



Postbus 5050

NL-3502 JB Utrecht

+31 30 87 820 87

www.AeQui.nl

info@AeQui.nl

Master Biobased Sciences

Wageningen University

Advisory report of the assessment of the existing programme
20 January 2025

Colophon

Institution and programmes

Wageningen University
Institutional Audit: yes

Master's programme Biobased Sciences (Croho 60961)
Location: Wageningen
Mode: full-time

Assessment panel

Stanley Brul, chair
Marloes van Dort, expert
Dmitry Murzin, expert
Davide Viaggi, expert
Thomas Westerhuis, student member
Linda van der Grijsparde, secretary

AeQui Nederland
PO Box 5050
3502 JB Utrecht
The Netherlands
www.AeQui.nl

Summary

On 20 January 2025, the master's programme Biobased Sciences of Wageningen University was assessed. The panel's overall judgement of the programme is [positive](#).

Intended learning outcomes

The main focus of the master's programme Biobased Science is the transition from a fossil resource linear based economy towards a circular economy that fills up lacking material with renewable resources. Graduates are academic experts able to apply their own specialised knowledge and skills in complex, interdisciplinary projects to enable the transition from a fossil towards a biobased economy. Students' backgrounds are broad and include engineering, natural sciences and social sciences.

The programme offers three interdisciplinary specialisations: 1. *Biomass Production and Carbon Capture*; 2. *Biorefinery and Conversion*; and 3. *Biobased and Circular Economy*.

The profile of the programme is translated into eleven intended learning outcomes. These fit the master's level and orientation of the programme and are aligned with the expectations of the (international and interdisciplinary) professional field.

To match the demands of the field, the programme maintains sufficient formal and informal contacts with potential employers. An External Advisory Committee meets annually to discuss the intended learning outcomes, the content and quality of the programme and the performance of graduates.

The panel thus concludes that the master's programme Biobased Sciences meets this standard.

Teaching-learning environment

The English-language fulltime master's programme has a duration of two years and comprise a total of 120 EC.

According to the panel, the contents of the programme enable students to achieve the intended learning outcomes. The programme has clearly translated the intended learning outcomes into the curriculum. The programme starts with two compulsory courses that offer basic understanding of the different biobased disciplines and an introduction in biobased circularity and interdisciplinarity. In addition, students start to build up a portfolio with self-reflection reports on their interdisciplinary work. In the second half of the first year, students choose limited electives depending on their specialisation and free electives. The first year is finalized with group work in mixed teams to perform a project of an external stakeholder. The second year consists of the compulsory thesis and an academic internship.

The didactic concept of the programme supports the learning process of the students. The educational formats are adequate. The programme consists of mainly lectures, working lectures and self-study.

The programme has a strong teaching team. The various disciplines are well represented by the input of staff from a variety of research groups, as is practical and scientific experience in the various fields of work.

The admission requirements adequately match the content and focus of the programme. Students should have specialised in their pre-education in one of the disciplines engineering, biomass production or economy, or followed an interdisciplinary programme in the field of biobased sciences, circularity or sustainability. The panel notes that in the first two courses, the programme pays ample attention to introducing the different disciplines to this multidisciplinary field.

The panel thus concludes that the master's programme Biobased Sciences meets this standard.

Student assessment

The programme has an adequate, solid assessment system and assessment procedures. The system is adequately based on the university wide policy. Frequently used assessment forms are written exams (open and/or closed questions), groupwork performance, oral assessment (presentation), practical performance, written reports and individual assignments. Learning outcomes on interdisciplinarity are assessed via reflection reports and an oral examination.

Quality assurance of assessment is ensured by a proactive Examining Board. The Board, focusing on a group of programmes, show a sufficient knowledge of the individual master's programme and its assessment. In the past years, the capacity of the Board is sufficiently increased.

The panel thus concludes that the master's programme Biobased Sciences meets this standard.

Achieved learning outcomes

With the master's programme thesis (36 EC), the programme aims to assess seven of the eleven intended learning outcomes. The intended learning outcomes on designing a new

biobased concept, cooperating in an interdisciplinary team, create additional value by combining biobased disciplines, and reflecting on the learning path is assessed elsewhere.

Partly based on reviewing the recent theses of fifteen alumni from each programme, the panel finds that the students achieve the intended level of the programme. The programme prepares students well for the job market and students end up in positions that fit their specialisation.

The panel thus concludes that the master's programme Biobased Sciences meets this standard.

Suggestions

Looking ahead, the panel offers several suggestions for consideration, including the following recommendations:

- Specify the intended learning outcomes so that they reflect the three specialisations more explicitly, because the focus in the three specialisations is different. Also make this difference in exit profiles clearer in the programme's explanations of its profile and focus, so that it is clear to all concerned that students become academic experts who can apply their own specialised, disciplinary knowledge and skills in complex, interdisciplinary projects.
- Further strengthen the interdisciplinary nature of the programme, especially in the second year, particularly in the MSc thesis.
- Provide an overview of where intended learning outcomes are assessed in the programme, in which the relationship between a course and a learning outcome is only established if the assessment of the learning outcome is secured and demonstrated by all students. This is not the case now: in the thesis, an intended learning outcome around integrating e.g. the design of a bio-

based concept into scientific work within an interdisciplinary and international context cannot always be demonstrated.

- To safeguard sufficient interdisciplinarity in the second year of the master's programme, increase for instance the weight of the course "Boundary crossing in biobased sciences".

- Implement a more matured central policy around the teachers' and students' use of AI and consider integrating some practical introduction to the efficient, correct and ethical use of different (generative) AI applications.

All standards of the NVAO framework have been positively assessed. On this basis, the panel provides a positive recommendation regarding the accreditation of the master's programme Biobased Sciences.

On behalf of the entire site visit panel,
Utrecht, March 2025

Stanley Brul
Chair

Linda van der Grijspaarde
Secretary

Introduction

Profile

Wageningen University & Research is a collaboration between Wageningen University and the Wageningen Research foundation. The domain of Wageningen University & Research consists of three related core areas: Food, feed & biobased production, natural resources & living environment, and society & well-being. The mission of Wageningen University & Research is 'to explore the potential of nature to improve the quality of life.' Wageningen University & Research has 7,600 employees and 13,100 students.

Wageningen University & Research consists of one faculty, 5 departments and 95 chair groups. By 2023, there were 20 bachelor's programmes, 31 master's programmes and 49 Massive Open Online Courses.

The master's programme Biobased Sciences is assessed. In 2018 the initial accreditation (Toets Nieuwe Opleiding, TNO) of the programme took place. NVAO decided to accredit the programme but imposed conditions to be met within two years. This was in line with the advice formulated and substantiated in the assessment report by the TNO panel. The conditions focused mainly on the interdisciplinarity of the programme. In 2020, the TNO panel reassessed the programme and found that the conditions were sufficiently met. The response of the programme on remaining recommendations can be found in Appendix 3.

The master's programme is offered in English. Ever since the establishment of the bachelor's and master's programme's system, English has been the language of instruction for all master's programmes at Wageningen University. It is a

condition for a basic principle of education at Wageningen University: the 'international classroom.' The language of English is defined in the Code of Conduct of the Wageningen University. With this policy, Wageningen University not only aims to ensure that students from all over the world can participate in the instruction and share its knowledge; it also aims to endow graduates with a basic skill that will help them to launch their (international) careers. The panel considers this an adequate explanation. In this respect, the panel finds it logical that the English-language programme has also chosen a corresponding English title.

The assessment

Wageningen University has commissioned AeQui to conduct the current assessment. For this purpose, AeQui, in collaboration with the programme, has assembled an independent and knowledgeable panel. A preparatory meeting with representatives of the programme has taken place.

The assessment was conducted based on the Accreditation Framework for Higher Education in the Netherlands, according to the programme outlined in Appendix 2. The institution has a positive institutional audit decision, and therefore four standards were assessed.

Recommendations for further development were made during the initial accreditation. The panel has integrated this follow-up into its considerations for the current assessment.

The panel conducted the assessment independently; the panel received the necessary information to arrive at a judgement. At the end

of the assessment, the programme was informed of the findings and conclusions.

This report was sent in draft to the programme; the programme's response has been incorporated into this final report.

At the initiative of the programme, a development meeting took place at the end of the site visit. The results of this development meeting did not affect the assessment presented in this report.

Intended learning outcomes

Standard 1: The intended learning outcomes tie in with the level and orientation of the programme; they are geared to the expectations of the professional field, the discipline, and international requirements.

Findings

The main focus of the master's programme Biobased Science is the transition from a fossil resource linear based economy towards a circular economy that fills up lacking material with renewable resources. Graduates are academic experts able to apply their own specialised knowledge and skills in complex, interdisciplinary projects to enable the transition from a fossil towards a biobased economy. The programme expects they will work in multidisciplinary or interdisciplinary teams within the biobased and circular economy, as researcher, plant breeder, process technologist, product developer, technical sales or product manager, entrepreneurs, economists, managers or transition consultants. They can find employment in the agri-food sector, chemistry, energy and manufacturing industries, financial institutions, and in national or regional authorities. They are entrepreneurial, contribute to an innovative and growing market, and take climate change, biodiversity loss, land, water-use and societal impact into consideration.

When the programme refers to multidisciplinary or interdisciplinarity, the programme addresses different biobased disciplines and boundary crossing between those disciplines, respectively. This includes engineering, natural sciences as well as social sciences. Therefore, the programme offers three specialisations: 1. *Biomass Production and Carbon Capture*; 2. *Biorefinery and Conversion*; and 3. *Biobased and Circular Economy*.

The profile is translated into 11 intended learning outcomes. Graduates understand the basic concepts of biobased disciplines and have advanced knowledge and skills in one of the several disciplines (learning outcomes 1+2). Graduates function as experts in interdisciplinary teams working on the transition from a fossil based towards a biobased economy. They are able to translate requests from an interested party into development and design, co-operate with experts from other biobased disciplines and are aware of non-technical constraints (learning outcomes 3-5). They are able to create additional value by application of an interdisciplinary approach (learning outcomes 6). They are able to apply specialised knowledge and skills in biobased research and design projects and take responsibility for their own sub-project (learning outcomes 7-8 and 10-11). Like graduates from other programmes of Wageningen University, graduates develop an academic attitude for lifelong learning (learning outcome 9).

To match the demands of the field, the programme maintains formal and informal contacts with potential employers. In addition to the frequent contacts and meetings of staff with representatives of the professional field, an External Advisory Committee meets annually to discuss the intended learning outcomes, the content and quality of the programme and the performance of graduates. The committee last met in February 2024. Discussions included whether the programme provides sufficient knowledge

and skills relevant to the professional field and whether the programme is well aligned with current developments and trends in the professional field.

Considerations

The panel appreciated the added value of the programme, which combines disciplinary, multi- and interdisciplinary knowledge and skills to contribute to the transition from a fossil-based to a bio-based economy. The orientation of the programme clearly fits the needs of industry, governmental and nonprofit organisations, the panel notes.

The panel assesses that the intended learning outcomes fit the level and orientation of the programme and are aligned with the expectations of the (international) professional field. The aim of the programme is translated adequately into the intended learning outcomes, according to the committee. The panel does advise the programme to reflect the three specialisations more explicitly in the intended learning outcomes, because the focus in the three specialisations is very different. Graduates of the three specialisations therefore differ in competences, which makes them qualified, for example, to conduct research at chair groups specifically suited to the content of the specialisation. These differences in students' profiles should be visible in, for instance, one specific intended

learning outcome per specialisation. Because of the very rapidly changing field of work, the panel also recommends adjusting intended learning outcomes more frequently than usual.

The programme explained to the panel that they feel the current title of the programme is not sufficiently specific and are looking for a more appropriate name. The panel agreed and encourages the programme to choose a new title, possibly with a subtitle, that is clear about the focus of the programme and preferably better emphasises the specific focus of the three specialisations.

The panel appreciates the programme's good contacts with the professional field. The programme aligns the objectives and curricula with the professional field through informal contacts with stakeholders and annual consultations of their External Advisory Committee. The panel notes that the programme's good relation with the professional field enable it to continuously monitor current developments and incorporate them into the programme's profile and programme.

Taking these considerations into account, the panel assesses that the master's programme Biobased Sciences meets this standard.

Teaching-learning environment

Standard 2: The curriculum, the teaching-learning environment and the quality of the teaching staff enable the incoming students to achieve the intended learning outcomes.

Findings

The English-language fulltime master's programme has a duration of two years and comprises a total of 120 EC.

The first year starts with two 6 EC of compulsory courses: *Principles of biobased economy* and *Circular economy*. These courses offer basic understanding of the different biobased disciplines and an introduction in biobased circularity and interdisciplinarity, respectively. In addition, students start to build up a portfolio with self-reflection reports for the compulsory element *Boundary crossing in biobased sciences during Circular economy*. Later students choose at least 12 EC restricted optional courses depending on their specialisation. Half of the specialization courses are meant as basis for the specialisation and the other half are thesis preparing courses. In addition, students choose free elective courses. The first year is finalized with 12 EC *Academic consultancy training*. Students from different master programmes follow the Academic consultancy training in mixed teams and perform a project of an external stakeholder.

The second year consists of the compulsory thesis (36 EC) and an academic internship (24 EC).

The choice of a specialisation determines at which chair groups students are allowed to perform their compulsory thesis. In addition, most chair groups ask students to follow defined restricted optional courses prior to the start of the thesis. Many students choose additional

specialized courses to prepare for the thesis. Other students choose to broaden their scope.

The academic year consists of six periods. Period 1,2,5 and 6 comprise seven weeks of classes, time for self-study and the exam week. In these periods students of all programmes often follow two courses worth 6 EC each. Periods 3 and 4 entail of four weeks in which both the lectures and the exams take place. In these periods students usually follow one course worth 6 EC.

To achieve the three intended learning outcomes referring to interdisciplinarity, the programme combines education to further strengthen one's own discipline, alongside education in interdisciplinary (team)work. First, students are taught basic knowledge, insight and skills in various biobased science disciplines. Second, in multidisciplinary student teams learn from each other's practice and start to create additional value by combining each other's expertise. Third, students follow a number of specialisation courses to become an expert in one aspect of biobased science. To strengthen interdisciplinarity, each student needs to choose an interdisciplinary master course. The offering of these courses differs per specialisation. In these courses students learn to create added value by applying different practices. This finally results in a reflection about the relevance of the thesis topic for the biobased/circular economy. In a fourth step, students work in multidisciplinary, international teams during *Academic consultancy training* on a realistic, societal-relevant biobased project. Students develop a product/

solution for an external commissioner in which they integrate the different team disciplines. In this project, students are again asked to reflect on the relevance of interdisciplinarity. The course addresses crossing disciplinary as well as cultural and societal boundaries. Prior graduation students complete their reflection on interdisciplinarity in a final oral exam of the course *Boundary crossing in biobased sciences*.

The average number of contact hours is 17 hours per study week during the first year of the programme. In the second year of the programme, students receive individual supervision while they work on their thesis and internship. The programme applies a mix of teaching and methods in the first year: lectures, tutorials, practicals and group work. On campus teaching methods are supplemented by online study material.

Inflow and admission requirements

Students should have specialised in their pre-education in one of the disciplines engineering, biomass production or economy, or followed an interdisciplinary programme in the field of biobased sciences, circularity or sustainability. Students with a bachelor's degree in Biosystems Engineering, Management and Consumer Studies, Biotechnology, Economics and Governance, Environmental Sciences, Molecular Life Sciences, Plant Sciences, or equivalent, will be admitted unconditionally.

The number of new students entering the Biobased Sciences Master of Science programme has fluctuated between 30 and 40 in the past four years. This is still below the expectations of the university. Most enrolled students explained that they found the programme by coincidence. Thus, the programme has a challenge to increase visibility.

Staff

The programme has a student staff ratio of 13:1. Staff are often active in other study programmes as well. Most lecturers hold a PhD degree. Technicians are only engaged for assistance of practicals in the two specialisations offering laboratory courses. Many advanced courses are managed and taught by tenure trackers developing a research group in the field of the course. The staff's didactic qualities is proofed by the obtained teaching qualifications from Wageningen University or other universities.

During the thesis and internship period students get individual supervision. During the thesis two supervisors are involved. In most cases, the main supervisor is leader of a research group or subgroup within a chair group. In addition, students have a daily supervisor (e.g. PhD candidate or postdoc researcher) accompanying in most cases only one student at the same time.

Two study advisors support Biobased Science Master of Science students according to Wageningen University standards.

Considerations

The panel has established that the contents of the programme enable students to achieve the intended learning outcomes. The programme has clearly translated the intended learning outcomes into the curriculum. The panel notes that the curriculum is sufficiently coherent, while at the same time giving students a lot of freedom in designing their individual study paths. The panel appreciates the opportunity for students to put together a programme to suit individual interests by choosing one of the three specialisations and the wide range of choices within them.

In the eyes of the panel, the admission requirements adequately match the programme.

In the eyes of the panel the didactic concept of the programme structures the programme and supports the learning process of the students. The educational formats are adequate. The panel notes a particularly good atmosphere. Students and alumni indicate that they find the lecturers approachable and helpful.

The panel understands that the university has opted for a format of six periods per year, with a short third and fourth period, so that minors, for example, fit well with teaching elsewhere. However, the panel notes that for some courses, the third and fourth period is on the short side to fully grasp the material. The panel suggests that the programme carefully evaluates whether courses are suitable for such a brief period and, if necessary, spread course content over two periods.

The tutoring and provision of information to students are conducive to study progress and tie in with the needs of the (international) students and students with functional disabilities.

Students come from very different backgrounds. The panel notes that in the first two courses, the programme pays ample attention to introducing the different disciplines to this multidisciplinary field. For example, the panel appreciates the range in the first course of 10 topics, some of which students will already know well and others will be new. The digital study material, such as MOOCS, to get students to a similar level of knowledge is supportive here, according to the panel.

Partly based on the conditions to be met after the initial accreditation regarding the interdisciplinarity of the programme, the programme made a number of changes to the curriculum. In the assessment of conditions in 2020, The TNO panel was convinced by the richness of the

examples of how interdisciplinarity was presented, developed and reflected upon in the different courses and student projects. According to the TNO panel, interdisciplinarity was sufficiently present in the programme. The programme convincingly demonstrated that the foundation for and learning line on interdisciplinarity was strengthened and that all individual study paths would include interdisciplinarity sufficiently.

The current panel evaluated the interdisciplinarity of the programme as well. The panel assesses the interdisciplinarity of the programme as sufficient and the alignment of the courses with the (interdisciplinary) intended learning outcomes as adequate. However, the panel feels that interdisciplinarity could be further strengthened and has a number of findings and recommendations. The mixed student population and cooperation with other study programme enables an international and multidisciplinary learning environment. The panel is of the opinion that the three disciplines are sufficiently interdisciplinary in themselves through the combination of themes.

While acknowledging the interdisciplinary aspect of the programme, students recommend the programme to follow up on bringing disciplines together. The panel agrees that this would enhance interdisciplinarity. This is especially needed in the second year, where, according to the panel, interdisciplinarity is guaranteed to a limited extent. For example, the programme could build in extra contact moments in the second year, to come back and bring together what students have learned.

The focus of interdisciplinarity in the thesis had been described by the programme when the TNO panel assessed the conditions. The programme stated: 'Interdisciplinarity is embedded

in the Master's thesis projects. Students spend at least 20% of their project time on a different disciplinary perspective and are asked to reflect on the added value. Guidance is provided by two supervisors from the two disciplines or one of the interdisciplinary role-models.' Following that, the programme indicates in its self-evaluation report that the thesis tests the intended learning outcome on integrating scientific work within an interdisciplinary and international context. In assessing the conditions in 2020, the TNO panel concluded that the thesis projects, as explained by the students, showed a substantial interdisciplinary approach. The guidance by two chair groups, the requirements and the examples given by the students convinced the TNO panel that the projects all realized relevant interdisciplinarity in the Biobased Sciences. However, in interviews with the current panel, the programme indicates that it has not proved feasible to follow up on this procedure. Though students may work in the described way during their thesis trajectory, many graduate from one chair group without an interdisciplinary context. The panel notes that the interdisciplinary context in the MSC thesis is thus not secured for all students. As also mentioned above, the panel finds the assurance of attention to the interdisciplinary context in the second year of study limited and advises to increase for instance the weight of the course "Boundary crossing in biobased sciences". Overall the panel advises the programme to look for robust ways to guarantee working in an interdisciplinary context throughout the master's.

The *Academic Consultancy Training* includes training and assessment of the three intended learning outcomes on interdisciplinarity. This training is also offered to other master's programmes and is interdisciplinary in nature. The panel welcomes this component, but recommends that the aims and design of the training

should? be adapted to this master's programme, which focuses more on interdisciplinarity than the other master's programmes and would benefit from further refinement.

In the course *Boundary Crossing in Biobased Sciences*, students reflect on their ability to work interdisciplinary in projects at various points during the programme. The panel learnt from the interviews that the reflections reveal that, over the course of the programme, students have an increasing understanding of the manner and value of interdisciplinarity in their own actions. The panel appreciates this component of the programme, but recommends that the programme review the learning objectives for this component. This is not a test of the actual implementation of interdisciplinary projects, as stated in the current learning objectives, but rather how students can assess their own actions and how the interdisciplinary approach could have been strengthened in their projects.

In the assessment of conditions in 2020, the TNO panel was critical on the measures taken to meet the condition to include academic level elements with appropriate learning outcomes and assessments for all students on 1) ethics and philosophy related to biobased sciences and transition paths; and 2) societal aspects of biobased sciences & innovation. Although good examples of ethical and societal discussions in the courses were presented, the panel was not convinced that the Data Science Ethics course would add to the exploration of ethical issues related to the biobased value chain. It remains unrelated to the specific ethical discussion in biobased issues and it was scheduled too late in the programme, according to the TNO panel. The panel notes that the programme has adequately responded to this by integrating an ethics module into the first, compulsory, course of the programme.

The panel observed that the programme has a strong teaching team. The various disciplines are well represented by the input of staff from a variety of research groups, as is practical and scientific experience in the various fields of work. In most courses, guest lecturers are also used to get broad input from the interdisciplinary field. The panel observes that the staff is also qualified for the execution of the programme in terms of educational expertise. The panel notes that all staff members have adequate English language skills for teaching, which is partly ensured by appropriate policies on teachers' English-speaking skills. The panel appreciates the opportunity to get an appoint-

ment with an emphasis on teaching, which increases the number of lecturers with a focus on developing and delivering teaching. Cooperation between lecturers from different chair groups in designing multi- or interdisciplinary courses is good, notes the panel.

In summary, according to the panel, the curriculum, faculty, and facilities for the programme form a cohesive, inspiring learning environment. Taking these considerations into account, the panel assesses that the master's programme Biobased Sciences meets this standard.

Student assessment

Standard 3: The programme has an adequate system of student assessment in place.

Findings

The programme presents an overview of the forms of assessment per course. Most courses include more than one assessment to cover a number of learning outcomes. The intended learning outcomes to be assessed are indicated for each assessment. This overview shows that frequently used assessment forms are written exams (open and/or closed questions), group-work performance, oral assessment (presentation), practical performance, written reports and individual assignments. Learning outcomes on interdisciplinarity are assessed via reflection reports and an oral examination.

To properly assure the quality of interim examinations and final examinations, there are institution-wide guidelines and instructions for assessment. These guidelines and instructions include the following: the method of testing whether the student has met the learning outcomes; the procedures for testing in individual teaching methods; the role of assessment strategies and assessment criteria in the examination per course; and the supervision on these aspects by the Examiners and the Examining Boards.

Wageningen University has four Examining Boards: Life Sciences, Social Sciences, Environment and Landscape, and Technology and Nutrition. Each of the Boards is responsible for the examination arrangements for one of the four groups of study programmes. Joint degrees have their own specific Examining Boards. The master's programme Biobased Sciences falls under the Examining Board Technology and Nutrition. This Board consists of a chair, a secretary,

a second secretary, six members employed by the University and one external member.

The Examining Board evaluates the sets of study components, approves exemptions, and determines the results of the final evaluations of the programme. The Examining Board is also responsible for assuring the quality of interim examinations and final evaluations. The Examining Board periodically consults with the programme directors.

Considerations

The panel judges that the programme has an adequate, solid assessment system and assessment procedures. The system is adequately based on the university wide policy, the panel notes. Multiple adequate assessment types are implemented in the programme: from written exams to (individual and group) assessments. The panel believes that the variety of assessment formats allows students to develop the necessary knowledge and skills and learn to work in interdisciplinary environments.

According to the panel, the procedures for assessing the final product of the programme, the thesis, is clear and the assessment itself is sound. However, the panel notes that the feedback on assessment forms of theses is not always of the same level. In some cases, for example, the feedback is limited or only mentions points for improvement, so that the grounds for the judgment are not in line with the outcome from the completed Rubric. The panel observes that the programme pays attention to the justification on the forms and recommends that the

programme continues this attention, for example in calibration sessions with each other to assess whether the justification for a judgement can also be followed by outsiders.

There is a lot of focus on the use of AI in student products within the university. Guidelines are in use, but programmes would benefit from a more matured central policy, according to the panel.

The programme uses assessment forms prepared centrally in the university, for example when assessing the thesis and internship. Based on the documentation, the panel finds that these general forms might not always fit well with the objectives to be assessed. The panel recommends allowing the possibility of adaptation when this is necessary for alignment with the learning outcomes, for example on the interdisciplinary approach.

According to the panel, quality assurance of assessment is ensured by a proactive Examining

Board. The Board, focusing on a group of programmes, show a sufficient knowledge of the individual programmes and its assessment. Since the previous accreditation, the capacity of the Board is sufficiently increased, and its agency in relation to the rather autonomous chair groups is improved. For ensuring the quality and uniformity of assessment in general, the panel appreciates the increased use of calibration sessions in which assessors participate. The panel recommends that the Examining Board evaluate whether the testing of intended learning outcomes is appropriate. Indeed, the panel thinks that the assignment of intended learning outcomes to courses and their elaboration into learning objectives, e.g. the thesis and Boundary Crossing, does not fully reflect current achievable practice.

Taking these considerations into account, the panel assesses that the master's programme Biobased Sciences meets this standard.

Achieved learning outcomes

Standard 4: The programme demonstrates that the intended learning outcomes are achieved.

Findings

With the master's programme thesis (36 EC), the programme aims to assess seven of the eleven intended learning outcomes. The intended learning outcomes on designing a new biobased concept, cooperating in an interdisciplinary team, create additional value by combining biobased disciplines, and reflecting on the learning path is assessed elsewhere: in the two compulsory courses, the courses offered for a specific specialisation and in the course *Boundary crossing in biobased sciences*. The thesis consists of a performance (40%), a research report (50%), an oral presentation and an oral defence (both 5%). All components must be assessed with a 5.50 for a satisfactory final grade.

The master thesis assessment is similar for all master's programmes at Wageningen University. Biobased Sciences Master of Science students perform their thesis at chair groups supervising students from other master programmes as well.

In the academic years 2022/2023 and 2023/2024, half of the graduates completed the specialisation *Biobased and Circular Economy*. The other two specialisations, *Biorefinery and Conversion* and *Biomass Production and Carbon Capture* were completed by one-quarter of the students each.

Considerations

To form an opinion about the final level of the students, the panel read recent theses of fifteen graduates of the programme and viewed the assessments of these works. The selection included theses with a variety of topics from the

three specialisations and a distribution between lower and higher grades. The panel found that all the theses attested to the master's level and the content matches the profiles of the programme. The quality of the works varies, with the grade given corresponding to the panel's assessment of quality. In general, the panel was pleased with the quality of the work and the accuracy of their assessments. Adequate research ability is evident in all theses. This finding is in line with the strong research profiling of the programme.

From surveys and conversations with alumni, the panel concludes that the master's programme prepares students well for the job market and that students end up in positions that fit the intended exit profile. The programme trains students to become academic experts who can apply their own specialised knowledge and skills in complex, interdisciplinary projects. It has become clear to the panel that although students are trained to work interdisciplinary they are indeed also trained in depth in one expertise. Alumni thus differ in their ability to perform certain employment positions. For example, chair groups indicated that they do not hire a student just because he or she has completed this master's, but also look mainly at the student's background to fill the position. After all, someone with a technology background has different capabilities than someone with a bachelor's degree in economics. The panel understands this and thinks it also fits the profile of the programme which states that alumni learn to apply their own specialist knowledge. However, the panel feels that this profiling could be more clearly reflected in the intended learning

outcomes (as already mentioned in standard 1) and also in the explanation of the profiling. For example, the programme could provide some examples of (the work of) graduates in practice, in line with their own disciplinary background.

Taking these considerations into account, the panel assesses that the master's programme Biobased Sciences meets this standard.

Attachment 1: assessment panel

[Stanley Brul](#), chair, is a professor at the University of Amsterdam specializing in microbial food safety and molecular biology. He has led research projects funded by NVWA and NWA-ORC METAHEALTH. He is also an educator, program coordinator, and evaluator for academic programs, contributing to various national and international scientific committees.

[Marloes van Dort](#) is a senior education policy advisor at Erasmus University Rotterdam. She has expertise in curriculum development, assessment, and educational policy. She played a key role in implementing new study programs and quality assurance frameworks.

[Davide Viaggi](#) is a professor of Agricultural Economics at the University of Bologna. His expertise includes agricultural policy, rural valuation, and environmental economics. He has led numerous EU and national research projects, contributing to policy development and higher education.

[Dmitry Murzin](#) is Professor of Chemical Engineering at Åbo Akademi University in Finland, where he leads the Laboratory of Industrial Chemistry and Reaction Engineering. He has extensive experience in catalysis research, international collaboration, and academic teaching, and maintains strong links with industry through joint projects, technology transfer, and curriculum development.

[Thomas Westerhuis](#) is an MSc Biomolecular Sciences student at the University of Groningen. He has served as a student assessor and is trained by NVAO as a student panel member.

The panel was supported by [Linda van der Grijspaarde](#) as an independent secretary on behalf of AeQui.

All panel members have completed and signed a statement of independence and impartiality, and these have been submitted to NVAO.

Attachment 2: site visit program

Monday 20 January 2025

Time	What	Who
9.00-9.30	Arrival panel and preparation	
9.30-10.15	Management of programme	<ul style="list-style-type: none"> • Dean of education • Programme Director • Chair Programme Committee
10.15-10.30	Break	
10.30-11.15	Students MBS + alumni	<ul style="list-style-type: none"> • Student MBS-1 • Student MBS 2 / Spec. A - Biomass Production and Carbon Capture • Student MBS-1 / Spec. B - Biorefinery and Conversion • Student MBS-2 / Spec C. Biobased and circular economy • Student MBS-2 / Spec. B - Biorefinery and Conversion • Student MBS-1 / Spec C. Biobased and circular economy • Student MBS-2 completed / Spec. B - Biorefinery and Conversion • Alumnus, 2022, co-founder Weco – the Wave Energy Collective (online) • Alumnus, 2022, coordinator sustainability Vconsyst (online)
11.15-11.30	Break	
11.30-12.15	Teaching staff MBS	<ul style="list-style-type: none"> • Lecturer, <i>Environmental Technology</i> • Lecturer, <i>Business Management & Organisation</i> • Lecturer, <i>Biobased Chemistry and Technology (chair)</i> • Lecturer, <i>Bioprocess Engineering</i> • Lecturer, <i>Plant Breeding</i> • Lecturer, <i>Plant Production Systems</i>
12.15-13.30	Lunch Break	
13.30-14.15	Examining Board + Study advisor(s)	<ul style="list-style-type: none"> • Member EBTN • Secretary EBTN-Quality Assurance • Secretary EBTN-student affairs matters • Study advisor • Study advisor
14.15-15.30	Deliberation	
15.30-16.00	Preliminary feedback	All

16.00-16.45	Development dialogue/theme session	
16.45	Closure of the day - drinks	

The open consultation took place online prior to the visitation. No one signed up for this.

Attachment 3: Recommendations from previous assessment

In 2018 the initial accreditation (Toets Nieuwe Opleiding, TNO) of the programme took place. NVAO decided to accredit the programme but imposed conditions to be met within two years. This decision was in line with the advice formulated and substantiated in the assessment report by the TNO panel. The conditions focused mainly on the interdisciplinarity of the programme. In 2020, the TNO panel confirmed that the programme fully met four of the five conditions and had an advice for the fifth. The accreditation committee confirmed that interdisciplinarity had been included in learning outcomes (1), criteria (2) and assessments (3) and was explicitly embedded in courses (4). The fifth point related to the position of ethics and philosophy in the programme. The accreditation committee advised to introduce ethics and philosophy earlier in the programme and to embed it in one of the first interdisciplinary courses rather than offer a single course at the end of the first year. Since, an ethics module has been integrated in the first, compulsory, course of the programme.

Attachment 4: reviewed documents

Selfevaluation MBS (2024)

Development dialogue – discussion points MBS

General information WU and Programme:

2d. Assessment Policy WU 2023

2e. Framework for Education Wageningen University 2024-2025

2f. Study Advice Service level commitment 2023

Selection of courses: course materials

Boundary Crossing in Biobased Sciences

Circular Economy

Principles of Biobased Economy

Sustainability Analysis

Thesis (selected samples)

15 Theses reports en evaluation forms

MSc Thesis course guide WU

Examining Board

FBE (Facultair Beleidsoverleg Examencommissies) Annual Reports 20/21, 21/22 en 22/23

Programme Committee

PC annual reports and plans 20/21, 21/22 en 22/23

