nvao
nederlands - vlaamse accreditatieorganisatie

Besluit

Definitief equivalentie- en accreditatiebesluiten met positief eindoordeel voor de 5 (international) masteropleidingen in de ingenieurswetenschappen van de faculteit Ingenieurswetenschappen en Architectuur aan de Universiteit Gent

datum
12 juli 2017
onderwerp
Definitief equivalentie- en accreditatiebesluiten MSc in de ingenieurswetenschappen van de Universiteit Gent (005540 – 005544)
bijlagen
2

Oordeel van de accreditatieorganisatie

De Commission des titres d'ingénieur (CTI) heeft vastgesteld dat de volgende opleidingen in de ingenieurswetenschappen van de faculteit Ingenieurswetenschappen en Architectuur aan de Universiteit Gent voldoen aan de generieke kwaliteitswaarborgen:

- Master of Science in Chemical Engineering / Master of Science in de ingenieurswetenschappen: chemische technologie (master) (005540);
- Master of Science in Engineering Physics / Master of Science in de ingenieurswetenschappen: toegepaste natuurkunde (master) (005541);
- Master of Science in Textile Engineering (master) (005542);
- International Master of Science in Fire Safety Engineering (master) (005543), *i.s.m. University of Edinburgh en Lund University*;
- International Master of Science in Biomedical Engineering (master) (005544), *i.s.m. Vrije Universiteit Brussel, Czech Technical University Praque, RWTH Aachen University, Rijksuniversiteit Groningen, Trinity College Dublin*.

Samenvatting van de beoordeling

General presentation

Ghent University is a major university in Belgium, offering courses to 41,000 students under 11 different faculties that cover the full spectrum of academic disciplines. It distinguishes itself as a socially committed and pluralistic university that is open to all students, regardless of their ideologies, political opinions or cultural or social background, and scores highly in international rankings.

The Faculty of Engineering and Architecture (FEA) is one of the 11 faculties, established by Napoleonic Decree based on the French *Corps des Ponts et Chaussées* system. It integrated Ghent University in 1835.
The range of engineering specialisations has gradually increased to cover needs in industry and society.

The FEA offers a 5-year integrated programme structured according to the Bologna Accords, with a 3-year Bachelor's degree followed by a 2-year Master's programme.
The faculty currently has 7 Bachelor's programmes and 17 Master's programmes mostly leading to a Bachelor of Science in Engineering and Master of Science in Engineering.

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
info@nvao.net | www.nvao.net

General characteristics

The FEA is well integrated into the University, and has the independence needed to define its own missions while taking into account the specific needs of engineering training, and to reach its objectives.

Ghent University and the FEA define themselves as research-driven schools, and the FEA's education missions are based on the following principle:
To educate and prepare students so that they are able to solve complex problems, based on a solid technological and scientific background, and with a readiness to adopt and develop new methods and knowledge.

The FEA aspires to train highly skilled engineers able to adapt quickly to global technological and economic changes, and contribute to the long-term socioeconomic development of Flanders and Belgium.

Doctoral and postdoctoral researchers advise students during their Masters studies, bringing them into close contact with current research practices and results.
The FEA staff are involved in cutting edge research and ERC and Methusalem grants are commonplace. Start-ups and spin-offs are well-developed and a longstanding tradition at Ghent University.

Changes to the institution

In 2013-2014, industrial engineering programmes (4-year degrees in Flanders) were integrated into the FEA as the result of a 7-year integration process. CTI did not examine these programmes (Bachelor and Master of Engineering Technology) under this evaluation.
The language of instruction has been Dutch since 1930. However, in 2012, language legislation became less restrictive and since the 2013-2014 academic year, all engineering programmes except Architecture have been taught in English.

As part of the "Creative Knowledge Development" initiative, the FEA has created programmes available to all students that foster innovation, entrepreneurship and entrepreneurial skills.

Over the last several years, these programmes have given students the opportunity to take part in internships and gain hands-on experience. Unfortunately, this is not a widespread practice in all programmes.

The FEA has also developed a "Project track" which applies throughout the whole 5 years of programmes, but cross-disciplinary aspects still need to be improved.
Several initiatives have been developed by the FEA and/or students to inform secondary students about engineering studies and careers in an effort to encourage them to enrol in engineering studies.

Programme contents (All the Masters are taught in English)

Master en Sciences de l'Ingénieur en Ingénierie Physique - Master of Science in de ingenieurswetenschappen: toegepaste natuurkunde - Master of Science in Engineering Physics

The Master of Science in Engineering Physics (SEP) aims to prepare students for research and development tasks with foundations in physics both in industry and research labs but also have the skills to set up and lead industrial production departments.

The claimed objectives are the training of "engineers who are well versed in the reductionist approach, in which experimentation and mathematical modelling are aimed at reducing the physical phenomena to their essence and to ascertain the physical laws"[1].
The emphasis is put on scientific excellence and on teaching based on research, so that about 70% of the graduates pursue a Ph.D.

Master International en Sciences de l'Ingénierie Biomédicale - International Master of Science in Biomedical Engineering
Graduate Engineers in these Masters programmes develop knowledge and know-how with regard to materials, equipment, tools and resources, systems and methods for prevention, diagnosis and treatment of disease, to improve healthcare and the quality of life of individuals

Master International en Sciences de l'Ingénierie de la sûreté du feu - International Master of Science in Fire Safety Engineering
The main objective of this 4-term International Master of Science in Fire Safety Engineering (IMFSE) programme is to provide graduates with a first-rate education so that they can emerge as leading experts in the field of Fire Safety Engineering (FSE) all over the world. This programme moved to an Erasmus Mundus Master in partnership with Lund University and the Edinburgh University, Ghent University being the Programme's Coordinator. It currently has about 20 Students / year under the ERASMUS+ label. The ETH Zürich and the University of Queensland (Australia) have now joined the founders' Consortium as associated partners and the University of Maryland is in the process of joining as well.

Master en Sciences de l'Ingénieur en Génie Chimique - Master of Science in de ingenieurswetenschappen: chemische technologie - Master of Science in Chemical Engineering
The Master of Sciences in Chemical and Materials Engineering aims to deliver broadly trained engineers. The master's programme and associated research activities are focused on Reactions and Catalysis with a strong reputation in reactor technology and kinetic modelling.

Master en Sciences du Génie Textile - Master of Science in Textile Engineering
This master is aimed at training textile engineers with a good knowledge of the structure and properties of textiles and the production and processing methods of various fibre-based structures. Textile engineers should be duly capable of efficiently and methodically optimising production methods and processes as well as purposefully designing new and/or improved textile materials including sustainable materials and processes.
The Master in Textile Engineering builds an international and highly advanced programme in which the latest developments in the textile field are incorporated. Textile education is brought in a multidisciplinary way and the strengths of the most renowned textile education specialists in Europe are brought together.

---

[1] This position is unique in the field of engineering, where "complexity" and "undefined environment" are the most common keywords.

 Evaluation summary

The audit and SER led the team to general conclusions:

Strengths of FEA

- Students appreciate the strong friendships and relations between staff and students
- Laboratories are well recognised and of high scientific quality, managed by highly skilled scientific staff
- Innovation and entrepreneurial skills have been strongly developed: "Student entrepreneurs" is well designed and organised
- Project track is available for all students
- Project team work analysis is a good initiative and could be shared between programmes
- Student association initiatives are noteworthy. They implement real successful initiatives to create ties with industry
- Employment opportunities are excellent for all the master's programmes

Weaknesses of FEA

- Too few students from Belgium and from abroad with respect to the staff potential of the FEA
- Course evaluation methodology should be examined to get even more feedback
- Programmes taught in English do not attract enough students, promotion is necessary
- Not enough outbound mobility, however these students could be the best publicity for the FEA
- The role of Advisory Groups could be enhanced
- More guidance for the students in building their career project could be of great use
- Follow-up with alumni from each programme could be improved

Risks

- Strategic vision of the FEA does not appear clear in particular with respect to:
- Mobility, international students and internships that are unequally developed depending on the programmes

Opportunities

- Set up multidisciplinary projects across departments or faculties in favour of cross-fertilization
- Increase the share of successful experiments and best practices such as new teaching practices
- To attract more Belgian students, use companies to increase numbers and send more students into secondary schools
- Send teachers for training in industry to better understand companies and strengthen ties
- Improve coordination between the bottom-up approach used to design the programmes and learning outcomes
- Promote English-taught programmes through marketing and branding

The recommendations for each programme are as follows:

Master en Sciences de l'Ingénieur en Ingénierie Physique - Master of Science in de ingenieurswetenschappen: toegepaste natuurkunde - Master of Science in Engineering Physics

- Re-examine the fundamentals of the programme, giving it a more skilled-based approach and a deeper relevance to engineering (in the content and in the teaching methods)
- The programme has scientific and technical excellence objectives based on the teaching of the modern theories of physics (reductionist paradigm)
- The students benefit from the broader education in engineering provided by the Bachelor of Engineering physics, with in particular the "project track", which provides efficient training to the "problem solving" approach.
- The common core of basic physics constitutes one third of the curriculum, the rest being elective courses. This "à la carte" organization does enable specific graduate profiles to be defined. One may question why clusters of elective specialised courses overlap with the programmes of other masters.
- The lack of defined graduate profiles -beyond scientific excellence- does not favour communication to the public and employers on the benefits of this programme.
- There is little place left for soft skills in the curriculum and they are not a priority for teachers.

Master International en Sciences de l'Ingénierie Biomédicale - International Master of Science in Biomedical Engineering

- The creation of the Steering Committee in order to develop the Strategic Vision is positive and the formal and thorough analysis of soft skills developed during the Master 2 Project is to be underlined
- The forthcoming objective to participate in a mandatory internship is to be encouraged
- The visibility of the Biomed programme needs to be improved:
  - The creation of a dedicated stream at the Bachelor level, currently being discussed within the Steering Committee, would certainly contribute
  - The Students initiatives to promote the programme in High Schools should be encouraged
  - Initiatives to increase visibility within industry, to better understand industry needs, have to be strengthened
  - The programme course has been adapting quickly over the years since its creation less than 10 years ago. The Strategic Vision will define the Programme signature to be promoted with various stakeholders (Hospitals, Companies, Students, etc.) in the future
- International visibility (beyond the International Master partners) and foreign recruitment deserve to be improved as part of a reinforced FEA policy in this area

Master International en Sciences de l'Ingénierie de la sûreté du feu - International Master of Science in Fire Safety Engineering

- Very good and unique programme at the Master's level, delivering strong multicultural background
- Both students and alumni seem very active and well prepared for the professional world
- Would be worthwhile make projects more cross-disciplinary
- Some parts of the Programme seem rather theoretical with few or no lab experiments
- The programme's staff need to develop new sponsorships in order to secure the future when the Erasmus+ support ends.

Master en Sciences de l'Ingénieur en Génie Chimique - Master of Science in de ingenieurswetenschappen: chemische technologie - Master of Science in Chemical Engineering

- Establish an ambitious vision for the future of the Chemical Engineering Master and clarify the student recruitment strategy
- Actively promote the programme both in Belgium and abroad and further develop outbound mobility
- Increase the awareness of process safety throughout this programme
- Include a hands-on execution phase for the business project

Master en Sciences du Génie Textile - Master of Science in Textile Engineering

- This is an international master's programme over 100 students participating since it opened. It is well recognised in the specialised area of textile engineering.
- However relations and the role of the various partner universities are not well-defined. The involvement of the partners is not well-promoted. For instance, this master is not described on the websites of most of the partner universities.
- This master is now in competition with the Textile Major of the Science in Sustainable Materials Engineering programme.
- The students enrolled at Ghent University easily found jobs. No information is available about the other students from partner universities.

Aanbevelingen

De NVAO onderschrijft alle aanbevelingen geformuleerd door deze accreditatieorganisatie.

Bevindingen NVAO

De NVAO verklaart de accreditatiebesluiten van CTI equivalent op basis van de volgende vaststellingen:

- De buitenlandse accreditatieorganisatie geeft een positieve beoordeling van de kwaliteit van de betrokken opleidingen;
- De buitenlandse accreditatiebesluiten zijn voldoende actueel;
- De buitenlandse accreditatiebesluiten zijn gebaseerd op een openbare externe beoordeling;
- De buitenlandse accreditatieorganisatie is EQAR-geregistreerd;
- De buitenlandse accreditatieorganisatie heeft een methodologische aanpak vergelijkbaar met de Vlaamse.

Besluit[2]

betreffende de equivalentie- en accreditatiebesluiten met positief eindoordeel voor 5 (international) masteropleidingen in de ingenieurswetenschappen van de faculteit Ingenieurswetenschappen en Architectuur aan de Universiteit Gent.

De NVAO,
Na beraadslaging,
Besluit:

Met toepassing van de Codex Hoger Onderwijs, in het bijzonder de artikel II.149, besluit de NVAO accreditatie te verlenen aan de volgende opleidingen:

- Master of Science in Chemical Engineering / Master of Science in de ingenieurswetenschappen: chemische technologie (master) (005540);
- Master of Science in Engineering Physics / Master of Science in de ingenieurswetenschappen: toegepaste natuurkunde (master) (005541);
- Master of Science in Textile Engineering (master) (005542);
- International Master of Science in Fire Safety Engineering (master) (005543), *i.s.m. University of Edinburgh en Lund University*;
- International Master of Science in Biomedical Engineering (master) (005544), *i.s.m. Vrije Universiteit Brussel, Czech Technical University Praque, RWTH Aachen University, Rijksuniversiteit Groningen, Trinity College Dublin.*

De accreditatie geldt, overeenkomstig de door CTI aangegeven periode van zes jaar, van 1 september 2016 tot en met 31 augustus 2022.

Den Haag, 12 juli 2017

De NVAO
Voor deze:

Marc Luwel
(bestuurder)

---

[2] Het ontwerp accreditatiebesluit werd aan de instelling bezorgd voor eventuele opmerkingen en bezwaren. De instelling heeft geen gebruik gemaakt van de gelegenheid om te reageren.

 Bijlage 1: Basisgegevens over de instelling en de opleidingen

Naam instelling	*Faculteit Ingenieurswetenschappen en Architectuur* – Universiteit Gent J. Plateaustraat 22 B-9000 GENT *In samenwerking met:* – Vrije Universiteit Brussel; – Czech Technical University; – RWTH Aachen University; – Rijksuniversiteit Groningen; – Trinity College Dublin
Aard instelling	Ambtshalve geregistreerd
Naam associatie	Associatie Universiteit Gent

Naam opleidingen	– Master of Science in Chemical Engineering / Master of Science in de ingenieurswetenschappen: chemische technologie (005540); – Master of Science in Engineering Physics / Master of Science in de ingenieurswetenschappen: toegepaste natuurkunde (005541); – Master of Science in Textile Engineering (005542); – International Master of Science in Fire Safety Engineering (005543), *i.s.m. Lund University en University of Edinburgh;* – International Master of Science in Biomedical Engineering (005544), *i.s.m. Vrije Universiteit Brussel, Czech Technical University Prague, RWTH Aachen University, Rijksuniversiteit Groningen en Trinity College Dublin.*
Niveau en oriëntatie	Master
Bijkomende titel	Master of Science: Burgerlijk ingenieur
Opleidingsvarianten: – Afstudeerrichtingen: – Studietraject voor werkstudenten:	 – Geen – Geen
Onderwijstaal	Engels (met Nederlandstalige variant)
Studieomvang (in studiepunten)	120 studiepunten
Studiegebied(en)	Toegepaste Wetenschappen

ISCED benaming studiegebied	05: Natural sciences, mathematics and statistics 053: Physical sciences 0533: Physics 07: Engineering, manufacturing and construction 071: Engineering and engineering trades 0711: Chemical engineering and processes 072: Manufacturing and processing 0722: Materials 0723: Textiles 073: Architecture and condtruction 0732: Building and civil engineering 09: Health and welfare 091: Health 0914: Medical diagnostic and treatment technology 10: Services 103: Security services 1032: Protection of persons and property

Bijlage 2: Samenstelling van het accreditatiepanel

Voorzitter:

- A. (Anne-Marie) Jolly, CTI member and co-chair;
- G. (Gabriel) Henrist, CTI member and co-chair;
- B. (Bernard) Remaud, CTI expert, chair;

Leden:

- D. (Denis) LeMaitre, CTI expert;
- M. (Marie-Jo) Goedert, CTI Expert;
- A. (Anne) Perwuelz, CTI Expert;
- C. (Cédric) Belloc, CTI International expert;
- J. (Jean) Le Quenven, CTI expert;
- J. (Joost) Walraven, CTI international expert;
- A. (André) De Herde, CTI international expert;
- R. (Roland) Vidil, CTI expert;
- B. (Bertrand) Bonte, CTI expert;
- L. (Laurent) Bédat, CTI expert;
- J. (Jean-Louis) Allard, CTI expert;
- D. (Daniele) Choueiry, CTI international expert;
- D. (David) El Baze, CTI student expert