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BSc Biologie
BSc Life Science and Technology
University of Groningen

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Summary

Standard 1. Intended learning outcomes

The bachelor's programmes Biology (formal name in CROHO: *Biologie*) and Life Science and Technology (LST) aim to offer research-driven and research-focused education. The programmes provide students with a broad basis of foundational subjects, and subsequently allow them to specialize in a subdiscipline of their choice in either year two (Biology) or year three (LST) of the curriculum.

The profile and aims of the bachelor's programmes Biology and LST are fitting for an academic programme within the field. The aims are relevant with regard to modern-day biology and life sciences. The recent revision of both programmes has led to two distinctive and attractive programmes with a clear focus. The panel praises the programmes for their thorough reprofiling. Regarding future development of the LST programme, the panel recommends safeguarding the interdisciplinary character of the programme by keeping a clear link to biology. The goals of both programmes have been well-translated into two coherent sets of intended learning outcomes that are aligned with the requirements of the academic and professional fields. The panel supports the plans for further differentiation between the ILOs of the Biology and LST. The panel also recommends including an explicit mention of ethics and research integrity in the ILOs of both programmes.

Standard 2. Teaching-learning environment

The bachelor's programmes Biology and Life Science & Technology have adequately translated their intended learning outcomes into a coherent curriculum. Each programme and major has a good balance of core courses and electives, and provides opportunities for specialization as well as for an interdisciplinary approach. The new curricula are well-designed and offer an attractive mix of theoretical courses, skills development and connections to research and application. The majors in Biology and the choice of a focus area in LST offer students plenty of opportunities to develop their own area of focus after following a broad common core. Students are well-supported in the choice of a major or focus area. The panel recommends also adding job market orientation to this process to help students orient themselves towards a future profession through their major or focus area. Some students in the LST programme would welcome more choice in the first two years of the curriculum; the panel recommends investigating whether this is shared by all students and, if necessary, create possibilities for this. With regard to the curriculum structure, the panel advises the Biology programme to investigate whether it could benefit from planning courses in parallel over a longer period of time rather than in focused three-week blocks.

The teaching methods used in the courses are appropriate, and students are provided with sufficient training in academic and professional skills. The panel recommends making this more explicit in the curriculum by describing an in-depth skills learning trajectory. The panel supports the decision of the programmes to shift from Dutch to English, and concludes that the programmes have taken adequate measures to safeguard the quality of the English-taught courses. The new curricula are feasible, and there is sufficient attention to support for students that still follow the old curricula. Students are well-supported and guided, both in the regular setting and during the corona lockdowns in 2020 and 2021. The programmes successfully made the transition to online education, and closely monitored the well-being of students.

The teaching staff of the programmes is well-qualified with strong connections to research, and the staff is very much valued by students. The programmes have taken adequate measures to reduce the workload of the teaching staff in response to recommendations by the previous accreditation panel. Nevertheless, growing student numbers have posed the programmes with a new challenge, resulting in a renewed rise in workload throughout the teaching staff. The panel supports the plans presented by the programmes as well

as the Faculty to tackle this challenge by the upcoming introduction of a numerus fixus on Biology per 2022, and hiring additional teaching staff. It urges the programmes and the Faculty to implement this as soon as possible to alleviate the strain that is currently put on the teaching staff. This will allow the programmes to address a number of recommendations by the panel associated with teaching capacity, such as the sometimes-limited availability of tutors, capacity issues for experimental work, a more extensive bachelor's project and attention to educational innovation.

Standard 3. Student assessment

Both programmes have a valid, transparent and reliable system of assessment in place. The assessment methods are sufficiently varied and fit the learning goals of the courses, and the Course Unit Assessment Overviews are helpful tools in the quality assurance of course assessment. The Board of Examiners plays an important and proactive role in safeguarding the quality of assessment in the programmes through structural checks and advice, in particular during the corona pandemic and the implementation of the new curricula. The staffing issues of the Board of Examiners should be solved. The procedures for the assessment of the bachelor's projects and theses are solid, but should be better enforced, in particular with regard to the completion of assessment forms, differentiation between assessment of students in group projects and the independence of the two assessors and documentation of the feedback to students. To strengthen the role of the second assessors, the panel recommends appointing these from other research groups, and making their contribution to the assessment more explicit on the assessment form.

Standard 4. Achieved learning outcomes

The panel concludes that the final products of both programmes show that the intended learning outcomes of both programmes are achieved. Graduates of the bachelor's programmes continue successfully into a diversity of master's programmes, either in Groningen or elsewhere.

Score table

The panel assesses the programmes as follows:

BSc Biology

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

BSc Life Science and Technology

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

Ton Bisseling, chair

Peter Hildering, secretary

Date: 18-02-2022

Introduction

Procedure

Assessment

On 4, 5, 6 and 7 October 2021, the Biology programmes of the University of Groningen were assessed by an independent peer review panel as part of the cluster assessment Biology. The assessment cluster consisted of 21 programmes, offered by Utrecht University, Radboud University, the University of Groningen, Leiden University, the University of Amsterdam and Vrije Universiteit Amsterdam. The assessment followed the procedure and standards of the NVAO Assessment Framework for the Higher Education Accreditation System of the Netherlands (September 2018).

Quality assurance agency Academion coordinated the assessment upon request of the Biology cluster after taking over from Qanu per August 2021, when the first site visit to Utrecht University had already taken place. Els Schröder acted as coordinator for Qanu during the start-up phase and the site visit to Utrecht University. From then on, Fiona Schouten and Peter Hildering acted as coordinators and secretaries in the cluster assessment, and Mariëlle Klerks acted as secretary. They have all been certified and registered by the NVAO. For the University of Groningen, Peter Hildering acted as coordinator and secretary and Fiona Schouten as second secretary during several parallel sessions.

Preparation

Qanu 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 22 June 2021, the NVAO approved the composition of the panel. The coordinator instructed the panel chair on his role in the site visit.

The contact persons for the University of Groningen composed a site visit schedule in consultation with the Qanu coordinator (see appendix 3). They selected representative partners for the various interviews. It was determined that the development dialogue would take place after the site visit. A separate development report was made based on this dialogue.

The programmes provided the Qanu coordinator with a list of graduates over the period 2016-2020. In consultation with the coordinator, the panel chair selected 15 theses per programme. He took the diversity of final grades and examiners into account, as well as the various specializations. This included 2-3 theses for each of the original majors (old curricula) of both BScs. 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 reports 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 framework, 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 publicly presented the preliminary findings.

Report

The secretary wrote a draft report based on the panel's findings and submitted it for peer assessment within Academion. Subsequently, the secretary sent the report to the panel for feedback. After processing this feedback, the secretary sent the draft report to the Faculty of Science and Engineering of the University of Groningen 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 the University of Groningen

Panel

The following panel members were involved in the cluster assessment:

- Prof. dr. Ton Bisseling, professor emeritus Molecular Biology at Wageningen University & Research (chair);
- Em. prof. dr. Nico van Straalen, professor emeritus of Animal Ecology at Vrije Universiteit (vice-chair);
- Prof. dr. Aard Groen, professor of Entrepreneurship & Valorization at University of Groningen;
- Prof. dr. Menno Witter, Professor of Neuroscience at Norwegian University of Science and Technology;
- Prof. dr. Ellen Blaak, Professor of Human Biology at Maastricht University;
- Prof. dr. Roos Masereeuw, professor of Experimental Pharmacology at Utrecht University;
- Prof. dr. Sander Nieuwenhuis, professor Cognitive Psychology at Leiden University;
- Prof. dr. Maarten Frens, professor in Systems Physiology at Erasmus University Rotterdam;
- Prof. dr. ir. Jan Kammenga, professor of Functional Genetics at Wageningen University & Research
- Prof. dr. Dennis Claessen, professor Molecular Microbiology at Leiden University;
- Prof. dr. Isa Schön, team leader at the Royal Belgian Institute of Natural Sciences;
- Prof. dr. Hauke Smidt, professor Microbial Ecology at Wageningen University & Research
- Dr. ir. Frank van der Wilk, executive director Netherlands Commission on Genetic Modification;
- Dr. Mariken de Krom, head team Education and Research (Brain Division) at UMC Utrecht;
- Dr. Mieke Latijnhouters, assessment expert at Education Support Office of Wageningen University & Research;
- Dr. Eric Schouwenberg, head of department Nature and Biodiversity at Arcadis;
- Prof. dr. ir. Wim Petegem, professor in Engineering Education at the unit Engineering Technology Education Research (ETHER) of KU Leuven;
- Dr. Peter Korsten, researcher and lecturer in Evolutionary Biology at Bielefeld University;
- Dr. Éva Kalmár, researcher and lecturer in Science Communication at Delft University of Technology;
- Dr. Mark Bos, researcher and lecturer in Science Communication at Utrecht University;
- Drs. Bas Reichert, founder and CEO of BaseClear (microbial genomics);
- Jelle Keijzer BSc, master student Molecular Cellular Life Sciences at Utrecht University (student member);
- Ishara Merhai, bachelor student Biology at University of Amsterdam (student member).

The panel assessing the Biology programmes at the University of Groningen consisted of the following members:

- Prof. dr. Ton Bisseling, professor emeritus Molecular Biology at Wageningen University & Research (chair);

- Em. Prof. dr. Nico van Straalen, professor emeritus of Animal Ecology at Vrije Universiteit;
- Prof. dr. Menno Witter, Professor of Neuroscience at Norwegian University of Science and Technology;
- Prof. dr. Ellen Blaak, Professor of Human Biology at Maastricht University;
- Prof. dr. Roos Masereeuw, professor of Experimental Pharmacology at Utrecht University;
- Prof. dr. Dennis Claessen, professor Molecular Microbiology at Leiden University;
- Dr. Mieke Latijnhouwers, assessment expert at Education Support Office of Wageningen University & Research;
- Drs. Bas Reichert, founder and CEO of BaseClear (microbial genomics);
- Jelle Keijzer BSc, master student Molecular Cellular Life Sciences at Utrecht University (student member)

Information on the programmes

Name of the institution:	University of Groningen
Status of the institution:	Publicly funded institution
Result institutional quality assurance assessment:	Positive
Programme name:	Biologie (International name: Biology) *
CROHO number:	56860
Level:	Bachelor
Orientation:	Academic
Number of credits:	180 EC
Specialisations or tracks:	Behaviour and Neurosciences Molecular Life Sciences Biomedical Sciences Ecology and Evolution Integrative Biology
Location:	Groningen
Educational minor:	Applicable
Mode(s) of study:	Full-time
Language of instruction:	English
Submission date NVAO:	1 May 2022

* The remainder of the report will use the international name *Biology* for the BSc Biologie.

Programme name:	Life Science and Technology
CROHO number:	56286
Level:	Bachelor
Orientation:	Academic
Number of credits:	180 EC
Specialisations or tracks:	-
Location:	Groningen
Educational minor:	Applicable
Mode(s) of study:	Full-time
Language of instruction:	English
Submission date NVAO:	1 May 2022

Description of the assessment

Organizational context

The bachelor's programmes Biology and Life Science and Technology (LST) are embedded in the School of Science and Engineering (SSE) at the Faculty of Science and Engineering (FSE) of the University of Groningen. SSE organizes 38 bachelor's and master's programmes in six disciplinary clusters: Biology, Chemistry, Pharmacy, Physics, Mathematics and Engineering. The bachelor's programme Biology is organized by the Biology cluster, and the bachelor's programme LST by the Chemistry cluster. Education is organized on the level of the clusters, with the programme directors of the individual programmes forming (together with others) the programme board that heads the cluster. Each cluster has one or more Boards of Examiners and Programme Committees for its programmes. The two bachelor's programmes each have their own Programme Committee.

New curricula (2018-2020)

Both bachelor's programmes have recently implemented new curricula. In the old curriculum (until 2018), Biology and LST used to share their first year, and required students to choose a major in their second year. Three of these majors (Biomedical Sciences, Molecular Life Sciences and Behavioural & Neurosciences) were shared between both programmes. Furthermore, Biology offered unique majors in General Biology as well as in Ecology and Evolution, and LST offered unique majors in Biomedical Engineering and Medical Pharmaceutical Sciences. In its new curriculum (starting in 2018), Biology retained four of its five majors, with General Biology being replaced by Integrative Biology. The unique majors offered by LST were either transformed into a separate bachelor's programme (Biomedical Engineering) or transferred to another bachelor's programme (Medical Pharmaceutical Sciences, to Pharmacy). The curriculum of LST was redesigned with an emphasis on molecular life sciences with a strong background in physics and chemistry, and started in 2020. In the intermediate period, LST students could still follow the original five majors in close cooperation with the bachelor's programmes Biology, Pharmacy and Biomedical Engineering. This pre-2020 LST curriculum, as well as the pre-2018 Biology curriculum, are currently being phased out, and will be discontinued when the last students in this structure have graduated.

This assessment takes the new curricula of both bachelor's programmes as a starting point. The panel has considered elements of the old curricula when appropriate, for instance in the assessment of the realized learning outcomes of both programmes, which was mainly based on final projects by students that started in the old curricula.

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

Aims and profile

The bachelor's programmes Biology and LST aim to offer research-driven and research-focused education, and foster students' development into scientists with a clear responsibility towards science and the biosphere. The programmes provide students with a broad basis of foundational subjects, and subsequently allow them to specialize in a subdiscipline of their choice. The programmes are designed to prepare students

for relevant master's programmes, and afterwards as researchers and professionals in academia, industry, or broader society.

The *bachelor's programme Biology* covers biology in its full breadth, from the molecular and cellular level to organismal, population and ecosystem level. After one year of developing this broad base, students choose an area of specialization, or pursue an interdisciplinary profile. To this end, the programme offers the following five majors: Molecular Life Sciences (the molecular processes at the basis of all life forms), Behaviour and Neurosciences (the functioning of the brain and/or human and animal behaviour), Biomedical Sciences (the biological basis of health and disease), Ecology and Evolution (the interaction of organisms with their natural environment and ecological interaction partners) and Integrative Biology (an interdisciplinary profile that combines different perspectives on biology while studying a scientific problem).

The *bachelor's programme LST* has a strong foundation in chemistry and physics, and focuses on the application of these disciplines in the (molecular) life sciences. After a broad two-year core, students can specialize in an area of choice by following a personalized package of courses in either chemistry, life sciences, biomedical engineering or biophysics.

The panel studied the aims and profile of the bachelor's programmes. It concludes that the aims of the programmes are relevant with regard to biology and life sciences, and that both programmes have a clear and distinct profile. The observations of the previous accreditation panel that the programmes had too much overlap and lacked a clear focus was taken to heart and led to a further separation of the programmes and a restructuring of both curricula. The panel is very positive on the results of this revision and praises the programmes for their thorough work on reprofiling the programmes. The Biology programme is clearly focused on the full breadth of biology, whereas the LST programme has developed a clear, distinctive profile towards physics and chemistry. At the same time, the interaction between both programmes in the field of biology and life sciences has been maintained. According to the panel, the alignment of both programmes to New Biology is very well visible. The BSc Biology for instance has content related to modelling, systems ecology and bioinformatics, whereas LST provides an interdisciplinary, integrated and quantitative approach towards the life sciences. With the revolutionary innovations going on in the life sciences and the many societal applications, the panel expects that the LST programme will increasingly attract different types of students with both molecular biology and exact and technical interests, especially now that the programme is organized by the Chemistry cluster at FSE. With this expectation in mind, the panel recommends safeguarding the link of the LST programme to biology to maintain its interdisciplinary character in the future by ensuring that each student has sufficient biology-focused courses in his or her curriculum.

Intended learning outcomes

The programmes have translated their aims into a set of 11 intended learning outcomes (ILOs) divided in Knowledge and Skills, Understanding and Insight, and Academic Development of Competences (see appendix 1). The ILOs for both programmes are identical, with exception of the ILOs referring to Knowledge and Skills, which differentiate towards the respective fields covered by the programmes. The programmes plan to incorporate further specialization in the near future, when the transition phase from the old to the new curricula is complete.

The panel studied the ILOs of both programmes and concluded that they form a well-structured overview of the main goals of the programme translated into knowledge and skills to be acquired by students. An overview provided by the programme demonstrates that the ILOs align with the Dublin descriptors for bachelor's programmes, thereby demonstrating the bachelor's level and academic orientation. Furthermore, the panel determined that the ILOs of the bachelor's programme Biology align well with the domain-specific

framework of reference (DSFR) for Biology (see appendix 2). Due to the interdisciplinary character of LST, the programme compares itself not only with the DSFR for Biology, but also with the framework for Chemistry. The panel determined that elements of both frameworks are sufficiently incorporated in the intended learning outcomes of LST. As a result, the ILOs of both programmes meet the expectations of the academic and professional field.

The panel supports the planned further differentiation between the ILOs of both programmes. It recommends taking this opportunity to implement the profile of both programmes more clearly. The panel also recommends incorporating ethics and scientific integrity more explicitly into the programme's ILOs. It learnt from the curriculum content that sufficient attention is paid to these aspects, but this is not yet reflected in the ILOs.

Considerations

The profile and aims of the bachelor's programmes Biology and Life Science and Technology are fitting for an academic programme within the field. The aims are relevant with regard to New Biology and life sciences. The recent revision of both programmes has led to two distinctive and attractive programmes with a clear focus. The panel praises the programmes for their thorough reprofiling. With regard to future development of the LST programme, the panel recommends safeguarding the interdisciplinary character of the programme by keeping a clear link to biology. The goals of both programmes have been well-translated into two coherent sets of intended learning outcomes that are aligned with the requirements of the academic and professional fields. The panel supports the plans for further differentiation between the ILOs of the Biology and LST programmes. It also recommends including an explicit mention of ethics and research integrity in the ILOs of both programmes.

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: Content

The *bachelor's programme Biology* starts with a broad-based first semester in which students acquire foundational knowledge of biology, as well as an introduction to the topics that are central in the programme's majors. In the second semester, students choose one of two pathways depending on their interest. The first pathway has a molecular focus, and prepares for the majors Molecular Life Sciences, Behaviour & Neurosciences and Biomedical Sciences. The second pathway focuses on ecology and evolutionary biology, preparing for the Ecology and Evolution major. Both pathways prepare for the Integrative Biology major. From their second year onwards, students choose one of the five majors. Each major has its own curriculum, organised around a set of core compulsory courses and electives. These electives are either major-specific or can be followed together with students in other majors. Students in the Integrative Biology major choose an interdisciplinary focus area such as evolutionary medicine or evolutionary development that combines insights from multiple majors. In the third year, students spend the

first semester on a 30 EC minor programme chosen from an extensive selection of faculty- or university-wide minors, or a minor at another university (to be approved by the Board of Examiners).

The *bachelor's programme LST* has a core compulsory programme of two years, in which students obtain foundational knowledge in mathematics, chemistry, physics and life sciences. Starting in the second year, students are provided with deepening knowledge that helps them discover their area of interest. In their third year, students choose a set of electives in their area of interest. In addition, they have the opportunity to follow a 30 EC minor programme, which can either be used to broaden their knowledge, or to choose courses that ensure that the student qualifies for the entry requirements of a specific master's programme, such as Chemistry, Biomolecular Sciences, Medical Pharmaceutical Sciences or Biomedical Sciences. The full curriculum of both programmes is included in appendix 2.

Students in both bachelor's programmes complete their curriculum with a bachelor's project (10 EC) and a bachelor's thesis (5 EC). The bachelor's project is a short practical research project performed in one of the research groups affiliated with the programme. The research project itself can be conducted in groups, but students always write an individual report. The bachelor's thesis is an individual literature study often connected to the topic of the bachelor's project. Students in the new LST curriculum can choose to combine both final works in a single 15 EC bachelor's project.

The panel studied the structure and content of the curriculum as well as the content of a selection of courses within the programmes, and spoke to the programme management, teaching staff and students. The panel concludes that the intended learning outcomes of both programmes are well incorporated into the curriculum. Each programme and major has a good balance of core courses and electives, and provides opportunities for specialization as well as for an interdisciplinary approach. The new curricula are well-designed and offer an attractive mix of theoretical courses and skill development. The courses frequently make connections to research as well as applications. This includes attention to ethics and societal relevance, for instance in the core course *Biology & Society* in the Biology programme and *LST & Society* in the LST programme.

Compared to the old curricula, the new curricula have a broader common core. The Biology programme has postponed the choice of a major from the second semester to the second year, creating more room for additional courses related to New Biology, such as Biostatistics, Systems Ecology and Ecological Interactions and Modelling life, and also gives students more time to develop their area of interest. The panel appreciates this change. It learnt from the interviews that students are positive on this aspect as well. Some students in the LST programme indicated to the panel that they would welcome some elective components in the first two years. The panel understands the reasons of the programme to offer a broad compulsory core, as the interdisciplinary character of the programme requires students to obtain in-depth knowledge in several fields. It nevertheless suggests the programme to investigate whether this opinion is shared by other students and, if deemed necessary, add some element of choice or specialization to the curriculum early on, possibly within existing courses.

The panel noted that the final projects of both programmes are relatively short, especially when students opt for a separate bachelor project and bachelor thesis. The panel understood that one of the reasons for this design has been to reduce the duration of the research projects because of the strain they put on staff and facilities. The panel recommends considering, once these capacity issues have been solved (see also 'Teaching staff'), to offer a single bachelor's project of 15 EC for both programmes. This would allow students to develop their research skills over a longer period of time.

Curriculum: Structure and coherence

The Biology programme offers its courses in blocks of three weeks, where students follow one course for three weeks, with an examination on the last day of the block. Resits are scheduled in a separate examination period. Students mostly appreciate this set-up, as it allows them to focus on one subject at a time and spread their workload evenly over the year. The LST programme offers three courses in parallel during eight weeks, followed by two weeks of examination. Teachers involved in the three parallel courses in the LST programme frequently discuss alignment and cross-fertilization between their courses. Students noticed and appreciated this coherence in the LST-curriculum. The panel understood from the interviews that there is occasionally debate within the Biology programme on the effects that the three-week courses have on the knowledge retention of students and the coherence of the curriculum. The panel suggests that the Biology programme investigates whether their curriculum could benefit from the set-up used in LST as well as the educational effects of the three-week schedule.

The panel concluded from the course materials and interviews with students and alumni that there is sufficient attention for skills development in both programmes. The panel however missed a clear in-depth overview in the form of a skills learning trajectory for skills throughout the curriculum. It recommends creating this for both programmes. Such a learning trajectory would be helpful to display the build-up of skills throughout the curriculum, and to monitor whether all students receive comparable skills training, regardless of their choice of major and electives.

Curriculum: Didactic approach and lab work

Both programmes aim to provide students with both theoretical and hands-on experience in the life sciences. Courses are taught in the form of lectures, tutorials, practicals, guided self-study, group learning and project work. The practicals include lab classes in which students learn how to perform experiments, starting from basic skill training in the first year, to supervised scientific research in the third year. Lab classes are typically conducted in small and interactive groups.

The panel studied the teaching methods of the programmes and informed itself on the facilities used in lab work. It concludes that the programmes use an appropriate blend of teaching methods, and offer students sufficient opportunities to obtain experimental skills. It understood from the course materials and interviews with students that apart from the lab work, courses predominantly use a combination of lectures and tutorials. The teaching staff of the programmes indicated that due to their high workload, opportunities for developing new and innovative teaching and assessment methods have been scarce. They hope that the planned investments in educational staff (see 'Teaching staff') will bring more opportunities for educational innovation. The panel supports these plans. It thinks that more variation in teaching and assessment methods, such as a more blended approach ('flipping-the-classroom'), group work and team/problem-based learning, would fit the aims of the programme and provide students with more opportunities for skills training.

From the interviews and the self-evaluation report, the panel learnt that the current student numbers in the Biology cluster at FSE put considerable pressure on the availability of lab facilities for experimental work. This has led to a small number of incidents where students were unable to participate in practical work. The Faculty is aware of these issues and is working on solutions. The panel urges the Faculty to ensure that such situations do not happen again.

During the lockdowns in 2020 and 2021, both programmes were mostly successful in shifting their courses to an online setting. Nevertheless, both students and teaching staff reported that the lack of direct interaction in courses made online education challenging, and were glad to resume on-site education later in 2021.

Capacity restrictions in the labs posed the largest challenge for the programmes. By using alternatives wherever possible, working with very small groups and reducing the actual time spent in the lab to a minimum, all students could eventually be provided with the minimally required practical teaching. The panel praises the programmes for this major effort in keeping the labs operational in this challenging period.

Feasibility and student support

Both programmes closely monitor the feasibility of their new curricula through course evaluations and through solicited and unsolicited advice provided by the Programme Committees. Students and teaching staff reported no major issues in the first years of the new curricula, and the programme management expects that the success rates will be similar to the old curricula (approximately two-thirds of students graduated within four years) or somewhat higher. Students that are still following the old curricula reported very few issues during the transition period, as all of their courses are still available, either as part of the new Biology or LST curricula or in cooperation with the bachelor's programmes Pharmacy and Biomedical Engineering. The panel agrees with the programmes that the feasibility of the new curricula seems to be in order, and it is confident that the programmes will be able to tackle any issues that might arise during the transition phase to the new curricula. It concludes that the programmes sufficiently support the cohorts of students that follow the old curricula in the intermediate phase of the transition, allowing them to complete their programme as intended.

Students are guided throughout the programme by a mentor (later-year student) and a tutor (experienced staff member). The mentor is assigned at the start of the first year, and helps new students get acquainted with studying at the university and (especially in the case of international students) adjusting to student life in the Netherlands. The tutor is either allocated in the first year (Biology) or the second year (LST), and helps students choose a focus area and pick electives that fit this focus area as well as the requirements for a master's programme of choice. Furthermore, each programme has one or more academic advisors that help students with individual advice on study-related issues and personal well-being. Students that the panel interviewed were generally satisfied by the role of both the mentor and the tutor, although availability of tutors varied somewhat, also due to high workload in the teaching staff. Next to the guidance by their tutor, students can also inform themselves on possible study paths through the academic advisor. Students of the BSc Biology can attend a major fair, where the representatives of all five majors present themselves. During the corona pandemic, the programmes, and in particular the academic advisors, closely monitored the well-being of students through regular surveys, and offered support wherever possible.

The panel is positive on the guidance students receive in both programmes, in particular the support that students receive to make the right choice for majors and subsequent master's programmes through the tutors, academic advisors and the major fair. It recommends safeguarding that tutors have sufficient time for supporting students, so that all students can experience a similar involvement of his or her tutor. The programmes could also consider offering tutor training to help tutors prepare for their role. Furthermore, the panel thinks that the programme could expand its student support by introducing job market orientation for bachelor students. Orientation towards a future profession could help in choosing a major or focus area. Bachelor students could for instance be invited to attend the professional orientation activities organized by the master's programmes.

Language of instruction

Both bachelor's programmes recently shifted from Dutch to English as part of the restructuring of the curriculum. This shift is part of a broader decision of FSE to use English as language of instruction for programmes that intend to prepare students for an international career in research or industry. The programmes have taken several measures to improve the English-language proficiency of its staff. For new

staff, a sufficient command of English is one of the selection criteria. Existing research staff usually have years of experience in an international research environment. The university offers a wide range of language courses through which teachers can improve their English language proficiency. These can be followed out of a teacher's own initiative, or upon recommendation of the programme management, for instance when students express serious dissatisfaction with the level of English used in courses.

The panel supports the decision of the programmes to shift from Dutch to English. The use of English provides students with the opportunity to get acquainted with an international atmosphere and interact with the increasingly international research staff at FSE. In the interviews during the site visit, the panel discussed with students and alumni to what extent the use of English limits the opportunities for students to pursue jobs that require Dutch language skills, for instance in policy or consultancy. In particular, alumni assured the panel that the language skills they acquired in the bachelor's programmes were easily transferable between Dutch and English. The panel suggests the programme to consider pointing students interested in a national policy or consultancy career towards extracurricular opportunities if they want to develop their Dutch language skills for these fields.

Teaching staff

The majority of staff members participating in the bachelor's programme are active researchers, and embedded in the research institutes participating in the programmes: the Groningen Institute for Evolutionary Life Sciences (GELIFES), Groningen Biomolecular Sciences and Biotechnology Institute (GBB), Groningen Research Institute of Pharmacy (GRIP), Stratingh Institute for Chemistry (Stratingh) and Zernike Institute for Advanced Materials (ZIAM).

The bachelor's and master's programmes in the life sciences have a relatively high involvement of senior research staff, with full and associate professors spending approximately 40% of their time on teaching. With regard to professionalization of teachers, the programmes require all new teaching staff to have obtained or pursue a University Teaching Qualification (UTQ). Current staff members have either followed or are following the UTQ trajectory, or received an exemption based on acquired teaching competences. The documents and in particular the interviews with students and teaching staff gave the panel a positive impression of the teaching staff of both programmes. Students praise the expertise, involvement and motivation of their teachers. The teaching staff was enthusiastic about the new curricula, particularly about the opportunities offered through the many new courses and approaches.

A major topic during the site visit was the workload of the teaching staff. After recommendations of the previous accreditation panel on this issue, the Faculty took several measures to improve the teaching capacity of the programmes by expanding the size of the research staff, as well as appointing seven dedicated lecturers for the bachelor's programmes. These measures resulted in 7,7 fte of extra teaching capacity for the programmes. At the same time, student numbers grew significantly within the faculty, particularly in the bachelor's programme Biology, where the intake grew with 80% from 160 to 291. Part of this growth can be associated with the shift to English-language education, but not entirely: roughly 20% of the intake is international. This growth in student numbers nullified a large part of the improvement in teaching capacity the Faculty made. The current student-staff ratio is approximately 37 to 1, which is a significant improvement since the previous accreditation, but is still too high to be sustainable on the long term.

Combined with a general high workload in academia, this workload of teaching staff puts a strain on the programmes. The staff members have to put in many hours in education beyond their teaching appointment, and still they have only barely enough time for supervision and guidance of students.

Discussions on some elements of the curricula are dominated by capacity issues, such as the bachelor's projects (see Curriculum) and assessment procedures (see standard 3), and there is limited time available for developments in educational innovation. The programme management and the Faculty are aware of these issues and working hard on improvements. The bachelor's programme Biology will apply a numerus fixus, limiting the intake to 250 students per year from 2022 onwards. Furthermore, the Faculty has provided funds for the hiring of tenure track researchers with a 60% teaching appointment. These new positions are created to provide a career path for researchers who want to specialize more in teaching. The GELIFES and GBB institutes are in the hiring process for six of these positions.

The panel supports the measures taken by the programmes to reduce the workload for the teaching staff. It is positive on the actions taken in response to the previous accreditation and sees a clear improvement. Nevertheless, as the programmes have been confronted with growing student numbers, the panel strongly encourages the programmes to continue their efforts to remediate the issue of workload. The panel experienced during the site visit that the current situation is very demanding for the teaching staff, and limits the possibilities for further development of the programmes. The panel was glad to learn that funding for extra teaching staff is available for the bachelor's and master's programmes in the life sciences, and encourages the Faculty to work out a plan together with the programmes to utilize these funds for extra teaching capacity. It expects that these extra investments, together with a possible numerus fixus on the bachelor's programme Biology and the hiring of tenure track researchers with career perspectives in education will lead to a significant improvement of the current situation.

Considerations

The bachelor's programmes Biology and Life Science and Technology have adequately translated their intended learning outcomes into a coherent curriculum. Each programme and major has a good balance of core courses and electives, and provides opportunities for specialization as well as for an interdisciplinary approach. The new curricula are well-designed and offer an attractive mix of theoretical courses, skills development, and connections to research and application. The majors in Biology and the choice of a focus area in LST offer students plenty of opportunities to develop their own area of focus after following a broad common core. Students are well-supported in the choice of a major or focus area. The panel recommends also adding job market orientation to this process to help students orient themselves towards a future profession through their major or focus area. Some students in the LST programme would welcome more choice in the first two years of the curriculum; the panel recommends investigating whether this is shared by all students and, if necessary, create possibilities for this. With regard to the curriculum structure, the panel advises the Biology programme to investigate whether it could benefit from planning courses in parallel over a longer period of time rather than in focused three-week blocks.

The teaching methods used in the courses are appropriate, and students are provided with sufficient training in academic and professional skills. The panel recommends making this more explicit in the curriculum by describing an in-depth skills learning trajectory. The panel supports the decision of the programmes to shift from Dutch to English, and concludes that the programmes have taken adequate measures to safeguard the quality of the English-taught courses. The new curricula are feasible, and there is sufficient attention to support for students that still follow the old curricula. Students are well-supported and guided, both in the regular setting and during the corona lockdowns in 2020 and 2021. The programmes successfully made the transition to online education, and closely monitored the well-being of students.

The teaching staff of the programmes is well-qualified with strong connections to research, and very much valued by students. The programmes have taken adequate measures to reduce the workload of the teaching staff in response to recommendations by the previous accreditation panel. Nevertheless, growing student

numbers have posed the programmes with a new challenge, resulting in a renewed rise in workload throughout the teaching staff. The panel supports the plans presented by the programmes as well as the Faculty to tackle this challenge by the upcoming introduction of a numerus fixus on Biology per 2022, and hiring additional teaching staff. It urges the programmes and the Faculty to implement this as soon as possible to alleviate the strain that is currently put on the teaching staff. This will allow the programmes to address a number of recommendations by the panel associated with teaching capacity, such as the sometimes-limited availability of tutors, capacity issues for experimental work, a more extensive bachelor's project and attention to educational innovation.

Conclusion

The panel concludes that both programmes meet standard 2.

Standard 3. Student assessment

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

Findings

System of assessment

The programmes have defined an assessment system that aims to assure that assessments are valid, reliable, effective, fair and transparent. The programmes aim to provide a variety of assessment methods, based on the nature of the course, and include written exams, essays, reports, presentations, lab work and field work. To this end, each course has a Course Unit Assessment Overview (CUAO). This is a systematic description of the place of the course in the curriculum and its relation to the ILOs, as well as the relation between the course goals, teaching methods and assessment methods. The CUAO's are reviewed yearly by the programmes, and are an important instrument for the Board of Examiners in quality control of assessment.

The bachelor's programmes Biology and LST share a Board of Examiners (BoE) that also covers the master's programmes Biology, Ecology and Evolution, Biomolecular Sciences and Marine Biology. The Board monitors the quality of assessment in the programmes by annually checking the assessment of 10 randomly chosen course units (including CUAOs) throughout the programmes, and a selection of recent bachelor's theses. The Board checks the level of the theses, as well as the reliability and transparency of the assessment. The Board paid additional attention to the new curricula of the bachelor's programmes, providing advice on course assessment and conducting extra checks on new courses in the case of issues reported by students. In the case of shortcomings, the Board reports its findings to the examiners, or to the programme management in case of more structural or serious issues.

During the corona pandemic in 2020 and 2021, most exams were held online. The Board of Examiners played a major role in this process. The Board was consulted with regard to alternative assessment methods, decided which adaptations could be made and what exams needed to be held on-site within the limited possibilities available. The latter mainly concerned assessment types which involved hands-on experience, such as lab and field work.

The panel is positive on the system of assessment in both programmes. The assessment methods fit the learning goals of the courses, and cover the knowledge and skills described in the ILOs of the programmes. The CUAOs, of which the panel studied a few examples, are helpful and insightful tools to design and monitor

the assessment in the courses and the programmes as a whole. The students and teaching staff that the panel interviewed were generally satisfied by assessment within the programmes, both in the regular curriculum and during the online assessments in 2020. The panel was impressed by the influential, proactive and constructive role of the Board of Examiners in the programmes. The Board takes its role of safeguarding the quality of assessment in the programmes very seriously. This does not only involve regular checks: the Board has also taken a central role in advising on the design of the assessment of the new curricula, as well as the transition to online assessment in 2020.

The panel noted that the high workload within the programmes also impacts the Board of Examiners. On top of the extra time required for assessment during corona and the implementation of the new curricula, higher student numbers lead to more requests and approvals of individual study programmes. Finding members for the Board is challenging due to the general workload in the programmes. To address this, the Board has recently expanded the role of the formal secretary, with the intention of delegating more tasks. The panel supports the efforts of the Board to reduce the workload of its members, and agrees that new board members are necessary, both for existing vacancies and expansion of the Board. Programme representatives expressed hope during the interviews that the new education-focused tenure track researchers can also take up roles in the Boards and Committees. The panel supports this, and recommends safeguarding adequate staffing of the Boards of Examiners.

Assessment of bachelor's projects and theses

The bachelor's projects and theses are assessed by two independent assessors who document their assessment in an assessment form. Assessment criteria include scientific quality, technical contribution, project management, interpersonal skills, and presentation and writing skills. The assessors jointly complete an assessment form on which they substantiate the grade on the various criteria, as well as provide feedback to the student. In the case of joint research projects performed by multiple students, each student writes his or her own report and is assessed individually.

As part of its preparation of the site visits, the panel studied the work of 15 students from each programme, including the accompanying assessment forms. It concludes that the form has useful and clear criteria to evaluate the thesis, as well as a helpful rubric. In a small number of bachelor's projects in both programmes, the panel found that two students delivered a single report and received identical grades. The programme assured the panel that the policy has always been that students are assessed individually and that, in case of a group work, the individual contributions should be clearly discerned. It was however sometimes less strictly enforced in previous years than it is now. The panel agrees with this policy, and urges the programmes to ensure that this is enforced in all cases.

In most cases, assessors provided insightful considerations and feedback to substantiate the grades. However, the panel noted that a number of forms were less transparent and contained little more than the grades. Also, the panel found that, incidentally, the assessors consisted of the supervising PhD student and his or her promotor. Both are violations of the assessment policy of the Faculty, which requires substantiated assessment forms and two independent assessors. The Board of Examiners informed the panel during the site visit that both observations also emerged from the Board's recent thesis checks. The management of both programmes acknowledged to the panel that some assessors choose the easy way out due to time and capacity constraints, and agreed with the panel that better enforcement of the internal assessment policies is necessary. The panel suggests promoting a culture of accuracy by making a thesis coordinator responsible for checking the correct use of procedures at the start and completion of a project. In addition, the panel recommends paying extra attention to the role of the independent second assessor. The panel recommends appointing a second assessor from a different research group or even institute unaffiliated with the project

to assess the report and presentation. This serves as an extra external check of the thesis quality (see Standard 4). Furthermore, the panel recommends making the role of this second examiner more explicit in the assessment form, for instance by noting any differences of opinion or by including separate assessment forms for both assessors.

Considerations

Both programmes have a valid, transparent and reliable system of assessment in place. The assessment methods are sufficiently varied and fit the learning goals of the courses, and the CUAOs are helpful tools in the quality assurance of course assessment. The Board of Examiners plays an important and proactive role in safeguarding the quality of assessment in the programmes through structural checks and advice, in particular during the corona pandemic and the implementation of the new curricula. The staffing issues of the Board of Examiners should be solved. The procedures for the assessment of the bachelor's projects and theses are solid, but should be better enforced, in particular with regard to the completion of assessment forms, differentiation between assessment of students in group projects and the independence of the two assessors and documentation of the feedback to students. To strengthen the role of the second assessors, the panel recommends appointing these from other research groups, and making their contribution to the assessment more explicit on the assessment form.

Conclusion

The panel concludes that both programmes meet standard 3.

Standard 4. Achieved learning outcomes

The programme demonstrates that the intended learning outcomes are achieved.

Findings

Bachelor's assignment quality

Prior to the site visit, the panel studied the bachelor's theses and projects of 15 students for each of the programmes. The panel took care that all majors of the programmes were sufficiently covered in the selection. As the new curricula had not yet (LST) or only very recently (Biology) delivered their first final projects, the selection could only cover the old curricula of the programmes. Shortly before the site visit, the panel had the opportunity to view several projects written by graduates from the new Biology curriculum. As the set-up of the bachelor's theses and projects does not differ significantly between the old and new curricula, the panel considers this selection to be an adequate representation of the realized learning outcomes of both programmes.

For the Biology programme, the panel concludes that all theses were of a sufficient level, and show that the students realize the learning outcomes of the programme. For the LST programme, the panel encountered two projects in the initial selection of 15 that it felt did not meet the requirements for a bachelor's programme based on the available information. These projects were from different majors and both received minimum passing grades. The panel requested three additional bachelor's projects from the same majors and within the same range of grades to determine whether or not these two cases were outliers. The panel found all additional works to be of sufficient quality. Furthermore, the panel observed that the projects in the bachelor's programme Biology, which has a major overlap with the old LST curriculum, were all found to be sufficient. This led the panel to conclude that both cases they encountered were incidental, and that

students in the programme sufficiently realize its learning outcomes. To prevent future incidents, the panel recommends improving the assessment procedure of final works (see Standard 3).

Alumni

Alumni of the bachelor's programme generally continue with a master's programme. A recent survey shows that 70% of students continue in a master's programme in Groningen: 61% in one of the life sciences master's programmes and 9% in another field. 5% pursue another bachelor's programme (usually Medicine) and 9% enrol in a master's programme elsewhere in the Netherlands. Where the remaining 16% end up is unknown, but they presumably either enrol in a master's programme abroad or leave academia. The bachelor's graduates that the panel interviewed were generally satisfied with the content of the programmes and the skills acquired. The panel concludes that the programmes prepare students well for the diverse master's programmes that can be pursued after graduation. The majors and elective space provide students with options to prepare for various programmes.

The LST programme, as well as the panel, is very interested to see where the new cohorts of LST graduates will end up considering their interdisciplinary profile. The panel expects that more graduates will find their way into for instance the master's programmes Biomolecular Sciences or Medical Pharmaceutical Sciences, as their more chemically oriented education seems very well aligned with the (fundamental) research performed in these fields.

Considerations

The panel concludes that the final products of both programmes show that the intended learning outcomes of both programmes are achieved. Graduates of the bachelor's programmes continue successfully into a diversity of master's programmes, either in Groningen or elsewhere.

Conclusion

The panel concludes that both programmes meet standard 4.

General conclusion

The panel's assessment of the BSc Biology is positive.

The panel's assessment of the BSc Life Science and Technology is positive.

Development points

Both programmes

1. Implement the plans for alleviating the workload of teaching staff as soon as possible, as it is a prerequisite for addressing most other development points.
2. Keep working on further describing the differentiation between the ILOs of the Biology and LST programmes.
3. Include an explicit mention of ethics and research integrity in the ILOs of both programmes.
4. Make skills training more explicit in the curriculum by describing an in-depth skills learning trajectory.
5. Provide additional job market orientation to help students orient themselves towards a future profession through their major or focus area.
6. Ensure that the Board of Examiners remains sufficiently staffed.

7. Better enforce the assessment procedures in the programmes, in particular with regard to the completion of assessment forms and the independence of the two assessors.
8. Appoint second assessors of these final projects from other research groups, and make their contribution to the assessment of the report and presentation more explicit on the assessment form.

BSc Biology

9. Investigate whether courses can be planned in parallel over a longer period of time rather than in focused three-week blocks.

BSc Life Science and Technology

10. Ensure that the programme remains sufficiently multidisciplinary in the envisioned closer cooperation with the Chemistry programmes
11. Investigate whether students prefer more choices, and, if necessary, create possibilities for this.

Appendix 1. Intended learning outcomes

After completion of the **bachelor's degree programme in Biology**, graduates are able to:

Knowledge and skills

1. Explain general basic principles of biology and describe how they relate to each other.
2. Estimate the relevance of research results in one or more areas of biology as published in academic journals and discuss these results with peers.
3. Describe fundamental and/or applied scientific research and recognise areas of interest within it.

Understanding and Insight

4. Describe the relationship between various disciplines and integrate terms and concepts from the subject areas.
5. Recognise and analyse scientific problems and design a scientific/academic approach to them in a systematic manner.

Academic development of competences

6. Under supervision, formulate a research hypothesis or propose a research design within their own discipline, and possess sufficient practical skills to conduct the research themselves.
7. Explain the societal relevance of the discipline, evaluate the related responsibilities and judge their individual role in that context.
8. Develop a work method independently and proactively, justify it, and carry it out in order to achieve a specific aim.
9. Contribute to and take responsibility for solving a specific problem or task in a specific role as part of a team.
10. Report about research in a structured manner, both orally and in writing.
11. To explore career opportunities and opportunities for follow-on degree programmes.

After completion of the **bachelor's degree programme in Life Science and Technology**, graduates are able to:

Knowledge and skills

1. Explain general basic principles of biology from chemical and physical perspectives.
2. Explain the basic principles of applied technology within the field of life sciences.
3. Estimate the relevance of research results in Science, Technology, Engineering, and Mathematics (STEM) published in academic journals and discuss these results with peers.

Understanding and Insight

4. Describe the relationship between various disciplines and integrate terms and concepts from the subject areas.
5. Recognise and analyse scientific problems and design a scientific/academic approach to them in a systematic manner.

Academic development of competences

6. Under supervision, formulate a research hypothesis or propose a research design within their own discipline, and possess sufficient practical skills to conduct the research themselves.
7. Explain the societal relevance of the discipline, evaluate the related responsibilities and judge their individual role in that context.

8. Develop a work method independently and proactively, justify it, and carry it out in order to achieve a specific aim.
9. Contribute to and take responsibility for solving a specific problem or task in a specific role as part of a team.
10. Report about research in a structured manner, both orally and in writing.
11. To explore career opportunities and opportunities for follow-on degree programmes.

Appendix 2. Programme curriculum

BSc Biology (with the five majors, courses marked green are compulsory courses and common for the different majors)

	Major EE	Major IB	Major BN	Major BMS	Major MLS
YEAR 1 SEMESTER 1	Genetics, Ecology and Evolution (5EC)				
	Basic Cell and Molecular Biology (5EC)				
	Physiology(5EC)				
	Biostatistics 1 (5EC)				
	Microbiology (5EC)				
	Lab Course (3EC)				
	First-year Symposium (2EC)				
YEAR 1 SEMESTER 2	Behavioural Neuroscience (5EC)				
	Evolutionary Ecology (5EC)	Molecules of Life (5EC)			
	Biochemistry and Cell Biology in Ecology and Evolution (5EC)	Cell Biology and Immunology (5EC)			
	Ecophysiology of Plants and Animals (5EC)	Metabolism (5EC)			
	Research Skills in Ecology and Evolution 1, 2 (10EC)	Research Skills in Life Sciences 1, 2, 3 (10EC)			
YEAR 2 SEMESTER 1	Systems Ecology & Ecological Interactions 1 (5EC) Systems Ecology & Ecological Interactions 2 (5EC) Genes and Evolution (5EC)	Molecular Genetics (5EC) Integrative Neuroscience (5EC)	Molecular Genetics (5EC)	Integrative Neuroscience (5EC) Behavioural Biology (5EC)	Molecular Genetics (5EC)
	EE specific electives (10EC)	IB specific electives (15EC)	BN specific electives (10EC)	BMS specific electives (5EC)	MLS specific electives (5EC)
YEAR 2 SEMESTER 2	Modelling Life (5EC)				
	Electives (10-25 EC) – major specific				
	Biostatistics II (5EC)	Evolutionary Medicine (5EC) Evolution and Development (5EC) Integrative Biology (5EC)			Cell Biology and Microscopy (5EC) Cell Migration and Communication (5EC) Practical Carousel (5EC) Bio-organic Chemistry (5EC) Enzymology and Thermodynamics (5EC)
	Biology & Society: Ethical and Professional Aspects (5EC)				
YEAR 3 SEMESTER 1	Minor (10EC)				
	Electives (5-15 EC)				
YEAR 3 SEMESTER 2	2nd Bachelor's Project (10EC)				
	Bachelor's Project (10EC) – major specific				
	Bachelor Thesis Life Sciences (5EC)				

BSc Life Science and Technology (initiated from academic year 2020-2021)

	1a	1b	2a	2b
YEAR 1	<p>Mammalian Cell Biology (5EC)</p> <p>Optics (5EC)</p> <p>Practical Course Optics and Cell Biology (5EC)</p>	<p>Biochemistry for LST (5EC)</p> <p>Calculus for LST (5EC)</p> <p>Organic Chemistry for Life Science 1(5EC)</p>	<p>Biophysics (5EC)</p> <p>Principles of Physiology (5EC)</p> <p>Thermodynamics (5EC)</p>	<p>Pharmaceutical Analysis A (5EC)</p> <p>Programming for Life Sciences (5EC)</p> <p>Scientific Reading and Communication Skills (5EC)</p>
YEAR 2	<p>Applied Microbiology (5EC)</p> <p>Bioinorganic Chemistry (5EC)</p> <p>Practical course microbiology (5EC)</p>	<p>Linear Algebra for LST (5EC)</p> <p>Quantum and Classical Mechanics for LST (5EC)</p> <p>Spectroscopic Tools for Life Sciences (5EC)</p>	<p>Organic Chemistry for Life Science 2 (5EC)</p> <p>Practical Skills in Organic Chemistry for LST (5EC)</p> <p>Imaging (5EC)</p>	<p>Applied Biotechnology (5EC)</p> <p>LST and Society: Ethical and Professional Aspects (5EC)</p> <p>Genetics and Evolution (5EC)</p>
YEAR 3	<p>Minor (30EC)</p>		<p>Courses in focus area (15 EC)</p> <p>Bachelor project in focus area (10 EC)</p> <p>Bachelor Thesis Life Sciences (5EC)</p>	

Appendix 3. Programme of the site visit

Maandag 4 Oktober 2021			
<i>Tijd</i>	<i>tot</i>	<i>Sessie</i>	<i>Evt parallelsessie</i>
17.30	19.00	Voorbereidend overleg	

Dinsdag 5 Oktober 2021			
<i>Tijd</i>	<i>tot</i>	<i>Sessie</i>	<i>Evt parallelsessie</i>
8.45	9.00	Aankomst panel	
9.00	10.00	Voorbereidend overleg en inzien documenten	
10.00	10.40	Gesprek met inhoudelijk verantwoordelijken BSc Bio en BSc LST	
10.40	10.50	Pauze	
10.50	11.30	Gesprek met inhoudelijk verantwoordelijk MScs (EE, MB, BiMoS, Bio, BMS, MPS)	
11.30	12.00	Inloopspreekuur	
12.00	12.30	Lunch	
12.30	13.15	Overleg panel	
13.15	14.00	Gesprek met studenten van beide BSc-opleidingen	
14.00	14.15	Pauze	
14.15	15.00	Parallelsessie: Docenten BSc Biologie	Parallelsessie: Docenten BSc LST
15.00	15.15	Overleg panel	
15.15	16.00	Parallelsessie: Studenten MSc BMS	Parallelsessie: Studenten MSc MPS
16.00	16.15	Pauze	
16.15	17.00	Docenten MSc BMS en MSc MPS	

Woensdag 6 Oktober 2021			
<i>Tijd</i>	<i>tot</i>	<i>Sessie</i>	<i>Evt parallelsessie</i>
8.45	9.00	Aankomst panel	
9.00	10.00	Inzien documenten, voorbereiding gesprekken	
10.00	10.45	Parallelsessie: Studenten MSc EE	Parallelsessie: Studenten MSc Marine Biology
11.00	11.45	Docenten MSc EE en MSc MB	
11.45	12.30	Lunch	
12.30	13.00	Overleg panel	
13.00	13.45	Parallelsessie: studenten MSc Biology	Parallelsessie: studenten MSc BiMoS
13.45	14.15	Pauze	
14.15	15.00	Docenten MSc Bio en MSc BiMoS	
15.00	15.15	Pauze	
15.15	15.45	Overleg panel	
15.45	16.15	Studenten en docenten SBP-track	
16.15	16.30	Pauze	
16.30	17.30	Examencommissies	

Donderdag 7 Oktober 2021			
<i>Tijd</i>	<i>tot</i>	<i>Sessie</i>	<i>Evt parallelsessie</i>
8.45	9.00	Aankomst panel	
9.00	10.00	Overleg panel	
10.00	11.00	Alumni van alle MSc-opleidingen	
11.00	11.15	Pauze	
11.15	12.30	Overleg panel	
12.30	13.15	Lunch	
13.15	14.15	Formeel verantwoordelijken alle opleidingen	
14.15	16.15	Opstellen voorlopige bevindingen	
16.15	16.30	Voorbereiden mondelinge terugkoppeling	
16.30	16.45	Mondelinge terugkoppeling	

Appendix 4. Materials

Prior to the site visit, the panel studied 15 theses for the BSc Biology and 18 theses for the BSc Life Science and Technology. Information on the theses is available from Academion upon request. The panel also studied other materials, which included:

- Domain-specific framework of reference Biology
- Domain-specific framework of reference Chemistry
- Teaching and Examination Regulations
- Assessment plans
- Selection of courses, assessment and CUAOs from each programme
- Overview members committees
- Overview examiners
- Guide bachelor's project and thesis
- Five theses from the first cohort of the new curriculum of the BSc Biology
- Quality assurance manuals FSE
- Annual reports Board of Examiners
- Annual reports Programme Committees