

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

Gegevens

	Naam instelling	: Technische Universiteit Delft
datum	Naam opleiding	: wo-master
9 oktober 2013		Applied Earth Sciences (120 ECTS)
onderwerp	Datum aanvraag	: 18 december 2012
Besluit	Variant opleiding	: voltijd
accreditatie wo-master	Afstudeerrichtingen	: Petroleum Engineering and Geosciences
Applied Earth Sciences van de Technische Universiteit Delft (001697)		Applied Geophysics
ons kenmerk		Resource Engineering
NVAO/20133017/LL		Geo-Engineering
bijlage	Locatie opleiding	: Delft
3	Datum goedkeuren panel	: 22 mei 2012
	Datum locatiebezoek	: 17 september 2012
	Datum visitatierapport	: januari 2013
	Instellingstoets kwaliteitszorg	: positief besluit d.d. 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. Het visitatierapport geeft de bevindingen en overwegingen weer van het panel over de bacheloropleiding Technische Aardwetenschappen en masteropleiding Applied Earth Sciences van de Technische Universiteit Delft. Het panel heeft beide opleidingen gezamenlijk beoordeeld.

Advies van het visitatiepanel

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

This report provides the findings and considerations of the Earth Sciences committee on the master's programme in Earth Sciences at the Delft University of Technology (TUD). The committee assessment is based on information in the critical reflection, interviews during the

Pagina 2 van 8 site visit and a selection of theses. In general, the committee concludes that the programme is unique in the Netherlands in focusing on Applied Earth Sciences with a technical component. It further applauds the international character of the master's programme. Through the strong connection with industry, students are well acquainted with the professional field. The main points requiring attention are the objectivity and transparency of the assessment system, the improvement of the students' progress towards completion and the development of a safety assurance system.

Standard 1: Intended learning outcomes

The master's programme in Earth Sciences at TUD have, as other academic programmes in Earth Sciences, the planet Earth as the object of study, and consider its genesis and its quality of life. These sciences are strongly interdisciplinary, with interaction between various factors, such as humans, fauna, relief, soil, water, lithology, atmosphere, hydrosphere and vegetation. Knowledge is gathered about its origin, current and former composition, and structure and the processes acting in and between the components of geosphere, hydrosphere, atmosphere and biosphere. Equally important is knowledge of how to manage and responsibly use the Earth's resources and understand the influence of human activity on the terrestrial system. It takes into account society's rapidly growing demand for well-trained Earth Scientists prepared to tackle scientific and societal issues. The master's programme at TUD focus on Applied Earth Sciences with a strong technical component. The programme is characterized by the strong synergy between the disciplines of geology and geophysics on one hand and petroleum engineering, geo-engineering and resources engineering on the other hand. The committee concludes that this focus is unique in the Netherlands.

The objectives of the master's programme are to enable students to practise their profession independently or to continue their training in scientific research. The orientation of the master's programme is mostly toward a professional career in industry or government. This orientation is well known and internationally appreciated. The academic research orientation is less prominent, but is nevertheless developed to an acceptable level. However, the committee advises that the research orientation of the programme should be made more visible because it is not well known and the programme management should have no reservations about being open to the world concerning what it offers.

The committee concludes that the master's programme closely relates to the domain-specific framework of reference. The framework is an effective and meaningful representation of Earth Sciences and offers enough anchor points for programmes to establish their own objectives. Derived from this framework of reference, the programme has formulated intended learning outcomes. The intended learning outcomes are in line with the Dublin descriptors. The committee confirmed that the intended learning outcomes are in line with this framework and reflect the level and orientation of the master's programme.

Standard 2: Teaching-learning environment

The master's programme consists of four different tracks: Applied Geophysics, Geoengineering, Petroleum Engineering and Geosciences and Resource Engineering. A new track on Geoscience and Remote Sensing will start in 2012. For all four tracks, the course programme consists of a combination of theoretical and practical components and is concluded by an individual research project for which students deliver a thesis report and give a presentation in a colloquium. The credits for the thesis vary from 30 to 45 ECTS. Two tracks, Applied Geophysics and Resource Engineering, are international programmes

Pagina 3 van 8 offered jointly by other European Universities. The committee has the opinion that the content of the courses is of high quality and cover most of the intended aspects of Applied Earth Sciences. Each track offers a coherent programme. The committee's main concern is the division of the programme into a number of very distinctive tracks. The tracks deliver highly specialist training, whereas industry is possibly more interested in less specialised graduates. Also for efficiency reasons, the tracks could be organised in a more coordinated way. The committee welcomes the future plans to reduce the number of courses.

The committee applauds the offering of two international tracks. These tracks offer unique opportunities for students. The students gain increased experience by attending several universities, each with their own individual academic strengths and culture. The strong link with industry means that industry requirements are well integrated into the curriculum. The committee's only advice relates to the assurance of a formal approach to ensuring the quality and coherence of the overall programme.

The committee stresses the importance of improving students' study progress. Of all the master's students, 80% graduates within three years. The committee noted that in order to improve the success rate, the didactic concept will be changed in several ways per September 2013. Firstly, the total number of contact hours (+/- 800 hours each year) will be reduced per week to allow students more time for self-study. Secondly, more mid-term assessment periods during courses are being introduced in the current programme of 2012-2013 and will remain in the new programme per September 2013. Thirdly, a stronger integration of mathematics, chemistry and physics will be accomplished. The committee questions the didactics and the recent decision to decrease the number of contact hours per week by more self-study. The committee appreciates that self-study is accompanied by more individual-based feedback, but wants to draw attention to the risk that students can squeeze through. The committee strongly supports the introduction of the mid-term assessments.

The committee concluded that the programme is provided by motivated lecturers who are both willing and able to pay close attention to the students. It is positive about the research qualities of the lecturers and very positive about the strong connections between master lecturers and industry. The committee further concludes that the educational quality of the lecturers is clearly apparent. However, it suggests that this quality should be further guaranteed, by encouraging lecturers to follow courses and take advantage of the educational desk within the university.

Students receive support from lecturers, a tutor-mentor system and study advisor. Nevertheless, given the slow progress of many students, it seems that some students slip through the net of support. The committee therefore suggests to evaluate the support system and to organise it more proactively and effectively if needed.

The committee noticed that students and staff profit from excellent facilities. The laboratories are equipped in such way that research and educational goals are achieved.

The programme includes fieldwork and practical training. The committee learned that the programme has no legally based safety assurance system for fieldwork. Although the programme has a travel insurance policy and use well written guidelines, the overall legal signature is missing. Responsibilities are not clear and first aid courses are not obligatory. The committee strongly recommends that a safety assurance system should be developed

Pagina 4 van 8 as a matter of urgency, to legally protect faculty, staff and students. The committee suggests that a national system should be developed in cooperation with the other academic Earth Sciences programmes in the Netherlands. Furthermore, the committee advises obligatory first aid courses for both students and lecturers.

Standard 3: Assessment and achieved learning outcomes

The committee has evaluated the assessment system and methods of the master's programme as well as the achievement of intended learning outcomes by students.

The main concern of the committee is the lack of a clear assessment protocol for written exams that guarantees transparency and objectivity. It is therefore pleased to see that the Board of Examiners has already formulated such a protocol and is now in the process of fine-tuning and implementing. Nevertheless, it stresses the urgency of implementing such system as soon as possible to underpin the grading and content of assignments in an appropriate manner.

For the thesis project, the committee appreciates the appointment of a committee to supervise students during the thesis project. However, it is concerned by the absence of a form that guarantees a transparent and objective grading. The committee has noted that the programme has already started to develop such a form. The committee has formulated several recommendations for this thesis evaluation form, including the use of a standard weighting for individual grading criteria for all students, the inclusion of rubrics and provision of a narrative explanation of the grading.

To assess the achievement of the learning outcomes, the committee reviewed 16 master theses. The level of the master theses conformed to or was even above the expectations of the committee.

Aanbevelingen

De NVAO onderschrijft de aanbevelingen van het panel om

- de kwaliteitszorg van de opleidingen te formaliseren om de kwaliteit en coherentie van het programma te borgen;
- in samenwerking met andere opleidingen een adequaat veiligheidsprotocol voor veldwerk in te stellen zoals in het visitatierapport is omschreven.

Daarnaast wijst de NVAO specifiek op de aanbevelingen van de commissie ten aanzien van het verbeteren van de transparantie en objectiviteit van de toetsing en beoordeling. De commissie verwijst daarbij naar in gang gezette verbeteringen als het opstellen van een toetsplan.

De NVAO gaat er vanuit dat de instelling middels haar interne kwaliteitszorg zorgdraagt voor het volgen van de realisatie en effectiviteit van deze maatregel. In een eerstvolgende beoordeling verwacht de NVAO het resultaat van deze aanpak te kunnen vaststellen.

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 26 augustus 2013 naar voren te brengen. Bij e-mail van 16 september 2013 heeft de instelling van die gelegenheid gebruik gemaakt om te reageren. Dit heeft geleid tot een aanvulling in bijlage twee.

De NVAO besluit accreditatie te verlenen aan de wo-master Applied Earth Sciences (120 ECTS; variant: voltijd; locatie: Delft) van de Technische Universiteit Delft te Delft. De opleiding kent de volgende afstudeerrichtingen: Petroleum Engineering and Geosciences, Applied Geophysics, Resource Engineering, Geo-Engineering, Geoscience and Remote Sensing. 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, 9 oktober 2013

De NVAO
Voor deze:



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>
1. Beoogde eindkwalificaties	De beoogde eindkwalificaties van de opleiding zijn wat betreft inhoud, niveau en oriëntatie geconcretiseerd en voldoen aan internationale eisen	G
2. Onderwijsleeromgeving	Het programma, het personeel en de opleidingsspecifieke voorzieningen maken het voor de instromende studenten mogelijk de beoogde eindkwalificaties te realiseren	V
3. Toetsing en gerealiseerde eindkwalificaties	De opleiding beschikt over een adequaat systeem van toetsing en toont aan dat de beoogde eindkwalificaties worden gerealiseerd	V
Eindoordeel		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 totale instroom (cumulatief)

Cohort	2005	2006	2007	2008	2009
Rendement	84%	94%	80%	46%	35%

Tabel 2: Docentkwaliteit

Graad	Ma	PhD	BKO
Percentage	8%	92%	4%

Tabel 3: Student-docentratio

Ratio student:docent	10:1
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Tabel 4: Contacturen

Studiejaar	1	2
Contacturen	17	-- ¹

¹ De instelling laat weten dat het grootste deel van dit jaar uit thesis-werk bestaat, waarvoor geen definitie beschikbaar is voor de berekening van contacturen.

- Prof. M.A. Herber (chair), professor of Geo-Energy, University of Groningen, the Netherlands;
- Prof. M. Landrø, professor of Applied Geophysics, NTNU Trondheim (Norwegian University of Science and Technology), Norway;
- Prof. J.W. Hopmans, professor of Vadose Zone Hydrology, University of California (Davis), USA;
- Prof. Emeritus D.E. Walling, hydrologist/geomorphologist, University of Exeter, UK;
- Drs. R.L. Prenen, Msc, independent educational advisor;
- M.M. Cazemier MSc (student member), master's graduate of Earth Sciences, Hydrology and Water Quality, Wageningen University.

Het panel werd ondersteund door dr. Willemijn van Gastel, secretaris (gecertificeerd).