MASTER OF SCIENCE IN PHARMACEUTICAL ENGINEERING

GHENT UNIVERSITY

PROGRAMME ACCREDITATION CUSTOMISED TO OWN CONDUCT • ASSESSMENT REPORT

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Content

1 Abstract

The panel issues a positive advice to the NVAO Board for the accreditation of the Master of Science in Pharmaceutical Engineering of Ghent University. The programme is an interdisciplinary master's programme that is unique in Flanders/Belgium, and has a clear and relevant structure and content, including the multidisciplinary design, active learning methods and a solid, research-based approach. The involvement of two faculties with solid research groups contributing to the curriculum, is a strong aspect of the programme.

The panel values the programme's commitment to continuous improvement, which is essential in an environment that evolves as rapidly as the pharmaceutical industry. The teaching and assessment methods appear well suited to support this vision. The panel considers it a major strength that students with different academic and cultural backgrounds work closely together throughout the programme, which mirrors the reality of the professional field.

The main topics discussed concerned the governance of the programme, the admission criteria and composition of the student cohorts, student progression and success rates, the graduate profile, the link with and involvement of the industry, the attention for broader professional and soft skills and the master's thesis.

The panel is convinced that a more structural collaboration with the pharmaceutical industry would be fruitful in optimising the programme, ensuring it remains up to date and aligned with rapid technological developments in the field. **The panel therefore recommends activating the Advisory Board in the short term**.

The panel also **recommends further improving the current admission process for international students and investigating how to increase enrolment from local students**. The panel understood that since the launch of the master's programme the selection process for international students has been fine-tuned to ensure that students allowed into the programme have a sufficient knowledge of the key domains to successfully progress and graduate. It recommends taking ongoing efforts a step further and enhancing pathways to ensure a balanced mix of local and international students in the master's programme.

2 Methodology

2.1 Composition of the panel

In accordance with the assessment framework 'programme accreditation tailored to institutional autonomy', the NVAO appointed an assessment panel consisting of four experts. The panel is composed as follows:

- Prof. Dr. Ann De Schepper (chair) – Dean of the Faculty of Business and Economics and former vice-rector for Education, University of Antwerp.
- Prof. Dr. Gert Fricker (panel member) – Director of the Institute of Pharmacy and Molecular Biotechnology at the Faculty of Engineering of the University of Heidelberg, Germany; co-founder of Heidelberg Delivery Technologies GmbH, HeiDelTec.
- Karen Delabie (panel member) - Senior R&D product developer at Medgenix Benelux
- Lin Desmit (student panel member) – Student Master of Bioscience Engineering: Human Health Engineering, student representative.

The panel was supported by Nafal Hostens, process coordinator and policy advisor at NVAO, and Anja Detant as external secretary.

All panel members have signed the NVAO Code of Ethics and have been trained for their assignment by the NVAO. The panel collectively possesses all expertise required for this assessment.

2.2 Methods of investigation

The assessment was carried out in accordance with the framework *'programme accreditation customised to own conduct'* of June 2020, as endorsed by the Flemish Government on 27 November 2020.

Once the application submitted by the institution had been declared admissible, NVAO appointed the above-mentioned panel. This panel was approved by NVAO's Executive Board. The institution did not raise any objections regarding the composition of the panel.

The panel prepared for the assessment based on the documents provided by the programme. Prior to the dialogue, the panel drew up an investigative proposal. Each panel member analysed the materials supplied and formulated an initial appraisal based on this analysis. The panel then consolidated these individual inputs into a single coherent investigative proposal, delineated with priority themes and questions.

During the preparatory activities, the panel discussed all information obtained and prepared the dialogue with the institution and the programme.

Using NVAO's Appreciative Approach, the panel further explored the programme's context during the dialogue on the 2nd of April 2026 and investigated its achieved quality. During the concluding activities, the panel discussed all information gathered and translated this into a holistic judgement. The panel reached this conclusion with full independence.

All available information was incorporated into a draft assessment report. The chair of the panel formally endorsed the report after all panel members had agreed to its contents. The assessment report endorsed by the chair was subsequently submitted to the NVAO.

3 Investigative proposal

The panel examined the self-evaluation report (SER) and all the additional documentation submitted for the assessment. It established a first appreciation based on this analysis. This first appreciation reflected on the strengths of the programme and the themes that needed to be explored in more depth during the dialogue with the programme.

3.1 First appreciation

The panel appreciated the well-structured SER, with comprehensive information on the overall vision and learning objectives of the programme, aligned with the professional field. The programme structure and content were well explained, including the multidisciplinary design, active learning methods, and a solid, research-based approach.

The Master of Science in Pharmaceutical Engineering is a two-year, English-taught interdisciplinary programme with a study load of 120 credits. The programme brings together pharmaceutical and engineering competences and combines expertise across the Faculties of Pharmaceutical Sciences and Bioscience Engineering. The involvement of two faculties with solid research groups contributing to the curriculum is a strong aspect of the programme.

The programme also demonstrates a well-developed and coherent internationalisation strategy. International collaboration is embedded throughout the programme, building on a diverse international student body, globally oriented staff expertise, and strong personal networks with multinational pharmaceutical and chemical companies.

The SER clearly demonstrates the relevance of the programme and the needs that it intends to respond to. These originate directly from the pharmaceutical industry, which increasingly requires generalist profiles who can bridge pharmaceutical knowledge (regulations, innovation, development) with engineering expertise in complex, automated and digitalised production environments.

The panel confirms that the competencies required to fulfil this role are well-described in the Domain Specific Learning Results (DLRs). The alignment of the programme with industries' needs is also clearly reflected in the programme structure, where the focus goes beyond process engineering and puts strong emphasis on sustainability, data collection, digitalisation, and continuous innovation. Given the fast-changing context of pharmaceutical regulations, emerging innovative therapies and the overall dynamic nature of the sector, the panel values this approach.

Based on the information in the SER, the panel also appreciated the capacity for self-reflection and concludes positively regarding the quality assurance system in which the programme is embedded. The system demonstrates a focus on continuous improvement, student engagement, use of feedback for the enhancement of the curriculum, and the acknowledged importance of a more structural dialogue with stakeholders from the professional field.

The systematic review of the curriculum and course content, the structured collection of student feedback, and the active monitoring of trends and evolutions within the pharmaceutical sector appear highly relevant and valuable. These practices support continuous alignment of the curriculum with the rapidly evolving needs of the pharmaceutical industry and contribute to the delivery of up-to-date, practice oriented academic education.

The information provided was also convincing regarding the research expertise of the staff involved in the programme, and the quality assurance system in which the programme is embedded. These aspects were considered positive and clearly satisfactory, and thus not explored further during the dialogue.

The panel also identified several aspects requiring clarification and some critical elements for further examination.

3.2 Thematic areas

The following topics defined the lines of the panel's investigation and were discussed in more detail during the site visit.

3.2.1 Programme governance

The master in Pharmaceutical Engineering integrates in one interdisciplinary programme the pharmaceutical and engineering knowledge present at respectively the Faculties of Pharmaceutical Sciences and Bioscience Engineering of Ghent University. Given that the programme is a product of two distinct Faculties, the panel wanted to hear from the programme management how the programme is managed in practice and how the Programme Committee functions. The panel was also interested in understanding who is involved in programme adaptations. Moreover, given the importance of links with the professional field and industry, the panel wanted more information on the establishment of a structural relationship through the setup of an Advisory Board, and on expectations regarding what it can bring for the programme.

3.2.2 Admission numbers and admission criteria

Based on the SER and the information provided, the panel found that the admission criteria were not completely clear. The panel observed that the admission numbers were rather low compared to the target of 30 entering students per year and noted a predominance of foreign students entering the programme, with broad entry profiles among those enrolled. The panel wanted to hear from the management how the programme defines 'the right student', as mentioned in the SER. It was also interested in understanding what criteria are used to determine whether a candidate is sufficiently prepared to enrol in the programme.

The diversity of the student population not only raised questions on the selection process for the international students, but also on the approach to ensure that all students, regardless of their entry route (engineering or pharmaceutical background), attain the same intended learning outcomes. More specifically, the panel sought clarification on the target group of the programme and on the rationale for allowing direct entry from three different disciplines: bioengineering, pharmaceutical sciences, and chemistry, which leads to differentiated study paths at the start of the master's programme.

The panel was also interested to hear how the programme plans to increase enrolment, particularly from Flanders and Belgium, in line with its stated objectives.

3.2.3 Student success rates and progression

Based on the SER, the panel took note of the low pass rates for several courses by master's-level standards. Slow progression rates, a limited proportion of students graduating within the expected timeframe across cohorts and student drop-out raised several questions for discussion.

The panel wanted clarification on the analyses made by the management to explain slow student progression and on the extent to which students' prior education might be an explanatory factor to be remedied. For this purpose, the panel wanted more information about the plans that were developed to remedy this situation and to discuss measures with the management and teaching staff as a means to facilitate progression and success rates, including the proposed measures mentioned in the SER such as course sequencing or adapting course content, .

3.2.4 Graduate profile

The SER confirms the interdisciplinary and generalist profile of the Master of Science in Pharmaceutical Engineering as being fully aligned with the intended mission and vision of the programme. A Master in Pharmaceutical Engineering will be able to design and develop innovative, flexible, cost-efficient, automated and sustainable processes for the production of future complex and individualized drug products, enabling targeted delivery of the active molecules into the human body.

The programme expects that the relevance and demand for broadly trained pharmaceutical engineering profiles will continue to increase, hence demonstrating the continued validity and future-oriented nature of the programme's mission, vision and learning outcomes.

At the same time, graduates from the programme appear to experience difficulties to find suitable employment. The panel therefore wanted to better understand how the programme positions its intended graduate profile, given the reference to generalists alongside a focus on a specific combination of pharma and engineering. It also sought clarification on the direction the programme aims to pursue. Moreover, the panel was interested in knowing how the programme leverages the multidisciplinary composition of the student cohort to strengthen the graduate profile.

3.2.5 Connections with professional practice

The programme management claims in the SER that the master in Pharmaceutical Engineering responds to an increasing need in the pharmaceutical sector in Belgium for people with combined pharmaceutical and engineering competencies. With its interdisciplinary character, this new programme has a unique selling point in Flanders as compared to other related master's programmes. Yet, on the relationship with the professional field and the industry, the panel had several questions. The panel wanted more information about the way the engagement with the professional field has taken place, and how more structural and formalised involvement of external stakeholders is established.

The panel sought clarification on the extent to which the link with the professional field is implemented in practice, particularly in the first year of the programme, where this appears rather limited. Moreover, the panel wanted to discuss to what extent workplace experience, as an alternative to a full internship, can be integrated into the programme and in the preparation of the master's thesis. Finally, the panel was also interested in hearing how the programme plans to increase its visibility and recognition within the professional field, especially since graduates seem to struggle to find suitable employment.

3.2.6 Skills and master's thesis

A last topic in the panel's investigation is related to the range of skills embedded in the compulsory part of the curriculum, and the experience of students, alumni and work field

representatives with the development of the master's thesis. The panel wanted to investigate to what extent broader professional skills (e.g., basic financial insight) are integrated alongside technical competences, and where and how transferrable skills or 'soft' skills are embedded and assessed within the compulsory part of the curriculum. In the dialogue with management and teaching staff the panel sought to examine how the programme supports the development of communication skills, teamwork and self-management skills, including in an interdisciplinary and cross-cultural context. Additionally, in the exchange with students and alumni, the panel aimed to gain deeper insight into the students' and alumni experiences with the preparation of the master's thesis. The panel was also interested in knowing the external (industry-based) mentors' view on and expectations for this component and discussing this with work field representatives.

Section 4 of this report sets out the panel's assessment, which is a holistic judgement about the quality of the master's programme in its different aspects. The panel assessment is based on the information received before the site visit, the information that emerged from the interviews and the additional material made available for inspection during the site visit. The panel also benefited from the opportunity to see the facilities, the labs and the equipment for the programme to complement its assessment. A detailed account of the dialogues and the panel findings is included in Heading 5. *Reporting of the investigation*.

4 Holistic judgement

The panel issues a positive advice on the quality of the master's programme in *Pharmaceutical Engineering* of Ghent University. The panel conducted its investigation and defined the lines of research based on the following questions: "What does the programme intend", "How does the programme realise its intentions", and "How is the achievement of these intentions demonstrated". These 3 questions allowed the panel to assess the overall quality of the programme.

The *Master of Science in Pharmaceutical Engineering* is an interdisciplinary master's programme that brings together pharmaceutical and engineering competences and is unique in Flanders and Belgium. In the view of the panel, the programme covers all important aspects of pharmaceutical engineering. The involvement of two faculties with solid research groups contributing to the curriculum, is a strong aspect of the programme.

The programme aims to deliver graduates with a generalist profile, that can bridge pharmaceutical knowledge (regulations, innovation, development) with engineering expertise in complex, automated and digitalised production environments. The alignment of the programme with industries' needs is clearly reflected in the programme structure, where the focus goes beyond process engineering and puts strong emphasis on sustainability, data collection, digitalisation and continuous innovation. Given the fast-changing context of pharmaceutical regulations, emerging innovative therapies and the overall dynamic nature of the sector, the panel values this approach.

The panel appreciates the programme's capacity for self-reflection and concludes positively on the quality assurance system in which the programme is embedded, with a focus on continuous improvement, student engagement, use of feedback for enhancement of the curriculum, and the acknowledged importance of a more structural dialogue with stakeholders from the professional field.

Overall, the programme shows a high degree of maturity, relevance and coherence. It prepares graduates not only with solid technical and scientific foundations, but also with the mindset, skills and adaptability required to perform effectively in a fast-evolving pharmaceutical environment.

Yet, the panel had a number of questions for clarification and expressed some concerns, mainly about the programme governance, the admission process and student enrolment, the graduate profile, students' progression and success rates, the connections in the curriculum with the professional practice, the broadness of skills embedded in the programme, the master's thesis and the involvement of the professional field and industry.

The panel sought to understand who constitutes 'the right student' for the programme and requested further clarification of the admission criteria and the programme's target group. It also discussed with management, teaching staff, students and work field representatives the graduate profile.

The management informed the panel about the challenges in its selection process and how this has been fine-tuned and improved to ensure sufficient background knowledge from students who enrol in the programme (usually with a bachelor in pharmaceutical sciences, chemistry or engineering). Besides a stricter selection process for international students, several targeted curricular optimisations and course adjustments have been implemented to increase student progression and success rates. The panel is positive about these efforts.

The panel was also interested in hearing how the programme plans to increase enrolment, particularly from Flanders and Belgium, in line with its stated objectives. The panel was informed that the programme is considering the possibility of promoting a shorter, one-year version of the master's programme for local students who have obtained a master's degree in engineering or pharmaceutical sciences. It also intends to enhance its communication to potential students about the added value of the programme.

The panel further discussed the graduate profile with programme management, students and alumni and industry representatives. To the programme management, a 'pharmaceutical engineer' is a generalist that obtained a substantial knowledge in both fields. Graduates will 'speak the language' and understand the needs of one and the other, and thus function as a bridge between both disciplines in the professional environment. Students and work field representatives confirmed this understanding of the profile and underlined its relevance for a professional field that evolves fast. However, when discussing with work field representatives their willingness to recruit graduates from this programme, a prudent, conservative approach emerged. More efforts to invest in a clear communication and outreach strategy towards the sector, and clear information about potential roles and job perspectives for local candidate students could be helpful to overcome the current hesitation.

Also, the panel enquired on the broader professional skills embedded in the compulsory part of the programme, the connections with the professional practice and the experiences of students with the master's thesis. The panel received multiple examples of assignments and teaching methods that aim to train soft-skills and broader professional skills and stimulate students with diverse backgrounds to collaborate and learn from each other. The panel was also informed about concrete involvement of the professional field in the programme (guest lectures, company visits, etc.). The panel has seen room for improvement to respond to students' interest and create more opportunities for connections with the professional field throughout the programme, such as exposure to real-life industrial contexts, applied problem-solving, and professional skill development.

Given the importance of the link with the professional field and industry, the panel also discussed with the programme management the establishment of a structural relationship with the industry, and the expectations on what it can bring for the programme. It further exchanged with work field representatives on their views and willingness to be involved in the programme's development and implementation. The panel sees several opportunities to enhance the relationship into a more structural dialogue, that will bring added value to continuously improve the programme, generate more possibilities for students with regard to practical assignments and the thesis work, create a real community and generate job opportunities for graduates. To support the management and staff in their efforts to further adjust the programme, the panel issues the following recommendations:

The panel recommends **activating the Advisory Board as soon as possible** to ensure that the programme can build on a structural engagement from the pharmaceutical industry and professionals in relevant industrial roles.

The panel is convinced that a renewed and structural dialogue with the sector can support the fine-tuning and optimisation of the programme, ensuring that it remains up to date and aligned with rapid technological developments in the field. A strong national and international network of industrial partners, combined with regular consultation of multiple stakeholders (industry representatives, alumni, experts and students), would provide valuable external input. This multistakeholder approach will support the relevance, robustness and

future-proof nature of the programme and help ensure strong alignment with real-world professional practice.

At the same time, structural lines of communication and a good outreach strategy would enhance the programme's visibility within the sector and foster goodwill and openness within the industry towards the recruitment of graduates with the Pharmaceutical Engineer profile.

The panel also recommends **further improving the current admission process for international students and investigating how to increase enrolment from local students**. It recommends taking ongoing efforts a step further and enhancing pathways to ensure a balanced mix of local and international students in the master's programme.

The panel understood that since the launch of the master's programme the selection process for international students (that constitute most of those enrolling), has been refined to assess whether applicants possess the foundational knowledge required to successfully progress through the programme. While the current approach provides valuable screening, the programme continues to explore ways to further strengthen this process. A stricter selection process and the offer of some preparatory courses had a positive impact on the quality of the inflow. It is also reassuring that the programme keeps monitoring its selection process and has plans to further modify the procedures to guarantee that only students with sufficient background knowledge and adequate motivation are allowed to start the master.

In addition to these recommendations, the panel also issues the following suggestions:

First, the panel advises strengthening the outreach and communication strategy to reinforce the promotion of and communication about the programme towards local, Belgian students. To demonstrate the relevance and demand for broadly trained pharmaceutical engineering profiles, a better understanding of the graduate profile is needed, including insight in the employment opportunities and potential roles and responsibilities of a Pharmaceutical Engineer.

Second, as the first cohorts have graduated, the panel sees benefit in setting up an alumni network that can help build the community, be used to reinforce the links between the programme and the sector(s) in which alumni are engaged, have role models for promoting the programme and expanding contacts beyond the pharmaceutical industry.

Third, the panel suggests explicitly integrating in the curriculum from the first year onwards broader professional skills and transferable or 'soft' skills, alongside technical competences. The development of transferable skills such as communication, collaboration, creative problem-solving, project management, and networking adds strong professional relevance. These skills are essential for the very specific and niche roles for which the programme prepares students.

In addition, the panel suggests making even more use of the diversity of the student cohorts in the learning process. Using the full potential of students with different academic backgrounds (pharmaceutical sciences and engineering) and from diverse cultural contexts to work closely together throughout the programme is valuable. It mirrors the reality of the professional field, where multidisciplinary and multicultural teams need to collaborate towards common goals.

5 Reporting of the investigation

The panel discussed its preparatory work in a meeting on 1 April 2026. During the site-visit on 2 April a dialogue was established with the programme management, the staff and the stakeholders (students, alumni and representatives of the professional field) on the points that needed further clarification. The panel also had the opportunity to see the facilities at campus Heymans in Ghent, including the labs and the equipment available for the programme.

The panel used the dialogue during the site visit on 2 April 2026 with the programme management, teaching staff, students and alumni, and the stakeholders from the professional field and industry to supplement, refine and/or adjust its understanding on the quality of the programme in its different aspects. The questions that required further clarification guided the panel during the site visit in its research.

5.1 Programme governance

The master in Pharmaceutical Engineering is a unique programme in Flanders/Belgium. It integrates in one interdisciplinary programme the pharmaceutical and engineering knowledge present at respectively the Faculties of Pharmaceutical Sciences and Bioscience Engineering of Ghent University. Given that the programme is a product of two distinct Faculties, the panel wanted to hear from the management how the programme is managed in practice and how the Programme Committee functions. The panel was also interested in understanding who is involved in programme adaptations.

The Programme Committee is composed of lecturers from both involved Faculties and student representatives. It examines the validity and profile of the programme, monitors the implementation of the generalist profile within the curriculum, and ensures internal communication with involved lecturers regarding curriculum-related discussions. The Programme Committee is also responsible for a structured outreach strategy and is the body where decisions regarding adjustments to the programme are taken.

The panel received examples during the site-visit of several adjustments that were implemented since the start, to allow to adapt and fine-tune the new programme and to respond to the challenges which the multidisciplinary student population of the master's programme has been facing. The panel was positive about the efforts to further develop the programme, explore different options and learn from initial student feedback in order to reach a greater degree of maturity. However, there remains room for improvement, particularly in strengthening the involvement of industry throughout the programme and in exploring collaboration with the professional field to provide more real-life opportunities for students when developing their master's thesis (see below topic 5.5 and 5.6.).

Given the importance of the link with the professional field and industry, the panel wanted more information about the establishment of a structural relationship through the setup of an Advisory Board, and the expectations on what it can bring for the programme.

The panel learned from the information in the SER that an Advisory Board consisting of people working at different pharmaceutical companies in Belgium was established during the development phase of the programme. The mission and vision, as well as the programme-specific learning outcomes (DLRs), were tested with the industry and professional field at the start of the programme. These have more recently been reconfirmed by the Programme

committee as valid, coherent and up to date (cf. programme committee report November 2025). Feedback from the professional field, obtained through informal interaction with industrial guest lecturers (e.g. in the course 'Pharmaceutical Process Validation and Quality') and lecturers active in industry-related research and teaching, supported this conclusion.

The panel found it unfortunate that the Advisory Board has not been set up since the launch of the master's programme. A close interaction with the professional field is a clear strength for the programme. During the dialogue with the programme management, the rationale for not activating the Advisory Board yet was explained by the programme's "start-up phase", which required initial practical and curricular adjustments to the programme.

Allowing industry feedback to be integrated into the quality assurance cycle is important. The panel therefore **recommends activating the Advisory Board in the short-term** and to ensure that the programme can build on a structural engagement from the pharmaceutical industry and professionals in relevant industrial roles. The panel was informed during the site-visit that it is the intention of the management to engage in a structured conversation with the professional field and the industry. Given the current state of maturity of the master's programme, it was positive to hear that the Advisory Board will be resumed with new members, who will be involved in supporting the regular reviewing process of the master's programme.

5.2 Admission numbers and admission criteria

Based on the SER and the information provided, the panel sought further clarification of the admission criteria and the programme's target group. It wanted to understand who is 'the right student', as claimed in the SER.

The programme management confirmed that the 'pharmaceutical engineer' they intend to deliver is aimed at students with a background in pharmaceutical science, chemistry or engineering and a genuine interest in the combination of these fields. The programme delivers 'generalists', that obtained a substantial knowledge in both fields. Graduates will 'speak the language' and understand the needs of one and the other, and thus function as a bridge between both disciplines in the professional environment. Moreover, it is expected that they will be well-prepared for innovative roles in a fast-evolving industry that requires generalist competences besides broad technical skills and in-depth technical understanding. The students and alumni confirmed in the dialogue with the panel to be satisfied with this 'generalist profile', which brings them a fair understanding of both pharmaceutical sciences and engineering and allows them to understand and feel comfortable on both fields.

The panel was interested in the selection process for international students, and programme management provided details on the procedure and the criteria applied. In principle, holders of a bachelor's degree in engineering, pharmaceutical science or chemistry can enter the programme, as their background should match the different tracks offered. However, the panel understood that the challenge lies in assessing whether students from abroad have the required level of knowledge and competences to successfully start the master's programme. To this end, a number of starting competences (such as mathematics, statistics, physics, chemistry, biology, and programming) are evaluated based on the application files of prospective students, looking into the curriculum followed, the courses attended, and the marks received.

Furthermore, the programme management confirmed that, compared to the first phase of the programme, a stricter selection process and the offer of some preparatory courses have had a positive impact on the quality of the inflow.

The panel discussed with the programme management ideas to further improve the selection process. Starting competences and a strong level in mathematics and physics are needed to be able to successfully follow the courses of the master's programme. As interviews would be more appropriate to assess the motivation of students, a multi-step approach for admission is under discussion within the involved faculties. The panel appreciates the ongoing reflection to improve the current admission process. It is reassuring that the programme keeps monitoring its selection process and has plans to modify the procedures to guarantee that only students with sufficient background knowledge and adequate motivation are allowed to enrol. In addition, the programme acknowledges the importance of good information towards candidates to manage expectations.

Moreover, the panel has taken note of the internal debate about offering a preparatory route for international students. A limited offer of summer courses is already available. Yet, following the feedback received from students and alumni on the 'harsh' start of the programme, the request for more information beforehand on course content, and the interest in pre-courses (mathematics, statistics, chemistry, physics…), a more developed offer of suitable summer courses linked to the programme is under consideration. This could be organised as an optional path for international students enrolling in the master's programme. The panel welcomes the efforts to integrate the feedback received from students and develop measures that can support a smoother transition into the master's programme.

The panel was also interested in hearing how the programme plans to increase enrolment, particularly from Flanders and Belgium, in line with its stated objectives. While at the start of the programme it was expected to have significant enrolment of local Belgian students from the life sciences, in practice this did not materialise. The panel and programme management discussed the attractiveness of the programme for prospective students, particularly in relation to the (protected professional) titles awarded (such as engineer or pharmacist) as compared to a Master of Science.

The panel was informed that the programme is considering the possibility of promoting a shorter, one-year version of the master's programme for local students who have obtained a master's degree in engineering or pharmaceutical sciences. It is expected that this could make the programme more attractive and thus increase the number of Belgian students. In the fast-evolving professional field of pharmaceutics and related industries, it could be an advantage for trained engineers to add, via this programme, pharmaceutical sciences to their curriculum. However, it was also made clear that attracting master's students is not the main target of the programme. Currently, student cohorts are mostly composed of students who have a bachelor's degree and proceed to the master's level. A balanced mix of local and international students, however, remains an objective of the programme, which intends to deliver well-trained graduates for the Belgian industry and pharmaceutical sector.

The panel appreciates the ongoing reflections to improve the current admission process for international students and to ensure that those students with a sufficiently strong background knowledge can enrol, and the ideas to increase enrolment from local students. It **recommends** taking the efforts a step further and investigating how to **improve pathways to ensure a balanced mix of local and international students** in the master's programme.

5.3 Student success rates and progression

From the dialogue with management and teaching staff, the panel learned that starting competences and a strong level in mathematics and physics are needed to be able to successfully follow the courses of the master's programme. While the background level of local bachelor students in pharmaceutical sciences, chemistry and engineering is well-known and adequately prepares for enrolment in this master's programme, in practice the programme mainly attracts international students. The diversity of backgrounds generates some difficulties, both for the initial selection of students (see 5.2) as for the progression of those who enrol.

The programme provided concrete details on the teaching methods, which illustrate how the curriculum is designed to ensure that, in the first year, the different tracks allow students to level their starting competences. In these tracks, and depending on their disciplinary background, students of the Master in Pharmaceutical Engineering attend lectures from the corresponding bachelor programmes, complemented by programme-specific content and adapted to meet the level of a master's programme.

Moreover, in addition to the specific tracks, all enrolled students take part in common courses and are stimulated, through group tasks, to interact with fellow students with a different educational background. Students with a stronger pharmaceutical science background can support students with a stronger engineering background and vice versa. In the second year, this interactive approach is further pursued to enable students to learn from each other and to deliver as part of a multidisciplinary team.

To the panel, this approach is highly relevant and positively addresses the realities of working in the pharmaceutical (and related) industries, where English communication, multicultural teamwork, and global collaboration are standard practice.

Yet, the panel observed that the programme has little data available that give insight into student progression and success rates for certain courses, particularly in relation to students' disciplinary backgrounds. The panel therefore strongly suggests that the programme undertake such an analysis to understand how remediation might be possible.

Further, the panel discussed with the management and teaching staff the proposed measures in the SER to adapt the curriculum design and course content, such as course sequencing or adapting course content to facilitate progression and success rates.

The panel learned that the programme has undergone several targeted curricular optimisations and course adjustments in response to the experiences of the first student cohorts. These include changes in course content, course names, course positioning within the programme, as well as the introduction and removal of elective courses. Additionally, the programme adjusted its semester structure, and the alignment of prerequisite knowledge, study load distribution, and the generalist pharmaceutical engineering profile of the students. The dialogue with the staff also provided concrete examples of course-related adjustments: it appears that targeted adaptations in mathematical modelling, data science, and programming have significantly improved the preparedness of students entering the programme without an engineering bachelor's background.

Moreover, students can be oriented towards elective courses for more advanced levels of knowledge on certain topics. The panel suggests making full use of the electives to allow

master's students to expand their competences and acquire the broader professional skills that will fit their future professional roles.

5.4 Graduate profile

The programme is intended to create currently missing generalist profiles that correspond to the needs of the industry – a demand that the programme expects will continue to increase. However, graduates from the programme appear to experience difficulties to find suitable employment. The panel therefore wanted to better understand better how the programme positions its intended graduate profile.

The representatives of the industry confirmed that the intended graduate profile is interesting and relevant. The focus on multiple perspectives and interdisciplinary thinking is particularly appropriate for the intended professional roles, which often act as a bridge between R&D, regulatory affairs, quality, operations and project management.

From a work field perspective, the panel confirms that the programme provides a good balance between scientific depth, practical relevance, and professional skills. It prepares graduates with the right mindset and abilities to work effectively at the interface between pharmaceutical sciences, engineering, and industrial practice, aligning well with the current and future needs of the pharmaceutical industry.

The hesitation in the professional field is, however, obvious from the dialogue. Because of its unique interdisciplinary character, this relatively new programme is very different from the existing master's programmes. When it comes to considerations for recruiting graduates from this programme, the sector seems to adopt a prudent, conservative approach. The panel is convinced that regular and more direct talks with the field will allow the creation of more openness to integrating these new profiles.

The programme management highlighted its plans to increase the external communication towards prospective students, but also towards industry. Given the unique character of the programme, it appears useful to better inform candidates about the employment possibilities and professional roles that graduates can take up. The programme also envisages involving itself more with the pharmaceutical industry in communicating the value of the master's degree.

The panel encourages these plans. As stated above, it strongly advises strengthening external outreach, including more proactive dissemination, targeted presentations and leveraging the professional network. It also encourages considering openness to a wider range of possibilities and career pathways for graduates across other industrial sectors where their profile could create added value and unlock new opportunities (e.g., food industry, medical devices, and cosmetics).

Moreover, the panel advises ensuring the communication with alumni of the master's programme. It sees value in setting-up an alumni network that can be used to reinforce the links between the programme and the sector(s) in which alumni are engaged, have role models for promoting the programme and expanding contacts beyond the pharmaceutical industry.

5.5 Connections with professional practice

Engagement with the professional field has so far primarily taken place through company visits and guest lecturers and speakers with strong industry connections. Students appear to

be satisfied with guest lectures integrated in the programme, though the panel received signals that the opportunities and contact with the professional field could be strengthened in the first year of the programme. In addition, the panel saw great enthusiasm amongst students about the initiative of the programme to organise company visits, which allow them to learn about different topics in a professional environment and to engage in informal discussions on professional practice, roles and responsibilities.

Although these interactions validate the programme's relevance, the programme acknowledges the need for a more structural and formalised involvement of external stakeholders. The active involvement of international industry partners, research consortia and guest lecturers can provide students with an authentic exposure to international and intercultural professional environments.

Following the visit to the research infrastructure and available labs, the connections between the programme and the pharmaceutical industry were discussed more closely. Besides more fundamental research, in some of the labs more applied research is carried out that has been contracted with industry. Partnerships are important and motivating, and the panel received examples of concrete collaborations between ongoing research activities by PhD students and post-doctoral researchers and industry. These collaborations also lead to proposals for research that can be taken up in the choice of certain topics for the master's thesis.

A number of students expressed their interest to have opportunities to apply their knowledge in real-life cases in industry, be it as part of the thesis or of an internship. Internships were initially possible as elective course units but, for several reasons mentioned in the SER, this option has been discontinued. Given the interest expressed by students and the learning objectives typically associated with internships, such as exposure to real-life industrial contexts, applied problem-solving, and professional skill development, the panel suggests that the programme re-examines these possibilities with the professional field (e.g., through the Advisory Board and existing networks), to see where useful connections can be made that benefit both students and the professional field itself. In addition, the panel recommends engaging in a discussion with industry partners on the direction to take for the programme with regard to the focus areas to be reinforced (e.g. experimental experience, data digitalisation, QA knowledge) and any eventual gaps to be filled.

5.6 Skills and master's thesis

In the dialogue with students, the panel received multiple examples of assignments and teaching methods that aim to train soft-skills and broader professional skills. Students are challenged in project assignments to work as a team on group tasks, to engage in dialogue with peers, reflect in multidisciplinary groups, to deliver presentations, etc. In some of the compulsory courses, they are requested to collaborate on projects and teamwork with students from other programmes; in addition, in some of the electives, assignments are designed to train soft-skills and broader professional insights. Moreover, the master's thesis requires students to integrate technical competences and soft skills, as the defence of their graduation work is a mandatory part of the grade.

The master's thesis can be designed as a project that connects to and is part of ongoing PhD or post-doctoral research in the concerned Faculties.

The panel had the opportunity to visit the labs and see the equipment that is at the disposal of researchers. The excellent research infrastructure can also be used by the master's

students to prepare their experimental work. During the site-visit, the panel also saw the plans for the new infrastructure that was recently built for one of the involved research centres. Aside from new labs and office spaces, the building will, in the near future, offer more facilities and lab possibilities for research on oral solids, liposomes, LNP (lipid nanoparticles), nanomedicines, biologicals and new technologies. To the panel, it is both reassuring and very positive to see how the programme has been engaged in building new infrastructure and up-to-date facilities that will offer students research opportunities in a wide variety of products and latest technologies. The panel also found it interesting to learn that the new infrastructure is considered as a means to engage in potentially stronger connections with the outside world, as some of the office space could be rented out to external partners.

The panel further enquired about the opportunities available to students to interact with the pharmaceutical industry. Students are positive about the opportunity to undertake master's thesis projects proposed by the professional field and would also appreciate opportunities for internships. This option can be a stepping stone to employment. While the discussion with representatives from the professional field revealed a more cautious approach, raising a number of practical objections to quickly integrate students in an internship (such as the duration of an internship, the legal and safety constraints, and confidentiality), the panel encourages the programme to envisage ways to increase and strengthen its connections with industry and to offer students additional opportunities to better understand how the sector works and what is expected when taking up certain roles, for example through lunch meetings or presentations from the field on potential topics for the master’s thesis.

Annex 1: Administrative data regarding the programme

Institution	Ghent University
Name programme	Master of Science in Pharmaceutical Engineering
Qualification and specialisation	Master of Science
(Additional) title	-
(Part of the) field of study	• Pharmaceutical Sciences • Applied Biological Sciences
Majors/specialisations	-
Programme routes for working students, full-time/part-time education, day/evening trajectories, different formats of certification	Full-time
The location(s) at which the programme is taught	• Campus Heymans, Ghent • Campus Coupure, Ghent
Language of instruction	English
Workload (expressed in credits)	120 ECTS
Required prior education and admission requirements.	Flemish degrees: • *BSc in de bio-ingenieurswetenschappen*; • *BSc in de bio-industriële wetenschappen;* • *BSc in de biowetenschappen (upon approval by the faculty);* • *BSc in Environmental Technology;* • *BSc in Food Technology;* • *BSc in Molecular Biotechnology;* • *BSc in de farmaceutische wetenschappen;* • *BSc in de chemie* Students with a degree other than Flemish: *Students who wish to enrol for the Master of Science in Pharmaceutical Engineering can apply for the programme if they hold the following diploma:*

- *an academic diploma (at least 180 credits and/or 3 years of study) of Bachelor (or Master) of Science in pharmaceutical sciences, bio-science engineering, chemistry, bio-industrial sciences and bioscience engineering technology (module biotechnology).*
- *International students with similar previous education must be able to demonstrate through their transcripts that they received basic science training in the following fields: (i) Mathematics, and/or basic statistics; (ii) Physics; (iii) Organic chemistry; (iv) Biochemistry; (v) Inorganic chemistry; (vi) Analytical chemistry. Some lab experience is required too.*

Language requirements

Language requirements for this study programme differ from the required standard level for English taught study programmes as specified in the Ghent University Education and Examination Code:

- *TOEFL 580 (paper-based)*
- *TOEFL 92 (internet-based)*
- *TOEFL 237 (computer-based)*
- *IELTS: 6.5*

Annex 2: Programme-specific learning outcomes

The Master of Science in Pharmaceutical Engineering…

1. Has the required interdisciplinary insights, skills and application-oriented knowledge for sustainable drug development and associated production processes, with in-depth knowledge of required product quality and current and international developments of drug products and production technologies.
2. Has the required advanced interdisciplinary insights, skills and application-oriented knowledge to design and develop flexible, intelligent, and efficient production systems, and to analyse and control drug production processes in a model-based (mechanistic and datadriven) way.
3. Has in-depth insight into the phases from product and process development to final production and distribution of medicines, as well as insight into the consequences in terms of (environmental) sustainability.
4. Can analyse, optimise and manage pharmaceutical production processes and technology platforms using digital models and data.
5. Is able to recognize, analyse and solve complex pharmaceutical production related problems in an independent and scientifically proven way, and can report and present to colleagues and lay people in writing and orally.
6. Is able to take (final) responsibility in a multidisciplinary and international environment and shows a critical-constructive attitude towards his/her own functioning and that of others.
7. Works systematically, creatively and meticulously with attention to the quality of pharmaceutical production processes and resulting pharmaceutical products in complex contexts.
8. Possesses the scientific curiosity and the attitude of lifelong learning to continue to study independently the knowledge of and the evolution in the field of pharmaceutical engineering.
9. Is able to independently integrate and deepen previously acquired knowledge with a view to innovation of practical implementation possibilities and knows the limits of his/her own competences.
10. Based on the acquired interdisciplinary and cross-curricular insight, can select, adapt or, if necessary, develop advanced research, design and solution methods, apply them adequately and process the results scientifically; argue the choices made on the basis of application-oriented insight and the requirements of the pharmaceutical context.

Annex 3: Schedule for the dialogue with the programme

Time	Group
8:30	Reception, preliminary consultation with committee
8:45-10:00	**Session 1 – Discussion with board and training managers/programme management** • Prof. Ilse De Bourdeaudhuij (Director Education UGent) • Prof. Jan Van Bocxlaer (Dean FFW) • Prof. Sarah De Saeger (Director Education FFW) • Prof. Niko Verhoest (Director Education FBW) • Prof. Thomas De Beer (FFW – Programme Committee Chair) • Prof. Jo Dewulf (FBW – member Programme Committee) • Prof. Paul Van Liedekerke (FBW – member Programme Committee) • Prof. Chris Vervaet (FFW – member Programme Committee)
10:00-10:20	Break, committee consultation
10:20-11:10	**Session 2 – Discussion with students and alumni** • 2 students 1st Master • 2 students 2nd Master • 1 alumnus
11:10-12:20	Tour/Presentation of programme-specific infrastructure
12:20-13:20	Lunch, committee consultation
13:20 - 14:20	**Session 3 – Meeting with teachers/those involved in education** • Prof. Valérie Vanhoorne (FFW) • Prof. Stefaan De Smedt (FFW) • Prof. Ashish Kumar (FFW) • Prof. Paul Van der Meeren (FBW) • Prof. Jo Dewulf (FBW) • Prof. Serge Van Calenbergh (FFW)
14:20-14:40	Break, committee consultation
14:40-15:00	Consultation hour (not used; extended break & committee consultation instead)
15:00-16:00	**Session 4 – Meeting with representatives from the professional field** • 2 representatives from J&J • 1 representative from UCB
~~16:00-16:20~~	~~Break, committee consultation~~
~~16:20-16:50~~	~~**Session 5 – Second meeting with programme managers**~~ *Second meeting deemed unnecessary by the panel; the first meeting sufficed.*
~~16:50-17:50~~ 16:00-17:15	Internal committee consultation
17:15-18:00	**Final public reflection by the committee chair**

Annex 4: Overview of the materials reviewed

Documentation submitted with the application:

- Self-assessment report
- Annexes
    - Annex 1a: Letter of support of Pharma.be
    - Annex 1b: Charter for cooperation UGent/UZGent-Janssen, Pharmaceutica
    - Annex 2: Domain-specific learning outcomes (DLRs)
    - Annex 5: Learning paths overview
    - Annex 6: Study Programme Overview from AY 2025-2026
    - Annex 7: Competency matrix
    - Annex 8a: Lesgeversbevraging FBW MPE
    - Annex 8b: Lesgeversbevraging FBW
    - Annex 9: Teaching method matrix
    - Annex 10: Master's Dissertation Regulations AY 2025-2026
    - Annex 15a: Evaluation method matrix
    - Annex 15b: Toetsbeleid
    - Annex 16: (Studenten)bevraging Onderwijskwaliteit MPE
    - Annex 17: MPE Student Notes, AY 2024 - 2025
    - Annex 18: MPE exam results
    - Annex 19: Instroom en doorstroom MPE
    - Annex 20: Overview Research, expertise, and publications lecturers
    - Annex 24: SOP Administrative selection procedure
    - Annex 25: Vrijstellingen op basis van EVK
    - Annex 26: Nationalities represented in recent cohorts
    - Annex 27: Questionnaire Graduate tracking 25-26
    - Annex 28: Overview of contacts from professional organisations
    - Annex 29: Industrial involvement
    - Annex 30: Master's, programmes, in Pharmaceutical Engineering EU and US
    - Annex 31: Opleidingsfiche studiekiezer AJ 2025-2026
    - Annex 32: Overview study sheets AY 2025-2026

Documentation submitted during the dialogue:

- Four examples of master’s theses (two academic, two in collaboration with the industry).

Colofon

MASTER OF SCIENCE IN PHARMACEUTICAL ENGINEERING

GHENT UNIVERSITY • VL131112-26

Programme accreditation customised to own conduct • Assessment report

9 June 2026

NVAO

NVAO - Accreditation Organisation of the Netherlands, Flanders and Luxembourg
Department of Flanders & Luxembourg

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