschappen.

[Table 4] Intake and results per student category for the cohorts 2005-2011.

Student category	Intake	Stopped	Studying	Graduated	Study months
BSc international	41	7	15	19	27.4
BSc national	29 <sup>1</sup>	5	15	9	33.6
Coll. of Prof. Education	11	5	4	2	36.5
<b>All</b>	<b>81</b>	<b>17</b>	<b>34</b>	<b>30</b>	<b>29.8</b>

<sup>1</sup> This includes 4 students from the former five year programme Technische Materiaalwetenschappen.

**Tabel 2: Docentkwaliteit**

titulatuur / BKO	MSc	PhD	BKO
Percentage	93%	76%	18%

Titulatuur en behaalde BKO certificaten wetenschappelijke staf Faculteit 3mE

Pagina 6 van 7 Note:

3mE lecturers provide education for both Bachelor's programmes (Mechanical Engineering and Marine Technology) and the five Master's programmes (ME, MT, MSE, S&C, BME and ODE). Because of the complexity of determining exactly who the providers of the attended courses are, and of determining exactly which students are attending the different courses, it has been decided to relate the teacher-quality data for each of the different 3mE programmes to the complete scientific staff of 3mE.

**Tabel 3: Student-docentratio**

The department of MSE has sufficient staff for the amount of education to be given. In Table 5 an overview is shown, based on the situation on November 1, 2011, the date at which a reorganisation was finalized in the department MSE. It should be noted that at this date there was a vacancy for a full professor.

Per November 2011 there were 33 students active in the MSE programme, so the student-to staff ratio (based on FTEs spent on education) amounted to about 6.9.

[Table 5] Number of staff available for education per November 2011.

Category	number	FTE	FTE education <sup>1</sup>
Full professors	8	4.9	1.2
Associate professors	9	7.0	1.8
Assistant professors	3	3.0	0.8
Technical support staff	10	9.8	1.0
<b>Total</b>	<b>30</b>	<b>24.7</b>	<b>4.8</b>

<sup>1</sup> The time fraction spent on education is estimated as 0.25 for professors and 0.1 for support staff

**Tabel 4: Contacturen**

Studiejaar	1	2
Contacturen	560	155

- Prof. dr. J.K.M. De Schutter, professor in Mechanical Engineering, KU Leuven, Belgium;
- Prof. dr. ir. M. Vantorre, professor in Maritime Technology, Ghent University, Belgium;
- Prof. dr. ir. P. Van Houtte, professor in Material Sciences, KU Leuven, Belgium;
- Ir. G. Calis, Chairman Division of Mechanical Engineers of the Royal Institute of Engineers in the Netherlands, former manager of Stork group of companies;
- Ir. H. Grunefeld, Department of Training and Consultancy, Centre for Education and Learning, University Utrecht;
- E.M. Porte, master student Mechanical Engineering, University Twente.

Het panel werd ondersteund door dr. B.M. van Balen, secretaris (gecertificeerd).