



**B and M Biomedical Sciences**  
**Maastricht University/transnational University Limburg**

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[www.academion.nl](http://www.academion.nl)  
[info@academion.nl](mailto:info@academion.nl)

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## Summary

### Standard 1. Intended learning outcomes

According to the panel, the profile of the BSc and MSc BMS are fit for academic bachelor's and master's programmes in the field of biomedical sciences, with a strong focus on competences. The goals of both programmes have been well-translated into two coherent sets of intended learning outcomes which are aligned with the requirements of the academic and professional fields. The bachelor's programme ought to clearly define overarching outcomes related to the biomedical expert competence. As the major evolvments in health and disease go beyond biomedical sciences, for further development of the programmes, an interesting direction could be a collaboration with educational programmes in related disciplines such as medicine, psychology, and economics.

### Standard 2. Teaching-learning environment

The panel notes that both programmes have successfully translated their intended learning outcomes (ILOs) into coherent curricula. Each programme demonstrates a clear structure and provides ample flexibility for students to tailor the programme according to their preferences. Moreover, both programmes adequately address career opportunities, both within academia and beyond. According to the panel, the programmes should devote more attention to practical skills and data science in their further development.

The panel appreciates the successful implementation of the Problem-Based Learning (PBL) concept in the programmes, which strongly emphasizes both academic and professional skills and is valued by both students and staff.

Both programmes maintain a well-balanced study load. The panel is highly impressed by the completion rates of the master's programme. The panel finds the decision to use English as the language of instruction well-justified. The mixed backgrounds of the staff contribute to the esteemed international teaching and learning environment.

The panel is positive about the competency-based guidance and assessment facilitated by the mentor system with portfolio. Nevertheless, it suggests potential improvements such as enhancing instructions to students and more attention for students' individual needs. The panel welcomes the programmes' initiatives to further refine the mentor system for increased effectiveness.

The teaching staff is qualified for teaching in the programmes, both in terms of scientific quality and teaching experience. The panel highly appreciated the strong commitment towards the bachelor's and master's programmes expressed by the programme management and teachers. The panel is positive about the excellent guidance and support students receive throughout the programmes.

### Standard 3. Student assessment

The BMS programmes have a valid, transparent, and reliable system of assessment in place, guaranteeing that the students are assessed on all ILOs throughout the courses. The panel values the diversity of testing involved in the programmes.

The thesis assessment procedure for both programmes is up to standard. Each thesis is graded by two examiners, using grading criteria as well as qualitative argumentation. The procedure could be further improved by informing students and teachers about what they can expect and what their entitlements are during the thesis writing process.

The BoE is in control and has a proactive role in the quality assurance of assessment in the programmes. The communication between the programme management and the BoE should be improved by establishing clear agreements regarding the follow-up on the BoE's advice.

#### Standard 4. Achieved learning outcomes

The panel concludes that the theses show that the intended learning outcomes are achieved for both programmes. They are clearly of the level and quality that may be expected from a bachelor's or master's programme in the field of biomedical sciences. The bachelor's programme prepares students for relevant master's programmes. Alumni of the master's programme feel the programme prepared them well for their careers. They find employment in relevant jobs, both inside and outside academia.

#### Score table

The panel assesses the programmes as follows:

Programme Bachelor Biomedical Sciences	
Standard 1: Intended learning outcomes	meets the standard
Standard 2: Teaching-learning environment	meets the standard
Standard 3: Student assessment	meets the standard
Standard 4: Achieved learning outcomes	meets the standard
General conclusion	positive
Programme Master Biomedical Sciences	
Standard 1: Intended learning outcomes	meets the standard
Standard 2: Teaching-learning environment	meets the standard
Standard 3: Student assessment	meets the standard
Standard 4: Achieved learning outcomes	meets the standard
General conclusion	positive
Hans van Leeuwen	Annemarie Venemans
Date: 13 March 2024	

# Introduction

## Procedure

### Assessment

On 25 and 26 January 2024, the bachelor's and master's programmes Biomedical Sciences of Maastricht University were assessed by an independent peer review panel as part of the cluster assessment Biomedical Sciences. The assessment cluster consisted of 18 programmes, offered by Wageningen University, Vrije Universiteit Amsterdam, University of Amsterdam, Leiden University, Radboud University, Maastricht University and Utrecht University. The assessment followed the procedure and standards of the NVAO Assessment Framework for the Higher Education Accreditation System of the Netherlands (September 2018).

The MSc Biomedical Sciences is part of the transnational University Limburg, a collaboration between Maastricht University and Hasselt University. The programme is organized by Maastricht University and is fully covered by the quality assurance policies of the UM. It was therefore assessed as if it were a UM programme. For the remainder of the report, UM is referred to as the organizing institution for the sake of convenience.

Quality assurance agency Academion coordinated the assessment upon request of the cluster Biomedical Sciences. Peter Hildering and Jessica van Rossum acted as coordinator and Annemarie Venemans, Hester Minnema, Carlijn Braam and Jessica van Rossum acted as secretaries in the cluster assessment. They have been certified and registered by the NVAO.

### Preparation

Academion composed the peer review panel in cooperation with the institutions and taking into account the expertise and independence of the members as well as consistency within the cluster. On 25 July 2023, the NVAO approved the composition of the panel. The coordinator instructed the panel chair on his role in the site visit according to the Panel chair profile (NVAO 2016).

The programmes composed a site visit schedule in consultation with the coordinator (see appendix 3). The programmes selected representative partners for the various interviews. It also determined that the development dialogue would take place after the site visit. A separate development report will be made based on this dialogue.

The programmes provided the secretary with a list of graduates over the year 2023. In consultation with the secretary, the panel chair selected 15 theses per programme. The diversity of final grades and examiners were taken into account in determining the selected sample. Prior to the site visit, the programmes provided the panel with the theses and the accompanying assessment forms. They also provided the panel with the self-evaluation report(s) and additional materials (see appendix 4).

The panel members studied the information and sent their findings to the secretary. The secretary collected the panel's questions and remarks in a document and shared this with the panel members. In a preliminary meeting, the panel discussed the initial findings on the self-evaluation reports and the theses, as well as the division of tasks during the site visit. The panel was also informed on the assessment frameworks, the working method and the planning of the site visits and reports.

### Site visit

During the site visit, the panel interviewed various programme representatives (see appendix 3). The panel also offered students and staff members an opportunity for confidential discussion during a consultation hour. No

consultation was requested. The panel used the final part of the site visit to discuss its findings in an internal meeting. Afterwards, the panel chair publicly presented the preliminary findings.

## Report

The secretary wrote a draft report based on the panel's findings and submitted it to the coordinator for peer assessment. Subsequently, the secretary sent the report to the panel for feedback. After processing this feedback, the secretary sent the draft report to the programmes in order to have it checked for factual irregularities. The secretary discussed the ensuing comments with the panel chair and changes were implemented accordingly. The panel then finalised the report, and the coordinator sent it to Maastricht University.

## Panel

The following panel members were involved in the cluster assessment:

- Prof. dr. Hans van Leeuwen, professor of Calcium and Bone Metabolism, Erasmus MC – chair;
- Dr. Annik van Keer, Deputy Head Department Educational Policy, Faculty of Science, Utrecht University;
- Dr. Mieke Latijnhouwers, Assessment Expert, Wageningen University & Research;
- Prof. dr. Frans Ramaekers, emeritus professor Molecular Cell Biology at Maastricht UMC and CSO and QA Manager at Nordic-MUbio;
- Prof. dr. Jan Eggermont, professor of cell physiology, KU Leuven;
- Dr. Geert Ramakers, associate professor Translational Neuroscience, UMC Utrecht;
- Dr. Leo Schouten, associate professor Cancer Epidemiology, Maastricht University;
- Prof. Marjukka Kolehmainen, professor of Food and health, University of Eastern Finland;
- Liliane Bouma-Ploumen MSc, Policy Adviser secondary education, Bètapartners;
- Dr. Maud Huynen, assistant professor Planetary Health, Maastricht University;
- Dr. Margot Kok, Education Policy Department Manager, Utrecht University;
- Prof. dr. Dennis Claessen, professor of Molecular Microbiology, Leiden University;
- Emma van Wijk BSc, master student Biomedical Sciences, Radboud University – student member;
- Daphne Louws BSc, master student Nutrition and Health, Wageningen University & Research – student member;
- Prof. dr. Mieke Verstuyf, professor of Clinical and Experimental Endocrinology, KU Leuven – referee;
- Dr. Jur Koksma, assistant professor Transformative Learning, Radboud University – referee;
- Prof. dr. Ton Bisseling, emeritus professor of Molecular Biology, Wageningen University & Research – referee.

The panel assessing the bachelor's and master's programmes Biomedical Sciences at Maastricht University consisted of the following members:

- Prof. dr. Hans van Leeuwen, professor of Calcium and Bone Metabolism, Erasmus MC – chair;
- Dr. Annik van Keer, Deputy Head Department Educational Policy, Faculty of Science, Utrecht University;
- Prof. dr. Jan Eggermont, professor of cell physiology, KU Leuven;
- Liliane Bouma-Ploumen MSc, Policy Adviser secondary education, Bètapartners;
- Daphne Louws BSc, master student Nutrition and Health, Wageningen University & Research – student member;
- Prof. dr. Mieke Verstuyf, professor of Clinical and Experimental Endocrinology, KU Leuven – referee;

## Information on the programmes

Name of the institution: Maastricht University  
Status of the institution: Publicly funded institution  
Result institutional quality assurance assessment: Positive

Programme name: Biomedical Sciences  
CROHO number: 56990  
Level: **Bachelor**  
Orientation: Academic  
Number of credits: 180 EC  
Specializations or tracks: -  
Location: Maastricht  
Educational minor: Applicable  
Mode(s) of study: Fulltime  
Language of instruction: English  
Submission date NVAO: 1 May 2024

Name of Institution: Maastricht University /  
transnationale Universiteit Limburg  
Programme name: Biomedical Sciences  
CROHO number: 66990  
Level: **Master**  
Orientation: Academic  
Number of credits: 120 EC  
Specialisations or tracks: Genetics and Genomics  
Inflammation and Pathophysiology  
Nutrition, Physical Activity and Metabolism  
Regenerative Medicine  
Biomedical Imaging  
Neuromodulation  
Location: Maastricht  
Mode(s) of study: Fulltime  
Language of instruction: English  
Submission date NVAO: 1 May 2024



## Description of the assessment

### Previous accreditation's panel's recommendations

The documentation included an overview of how the programmes followed up on the recommendations given by the previous accreditation's panel (2018). Also, several recommendations and their follow-up actions were discussed with the programmes during the site visit. The panel concludes that the recommendations have been seriously acted upon. The panel is generally satisfied with the improvement measures taken and sees that these have contributed to improved quality of the programmes. For some points of attention identified by the previous accreditation committee, the programmes are still in the process of addressing the previous panels' recommendations; these issues will be described in this report.

### Organization

The bachelor's and master's programmes Biomedical Sciences are embedded in the Faculty of Health, Medicine and Life Sciences (FHML), one of the six faculties within Maastricht University (UM). Within FHML, the Institute for Education (IfE), headed by the scientific director, has the overall responsibility for the content (quality and innovation) of all education provided by the faculty, as well as for staffing, logistics, management and planning. Within the IfE, the Bachelor Biomedical Sciences (BBS) and Master Biomedical Sciences (MBS) are placed in the domain of Biomedical Sciences (BMS), together with the Bachelor Regenerative Medicine and Technology. The educational minor and module (EDM) are also structurally embedded under the FHML domain Biomedical Sciences. The BSc and MSc BMS have a joint Programme Committee and share a Board of Examiners with the bachelor's programme Regenerative Medicine and Technology, EDM and the master's programme Health, Food and Innovation Management.

### Standard 1. Intended learning outcomes

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 BMS programmes at Maastricht University teach students to become independent researchers that are able to critically judge scientific results and to understand scientific approaches to acquire insight in life science issues. Future employers in the field of biomedical sciences are no longer looking for biomedical experts only, they place at least as much weight on competences. Therefore, according to the Maastricht biomedical sciences programmes, the ideal graduate in biomedical sciences is a lifelong learner, effective communicator and collaborator, and is able to respond adequately to demands from colleagues working in academia, the clinic, and the industry.

To adequately prepare students for a relevant career in the biomedical sciences domain, both programmes have adopted a set of four competences. For the BBS these are 1) B-competence: the Biomedical Expert, who demonstrates and effectively applies knowledge of biomedical science, 2) C-competence: the Communicator and Collaborator, who can communicate about her/his work with persons from different backgrounds and can work together in a team with colleagues from various disciplines and with diverse societal and cultural backgrounds, 3) I-competence: the Investigator & Scholar, who is curious and inquisitive, shows willingness and curiosity to explore and to find answers, and has developed critical thinking as well as basic research and problem-solving skills, and 4) P-competence: the Professional & Organiser, who has a professional attitude to his/her work and in her/his relations to others.

The competencies of the MBS are in line with those of the BBS programme, although they are configured in a slightly different manner. The competences entail the MBS graduate as a 1) biomedical expert/investigator, 2) professional/collaborator, 3) creator/ innovator/ forerunner/ ground breaker and 4) communicator. In addition

to becoming knowledgeable professionals, MBS graduates should have the ability to: professionally collaborate and communicate with others, deal with feedback, manage time properly, and reflect on their personal and professional development in the areas of biomedical expertise, research, scientific integrity, academic communication, and creativity.

Both the BBS and MBS programmes formulated Intended Learning Outcomes (ILOs) that are connected to the four competences. The panel studied the ILOs of both programmes and concluded that they form a well-structured overview of the main goals, translated into the knowledge and skills to be acquired by students. An overview provided by the programmes demonstrates that the ILOs align with the Dublin descriptors for bachelor's and master's programmes, thereby demonstrating their level and academic orientation. Furthermore, the panel determined that the ILOs align well with the general knowledge, skills and attitudes described in the domain-specific framework of reference for Biomedical Sciences. The panel acknowledges that the bachelor's phase offers students a broad education in biomedical sciences. The MBS presents opportunities for students to apply and deepen their knowledge and competencies within diverse areas of biomedical research.

The panel is very positive about the framing of the ILOs in the context of the four competences aiming at developing academic competences and an academic attitude. The students are stimulated to advance their organisational and communicative skills and their scholarly and professional potential. A point for improvement is the absence of ILOs for the competence of a biomedical expert in the BBS programme. Although the programme has formulated learning objectives at the course level, the panel believes that this is too fragmented. According to the panel, the programme should articulate overarching outcomes with respect to this competence instead of using the ILOs articulated on national level in the domain specific framework.

As stated in the self-evaluation reports, both the bachelor's and master's programmes apply a multidisciplinary, integrated approach. The programme management clarified during the panel visit that this approach encompasses various fields within the biomedical sciences, from molecular processes inside cells to physiology and function in the whole organism. The panel stressed for the future the importance of biomedical sciences collaborating with disciplines outside the biomedical domain, for example medicine, psychology and economics. They conveyed assurance that the programmes' profiles and their accompanying didactical concepts (see also standard 2) are particularly well-equipped to encourage and facilitate such multidisciplinary approach.

#### Considerations

According to the panel, the profiles of the BBS and MBS are fit for academic bachelor's and master's programmes in the field of biomedical sciences, with a strong focus on competences. The goals of both programmes have been well-translated into two coherent sets of intended learning outcomes which are aligned with the requirements of the academic and professional fields. The bachelor's programme ought to clearly define overarching outcomes related to the biomedical expert competence. As the major evolvments in health and disease go beyond biomedical sciences, for further development of both programmes, an interesting direction could be a collaboration with educational programmes in other disciplines such as medicine, psychology, and economics.

#### Conclusion

The panel concludes that both programmes meet standard 1.

## Standard 2. Teaching-learning environment

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

### Findings

#### *Curriculum*

The **bachelor curriculum** consists of six semesters (see also appendix 2). Each semester in the first year is composed of two periods of eight weeks (each 7 EC) and one period of four weeks (5 EC). The initial semester in the second year also consists of two eight-week periods (each worth 6 EC) and one four-week period (5 EC). The eight-week courses in the first three semesters primarily focus on the B-competence. Students learn step-by-step how biological processes function in the body, from cells and molecules to the most complex organs and, ultimately, the human body as a whole. The four-week courses in the initial three semesters highlight the I-competence. During these courses, students delve into fundamental principles of research methods, statistics, and modern imaging techniques.

From the fourth semester onwards, students can specialize or broaden their knowledge through elective courses and the minor programme. Elective courses (17 EC) represent different biological organisation levels, either focussing more on molecular and cellular organisation or accentuating physiological processes at a higher organisational level. During the minor period in the fifth semester (30 EC), students have the flexibility to choose academic courses based on their preferences. The programme provides various minor courses. Alternatively, students can opt for a minor period at another UM faculty or at another university in the Netherlands or abroad, as long as it meets the requirements and is approved by the Board of Examiners as equivalent to a minor offered at UM. Additionally, an educational minor has been accessible since 2018.

Throughout the three years of the bachelor's programme, various overarching academic skills are systematically integrated. These encompass statistics and methodology (3 EC) and philosophy and ethics (7 EC). Also, assignments related to the C-competence (e.g. scientific writing, oral presentations, 20 EC), and the P-competence (e.g. good laboratory practices, time management, 22 EC), are embedded in various courses throughout the curriculum.

During the first course of the final semester, students delve deeper into a chosen biomedical specialisation of their preference. This course (6 EC) provides comprehensive hands-on training in the specific technique, requiring students to draft a Standard Operating Procedure. Over the twelve-week thesis period (20 EC), students undertake a compact research project. This project may be situated within one of the research groups in FHML departments or at another faculty, university, or biomedical company. The project revolves around a scientific, biomedical research question. While the research tasks can be carried out by a team of multiple students, each student is required to independently write a thesis focusing on the research project.

The panel studied the curriculum of the BBS programme and concludes that the programme successfully translated the ILOs into a coherent and varied curriculum with room for individual customization and specialization. The compulsory courses provide a common coherent core to the programme, whereas the electives, minor and internship offer opportunities for students to shape the programme to their own ambitions. Philosophy and ethics are covered in several courses throughout the bachelor's programme, which the panel considers to be a valuable addition to the curriculum.

The **master's programme** starts with two generic courses. In the course 'Biomedical Challenges' (10 EC), students explore the diverse subjects within biomedical sciences, emphasizing the pathophysiology, diagnosis, and therapy of various diseases. The main themes, including mitochondrial disorders, neurological and mental disorders, and metabolic disorders, are covered through lectures, problem-based learning cases, journal clubs,

workshops, and practicals. Simultaneously, students engage in a biomedical project, delving into the current biomedical knowledge and challenges of a chosen topic.

In the second 8-week MBS course, 'Biomedical Approaches' (10 EC), students receive hands-on experience with various data analysis tools and procedures, gaining familiarity with research tools related to specializations. By the course's end, students acquire sufficient background to choose the most suitable approach/technique for a given task. The biosafety course (1 EC) is a prerequisite to be allowed to work in certain laboratories. It is given during the second generic course preparing students to work safely in labs.

After the two generic courses, students choose one of the six specializations. Each specialization comprises two courses, each worth 10 EC. The specializations offered are:

1. Genetics and Genomics
2. Inflammation and Pathophysiology
3. Nutrition, Physical Activity and Metabolism
4. Regenerative Medicine
5. Biomedical Imaging
6. Neuromodulation

The first year ends with the 'Designing Scientific research' course (10 EC) in which students learn how to set up fundamental or applied research and how to write and defend their own research proposal. Students are trained in presentation skills and receive feedback on their performance.

In the second year, students undergo an extensive 40-week internship (50 EC), providing them with independent research project experience. Obtaining internship placements is facilitated by an internship database. In the academic year 2022-2023, 36% of students (50 out of 140) completed their internships outside UM, mostly at other universities or research institutions, with only a few in industry. Each student is supervised by a local (or daily) supervisor, and in external internships, an 'institutional supervisor' (always a UM staff member) is also appointed.

During the master's programme there are three longitudinal tracks. The 'Ethics in Biomedical Sciences' track (2 EC) centers on three aspects of research responsibility: bioethics, research ethics, and research integrity. The 'Managing a Biomedical Innovation' track (10 EC) provides various teaching and learning activities aimed at enhancing students' comprehension of intellectual property, regulatory affairs, quality assurance, and economic viability assessment, enabling them to apply this knowledge to their thesis project. In the Career Skills track (7 EC), students collaborate with a personal mentor to cultivate and enhance skills crucial for biomedical scientists.

The panel studied the MBS curriculum and spoke with the students and staff about the content of the curriculum. It concluded that the curriculum is well-designed and there is a good alignment between the ILOs and the curriculum. The generic courses cover an interesting selection of topics, after which the students can deepen their knowledge in advanced specializations. This combination makes it possible to achieve a high level of expertise. According to the students interviewed by the panel, all courses in the curriculum are valuable. However, they express a preference for dedicating more attention to their specialization in contrast to the generic courses. The panel agrees with the programme management that the generic courses are important as they contribute to a similar knowledge and skills level of all students and provide them with a wider expertise.

The panel commends both BBS and MBS programmes for their focus on career opportunities. The previous accreditation panel recommended that both programmes incorporate more attention to career opportunities beyond academia into their curriculum. The BBS programme responded to that by the implementation of science cafes and interviews with companies. Moreover, a career development coordinator is appointed and several of the newly developed minor courses include site-visits to companies and incorporate additional guest

lecturers from the industry. In the MBS programme, career orientation activities, such as site visits, guest lectures, and events with alumni, have been implemented. Students engage with industry experts early on, utilizing tools like the "my employability scan" to choose their career path and discuss it with their mentor. "Café sessions" introduced in the second year focus on various career paths, facilitating interaction and networking with professionals from industrial, academic, and educational backgrounds.

Students in BBS as well as MBS programmes highlight that they consider the quantity and quality of practical sessions in the curriculum to be insufficient. Bachelor students indicate in the student chapter that in addition to offering more practicals, these practicals should also have less of a 'cookbook character'. They would prefer exercises in which they have to develop a practical protocol themselves. Furthermore, due to the removal of the second master internship, master students have reduced exposure to a variety of laboratory techniques. Master alumni conveyed during the site visit that they felt less adequately prepared in practical skills for their roles compared to colleagues with other educational backgrounds. Consequently, the panel recommends the inclusion of more practical skills in the curriculum for both programmes.

Another area for improvement is the attention given to data science in both the BBS and MBS programmes. The panel gathered from conversations with teachers during the accreditation visit that several teachers are present that have sufficient expertise in this field. However, while certain courses touch upon data science, there is presently a lack of cohesion among courses on this subject. The amount of data science that students receive in their education now depends too much on the electives, minors, or specializations they choose. The panel asserts that data science is integral to biomedical sciences and advocates for both the bachelor's and master's programme to offer more thorough coverage of this topic within the curriculum and improving alignment among courses in this field.

The previous accreditation panel recommended to review whether the 'applied' character of statistics education in the BBS programme can be improved. The programme responded to that by incorporating an additional workshop in year 3. Although students deem that the dedicated statistics course meets its purpose, they also consider only one session to repeat statistical approaches before the start of the thesis inadequate. For the MBS programme, the internal midterm evaluation panel saw a benefit of devoting more attention to programming and letting students practice with different statistical analysis programmes. In response to that recommendation, the programme has decided to develop short video clips related to different topics in statistics and programming that can be used by both BBS and MBS students. The panel acknowledges the progress made by the programmes in statistics education but deems short video clips too limited and recommends further optimization to ensure adequate focus on applying theoretical concepts. This was also confirmed by the alumni that they missed profound knowledge of statistics in their programme.

#### *Didactical concept*

Like all programmes at UM, the BBS and MBS programme take a student-centred approach to learning, using the concept of problem-based learning (PBL), which focuses on contextual, constructive, collaborative and self-directed learning (CCCS). Education is developed as an interactive process, which builds on the activation of prior knowledge, elaboration, and an exposure to cases or problems that reflect the professional field. This approach stimulates students to play an active role in the planning, monitoring, and evaluation of their own learning process. In addition to the PBL tutorial groups, students attend introductory, topic-related and keynote lectures, as well as skills trainings.

The panel appreciates the integration of PBL into the programmes, noting it as a well-developed educational concept characterized by considerable flexibility and a robust focus on both professional and academic skills. In the conversations with students, alumni, and teaching staff, it appeared that all of them were positive about the didactic concept and the way it has been implemented. Part of the students chose BBS or MBS programme precisely because of the PBL concept. The students told the panel that they learn to practice all sorts of roles in

different groups and enjoy the combination of group work, self-study, and the challenge to work on real life cases.

The panel learned from master's students who had completed their bachelor's education elsewhere that they encountered no issues with the introduction of PBL. These students have access to training during the orientation week. A nice additional upside is that they have experienced significant support from fellow students in familiarizing themselves with PBL.

#### *Admission and feasibility*

The previous accreditation panel was concerned that the increasing enrolment numbers in the bachelor's programme put the organisation of the programme under pressure, and that this might negatively impact the quality of the programme. In response to this concern, the BBS programme has installed a numerus fixus (N=400) per academic year 2023-2024. The student intake after installation of the numerus fixus has decreased with more than 50% (175 students enrolled in the BBS first year per September 2023). During the site visit, the programme management told that they had foreseen a decline in enrolment but had hoped for a less substantial decrease. With a capacity to accommodate 400 students, the programme aims to witness a rise in enrolment in the upcoming years.

Candidates with a relevant bachelor's or master's degree from a Dutch university are directly admissible to the MBS programme. Other candidates may be required to pass a Graduate Record Examination (GRE)-test. Each application is assessed by the Admission Board BMS and, if needed, discussed with the programme coordinator. The programme management is satisfied with the current intake of 151 students with a diverse international background: 58% of the students has the Dutch nationality, 38% of the students originate from another EEA country, and 4% has a non-EEA nationality).

Over the past three years, bachelor students spent an average of 30 hours per week on their studies across all years. Results from the National Student Survey (2023) indicate that 62% of respondents find the study load 'exactly right', while 32% rate it as 'high', and 3% each rate it as 'too high' or 'low'. From the student chapter it appears that the balance between contact hours and self-study time is adequate. According to some students, the study load could be increased in the first two years, but this also depends on the individual motivation and willingness to study topics more in depth. The panel believes that the study load is sufficient.

In the master's programme, on average, first-year courses have 10-12 contact hours per week, and the average weekly study hours for all first-year courses were between 35 and 40 hours. Internship workload generally exceeds 35 hours per week, but students appreciate practical work reflecting future environments and workload. The panel considers the study load of the master's programme adequate. Although the number of contact hours is relatively low, the panel asserts that the utilization of active teaching methods within the programme ensures that this does not compromise the quality of education or the sense of community.

The panel is highly impressed by the completion rates of the master's programme. Between the academic years 2017-2018 and 2020-2021, an average of 78% of students who renewed their registration completed the programme within the nominal study duration of two years. This percentage increased to an average of 84% after three years. According to the programme, this high success rate is attributed to the small group teaching and the personalized attention given to students.

#### *Mentoring and portfolio*

The panel speaks highly of the extensive guidance that BBS and MBS students receive during their education. Every student is assigned a personal mentor who serves as a point of contact, overseeing their progress and offering support and guidance throughout the entire programme. Students are very satisfied with the personal meetings they have with their mentor. They especially appreciate having the same mentor throughout their



entire studies. Apart from mentor support, students have the option to consult with the study advisor for help in customizing their studies to their advantage and receiving guidance to make well-informed decisions.

In both programmes, the development of competences is monitored in an electronic portfolio in which students collect assessments from tutors, mentors, assessors, and peers on the development in the four competences). During scheduled mentor meetings students engage in reflective discussions about their theoretical and written communication skills, professional behaviour and organisational skills, as recorded in their portfolios. Before these meetings, students submit topics for discussion, along with information and brief reflections on their progress per competence. They also articulate personal learning goals. The mentor reviews the student's portfolio, including exam grades and narrative feedback, and offers interim and end-of-year assessments on professional behaviour related to the portfolio and mentoring. During the site visit, the panel received a demonstration of the portfolio system of both programmes.

Both bachelor's and master's students are generally very satisfied with the mentor system. Bachelor students indicated in the student chapter that initially, it takes some time to get used to the approach, but the personal contact and guidance received in mentor meetings help students in their study career. Students receive feedback on different competences, including feedback on writing and presentation skills, which is highly valued. Master students appreciate the ability to upload various forms of evidence to reflect on their development.

However, MBS students would like more flexibility in the portfolio system to avoid redundancy and repetition. They currently feel the need to check all the boxes, while especially master students would prefer to focus more on competencies that still require attention for their individual needs. In this respect, the mandatory activities with their mentor should be more geared towards interests and personal developments of the master's student. In addition, master students noted that they would benefit from a clearer and more hands-on instruction on how to use the portfolio. Faculty members in the bachelor's programme express their satisfaction with the administrative support they receive for their portfolio tasks. Staff in the master's programme would also like to make use of this support.

The programme management indicates that the mentorship system with portfolio has been successfully implemented in both programmes, yet there is room for further optimization to enhance user-friendliness. The programmes are currently in the phase of evaluation and further improvement. The panel is enthusiastic about the competency-based guidance and assessment. It welcomes the programmes' plans for further fine-tuning to enhance the mentor system's effectiveness even more.

#### *Language*

Both the titles of the programmes as the language of instruction are in English. The field of biomedical science has a strong international focus, in which the English language is essential. PBL is well-suited for an international classroom where students from different of different nationalities, cultural backgrounds and with various international experiences work together in a tutorial group. Such diversity is of intrinsic value to the learning process and to strengthening students' intercultural skills.

Due to the international context, all teaching staff works and communicates in English on a day-to-day basis. Language proficiency is one of the selection criteria for new staff. Additionally, the university offers courses to improve language proficiency of all staff.

The panel considers the choice for the use of English to be well motivated. The programme is closely related to the research field, which is fully international. An English language programme prepares students for an internationally oriented field. Students are positive on the quality of the education in English, and there is sufficient attention to the language skills of the teaching staff. Master students mentioned in the student

chapter that the fact that staff has diverse backgrounds themselves (in terms of experience in biomedical related research and professional positions) adds to the valued international teaching and learning community.

#### *Teaching staff and facilities*

In 2021-2022, a total of 257 staff members were active in the bachelor's programme and 131 staff members in the master's programme. Out of these staff members, 74% (BMS) and 91% (MBS) have obtained a PhD and the percentage of these staff members with a University Teaching Qualification (UTQ) amounted to 68% (BBS) and 79% (MBS).

Teaching comprises supervision during lecturing, practical training sessions, tutoring, mentoring, assessment of scientific writing, and thesis guidance. Every teacher must apply for one of the above-mentioned teaching roles or teaching coordination roles (course coordinators, track coordinators, planning group members). Obtaining the UTQ is a requirement that needs to be met in order to act in a teaching-coordination role. Teachers can fulfil a specific teaching coordination role for a period of three years, once renewable. According to the programme management, the fact that teachers can fulfil this role for a maximum of 6 years (2 x 3 years) guarantees a reassessment of the course content at regular intervals. The panel is positive about this approach, where teachers have the opportunity to become more involved in education and providing a fresh perspective. However, the panel recommends the institution not to be too rigid with the tenure, so as not to miss out on expertise and to lose historical knowledge.

The panel acknowledges the staff's scientific quality and teaching experience. During the site visit, the panel confirmed the commitment and enthusiasm of the staff. In addition, both bachelor's and master's students were very pleased about the involvement of staff members. According to the students, there is always a lot of interaction between the staff and the students. Students appreciate the open-door policy and accessibility of the staff. The panel highly appreciates the variety of roles teachers can take part in as part of their continuing professional development. For each role they have to apply and many of them take up several roles which gives them a broad perspective and responsibility in the educational programmes they are part of.

The previous accreditation panel pointed out that with increasing numbers of tutorial groups in the bachelor's programme, more time and attention is required to obtain consistency between these groups within a course. Bachelor students express their satisfaction with the tutors in the student chapter, although some differences in content knowledge are noticed between senior staff and PhD candidates. According to the panel, the programme pays sufficient attention to the consistency between tutorial groups by organizing regular meetings to keep staff up to date on course-specific issues and detailed tutor instructions that are annually evaluated and updated.

The panel considers teaching facilities (labs, classrooms etc.) adequate for current student numbers in the programme. The panel is pleased to hear that FHML has committed to invest in the extension of lab facilities from which the BMS programmes will benefit as well. However, one aspect that requires attention is communication with students. For example, BBS students indicated that they were missing current information about internship positions on the website. MBS students reported unclear communication regarding aims, deadlines and expectations of assessments. The panel acknowledges the programme's ongoing efforts to improve the clarity of information.

#### *Considerations*

The panel notes that both programmes have successfully translated their intended learning outcomes (ILOs) into coherent curricula. Each programme demonstrates a clear structure and provides ample flexibility for students to tailor the programme according to their preferences. Moreover, both programmes adequately address career opportunities, both within academia and beyond. According to the panel, the programmes should devote more attention to practical skills and data science in their further development.



The panel appreciates the successful implementation of the PBL concept in the programmes, which strongly emphasizes both academic and professional skills and is valued by both students and staff.

Both programmes maintain a well-balanced study load. The panel is highly impressed by the completion rates of the master's programme. The panel finds the decision to use English as the language of instruction well-justified. The mixed backgrounds of the staff contribute to the esteemed international teaching and learning environment.

The panel is positive about the competency-based guidance and assessment facilitated by the mentor system with portfolio. Nevertheless, it suggests potential improvements for the mentoring system in the MBS, such as enhancing instructions to students and more attention for students' individual needs. The panel welcomes the programmes' initiatives to further refine the mentor system for increased effectiveness.

The teaching staff is qualified for teaching in the programmes, both in terms of scientific quality and teaching experience. The panel highly appreciated the strong commitment towards the bachelor's and master's programmes expressed by the programme management and teachers. The panel is positive about the excellent guidance and support students receive throughout the programmes.

#### Conclusion

The panel concludes that that both programmes meet standard 2.

### Standard 3. Student assessment

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

#### Findings

##### *Vision on assessment*

In 2021, a vision on assessment was formulated at the university level. The three main features of the UM vision encompass that: 1) assessment should be meaningful, 2) assessment should support the CCCS principles of PBL, and 3) assessment should be coordinated at the programme level. During the site visit, the programmes provided the panel the concept version of BMS assessment policy in which aspects of the UM vision are translated to the programmes' specific context.

##### *Course assessments*

According to the panel, the validity of the course assessment is well secured. There are prechecks for all courses four weeks prior to the exam followed by a post check. For each course, the programmes have assessment plans that delineate assessment and feedback tasks, as well as define passing criteria. These plans are accessible and updated annually for all courses and longitudinal learning lines. An assessment advisor assesses these plans and offers feedback to coordinators to enhance reliability. Students can access these assessment plans to ensure transparency.

The panel notes that the full range of assessments covers all the intended learning outcomes of the programmes. It is positive about the multiple types of assessment the programmes use to best assess the different course objectives. Types of assessment are for example written exams (closed questions format, and short essay questions), multisource feedback, and assignments (essays, lab reports, papers, presentations). The programmes encourage the use of group work as part of assessment. To prevent 'free-rider' behaviour, students are required to sign a statement of equal participation for group assignments. In addition, where a course is assessed based on assessment of a group project at least 50% of the course mark is determined based on an individual course exam.

The panel notes that bachelor students evaluated the quality of end-of-course exams relatively low: year 1 courses on average with a 6.6/10 in 2020 and 2021, year 2 exams with a 6.2/10 in 2020, and 6.6/10 in 2021, and year 3 exams on average with a 6.2/10 in 2020 and 5.3/10 in 2021. During the accreditation visit, discussions with both students and teachers were conducted to explore potential causes. Students suggested that there was a discrepancy between the dynamics of problem-based learning and the end of course exams and that these exams focus excessively on factual knowledge and reproduction rather than insight and application of knowledge, which could contribute to lower grades. Teachers speculated that the low evaluation scores might be associated with a specific subset of students who participated in the survey. Beginning this academic year (2023-2024), the programme has made efforts to enhance student input and feedback on assessments through Student Evaluation Panel Reports. The panel stresses the programme to continue its efforts to enhance the quality of evaluations and encourages it to take additional steps if necessary to further improve the quality of assessments by putting more stress on the checking and acting of the PDCA assessment cycle.

#### *Thesis assessment*

In the bachelor's programme, every student is under the guidance of a primary supervisor (UM staff member), responsible for evaluating the internship, thesis defence, and the thesis itself. An additional independent examiner only assesses the form and content of the thesis. Evaluation of the internship, thesis presentation, and both assessments of the thesis, in terms of form and content, must be graded independently as 'sufficient.' Each thesis undergoes a check for potential plagiarism.

In the master's programme, internship assessment involves formal evaluations by the institutional (UM) supervisor, with input from the host supervisor in external internships. An interim assessment is conducted midway through to identify areas for improvement. Thesis assessment involves an institutional supervisor and an independent second examiner, both providing final marks. To pass, sub-scores for form and content must be at least 6, with a weighted average determining the final mark. If grades differ by more than two points, efforts are made to reconcile or involve a third examiner if necessary. Students must defend their research through a poster presentation during a two-day conference, independently assessed by at least three faculty members, with an average score of at least 5.5/10 required for passing. In this conference, over 200 students and staff members from various FHML domains participate.

In preparation of the site visit, the panel studied the thesis procedure and examined a sample of bachelor's and master's theses along with their corresponding evaluation forms. The panel concludes that the thesis procedure of both programmes is satisfactory. It established that supervisors and second assessors consistently provided ample written feedback on their assessment forms. Furthermore, the panel was pleased to learn, that in response to feedback from the previous accreditation panel, both programmes have implemented a sample survey of theses.

For the bachelor's programme, the prior accreditation panel suggested the incorporation of rubrics to improve thesis assessments. In compliance with this recommendation, standard forms have been introduced for evaluating internships and bachelor theses. Although these forms do not incorporate rubrics, they furnish assessors and students with comprehensive details outlining the aspects of theses and internships to be evaluated and the criteria for judgment. During the site visit, the panel was delighted to learn that upcoming thesis projects will see enhancements in the instructions for thesis assessment. Furthermore, a new assessment form, complete with a rubric, will be introduced. These updates aim to provide greater guidance to thesis examiners, a development welcomed by the panel.

A point of concern with respect to both programmes is the equality in internship supervision. The panel observed a lack of guidelines regarding the level of support students receive during thesis writing, posing a risk of inequality. Some students receive feedback incrementally, while others only receive feedback after the entire thesis has been written. Additionally, there were no guidelines regarding the frequency of feedback. The panel

recommends that the programmes establish guidelines to clarify for students what they can expect and are entitled to during their thesis writing process.

#### *Board of Examiners*

The Board of Examiners (BoE) serves the bachelor's and master's programmes in Biomedical Sciences as well as the educational minor, the bachelor's programme Regenerative Medicine and Technology, and the master's programme Health, Food and Innovation Management. The BoE is responsible for the quality assurance of assessments and exams, in terms of their validity, reliability and transparency. It safeguards this task by appointing examiners and by ensuring that the rules and regulations are clear. In addition, the BoE makes sure that the rules and regulations are adhered to and lead to assessments and exams of sufficient quality.

The panel is impressed by the meticulous manner in which the BoE carries out its duties. The board takes a proactive approach, including conducting detailed research on the quality of exams, participating in training sessions on chat GPT, and engaging in discussions with other BoEs within the university. In its annual report, the BoE describes all activities in detail. An area requiring attention is the communication of the dean as well as the programme management with the BoE. The panel has observed that not all points raised by the BoE got a formal response or have been addressed by the management. For example, the BoE asked the programme management to facilitate a cycle of periodic evaluations of non-final exams, but this has not been executed, yet. It recommends that both entities document how they plan to address each consideration and specify the timeframe for implementation.

#### Considerations

The BMS programmes have a valid, transparent, and reliable system of assessment in place, guaranteeing that the students are assessed on all ILOs throughout the courses. The panel values the diversity of testing involved in the programme.

The thesis assessment procedure for both programmes is up to standard. Each thesis is graded by two examiners, using grading criteria as well as qualitative argumentation. The procedure could be further improved by informing students and teachers about what they can expect and what their entitlements are during the thesis writing process.

The BoE is in control and has a proactive role in the quality assurance of assessment in the programmes. The communication between the programme management and the BoE should be improved by establishing clear agreements regarding the follow-up on the BoE's advice.

#### Conclusion

The panel concludes that that both programmes meet standard 3.

## Standard 4. Achieved learning outcomes

The programme demonstrates that the intended learning outcomes are achieved.

### Findings

#### *Thesis quality*

In order to establish whether the bachelor's programme demonstrates that the final qualifications are achieved, the panel studied a selection of fifteen bachelor theses from the academic year 2022-2023 and their assessment forms. Overall, the panel agrees with the grades given although in most times it would have given a slightly lower mark. It concluded that the theses showed that the students are on an academic bachelor's level. The panel appreciates the attention given to statistics and the critical analysis of the results in the theses it has reviewed.

The master's thesis of the internship serves as the culminating project of the programme. The panel reviewed fifteen master's theses spanning the academic years 2021-2023. It established that all graduates have achieved the intended learning outcomes of the programme on a master's level. It considered the projects in general to be of a sufficient level. They confirmed adequate research skills, fitting the goal of the programme to educate researchers. However, the panel noted that the English writing style of certain theses warrants attention.

#### *Alumni*

Practically all bachelor students opt for continuing their study in a masters' programme after their bachelor's graduation. An analysis of the consecutive studies of 2021-2022 BBS graduates reveals that 48% of these graduates opted for a master at FHML, while 52% of the students left the faculty to complete their master elsewhere. The panel is satisfied with the teaching and learning activities provided by the programme to give students an initial understanding of various employment opportunities. In the first year, a set of 25 mini-lectures is arranged, where FHML researchers share their enthusiasm for specific biomedical research domains. Additionally, students conduct interviews with lecturers regarding the career development of the scholars they interview. Moving into the second year, students conduct interviews with professionals in the field of biomedicine outside the university and visit a company.

The panel notes that master students are thoroughly prepared for the job market, with around 80% securing paid employment within 0-6 months after graduation. Alumni are employed across diverse sectors, ranging from hospitals and consultancy to governmental bodies, industry, research institutes, and universities. Additionally, approximately 50% of graduates continue with a PhD project.

During the site visit, the panel talked to five alumni. They all reported that they were very satisfied with their education. They pointed out that they had benefited from the long internship and the focus on personal development and critical thinking. However, they did indicate that they were lagging behind colleagues in terms of practical skills.

### Considerations

The panel concludes that the theses show that the intended learning outcomes are achieved for both programmes. They are clearly of the level and quality that may be expected from a bachelor's or master's programme in the field of biomedical sciences. The bachelor's programme prepares students for relevant master's programmes. Alumni of the master's programme feel the programme prepared them well for their careers. They find employment in relevant jobs, both inside and outside academia.

### Conclusion

The panel concludes that both programmes meet standard 4.

## General conclusion

The panel's assessment of the bachelor's programme Biomedical Sciences and master's programme Biomedical Sciences is positive.

## Development points

For further improvement of the programmes, the panel makes the following recommendations:

1. Define comprehensive outcomes regarding the biomedical expert competence within the bachelor's programme.
2. Include more practical skills in the curriculum for both programmes.
3. Enhance the coverage of data science in the curricula of both BMS and MBS including improving alignment among courses in this field.
4. Establish clear guidelines to inform students and teachers about what they can expect and what their entitlements are during the thesis writing process.
5. Improve the communication of the dean as well as the programme manager with the BoE by establishing clear agreements for following up on the BoE's advice.
6. Investigate the students' low appreciation scores on the course assessment in the entire bachelor's curriculum.
7. Finetune the portfolio/mentor system at the master level so that it better aligns with the personal development and competence acquisition of the student.

# Appendix 1. Intended learning outcomes

## **Bachelor's programme**

The intended learning outcomes (ILO) are related to the four competences:

1. Biomedical expert
2. Communicator (combining Collaborator and Communicator)
3. Investigator (combining Investigator and Scholar)
4. Professional (combining Professional and Organiser).

The learning outcomes for the competence Biomedical expert are based on the common set of learning outcomes shared between all Dutch universities that offer a bachelor programme in biomedical sciences. For each of the latter three competences, four sub-competences have been defined and per year the ILOs for each sub-competence have been defined.

Common set of learning outcomes shared by the Dutch universities offering a bachelor programme in BMS, formulated according to Dublin descriptors:

### Knowledge and understanding

The bachelor has knowledge and understanding in the field of

- the biological, mechanistic and etiological basis of human or animal health and illness;
- the broad methodological basis for biomedical research (from laboratory techniques to the use of model systems, statistics and epidemiology);
- translating clinical problems into both fundamental and clinically related biomedical research, and the translation of results of biomedical research (both human and animal) into relevant applications in the diagnosis, treatment and prevention of illness;
- the contextual position of the field of biomedical sciences as such, i.e. from an epistemological, historical, ethical and/or social perspective.

### Application of knowledge and understanding

The bachelor

- can apply qualitative, quantitative and statistical techniques in biomedical research;
- can gather data and analyse it qualitatively and quantitatively;
- can use the relevant computer software;
- can define a specific biomedical question, develop hypotheses and formulate explanations;
- can, under supervision, formulate and implement a scientific research plan for a project/internship.

### Making judgements

The bachelor

- can read, understand and critically evaluate biomedical professional literature;
- can assess the value of the biomedical data that has been gathered and evaluate its applicability;
- is, to a certain extent, capable of evaluating whether biomedical laboratory techniques or clinical and other research models are suitable for and applicable to a problem;
- can form a judgement on biomedical questions based in part on a consideration of the relevant social, clinical, scientific or ethical aspects;
- can establish connections between biomedical issues and adjacent fields of study (e.g. medicine, biology, pharmaceutical sciences);
- understands the historical and philosophical perspectives of the sciences, particularly biomedical sciences.

### Communication

The bachelor

- can communicate with fellow specialists and non-specialists both orally and in writing in Dutch and English;
- can make a substantive contribution to a scientific discussion;
- can form a reasoned opinion and defend it;
- can operate both individually and as part of a group and work on multidisciplinary topics;
- can provide peer feedback.

## Learning skills

The bachelor

- can independently and effectively acquire knowledge and understanding of previously unfamiliar biomedical issues;
- can operate at an academic working and thinking level; can and wants to develop this level further;
- understands the need and is able to keep up to date with relevant developments in the field;
- can and is inclined to find scientific explanations;
- is capable of multidisciplinary thinking and can establish links;
- can reflect on his/her own development and academic career to make well-considered choices for a follow-up programme;
- can reflect on his/her own actions and deal with peer and other feedback.

For the competence Communicator (C) the following four ILOs for a BBS graduate have been defined:

C-ILO1 Adjusts communication written or oral, to specific global audience/readership and international setting

C-ILO2 Communicates professionally with peers and staff originating from diverse cultural and disciplinary backgrounds

C-ILO3 Shows awareness of team roles and takes responsibly her/his position in a diversely composed international team

C-ILO4 Works effectively in an international and intercultural team

For the competence Investigator (I) the following four ILOs for a BBS graduate have been defined:

I-ILO1 Summarises and reflects on social, political, international and normative issues in the biomedical sciences

I-ILO2 Understands the values of and is able to apply scientific method to obtain academic knowledge, understanding and insight

I-ILO3 Has developed a critical approach to scientific knowledge I-ILO4 Designs and rationalises a biomedical experiment

For the competence Professional (P) the following four ILOs for a BBS graduate have been defined:

P-ILO1 Demonstrates professional interpersonal behaviour

P-ILO2 Appreciates the conventions of scientific integrity and legal and ethical standards and operates accordingly

P-ILO3 Takes responsibility for her/his personal and academic development

P-ILO4 Organizes his/her work and study well

## **Master's programme**

The MBS graduate is able to

*Biomedical Expert / Investigator*

- Identify biomedical challenges and evaluate scientific approaches
- Critically analyse knowledge related to one of the six specialisations which provides a basis or opportunity for originality in developing and/or applying ideas, often within a research context
- Integrate knowledge and handle complexity, and formulate judgments with incomplete or limited information, but that include reflecting on social and ethical responsibilities linked to the application of their knowledge and judgments
- Understand safety regulations regarding biological agents, wild type and genetically modified organisms

*Professional / Collaborator*

- Apply their knowledge and understanding, and problem solving abilities in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their field of study

- Understand ethical issues related to translational research

*Creator / Innovator / Forerunner / Ground breaker*

- Apply the learning skills which allow them to continue to study in a manner that is largely self-directed or autonomous.
- Create and manage a research project independently in a research environment

*Communicator*

- Communicate scientific innovative ideas, their conclusions, and the knowledge and rationale underpinning these, to specialist and non-specialist audiences clearly and unambiguously



## Appendix 2. Programme curriculum

### Bachelor's programme

	Year 1	Year 2	Year 3
8 weeks	1.1 The LEGO® bricks of life 7 EC	2.1 Threat and defence mechanisms 6 EC	<b>Minor period</b> <i>B-C-I-P competences</i> I Role of nutrition in prevention & treatment of disease II Immune responses in Health and Disease III Neuroscience: pathophysiology and interventions IV Pharmacological interventions 12 EC
8 weeks	1.2 Homeostasis & organ systems 7 EC	2.2 From cradle to grave 6 EC	I Physical activity and health II Infection & Immunity III Omics technologies and their analysis IV Environmental health and analytical chemistry 12 EC
4 weeks	1.3 Introduction to statistical methods for data analysis 5 EC	2.3 Non-invasive techniques in Biomedical research 5 EC	3.3 Critical review of a BMS intervention 6 EC
8 weeks	1.4 Brain, behaviour and movement 7 EC	2.4 Electives 6 EC	3.4 CORE of BBS 6 EC
		A Human intermediary metabolism B Cell signalling	
8 weeks	1.5 Human genetics, reproduction and prenatal development 7 EC	2.5 Electives 6 EC	3.5-3.6 Thesis 20 EC
		A Biorhythms in homeostasis B Neuromuscular control of movement	
4 weeks	1.6 Critical appraisal of a biomedical Publication 5 EC	2.6 Electives 5 EC	
		A Integrative systems biology B Allometry C Sensorimotor behaviour and neuroplasticity	
	C-competence year 1: 10 EC P-competence year 1: 10 EC SoPhiA year 1: 2 EC	C-competence year 2: 10 EC P-competence year 2: 10 EC SoPhiA year 2: 3 EC Statistics year 2: 3 EC	P-competence year 3: 2 EC SoPhiA year 3: 2 EC

## Master's programme

M-BMS Year 1						
(8 weeks)	Biomedical Challenges (10 EC)					Career skills (3 EC)
(8 weeks)	Biomedical Approaches (10 EC)  Biosafety (1 EC)					
Specialisations	Genetics & Genomics	Inflammation & Pathophysiology	Nutrition, Physical Activity & Metabolism	Regenerative Medicine	Biomedical Imaging	Neuro-modulation
(8 weeks)	Advanced principles of genetics and genomics (10 EC)	Pathophysiology of disease (10 EC)	Nutrition, physical activity & metabolism: fundamental aspects (10 EC)	The science and technology of regenerative medicine (10 EC)	Pre-clinical imaging (10 EC)	Invasive neuro-modulation (10 EC)
(8 weeks)	Clinical and applied genetics and genomics (10 EC)	Inflammation & Pathophysiology (10 EC)	Lifestyle interventions & metabolism: a translational perspective (10 EC)	Translating therapies into clinic and onto the market (10 EC)	Clinical imaging (10 EC)	Translational neuro-modulation (10 EC)
(8 weeks)	Designing Scientific Research (10 EC)					Ethics in Biomedical Sciences (1 EC)
	Longitudinal Tracks (9 EC) Managing a Biomedical Innovation (5 EC)					

M-BMS Year 2	
40 weeks	Internship and Thesis Period (50 EC)
	Career skills (4 EC)  Longitudinal Tracks (10 EC) Managing a Biomedical Innovation (5 EC)
	Ethics in Biomedical Sciences (1 EC)

## Appendix 3. Programme of the site visit

### Day 1: 25 January 2024

11.00	11.15	<b>Welcome</b>
11.15	12.00	Internal panel meeting
12.00	12.45	<b>Interview programme management</b>
12.45	13.30	Internal panel meeting and lunch
13.30	14.15	<b>Interview BSc students</b>
14.15	15.00	<b>Interview BSc teachers</b>
15.00	15.30	Internal panel meeting
15.30	16.15	<b>Interview MSc students</b>
16.15	17.00	<b>Interview MSc teachers</b>
17.00	17.30	Internal panel meeting
17.30	18.00	<b>Interview Alumni</b>

### Day 2: 26 January 2024

08.45	09.15	Internal panel meeting
09.15	09.45	<b>Interview Board of Examiners</b>
09.45	10.15	Internal panel meeting
10.15	10.45	<b>Interview EDM students</b>
10.45	11.30	<b>Interview EDM teachers</b>
11.30	13.00	Internal panel meeting and lunch
13.00	13.30	<b>Interview programme management</b>
13.30	15.00	Internal panel meeting
15.00	15.30	Presentation of preliminary findings

## Appendix 4. Materials

Prior to the site visit, the panel studied 15 theses per programme. Information on the theses is available from Academion upon request. The panel also studied other materials, which included:

### General information

#### Organisation

- Organisational Chart
- Faculty of Health, Medicine and Life Sciences

#### Educational vision and approach

- UM Vision on Education (interactive tool/video)
- UM Vision on Assessment
- Problem Based Learning (video)

#### Quality evaluation and improvement

- Minutes Education Programme Committee Biomedical Sciences 2022-2023
- Annual Report Board of Examiners Biomedical Sciences 2022-2023

### Bachelor's programme

#### RE-accreditation

- File of Information BBS
- Appendices File of Information BBS
- Programme Site-Visit

#### Curriculum

- Outline BBS
- BMS course cycle ('placemat')

#### Assessment

- Reflection on assessment vision
- Thesis guidelines
- Thesis assessment form ('23-'24)
- Thesis assessment rubric ('23-'24)

#### Recruitment

- Website BBS
- Infobrochure BBS

#### Background information

- Course Manual course 1.2 and 2.1
- Tutor Instructions course 1.2 and 2.1
- Assessment Plan course 1.2 and 2.1
- Exam/Answer key course 1.2 and 2.1

#### Competence communicator

##### *Scientific writing*

- Guidelines scientific writing
- Examples writing assignments
- Instructions for assessors
- Scientific writing assessment form

##### *Presentation training*

- Training presentation skills (1)
- Training presentation skills (2)

##### *Assessment plans*

- Assessment writing & presenting y1

- Assessment writing & presenting y2

## **Master's programme**

### **RE-accreditation**

- File of Information MBS
- Appendices File of Information MBS
- Programme Site-Visit

### **Curriculum**

- Outline MBS
- BMS course cycle ('placemat')

### **Assessment**

- Reflection on assessment vision
- Thesis guidelines

### **Recruitment**

- Website MBS
- Infobrochure MBS

### **Background information**

- Course Manual course 1, 1.4.5, and 1.5
- Tutor Instructions course 1, 1.4.5, and 1.5
- Tutor Instruction (cases) course 1.1
- Assessment Plan course 1, 1.4.5, and 1.5
- Exam/Answer key course course 1.4.5
- Assessment rubric project course 1.1
- Assessment forms course 1.5