

Besluit **Accreditierapport en -besluit met een positieve beoordeling van de accreditatieaanvraag voor de opleiding Master of Science in Nuclear Engineering (master na master) van de Katholieke Universiteit Leuven in samenwerking met Universiteit Gent en Vrije Universiteit Brussel**

onderwerp
Accreditierapport en -besluit

(001692)

bijlage

1

1. Inleiding

Bij brief van 29 maart 2013 heeft het instellingsbestuur van de Katholieke Universiteit Leuven te Leuven in samenwerking met Universiteit Gent en Vrije Universiteit Brussel een accreditatieaanvraag ingediend bij de Nederlands-Vlaamse Accreditatieorganisatie (NVAO) voor de opleiding Master of Science in Nuclear Engineering (master na master). Het betreft een interuniversitaire masteropleiding georganiseerd te Leuven (Katholieke Universiteit Leuven), Louvain-la-Neuve (Université Catholique de Louvain), Luik (Université de Liège), Brussel (Vrije Universiteit Brussel en Université Libre de Bruxelles) en Gent (Universiteit Gent). Deze aanvraag is ontvangen op 29 maart 2013 en ontvankelijk verklaard op 5 juli 2013.

De accreditatieaanvraag steunt op het visitatierapport van een externe beoordeling uitgevoerd door een visitatiecommissie ingesteld door de Vlaamse Universiteiten en Hogescholen Raad (VLUHR).

De visitatiecommissie kende de volgende samenstelling:

Voorzitter:

- Prof. dr. em. Dick van Campen, gewezen decaan faculteit werktuigbouwkunde, Technische Universiteit Eindhoven, gewezen Secretaris- Generaal International Union of Theoretical & Applied Mechanics;

Leden:

- Prof. dr. em. René Van den Braembussche, Honorary professor von Karman Institute;
- Ir. Jan Bens, Directeur-generaal van het Federaal Agentschap voor Nucleaire Controle;
- Prof. dr. Peter Van Petegem, gewoon hoogleraar onderwijskunde, Universiteit Antwerpen (onderwijsdeskundige);
- Dhr. Dieter Van Isterdael, masterstudent werktuigkunde-elektrotechniek Vrije Universiteit Brussel (student-lid).

Secretaris:

- Dhr. Jasper Stockmans en Dhr. Andreas Smets, stafmedewerkers van de Cel Kwaliteitszorg van de Vlaamse Interuniversitaire Raad (VLIR).

De visitatie heeft plaatsgevonden op 12 maart 2012. Het visitatierapport dateert van februari 2013.

De NVAO komt tot de volgende vaststellingen:

- De externe beoordeling is opgesteld en onderbouwd overeenkomstig het toepasselijke Accreditatiekader bestaande opleidingen hoger onderwijs Vlaanderen van de NVAO en volgens de daarbij behorende beslisregels;
- De visitatiecommissie heeft voor de externe beoordeling het door de VLUHR vastgestelde visitatieprotocol gevolgd;
- De externe beoordeling verschaft inzicht in de samenstelling van de visitatiecommissie;
- De externe beoordeling bevat een onderzoek ten gronde naar de aanwezigheid van voldoende generieke kwaliteitswaarborgen.

De NVAO is in het licht van het vorenstaande tot de slotsom gekomen dat de externe beoordeling over de voorliggende opleiding regelmatig en gedegen tot stand is gekomen.

3. Inhoudelijke overwegingen

De NVAO steunt haar inhoudelijke besluitvorming in hoofdzaak op de onderstaande elementen uit het visitatierapport.

Doelstellingen

The panel is satisfied about the level and orientation of the objectives of the programme, regarding both the general competences and the general academic competences. The general competences are at an advanced master level. The panel appreciates the way the scientific competences are conceived, also at an advanced master level. The panel considers that the formulation of the objectives is clear and that the necessary content, in accordance with the Flemish Higher Education Act (2003), is present.

The aims and objectives of the programme correspond with the requirements set by professional colleagues and the relevant professional field. In addition, the panel sees a clear accordance with her own reference frame. The learning outcomes also stem from requirements set by the academic practice and are tuned to requirements of the industry. The panel notes that the domain-specific requirements are to a large extent aimed at the Belgian situation. The panel suggests to broaden the orientation of the objectives and asks for more attention to the international situation.

Programma

The programme is largely based on the scientific and industrial expertise developed in Belgian universities, the Nuclear Research Centre in Mol (SCK•CEN) and the long standing and reliable operation of power plants. The panel believes that this collaboration has fostered the programme, concerning both the academic and the professional side. The essence in the programme is the introduction into the scientific basis of exploitation of phenomena based on nuclear reactions and fission and to apply it to the fundamental and technical problems encountered in practice. The curriculum mapping makes it clear that many course modules are directly related to actual research of the teaching staff. The panel appreciates the close link with the industry and the relevant professional practice.

The curriculum is an adequate realisation of the intended learning outcomes of the programme with regard to the level, orientation and discipline-specific requirements. A

Pagina 3 van 10 matrix is made to illustrate the correspondence between objectives and content of the programme. There is a clear contribution of the main learning outcomes of the mandatory courses, electives and master's thesis, to acquiring or improving each of the 30 defined competences. This link has however grown organically; the panels suggests a more systematic approach. The panel believes that the contents of the curriculum enable students to achieve the intended learning outcomes. The panel asks for attention to the international orientation of the content of the programme; including recent developments.

The panel finds the curriculum coherent in terms of content, considering the focus of the programme. The sequential structure and coherence of the curriculum, in terms of the standard process, is adequate. The coherence of the standard pathway is adequate, but more consultation is needed to guarantee this consistency. The panel heard complaints about a high degree of repetition in the various courses.

No real measurement has been done for the study load. However, evaluations organised by the BNEN secretariat, after each programme unit, represent in fact a screening of this aspect. During the visit, the panel heard many complaints of the students about the work load and the high density of the programme. The actual study load is much higher than the study load as it is expressed in study points and is situated on the edge of the viable for the strong students. Students already put in a workload equivalent to at least 90 ECTS. The panel regrets the fact that not all opportunities are used to relieve the programme and doubts whether it is possible to fit the programme in a one-year curriculum.

The panel sees an agreement between the structure and content of the curriculum and the qualifications of the incoming students. The programme is open for students holding a 5-year Master degree in Engineering. Masters in Sciences and Masters in Engineering of non-university institutes for higher education ("Industrial Engineers") can only be admitted to the programme if their dossier is complemented by successfully passing a bridge programme. The panel appreciates the fact that an adequate linking programme is developed.

The panel finds the educational concept in line with the aims and objectives. The study methods also correspond with this educational concept. The panel saw a certain variation in the quality of these educational resources. The panel heard from the students that the lack of "good" study material for some of the courses is perceived as a fundamental problem. However, concerning the didactic teaching approaches the panel is very satisfied. In addition to the classical ex-cathedra and exercise sessions, lab exercises and computer exercises are used. Hands-on exercises on the operation of a reactor and visits to operating nuclear installations, are integrated in the programme.

The students are assessed in an adequate manner. The panel studied the examination assignments and finds these satisfactory. The panel sees an adequate balance between knowledge reproduction and insight. The organisation of tests and examinations and the communication of the results leaves room for improvement.

The master's thesis stands for 15 ECTS, the minimal weight required by the Flemish Higher Education Act. The panel notes that the factual weight of the thesis is much higher. The panel studied a broad selection of master's theses and states that the students demonstrate their ability for analytic and synthetic reasoning, and independent problem solving at an academic level. Several master's theses have led to scientific publications in international journals with peer review or were the basis of presentations at conferences. This gives the

Pagina 4 van 10 panel clear indications about the fact that the work of the students reflects the general critical-reflective or research attitude of the student. Panel and students are positive about the guidance, however the panel wishes to address a certain amount of variation in the (intensity of the) guidance. The panel advises to strive for a more intense standardisation of the different approaches of different promoters. The panel has furthermore identified a certain intuitive character of the evaluation and points out that the evaluation process would benefit from the formulation and communication of more clear criteria.

De NVAO volgt het positieve oordeel over onderwerp 2: Programma, op grond van de gewogen en gemotiveerde onderbouwing door de commissie. Niettegenstaande de negatieve beoordeling van facet 2.4 'studielast' is de commissie globaal genomen positief over het programma. Het zeer hoge niveau van de masterthesis en het curriculum vormen duidelijke aanwijzingen voor de kwaliteit van het programma. De commissie komt daarom tot een globaal positief oordeel over onderwerp 2.

Inzet van personeel

The panel is very positive, concerning both the academic and the professional aspect of the staff. Teaching is principally provided by researchers who contribute to the development of the discipline. All members of the lecturing staff have important research or R&D-managerial activities in the domain that is related to the courses they teach. Most members of the teaching staff have strong interactions with the professional world or are employed full-time in a nuclear industry. This clearly contributes to the quality of the programme.

The mandatory courses are taught by 16 lecturers. The number of people, intervening in seminars or advanced courses, is changing from year to year, but typically amounts to 8-10. The 17 lecturers are nominated by one of the six partner universities. The lecturers/regular student ratio is about 17/15. Considering the ratio of the number of staff members over the number of students, the panel assesses the quantity of the staff as clearly sufficient to realise the intended quality of the programme.

The education is organised by contributions guaranteed through the interuniversity agreement: lecturers are appointed in the Faculties of Engineering of the six partner universities and teaching assistants are provided for the largest part by the nuclear research centre. The staff is highly qualified in the field of nuclear engineering to ensure that the aims and objectives of the programme are achieved. The panel appreciates the human resources policy, but it misses a substantial role of professionalization in this policy.

Voorzieningen

The panel is laudatory towards the housing and the facilities. The unique location at the research centre in Mol provides the teaching staff excellent tools to support the learning process of the students. Operating laboratory equipment, and even an operational reactor, are made available to the students for hands-on training exercises. Concerning the lecture halls, the self-study centres and the computer facilities, the panel is also satisfied. With respect to the library facilities, the panel values the fact that all students have access to the documentation resources of the home university of their choice. In addition, they can use the library of the nuclear research centre.

The panel is of the opinion that the support is adequate towards the students' needs. Globally, the amount of tutoring and the provision of information to students are adequate in view of study progress. Some lecturers do not always answer e-mails or have very long response times. The panel addresses this as an urgent need for follow-up. Students indicate that in most cases of disagreement or problems with the examinations, they find their way to the right people. The integration of exchange students is straightforward. Concerning the guidance on flexible learning paths, the panel is positive.

Interne kwaliteitszorg

Quality assurance consists, among else, of a questionnaire at the end of each course, and a meeting in alternating years, held with the stakeholders. The panel finds the instruments of internal quality assurance adequate, but it has missed a systematic approach. The evaluation of individual courses is quite limited.

The panel observes a need to improve the degree to which past targets were achieved and the degree to which the targets for the future are well founded. The panel has noted that the management of the programme is in most cases aware of the crucial critical points, like for example the problems concerning the very heavy study load. It regrets, however, that in most cases no effective and efficient initiatives were taken to remediate the problems.

Staff, students, alumni and the relevant professional field are actively involved in the internal quality assurance system. The management has succeeded in the development of an adequate culture concerning quality assurance. The panel is positive concerning the involvement of the professional field. An adequate involvement of the students is reached. The students clearly have a say in quality-assurance-related topics, including through two student representatives. In the staff, there is an overall satisfaction about their involvement.

Resultaten

The panel is very satisfied about the achieved learning outcomes, in agreement with the aims and objectives of the programme. The panel considers that the formulated goals are reached. The high quality and level of the master's theses underline this observation. The graduates themselves also seem to be satisfied. The students will acquire a solid and broad backbone in the basic aspects related to the use of nuclear phenomena for power generation. The panel finds the results of high level in the view of the formulated goals of the programme, but more effort will be needed to broaden the scope of these goals.

The panel is satisfied about the success rate of the programme. In the 9 years of existence, only 16 students (out of 110) did not finish the full programme. However, the panel wants to stress that in the future extensive attention is needed to limit the significant delay in study-progress or to align the duration of the programme to the study load. For international students, the administrative problems, housing, study accommodation and integration in a new environment are sometimes hampering study progress. The panel hopes that special care will be taken to help the newcomers with the local arrangements.

Conclusie

De NVAO is in het licht van het vorenstaande tot de slotsom gekomen dat het eindoordeel van de commissie deugdelijk is gemotiveerd. De NVAO kan zich dan ook aansluiten bij de

Pagina 6 van 10 bevindingen en overwegingen voor alle facetten en onderwerpen, zoals verwoord in het visitatierapport. De eindconclusie uit het visitatierapport wordt gevolgd.

Aanbevelingen

De NVAO onderschrijft de aanbevelingen van de visitatiecommissie, in het bijzonder de volgende:

- Align the actual study-load to the study-load expressed in study points, seize all opportunities to relieve the programme, strive for a stronger policy on admission requirements, be flexible in granting exemptions due to prior learning; and explore the possibilities of a 90-study-point-programme.

De tabel geeft per onderwerp en per facet het oordeel van de visitatiecommissie weer.

ONDERWERP	OORDEEL	FACET	OORDEEL
1 Doelstellingen opleiding	V	1.1 niveau en oriëntatie	G
		1.2 domeinspecifieke eisen	V
2 Programma	V	2.1 eisen gerichtheid	G
		2.2 relatie doelstellingen - programma	V
		2.3 samenhang programma	V
		2.4 studielast	O
		2.5 toelatingsvoorwaarden	V
		2.6 studieomvang	Ok
		2.7 afstemming vormgeving - inhoud	V
		2.8 beoordeling en toetsing	V
		2.9 masterproef	V
3 Inzet van personeel	V	3.1 eisen gerichtheid	G
		3.2 kwantiteit	V
		3.3 kwaliteit	V
4 Voorzieningen	V	4.1 materiële voorzieningen	E
		4.2 studiebegeleiding	V
5 Interne kwaliteitszorg	V	5.1 evaluatie resultaten	V
		5.2 maatregelen tot verbetering	V
		5.3 betrokkenheid	V
6 Resultaten	V	6.1 gerealiseerd niveau	G
		6.2 onderwijsrendement	V

Eindoordeel: positief

Pagina 8 van 10 **5. Globale oordelen NVAO**

De onderstaande tabel geeft per onderwerp het globaal oordeel van de NVAO weer.

ONDERWERP	ORDEEL
1 Doelstellingen	V
2 Programma	V
3 Inzet personeel	V
4 Voorzieningen	V
5 Interne kwaliteitszorg	V
6 Resultaten	V

Eindoordeel: positief

betreffende de accreditatie van de Master of Science in Nuclear Engineering (master na master) van de Katholieke Universiteit Leuven in samenwerking met Universiteit Gent en Vrije Universiteit Brussel.

De NVAO,
Na beraadslaging,
Besluit :

Met toepassing van het decreet van 4 april 2003 betreffende de herstructurering van het hoger onderwijs in Vlaanderen, wordt het accreditatierapport en –besluit met positief eindoordeel voor de opleiding Master of Science in Nuclear Engineering (master na master) van de Katholieke Universiteit Leuven in samenwerking met Universiteit Gent en Vrije Universiteit Brussel goedgekeurd en wordt de opleiding geaccrediteerd. Het betreft een interuniversitaire masteropleiding zonder afstudeerrichtingen die wordt georganiseerd te Leuven (Katholieke Universiteit Leuven), Louvain-la-Neuve (Université Catholique de Louvain), Luik (Université de Liège), Brussel (Vrije Universiteit Brussel en Université Libre de Bruxelles) en Gent (Universiteit Gent).

De in het eerste lid bedoelde accreditatie geldt vanaf de aanvang van het academiejaar 2013-2014 tot en met het einde van het academiejaar 2020-2021.

Den Haag, 30 september 2013

De NVAO
Voor deze:



Dr. A.H. Flierman
(voorzitter)

¹ Het ontwerp van accreditatierapport en –besluit werd aan de instelling bezorgd voor eventuele opmerkingen en bezwaren. Bij brief van 19 september 2013 heeft de instelling laten weten geen opmerkingen te hebben.

Pagina 10 van 10 **Bijlage 1 – Gegevens opleiding**

– naam instelling	Katholieke Universiteit Leuven
– adres penvoerende instelling:	Naamsestraat 22 - bus 5000 BE-3000 LEUVEN België
– naam instelling	Universiteit Gent
– adres instelling:	Sint-Pietersnieuwstraat 25 9000 GENT België
– naam instelling	Vrije Universiteit Brussel
– adres instelling:	Pleinlaan 2 B-1050 BRUSSEL
– aard instelling	ambtshalve geregistreerd
– graad, kwalificatie, specificatie	Master of Science in Nuclear Engineering
– niveau en oriëntatie	master na master
– studieomvang	60 studiepunten
– opleidingsvarianten	
– afstudeerrichtingen:	geen
– studietraject voor werkstudenten:	nee
– vestiging opleiding	Leuven, Gent en Brussel
– onderwijstaal	Engels
– (delen van) studiegebieden	Toegepaste wetenschappen
– bijkomende titel	geen