nvao
nederlands - vlaamse accreditatieorganisatie

Besluit

Accreditatierapport en -besluit met een positieve beoordeling van de accreditatieaanvraag voor de opleiding International Master of Science in Biomedical Engineering (master) van de Universiteit Gent in samenwerking met de Vrije Universiteit Brussel; Czech Technical University; RWTH Aachen University; Rijksuniversiteit Groningen en Trinity College Dublin.

datum
30 september 2013
onderwerp
Definitief accreditatierapport en -besluit (001687)
bijlage
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1. Inleiding

Bij brief van 29 maart 2013 heeft het instellingsbestuur van de Universiteit Gent te Gent een accreditatieaanvraag ingediend bij de Nederlands-Vlaamse Accreditatieorganisatie (NVAO) voor de opleiding International Master of Science in Biomedical Engineering (master). Het betreft een interuniversitaire opleiding die wordt georganiseerd te Gent (Universiteit Gent); Brussel (Vrije Universiteit Brussel); Praag (Czech Technical University); Aken (RWTH Aachen University); Groningen (Rijksuniversiteit Groningen) en Dublin (Trinity College Dublin). Deze aanvraag is ontvangen op 29 maart 2013 en ontvankelijk verklaard op 21 mei 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 (idem);
- Ir. Jan Bens, Directeur-generaal van het Federaal Agentschap voor Nucleaire Controle (idem);
- Prof. dr. Peter Van Petegem, gewoon hoogleraar onderwijskunde, Universiteit Antwerpen (idem) (onderwijsdeskundige);
- Dhr. Steven Lecompte, masterstudent werktuigkunde-elektrotechniek Universiteit Gent.

Secretaris:
Dhr. Jasper Stockmans en Dhr. Andreas Smets, stafmedewerkers van de Cel Kwaliteitszorg van de Vlaamse Interuniversitaire Raad (VLIR), traden op als projectbegeleider en secretaris voor deze visitatie;

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 De visitatie heeft plaatsgevonden op 3, 4 mei en 14 t/m 16 mei 2012. Het visitatierapport dateert van februari 2013.

2. Formele overwegingen

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.

Het panel heeft drie sterk verweven programma's beoordeeld en daarover in één beoordelingsrapport gerapporteerd.
Het gaat om de programma's:

- Master of Science in de ingenieurswetenschappen: biomedische ingenieurstechnieken (maBIT)
- Master of Science in Biomedical Engineering (maBIOM)
- International Master of Science in Biomedical Engineering (Erasmus Mundus) (EMmaBIOM)

In het beoordelingsrapport wordt voldoende duidelijk een onderscheid gemaakt waar dat relevant is. Het panel komt tot facet scores separaat voor de reguliere opleiding (Nederlandstalige en Engelstalige taalvariant) en het Erasmus Mundus programma. Dit rapport betreft het Erasmus Mundus programma.

Objectives

The panel assesses the aspect 'level and orientation' as satisfactory. The level and orientation of the objectives of the programme is in line with the Flemish Higher Education Act. The goals are formulated on the basis of the competence model of Ghent University, a tool provided by the central administration of the university, and which ensures the alignment with the Dublin Descriptors. The aims and objectives of the programme are, in the opinion of the panel, ambitious and they are focused on having the students achieve general (academic) competences at an advanced level, and advanced understanding of and insight into scientific, discipline-specific knowledge inherent to the domain of biomedical engineering. The panel appreciates the competence model of the UGent, which is used as a tool to ensure the alignment with the Dublin Descriptors.

The International Master of Science in Biomedical Engineering provides students with basic knowledge and skills in all fields in Biomedical Engineering, so they can be employed as generalists (mainly in year 1), but at the same time specialise them in one particular field of Biomedical Engineering in year 2.

The objectives of the programme appear to be well known by the students and staff.
The aims and objectives of the programme correspond with the requirements set by professional colleagues, both nationally and internationally, and the relevant professional field for a programme in biomedical engineering. The panel appreciates the fact that technology appears to be the main focus, in accordance with the envisioned profile of the biomedical engineer.
The learning outcomes of the academic master's programme stem from requirements set by the (international) academic practice and the practice in the relevant professional field.
Given that Biomedical Engineering is a rapidly evolving field, the panel appreciates that there is a permanent alertness for tuning the objectives, competences and programme to the needs of the profession. This is achieved via the input from an advisory board and from contacts with industrial and technological societies.
The panel also appreciates the clear formulation and argumentation concerning the objectives. In conclusion, it sees a great amount of accordance with its own reference frame.

Programme
The curriculum of the programme is an adequate realisation of the intended learning outcomes with regard to the level, orientation and discipline-specific requirements. The panel has the opinion that the programme enables the students to reach the formulated goals.
In the Erasmus mundus programme the students can choose for a certain focus via specialisation-options. On this aspect, the programme seems to be sufficiently linked to the formulated objectives. Especially, this Erasmus Mundus programme has a certain focus at Computational Fluid Dynamics (UGent) and/or Radiation Physics (VUB), which deserves the appreciation of the panel.
The panel appreciates the fact that a competence matrix is used in order to achieve a good representation of the intended learning outcomes. This enables the management of the programme to provide a quick overview of how the programme realise the envisioned competences, and how each course contributes to them.
The panel is satisfied concerning internationalisation. It noticed that there is clearly the necessary attention for student mobility.
The panel is positive about the way the students develop their knowledge through the interaction between education and research. The programme aims at providing the graduates with the intellectual tools and techniques to apply the acquired knowledge in the many sectors where this knowledge is required. They also aim at stimulating the students towards the academic attitude of searching for links between the courses and (re)organising and reformulating knowledge in their own way.
Where appropriate, the curriculum has verifiable links with the current relevant professional practice. The management of the programme takes the necessary initiatives to ensure the alignment to the aspired ambitions of the professional field. Especially the clear clinical input deserves the appreciation of the panel.
The panel is positive about the coherency in terms of content of the curriculum.
The Erasmus Mundus master programme, coordinated by University of Groningen and in collaboration with Trinity College Dublin, RTWH Aachen and Technical University of Prague,

is structured such that students follow the first year programme in one of these institutions, get a general background, and then switch to another institution where they select a specialisation. The panel is aware that this interuniversity cooperation could also potentially threaten the coherence of the programme. However, it observed during the visit that this threat does not manifest itself in the form of a lack of consistency.
Further initiatives are needed to achieve a more optimal alignment of the programme to the diversity in profiles of incoming students. The first master year offers only a limited number of elective courses.
In the Erasmus Mundus Programme students in the second year choose the institution depending on the specialisation being offered. Concerning this programme more attention is urgently needed to avoid the risk of loss of coherency in the individual paths of the students. Also the different locations pose, as mentioned above, a threat towards the consistency of the programme. The panel appreciates the current approach, but in the light of the complex organisation of this programme, thinks that a more strict monitoring by the staff could be beneficial.
However there is a policy to safeguard the coherence. Overlap between different courses is minimised through intensive consultation between the different lecturers. The follow-up of management of the programme is adequate, but continued attention will remain necessary.
The actual duration of the programme is assessed and corresponds with the statutory standards. Concerning study time measurements there are no specific data available for the International Master of Science in Biomedical Engineering due to its recent start. The panel understands this and has faith in the fact that in future the necessary initiatives will be taken.
The panel observed that the educational concept is in line with the aims and objectives of the programme. Although the panel noticed some variation in the quality of the resources, the educational forms and resources correspond grosso modo with the educational concept. The panel is very positive about some courses, but the panel also sees an urgent need for improvement for those cases where only slides of meagre quality are used. The panel appreciates the extensive use of English articles. Still, the panel notes that further efforts will be necessary, in order to minimise the variation in the quality of the educational resources provided by different lecturers.
Concerning the educational forms, the panel is positive on the whole line. It sees a great amount of variation in forms. Ex-cathedra classes, exercise- sessions, practical work, lab-sessions, project work, pc-sessions, and other forms which generate hands-on experience, occupy an important place. The students of the Erasmus Mundus programme address the issue of educational forms even as a strong point towards other involved universities.
The panel is satisfied with the quality of the evaluation methods and with the variety of evaluation forms. The students are assessed in an adequate manner which is insightful to them to determine whether they have achieved the intended learning outcomes.
The panel values the presence of clear interuniversity exam regulations, but the concrete organisation of exams leaves room for improvement in the context of the interuniversity collaboration.
At last the panel is positive about the transparency of the evaluation. It is common practice among lecturers to provide sample exam questions and to provide details about how the exams, projects, and other evaluations are weighed in the final score.
The master programme is concluded with the master's thesis whereby the students demonstrate the ability for analytic and synthetic reasoning, and independent problem solving at an academic level. The panel has studied a representative selection of theses and sees that the general critical reflective attitude and the research attitude of the students are reflected in the end products. In the Erasmus Mundus programme a higher number of credits is attributed to the master's thesis (5 credits for a preparatory course and 30 credits

for the thesis itself), which is not clearly reflected in demands towards the master's thesis. The panel asks to align more closely the requirements to the number of credits attributed to the master's thesis, in order to ensure a clear reflection of the demands
For the Erasmus Mundus Master, a careful selection procedure is developed. To ensure the quality of the programme, the admission to CEMACUBE is granted to applicants who meet detailed selection criteria (Bachelor in engineering or equivalent and sufficient English proficiency) and is limited to 20 students per consortium university.

Staff
The staff deployed is sufficiently qualified to ensure that the aims and objectives of the programme, in terms of content, didactics and organisation, are achieved. The responsibility for the content and the organisation of the courses is in the hands of the tenured faculty professors (ZAP). For a number of courses the responsibility is shared with other tenured faculty or post-doctoral researchers. The responsible lecturers are usually members of the ZAP, or sometimes post-doctoral associates.
In the International Master of Science in Biomedical Engineering, the students are educated at two different universities (first master year at one university and second master year at another) from the five partners. Here also, teaching staff is affiliated with different faculties.
The panel is positive about the human resources management. In the Erasmus Mundus programme, the appointments, promotions, evaluations and guidance of the staff at the different partner universities are mainly based on a combination of the research performance, the generation of grant income and teaching evaluations. The relative importance of each factor depends on the university and faculty.
The panel notes that the staff has the necessary didactical competences, but asks for a continuous refinement of these competences, by means of more attention to professionalization of the staff.
The lecturers who are ZAP personnel appear to have an important research activity in a domain that is still in development.
The panel understands that teaching is mainly provided by researchers who contribute to the development of the discipline of biomedical engineering. But the discipline itself is currently still in expansion. In this context, the panel is satisfied by the academic dimension of the staff and is also positive about the relation between education and research. The staff is clearly competent and also covers sufficient parts of the discipline.
In the Erasmus Mundus programme, the role of the partners in the programme is mainly defined by their research expertise, which is particularly visible in the specialisations offered in the second master year. According to the panel, this expertise is complementary between the different institutions and labs involved.
The panel is positive about the knowledge of and insight in the professional field. There is a sufficient amount of clinical input and a clear link with the global professional field. The panel also understands that the management of the programme take the role, which they can play in the further development of the field, very serious. The panel learned that in this context interesting initiatives are already taken. Concerning future optimisation, the panel advises to ensure a close monitoring of the further enhancement of the contacts with the industry. The research activity of the ZAP members (and of many BAP members) is for a large part in collaboration with industrial partners.
The panel assesses the quantity of the staff as positive. Clearly sufficient staff are deployed to realise the intended quality of the programme and to provide the opportunities for the students to reach the goals. The panel also sees that there is a good balance between research and education, in the job description of the different categories of staff.

Facilities and Guidance

The panel assesses the housing and facilities as clearly adequate for the realisation of the curriculum. The different labs are spread over the involved research groups. Especially the labs and the equipment deserve the valuation of the panel. The departments supporting the education have an extensive scientific research activity, and, for some exercises and projects, students use the same laboratory equipment which is used in daily medical practice and research. All the labs at the different faculties are clearly up to date. Especially the equipment concerning image-acquisition is very positively valuated by the panel. The panel is also positive about the fruitful cooperation with the UZ in Ghent and the strong involvement of the faculty of medicine.

The panel is also positive about the other student and teacher facilities, both in terms of quality as in terms of accessibility. The panel learned during the meetings with the students that there is a great amount of satisfaction concerning the computer-facilities.

All lecture rooms are fully equipped (pc, fixed projector, screen, blackboard). The teaching facilities deserve the appreciation of the panel.

The library facilities also deserve the appreciation of the panel.

The panel assesses the provision of information to students as adequate in view of study progress and in view of the students' needs, including the provision of information before the start of the master programme. Because the incoming students have different backgrounds, there are some services available to support the new incoming students in the master programme.

For the students in the International Master of Science in Biomedical Engineering information is available through the Erasmus Mundus website, Minerva and a dedicated information brochure that is mailed to the students prior to their arrival in Ghent. The Engineering faculties of both the UGent and the VUB provide students with information and advice. Students requesting information about a certain master programme, can contact the teaching staff or the chairman of the Programme Board.

The guidance and tutoring of the students are adequate. The close contact with the AAP- and also the ZAP-members, is fruitful in this context.

Concerning the International Master of Science in Biomedical Engineering, all partner institutions in the Erasmus Mundus consortium have extensive experience in working with international students. At each of the partner universities, the International Offices (both at central and faculty level) are the contact point for international students. Here, students are provided with all the necessary information and material on the structure of the university, its academic programmes and extra-curricular offerings.

Internal Quality Assurance

For the International Master of Science in Biomedical Engineering, local quality assurance plans of participating universities are very similar and easy to harmonise. Concerning the International Master of Science in Biomedical Engineering, the local Programme Boards and Management Committee are responsible to ensure the adequate implementation of the programme. They also installed an independent committee to supervise the quality of the programme. This IPAC is composed of representatives from the world of Biomedical Engineering with an educational, research, industrial, hospital and health insurance background. The committee judges the quality of the programme, both on the organisational aspects as on the programme content and provides feedback to the Management Committee.

At present, there are three important instruments with which the education quality is actively measured: the educational evaluation survey, the study programme evaluation and the

study time measurements. Another important feedback loop, the curriculum monitoring, acts on a higher level and takes into account the outcomes of all measurement instruments.
For the International Master of Science in Biomedical Engineering, the evaluation and quality assessment of individual courses is done using the existing mechanisms in the participating institutions. The Technical Secretariat of the coordinating university (University of Groningen) also organises separate informal evaluations of the programme.
Given the very recent start of the Erasmus Mundus programme, no students have graduated yet and there are no data available as to whether the original targets are effectively realised. Nevertheless, the panel is positive about the thoughtfulness of the management of the programme towards future improvement. The outcomes of the evaluations clearly form the basis for verifiable measures for improvement that contribute to the achievement of the objectives. The panel also values the fact that there is a positive attitude towards improvement on the informal level, complementary with the formal approach. In conclusion, the panel states that there is a very fast response towards improvement.
The panel appreciates the quality of the self-assessment report, although it is of the opinion that it is too extensive in size. The panel was satisfied with the openness during the visit.
The staff is in an adequate manner involved with the quality of the programme. The panel is very satisfied with the vivid dynamics it observed within the staff. Concerning the International Master of Science in Biomedical Engineering the situation of student participation is evidently more difficult, but the involvement of students is achieved on the local level via participation in evaluation sessions at the institution where they reside. In addition, the coordinating university, takes global student surveys via its Technical Secretariat, to probe for student satisfaction regarding the programme contents and structure, but also regarding matters of a more practical and organisational nature.
In the International Master of Science in Biomedical Engineering, there are no alumni yet. Involvement of the labour market is achieved via the International Programme Advisory Committee, internships of students, and project work in collaboration with industry.

Results
Concerning the Erasmus Mundus programme, the programme is clearly appreciated by the students and the alumni and matches the expectations of the students (in line with what is formulated in the goals).
The panel is hopeful about the level of the future theses. Although there were no second year students in the Erasmus Mundus programme at the time of the visitation, the panel sees no indications that the intended level will not be reached. The adequate preparation, guidance and evaluation, strengthen the panel in the conviction that the academic level is high.
The students are positive about the way and intensity they are prepared to enter the job market, about their future employment profile and the content and level of their employment.
Given the fact that, at the time of the visitation, no students had graduated yet from the Erasmus Mundus programme, so far there is not yet a clear image of pass rates, student advancement and average study duration and assessment. However, the panel believes that the policy of the study programme with respect to the study progress, should in principle be satisfactory in view of limiting delays in study progress.

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

4. Oordelen visitatiecommissie

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	V
		1.2 domeinspecifieke eisen	G
2 Programma	V	2.1 eisen gerichtheid	V
		2.2 relatie doelstellingen - programma	V
		2.3 samenhang programma	V
		2.4 studielast	V
		2.5 toelatingsvoorwaarden	G
		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	G
		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	V
		6.2 onderwijsrendement	V

Eindoordeel: positief

5. Globale oordelen NVAO

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

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

Eindoordeel: positief

6. Besluit[1]

betreffende de accreditatie van de International Master of Science in Biomedical Engineering (master) van de Universiteit Gent in samenwerking met de Vrije Universiteit Brussel; Czech Technical University; RWTH Aachen University; Rijksuniversiteit Groningen en Trinity College Dublin.

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 International Master of Science in Biomedical Engineering (master) van de Universiteit Gent goedgekeurd in samenwerking met de Vrije Universiteit Brussel; Czech Technical University; RWTH Aachen University; Rijksuniversiteit Groningen en Trinity College Dublin en wordt de opleiding geaccrediteerd. Het betreft een interuniversitaire opleiding zonder afstudeerrichtingen die wordt georganiseerd te Gent (Universiteit Gent); Brussel (Vrije Universiteit Brussel); Praag (Czech Technical University); Aken (RWTH Aachen University); Groningen (Rijksuniversiteit Groningen) en Dublin (Trinity College Dublin).

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

Voor de NVAO,

A.H. Flierman
(voorzitter)

[1] Conform de bepalingen vermeld in de handleiding accreditatie kan een instelling opmerkingen en bezwaren formuleren op het ontwerp van accreditatierapport. Bij <e-mailOFbrief> van <datum> heeft de instelling gereageerd op het ontwerp van accreditatierapport. Dit heeft geleid tot enkele aanpassingen in het accreditatierapport.

 Bijlage 1 – Gegevens opleiding

– naam instelling	Universiteit Gent
– adres instelling:	Sint-Pietersnieuwstraat 25 9000 GENT BELGIË
	Rijksuniversiteit Groningen Vrije Universiteit Brussel RWTH Aachen University Czech Technical University Trinity College Dublin
– aard instelling	ambtshalve geregistreerd
– graad, kwalificatie, specificatie	International Master of Science in Biomedical Engineering
– niveau en oriëntatie	master
– studieomvang	120 studiepunten
– opleidingsvarianten	
– afstudeerrichtingen:	geen
– studietraject voor werkstudenten:	nee
– vestiging opleiding	Gent, Brussel, Praag, Aken, Groningen, Dublin
– onderwijstaal	Engels
– (delen van) studiegebieden	Toegepaste wetenschappen
– bijkomende titel	burgerlijk ingenieur