

Biology

**Faculty of Science,
Leiden University**

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Project number: Q0522

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This report was finalized on 4 November 2015

Report on the master's programme **Biology of Leiden University**

This report takes the NVAO's Assessment Framework for Limited Programme Assessments as a starting point (19 December 2014).

Administrative data regarding the programme

Master's programme Biology

Name of the programme:	Biology
CROHO number:	66860
Level of the programme:	master's
Orientation of the programme:	academic
Number of credits:	120 EC
Specializations or tracks:	Animal Biology and Disease Models Microbial Biotechnology and Health Plant Sciences and Natural Products Evolution, Biodiversity and Conservation Biology and Education Biology and Science Based Business Biology and Science Communication and Society
Location(s):	Leiden
Mode(s) of study:	full time
Language of instruction:	English
Expiration of accreditation:	16-02-2017

The visit of the assessment panel Biology to the Faculty of Science of Leiden University took place on 18-19 June 2015.

Administrative data regarding the institution

Name of the institution:	Leiden University
Status of the institution:	publicly funded institution
Result institutional quality assurance assessment:	positive

Composition of the assessment panel

The NVAO has approved the composition of the panel on July 6, 2015. The panel that assessed the master's programme Biology consisted of:

- Prof. dr. Jan Kijne (chair), Professor emeritus of BioScience, Leiden University;
- Prof. dr. Ton Bisseling, Professor Molecular Biology, Wageningen University;
- Prof. dr. Herman Verhoef, Professor emeritus of Soil Ecology, VU University Amsterdam;

- Prof. dr. Joost Teixeira de Mattos, Professor of Quantitative Microbial Physiology, University of Amsterdam;
- Jeffrey Verhoeff BSc. (student-member), master's student Biology and Animal Sciences, Wageningen University.

The panel was supported by drs. José van Zwieten, who acted as secretary.

Appendix 1 contains the curricula vitae of the panel members.

Working method of the assessment panel

The assessment of the master's programmes Biology of Leiden University is part of a cluster assessment. From June 2015 until January 2016, the panel assessed a total of twenty-three programmes at seven universities.

The panel consisted of thirteen members:

- Prof. dr. Jan Kijne (chair), Professor emeritus of BioScience, Leiden University;
- Prof. dr. Ton Bisseling (vice-chair), Professor of Molecular Biology, Wageningen University;
- Prof. dr. Maarten Frens, Professor of Systems Physiology, Erasmus University Rotterdam;
- Prof. dr. Marieke van Ham, Professor of Biological Immunology, University of Amsterdam;
- Prof. dr. Paul Hooykaas, Professor of Molecular Genetics, Leiden University;
- Dr. Andries ter Maat, Research Scientist, Max Planck Institute for Ornithology;
- Dr. Maarten van der Smagt, Associate Professor Experimental Psychology, Utrecht University;
- Prof. dr. Joost Teixeira de Mattos, Professor of Quantitative Microbial Physiology, University of Amsterdam;
- Prof. dr. Herman Verhoef, Professor emeritus of Soil Ecology, VU University Amsterdam;
- Prof. dr. Jos Verhoeven, Professor emeritus of Landscape Ecology, Utrecht University;
- Prof. dr. Rens Voeselek, Professor of Plant Ecophysiology, Utrecht University;
- Pieter Munster MSc. (student member), management officer at Leiden University and recent graduate of the master's programme Cancer, Genomics & Developmental Biology, Utrecht University;
- Jeffrey Verhoeff BSc. (student member), master's student Biology and Animal Sciences, Wageningen University.

For every site visit, a (sub)panel was composed, based on the expertise and availability of panel members, thereby preventing possible conflicts of interests. Panels regularly consisted of five or six members. In order to enhance consistency of assessment within the cluster, professor Kijne acted as chair during all seven site visits. Coördinator of the cluster assessment Biology was dr. Kees-Jan van Klaveren, employee of QANU. He acted as secretary of the panel at Wageningen University and Utrecht University. He was also present during the final meetings of the five other site visits and read and commented upon each draft report in order to safeguard consistency of assessment. Drs. José van Zwieten, freelance employee of QANU, acted as secretary of the panel at Leiden University, Radboud University

Nijmegen, the University of Groningen, the University of Amsterdam and VU University Amsterdam. In Groningen dr. Fiona Schouten, employee of QANU, acted as second secretary to the panel.

Preparation

The panel held a preliminary meeting on May 22, 2015. During this meeting the panel was instructed about the accreditation framework and the programme of the upcoming assessments. Furthermore, the panel discussed its working methods in preparation to and during the site visits. A vice-chair was appointed and the Domain Specific Frameworks for Biology and Psychobiology were discussed.

To prepare the contents of the site visits, the coordinator first checked the quality and completeness of the critical reflections prepared by the programmes. After establishing that the reports met the demands, they were forwarded to the participating panel members. The panel members read the reports and formulated questions and findings on their contents.

Next to the critical reflections, the panel read a selection of fifteen theses per programme. The theses were chosen by the chair of the panel from a list of graduates of the last two completed academic years within a range of grades.

Site visit

A preliminary programme of the site visit was made by the coordinator and adapted after consultation of the contact persons at Leiden University. The time table for the visit in Leiden University is included as Appendix 5.

Prior to the site visit, the panel asked the programmes to select representative interview partners. During the site visit, meetings were held with panels representing students and teaching staff, institute management, programme management, alumni, the Programme Committee and the Board of Examiners.

During the site visit, the panel examined requested material; an overview of this material is given in Appendix 6. The panel provided students and lecturers with the opportunity – outside the set interviews – to speak informally to the panel during a consultation hour. No requests of master students or lecturers were received for this option.

The panel used the final part of the visit for an internal meeting to discuss its findings. The visit was concluded with a public oral presentation of the preliminary impressions and general observations by the chair of the panel.

Report

Based on the panel's findings, the secretary prepared a draft report. This report was then presented to the panel members involved in the site visit. After implementing their comments and receiving approval, the draft report was sent to Leiden University with the request to report any factual inaccuracies. The comments received from Leiden University were discussed with the panel's chair. Subsequently, the final report was approved and sent to Leiden University.

Decision rules

In accordance with the NVAO's Assessment framework for limited programme assessments, the panel used the following definitions for the assessment of both the standards and the programme as a whole.

Generic quality

The quality that can reasonably be expected in an international perspective from a higher education bachelor's or master's programme.

Unsatisfactory

The programme does not meet the current generic quality standards and shows serious shortcomings in several areas.

Satisfactory

The programme meets the current generic quality standards and shows an acceptable level across its entire spectrum.

Good

The programme systematically surpasses the current generic quality standard.

Excellent

The programme systematically well surpasses the current generic quality standard and is regarded as an international example.

Summary judgement

The master's programme Biology distinguishes four research specialisations falling under the scope of the IBL: Animal Biology and Disease Models (AB), Microbial Biotechnology and Health (MB), Plant Sciences and Natural Products (PS), and Evolution, Biodiversity and Conservation (EBC). In addition, three vocational specialisations are offered: Biology and Education (Edu), Biology and Science Based Business (SBB), and Biology and Science Communication and Society (SCS). These specialisations are organised at faculty level.

The panel has established that the intended learning outcomes of the master's programme are in line with (inter)national requirements. The programme has, according to the panel, clear profiles for the research master as well as for the vocational specialisations. The panel would welcome a future-directed view on the outcomes, recognizing the central role of Biology in the multidisciplinary area of the life sciences.

The panel has studied the master's programme Biology and established that the curricula of the different tracks offer students good opportunities for academic specialisation. The programme consists of a common component of mandatory courses (24 EC). Additionally, students participate in specialisation courses, electives and one or two research projects.

The mandatory courses offer students a state-of-the art overview of the research of the departments that are involved in the programme. The Genomic Architecture course provides all students with a broad and up-to-date perspective on the domain of Biology at master's level. The research projects offer students further options for specialisation and deepening. Being part of the research group, they are well guided while developing themselves as an independent researcher.

The three vocational specialisations enable students to obtain complementary knowledge and skills that enable them to use their biological knowledge in business, communication or educational environments. Each specialisation offers scientific insights from relevant disciplines, and graduates qualify for a PhD position.

The programme uses a variety of teaching methods: lectures, case studies and research projects. According to the panel these are adequate didactic practices for a master's programme. Attention for the science-society debate is limited.

The panel established that the programme is feasible. Individual programmes are well monitored by the student advisor and the Board of Examiners. The panel observed that students who enrol in February should get a better introduction in the faculty and departments, since they cannot participate in the 'Orientation' course at the start of their programme.

The programme is delivered by qualified and highly motivated staff members. Students can profit from research collaborations within the Faculty of Science and the Leiden Bioscience park and with LUMC and the Technical University Delft, and with the CML and Naturalis participating in the programme, students enjoy an interesting and diverse learning environment. According to the panel the strong increase in student intake requires attention in order to prevent too much pressure on the staff. These high numbers could impede the small scale of the programme and the availability of challenging research projects for all students. Quality assurance and study facilities suffice.

The panel has checked whether the programme has adopted an adequate assessment system. The panel has established that the programme uses diverse assessment methods that are aligned with the learning objectives of each course. The panel is convinced that the programme, and particularly the Board of Examiners (BoE), has installed adequate measures to monitor assessment quality. Safeguarding the quality of final research projects gets sufficient attention from examiners and the BoE. The BoE has a proactive and careful attitude. However, the panel is of the opinion that checking the quality of exams and surveillance of the assessment procedures has had limited attention until now, the assessment system needs to further mature in the organisation of the programme. The panel encourages the BoE in the priority it will be giving this surveillance in the nearby future. Furthermore, concerted consultation of teachers about assessment should be encouraged. Assessment quality profits from ‘continuously learning from each other’. In this respect, the programme can profit from *best practices* elsewhere in academia.

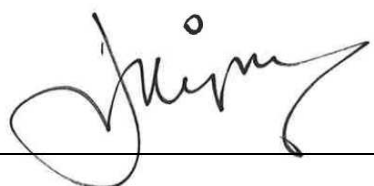
After studying a sample of final reports, the panel establishes that students realise the intended learning outcomes of the master’s programme in Biology. The achieved level in the final research internships is high, students demonstrate good research qualities in their work. According to the panel, this high quality of the reports shows the success of the research orientation of the programme. The panel concludes that graduates obtain the final qualifications to be expected in a high-quality research environment. Based on the performance of alumni the panel concludes that the programme prepares students well for an academic or business position on the labour market.

The panel assesses the standards from the *Assessment framework for limited programme assessments* in the following way:

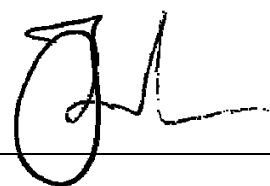
Standard 1: Intended learning outcomes	satisfactory
Standard 2: Teaching-learning environment	good
Standard 3: Assessment	satisfactory
Standard 4: Achieved learning outcomes	good
General conclusion	good

The chair and the secretary of the panel hereby declare that all panel members have studied this report and that they agree with the judgements laid down in the report. They confirm that the assessment has been conducted in accordance with the demands relating to independence.

Date: 4 November 2015



Prof. dr. Jan Kijne, chair



Drs. José van Zwieten, Secretary

Description of the standards from the Assessment framework for limited programme assessments

Organisation of education

The bachelor's and master's programmes in Biology are organised by the Institute of Biology Leiden (IBL), one of the eight research institutes of the Faculty of Science (FWN). The Institute of Environmental Sciences Leiden (CML) and Naturalis Biodiversity Centre (Naturalis) participate in both Biology programmes.

The management of the programmes is the responsibility of the Director of Education, who is accountable to the Faculty Board. Both programmes have a joint Programme Committee (PC) and Board of Examiners (BoE).

Standard 1: Intended learning outcomes

The intended learning outcomes of the programme have been concretised with regard to content, level and orientation; they meet international requirements.

Explanation:

As for level and orientation (bachelor's or master's; professional or academic), the intended learning outcomes fit into the Dutch qualifications framework. In addition, they tie in with the international perspective of the requirements currently set by the professional field and the discipline with regard to the contents of the programme. Insofar as is applicable, the intended learning outcomes are in accordance with relevant legislation and regulations.

Findings

The *master's programme* Biology aims to provide students with sufficient knowledge, insight, skills and hands-on experience for a scientific career in Biology. Professional options include a PhD position in the life sciences, a career in a life science company and a position in secondary education. After graduation, students should be able to recognise, propose and solve problems in the field of biology and discuss their findings with colleagues and non-specialists.

The programme distinguishes four research specialisations that fall under the scope of the IBL: Animal Biology and Disease Models, Microbial Biotechnology and Health, Plant Sciences and Natural Products, and Evolution, Biodiversity and Conservation. In addition, three vocational specialisations are Biology and Education (Edu), Biology and Science Based Business (SBB), and Biology and Science Communication and Society (SCS).

The bachelor's and master's Biology programmes entail the faculty teaching concept of 'Studying in a research environment', in line with the central position of research in the life sciences. This concept is further described under Standard 2.

The Consultative Body of Higher Educational Teaching in Biology ('Overlegorgaan Hoger Onderwijs Biologie', OHOB), in which all academic degree programmes in the Netherlands are represented, has drawn up the Domain-Specific Frameworks of Reference (hereafter the Frameworks) for academic bachelor's and master's programmes in Biology. This document demarcates the domain of Biology, and touches upon the transition towards New Biology. The past focus on mono-disciplines has shifted towards integration of different scientific disciplines and requires the competence to deal with the dynamics and complexity of life as a network, from molecules to ecosystems. The Frameworks provide a set of general requirements for academic bachelor's and master's programmes in Biology.

The panel has studied the Frameworks for master's programmes, and notes that its general requirements correspond to the internationally accepted Dublin descriptors. In terms of contents, the requirements also encompass what might be expected of an academic master's programme Biology. The panel appreciates the fact that New Biology has been mentioned in the Frameworks. However, it notes that New Biology and the corresponding scientific attitude has not yet been translated into concrete requirements for academic degree programmes. The panel expects that in the next revision of the document, the integrative and interdisciplinary nature of Biology will be recognized in the general requirements.

The objectives, attainment levels and competences of the master's programme are based on the Frameworks. The programme has translated these in general attainment levels and competences and added equivalent ones for the three vocational specialisations. The intended learning outcomes are presented in appendix 3 of this report.

According to the critical reflection, the intended learning outcomes match the requirements of employers. According to the study 'Arbeidsmarktonderzoek Biowetenschappen en Biomedische Wetenschappen in Nederland' (2014, NIBI), organisations that employ life scientists require well-trained and knowledgeable life scientists who can perform independently in a multidisciplinary environment, who exercise good communication skills and can work in a team. These requirements are in line with the intended learning outcomes of the master's programme.

The panel has studied the intended learning outcomes of the programme and observed that they are in line with the Frameworks. Thereby, their profile and level match (inter)national requirements. The research specialisations are organised in recognisable profiles. The intended attainment level and competences of the vocational specialisations clearly describe the requirements related to the professional field.

Considerations

The panel has established that the intended learning outcomes of the master's programme are in line with (inter)national requirements. The programme has developed clear profiles for the research specialisations as well as for the vocational specialisations. The panel would welcome a future-directed view on the outcomes, recognizing the central role of Biology in the multi/inter-disciplinary area of the life sciences.

Conclusion

Master's programme Biology: the panel assesses Standard 1 as 'satisfactory'.

Standard 2: Teaching-learning environment

The curriculum, staff and programme-specific services and facilities enable the incoming students to achieve the intended learning outcomes.

Explanation:

The contents and structure of the curriculum enable the students admitted to achieve the intended learning outcomes. The quality of the staff and of the programme-specific services and facilities is essential to that end. Curriculum, staff, services and facilities constitute a coherent teaching-learning environment for the students.

Findings

The panel has studied the curriculum of the master's programme. The panel has read course materials, reports of relevant committees and study information on the digital learning environment Blackboard. This standard starts with a short description of the didactic concept of the programme. Next, the findings concerning the content and structure of the curriculum are presented. Finally some findings on the feasibility, staff, quality assurance and facilities of the programme are described.

Didactic concept

The Biology programmes in Leiden use the concept of 'Studying in a research environment'. This concept is adopted by the whole faculty. It is intended to not only equip students with knowledge and insights, but moreover to let them develop a scientific attitude and to make them familiar with scientific research in an academic community.

In practice, a major characteristic of the concept is the role of scientific staff in the programmes. They incorporate their own and other current research results in their instruction. Students are actively involved in ongoing research at the different labs of the IBL. During one or two research internships, students join the host research group. They participate in meetings and colloquia as a junior researcher.

In two compulsory courses, 'Orientation' and 'Top Lectures', students are introduced in the research performed at the different departments. Students and alumni reported very positively about the master's Top Lectures course, as it offers a broad spectrum of research topics and updates students on topics outside their own domain of specialisation.

The curriculum

The master's programme in Biology is a two-year-programme and consists of 120 EC. Students may enter the programme in September and February. Appendix 4 shows an overview of the curricula of each of the specialisations in the programme.

The IBL offers four research specialisations: Animal Biology and Disease Models, Microbial Biotechnology and Health, Plant Sciences and Natural Products, and Evolution, Biodiversity and Conservation as well as a general Biology programme (a 'free' programme; in practice all students participate in one of the specialisations). Each research specialisation consists of a theoretical component (30-60 EC) and one or more research projects (60-90 EC) in one of the participating research groups (IBL, CML, Naturalis or LUMC).

The master's programme in the vocational specialisations (SBB, SCS and Edu) comprises a Biology component (60-80 EC) in the first year and either an SBB component (40-60 EC), an SCS component (40-60 EC) or an Education component (60 EC) in the second year. The Biology component in each of these specialisations consists of at least 24 EC of advanced theoretical courses and of one or more research projects of at least 36 EC in one of the

research groups. The SBB, SCS and Edu components comprise theoretical training within the theme of the specialisation (15-30 EC) and an internship. Graduates of these specialisations qualify for a PhD position in Biology.

The first year of the master's programme consists of the mandatory courses 'Orientation course', 'Genomic Architecture', 'Advanced Statistics' and one or two specialisation courses. The Orientation course provides an overview of scientific research and research methods used in the departments participating in the corresponding master specialisations, and provides information about available research projects at the end of the course. Genomic Architecture provides an overview of the structure, function and evolution of genomes. In the second semester all students participate in the courses 'Top Lectures' and 'Book Exam'. The elective elements consist of either additional courses or lectures, or of an extension of the duration of a research project.

The panel has studied the curricula and discussed them with students and staff. According to the panel, the Genomic Architecture course is a very good theoretical course that seems to be an interesting approach of the biology-content for students from all specialisations. The course contents are much broader than the course name suggests, as they address theoretical concepts ranging from gene regulation to speciation. The panel established that this course nicely illustrates a master's level. Students seem to be very satisfied with the content, the course enables them to have a good overview of the discipline and to deepen their knowledge later in the specialisation courses. For students with a bachelor degree from Leiden University, the statistics course overlaps somewhat with the content of the bachelor curriculum. For students from abroad this is not the case. The panel concludes that it is necessary to maintain the course in its current form in order to allow all students to reach the same level. As mentioned before, the Top Lectures are highly valued by students and alumni. The panel considers this approach well suitable for a programme aiming at familiarisation of students with functioning in a research environment. The panel is of the opinion that, in addition to the research projects, the Top Lectures course is a good vehicle for illustration and explanation of the rapid developments in New Biology.

The research projects form the core of the master's programme, and each individual study path may include one, but preferably two projects. The panel has observed that students are well integrated in the research groups during their research projects. According to the panel the diversity of the research domains in Leiden offers students a stimulating and diverse environment.

Students from the SBB specialisation reported very positively about this programme. The courses are based on case studies and are perceived as very challenging. It provides them with knowledge and insights in management, business and entrepreneurship in a research driven business-environment. Students work in teams on cases that connect theoretical concepts with business challenges. In this programme they also gain practical experience during an internship at a company, usually at the Bio-science Park in Leiden. The panel observed that the faculty has a broad network of companies that offer relevant internships.

The panel perceived that the SCS specialisation offers students a solid overview of insights from communication sciences and communication research. Students learn to use this expertise in order to be able to contribute to science communication to a variety of audiences. Students mention that for scientists it can be challenging to communicate to non-scientific audiences. They appreciate the theoretical insights and practical skills that obtain in communication research.

The panel appreciates the fact that students in these vocational specialisations work together with students from other master's programmes within the Faculty of Science. This provides them with interesting exercise in working in a multidisciplinary environment.

The Edu specialisation falls under the responsibility of the Leiden University Graduate School of Teaching ICLON. This part of the master's programme is beyond the scope of this assessment panel. However, the panel appreciates the responsibility taken by the programme by incorporating educational professionalization into the curriculum. Good biology teachers are essential for the success of academic biology programmes.

Feasibility, enrolment and success rates

Most compulsory courses are scheduled in the first semester in order to ensure that students acquire sufficient theoretical knowledge before starting their research project. Students who start in February have fewer choices in terms of theoretical components and in starting an internship. This may be challenging for (foreign) students who are not familiar with the organisation and the availability of internship opportunities at the departments. The panel has observed in its meeting with students that this indeed poses a problem. Students starting in February are unable to follow the Orientation course at the beginning of their programme. This impedes their way into the research activities of the IBL and other departments. The panel advises the programme to provide these students with better integration activities at the start of their study in Leiden.

The guidance of master's students includes an introduction meeting at the start of the programme, intake interviews, advice about study planning and the annual approval procedure for the study plan. Students can also make a personal appointment with the academic advisor or visit a walk-in consultation service.

The programme has experienced a rapid growth in student intake for the last couple of years. The number of students has grown from 44 in 2009 to 104 in 2014. This has been a point of attention for the panel during the interviews, as it may threaten the current small scale of the programme. It may also become more difficult to make sure that all students are provided with challenging research projects. The programme management is well aware of these challenges. By hiring additional temporary staff and student assistants for practicals, students are still fairly intensively supervised. Students confirm this by indicating that they experience the programme as personal, small-scaled and open. They indicate that teachers are very approachable and that they are supported properly when they encounter difficulties in studying. The average dropout rate after one year is 7%. The success rate is 79% after 3 years. In general students point out that the programme is challenging but feasible.

Staff

The education in the master's programme Biology is largely provided by the academic staff of the IBL. 92% of these teachers have a university teaching qualification (*Basiskwalificatie Onderwijs*, BKO). In addition, academic staff of the CML and Naturalis are involved in various courses and research projects. All lecturers have a PhD. Specific knowledge from the faculty is attracted to some courses, such as Bioinformatics for Genomic Architecture.

Teaching in the vocational courses for SBB and SCS is led by postdoctoral scientific staff employed by the faculty with expertise in the relevant areas. The specialisation Biology and Education is taught and coordinated by the ICLON.

Not all examiners of research projects hold a BKO certificate, but those who do not are required to have at least ten academic publications to be allowed to supervise students in their research project. The panel suggests that an additional training in coaching skills can be an alternative for the BKO for these staff members, in order to ensure that students are properly supervised while performing their research.

Based on the interviews with students, teachers and alumni, the panel concludes that education is provided by highly motivated, qualified and accessible staff. Students appraise the pleasant study environment and the accessibility of their lecturers. They indicate that it motivates them to see how dedicated to their research area lecturers are.

The staff-student ratio for the bachelor's and master's programme combined is 1: 31.7. The panel considers this ratio too high. It does understand that the growing student numbers may lead to temporary shortages, but advises programme and faculty to invest in a correspondingly growing teaching staff and in student assistants. The pressure on the current staff for taking care of the education of large groups of students, means that there is limited time to discuss and implement educational reforms, for example those inspired by New Biology developments.

Specific teaching facilities and quality assurance

The panel met with the Programme Committee (PC) Biology during the visitation. The PC consists of a representation of staff members and students. The interview made clear that the PC is sufficiently involved in the master's programme and is monitoring the quality of education by course evaluations. The panel suggested the PC to consider to supplement this rather reactive way of quality control by pro-actively advising the Programme Director or Dean about possible improvements of design and content of the programme.

During the visit, the panel had a tour through some of the educational facilities. The panel noted that the proximity of Naturalis makes the programme extra attractive for students with an interest in the biological discipline represented there.

Considerations

The panel has studied the master's programme Biology and established that the curricula of the different tracks offer students good opportunities for academic specialisation. The mandatory courses offer students a state-of-the art overview of the high quality research of the departments that are involved in the programme. The Genomic Architecture course provides all students with a broad and interesting perspective on the domain of Biology at master's level. The research projects offer students further options for specialisation. Being a member of the research group, they are well guided while developing themselves as independent researcher.

The three vocational specialisations provide students with an orientation on applied sciences to obtain complementary knowledge and skills that enable them to use their biological knowledge in business, communication or education environments. Each specialisation offers scientific insights from relevant disciplines.

The programme uses a variety of teaching methods: lectures, case studies and research projects. According to the panel these are adequate didactic practices for a master's programme. Attention for the science-society debate is limited.

The panel established that the programme is feasible. Individual programmes are well monitored by the student advisor and the Board of Examiners. The panel observed that students who enrol in February should get a better introduction in the faculty and departments, as they do not participate in the 'Orientation' course at the start of their programme.

The programme is delivered by qualified and highly motivated staff members. With the CML, LUMC and Naturalis as participants, collaboration with the faculty FWN, and in the presence of the Bioscience Park, the programme offers students an interesting and diverse learning environment. According to the panel the strong increase in student intake requires attention in order to prevent too much pressure on the staff. These high numbers could threaten the small scale of the programme and the availability of challenging research projects for all students. Quality assurance and study facilities suffice.

Conclusion

Master's programme Biology: the panel assesses Standard 2 as 'good'.

Standard 3: Assessment

The programme has an adequate assessment system in place.

Explanation:

The tests and assessments are valid, reliable and transparent to the students. The programme's examining board safeguards the quality of the interim and final tests administered.

Findings

As stated in the critical reflection, procedures, rules and guidelines regarding the organisation, completion and assessment of exams and practical courses, and the regulations concerning pass grades are addressed in the Teaching and Examination Regulations of the Leiden Faculty of Science and the Rules and Regulations of the Board of Examiners (BoE).

Board of Examiners

The tasks of the BoE of Biology are limited to the research specialisations and the Biology components of the SBB, SCS and Edu specialisations. The faculty has appointed a separate Board of Examiners for the vocational specialisation component of the last three specialisations. Faculty and university meetings involving the chairs of the different boards are held to align the procedures.

To do justice to the broad field of study, the BoE consists of representatives from different participating institutes in the programme. The BoE has a chair, a secretary and two members. At least four meetings are being held each year. Starting September 2015, an external member has joined the BoE. This member will focus on the assessment of the final research reports.

Every year, the BoE appoints examiners who are qualified to perform assessments and to guide research internships of students. Examiners are expected to hold a PhD, have a tenure and hold a BKO or are in the process of obtaining the BKO. Some examiners are only involved in supervising students during their internships. They are exempt from the BKO-duty, but need to hold at least ten scientific publications.

Assessment system

The panel has observed that the programme uses a variety of assessment methods, adapted to match the different learning objectives. The courses are usually tested with an examination, often combined with individual assessments or group assignments, written essays or oral presentations. Seminars and lecture series are tested by oral presentations, active participation in discussions and by writing a report. Both knowledge and insight are tested, as well as the application of knowledge and understanding, the ability to critically read appropriate scientific literature and the ability to communicate scientific knowledge and personal opinions.

The BoE has installed several procedures and guidelines to secure the quality of the programme, including:

- the introduction of a compulsory exam-format that describes the assessment procedure and the name of the second examiner,
- the setting up of a central electronic and paper exam archive by the Education Desk, for the purpose of quality assurance and accountability during programme assessments,
- improved guidelines for assessment forms that are more complicated to assess (e.g. poster presentations, internships).

- a compulsory workshop on assessment quality for examiners, performed by the ICLON. In this workshop, the design of good exam-questions has been addressed and practiced. Furthermore, assessment expertise is part of the BKO-training programme.

The BoE intends to assess the quality of exams and assessment formats in the nearby future by taking samples. According to the critical reflection, the intrinsic quality of examination is ensured by the expertise, professionalism and responsibility of the examiners and teachers. The courses and lecture series are monitored using PC-questionnaires that are used to evaluate and improve the quality of the courses.

Research projects

Safeguarding the quality of the final research reports has been a point of special attention for the BoE. This has resulted in a MSc Internship Booklet. At the beginning of the internship, students draft an internship-agreement based on a standard format. The BoE assesses these agreements. The criteria for the final assessment of research projects are derived from the following learning outcomes of the course.

1. Knowledge of concepts and methods in an important area of Biology and an understanding of how these are established and used to increase knowledge.
2. Insight in the most important international scientific developments in the specialisation field.
3. Aptitude for the independent analysis of scientific problems and the formulation of testable hypotheses as a basis for the solution of such problems.
4. Experience in the design and implementation of relevant scientific research according to an independently formulated research plan based on a thorough analysis of relevant literature.
5. Ability to present independently-generated research results in a clear manner (written and orally).
6. Ability to summarise and critically reflect on scientific literature.

The assessment of performance during a research project covers the research proposal (10%), the practical work (40%), the report (40%) and the oral presentations of the research proposal and at the end of the internship (10%). The sub score for each item must be at least 6. A report can only be discussed with the supervisor twice before the final version is handed in for grading. The assessment of the final reports is performed by two examiners. They assess the report independently from each other, each with their own assessment form. The BoE periodically checks samples of these assessments. When the rating of the BoE differs from the ratings of the examiners, the Board requests an explanation. Based on these checks, the BoE has drafted an instruction document which describes general criteria for each possible rating.

In the case of an external internship, an additional set of forms must be completed including details of the internship location and the availability of local support. For external research projects, an examiner from the Biology programme provides assessments in addition to the local supervisor. The Biology programme examiner is ultimately responsible for the evaluation of the internship. The quality of the final qualifications for the specialisations SBB, SCS and Edu is monitored by the special BoE of the faculty, in concert with the Biology BoE if applicable.

Scientific integrity, plagiarism and fraud are brought to the attention of teachers on a regular basis. Since 2014-2015, final reports are scanned for plagiarism with Turnitin software.

Teachers are obliged to report fraud or plagiarism to the BoE. The BoE hears both student and teacher upon such a report.

The panel is positive about the actions the BoE has undertaken in order to safeguard assessment quality. From its conversation with the BoE, the panel concludes that the BoE has elaborated on its legal responsibilities in adequate procedures and guidelines. The BoE demonstrates a clear vision on its role and on the implementation of their responsibilities. The implementation of the procedures has taken rather long. As a consequence, the monitoring of these procedures and quality checks on exams are lagging behind. In the opinion of the panel, the intended execution of the surveillance of assessment quality is important in order to completely fulfil the legal tasks of the BoE.

Considerations

The panel has checked whether the programme has adopted an adequate assessment system. The panel has established that the programme uses diverse assessment methods that are aligned with the learning objectives of each course. The panel is convinced that the programme, and particularly the BoE, has installed adequate measures to monitor assessment quality. Safeguarding the quality of final research projects gets sufficient attention from examiners and the BoE. The BoE has a proactive and careful attitude. The panel believes that checking the quality of exams and surveillance of the assessment procedures has had limited attention until now, the assessment system needs to further mature in the organisation of the programme. The panel encourages the BoE in the priority it will be giving this surveillance in the nearby future. Furthermore, concerted consultation of teachers about assessment should be encouraged. Assessment quality profits from ‘continuously learning from each other’. In this respect, the programme can profit from *best practices* elsewhere in academia.

Conclusion

Master's programme Biology: the panel assesses Standard 3 as ‘satisfactory’.

Standard 4: Achieved learning outcomes

The programme demonstrates that the intended learning outcomes are achieved.

Explanation:

The level achieved is demonstrated by interim and final tests, final projects and the performance of graduates in actual practice or in post-graduate programmes.

Findings

The final research internship illustrates the level achieved in the master's programme. Prior to the site visit, the assessment panel has selected and studied fifteen final reports. The selection procedure is described in the paragraph 'Working method of the assessment panel', at page 6 in this report.

The quality of biological research in Leiden is very good (Research Review Biology 2012, QANU). Biological education and especially master's education is derived from research, and the programme adopts corresponding quality standards in education. The panel has observed that the final products generally demonstrate a high level and in some cases an excellent level. In their reports, students show that they reach a level of performing scientific research to be expected in a high-quality research environment, preparing them well to start a PhD. The grades of the final products given by the examiners match the grades of the panel .

The level achieved by graduates is also demonstrated by their performance upon graduation. Many graduates have taken a position as a PhD, a postdoctoral researcher, a conservationist, soil biologist or teacher. According to a NIBI monitor . one year after graduation 53% of the alumni remain in the field of scientific research; 17% work in policy/advisory-related jobs, 8% are educators; 11% hold other academic positions and 9% have moved away from academia or their current position is unknown.

During the site visit, the panel had a conversation with a number of alumni. They appear to be very satisfied with their education, which has prepared them well for a job as a young professional, especially when they proceed as a researcher. Alumni from the SBB track are very positive about the way this track has combined their scientific knowledge with vocational competences. Alumni point out that it could have been useful to have more insight in the labour market for biologists. This could be easily organised by the involvement of alumni in the study guidance activities. The panel concludes that the master's programme is a good preparation for an academic or professional position. It encourages the programme to implement the advice of alumni to organise specific career orientation activities with the help from alumni.

Considerations

After studying a sample of final reports, the panel establishes that students realise the intended learning outcomes of the master's programme in Biology. The achieved level in the final research internships is high, students demonstrate good research qualities in their work. According to the panel, this high quality of the reports shows the success of the research orientation of the programme. Based on the performance of alumni the panel concludes that the programme prepares students well for an academic or business position on the labour market.

Conclusion

Master's programme Biology: the panel assesses Standard 4 as good

General conclusion

The panel has established that the programme's learning outcomes and assessment system meet the quality standards. It has also concluded that the programme has translated its ambitions into good curricula that have a strong research focus whilst creating elegant alternatives for students who pursue a career in business, communication or education. The programme does deliver highly qualified young researchers and professionals. In line with the NVAO decision rules, the panel concludes that the programme as a whole systematically surpasses the generic quality standards.

Conclusion

The panel assesses the *Master's programme Biology* as 'good'.

Appendices

Appendix 1: Curricula Vitae of the members of the assessment panel

Prof. dr. J.W. (Jan) Kijne is Professor emeritus of BioScience at Leiden University. He studied Biology in Leiden and obtained his PhD in 1979 under supervision of Prof. Ton Quispel. In his dissertation Kijne studied the symbiotic nitrogen-fixing root nodules of the pea, a theme which remained a main focus in his further research. He was Professor of Fytotechnology (in collaboration with TNO, 1994-1997), Plant Physiology (1997-2006) and BioScience (2006-2010) in Leiden, and visiting Professor of Microbiology at the University of Tromsø, Norway (1995-2000). At Leiden University Kijne also acted as programme director Biology (1996-2002), as vice-dean of the Faculty of Science holding the Education Portfolio (2002-2008), and as Academic Director of the Pre-University College (2004-2008). In 2009-2010, Kijne was chair of the panel that assessed nineteen programmes in Biology at five Dutch universities. Students elected him as a Teacher of the Year in Biology and Life Science & Technology.

Prof. dr. A.H.J. (Ton) Bisseling is Full Professor and head of the Laboratory of Molecular Biology at Wageningen University. He studied Biology in Nijmegen and obtained his PhD at the Department of Molecular Biology of Wageningen University. After holding a number of scientific positions there, he was appointed to his current chair of Molecular Biology in 1998. Bisseling is member of numerous Editorial Boards of international journals, including *Plant Biology* and *Science*. Bisseling is member of the Royal Netherlands Academy of Arts and Sciences, and member of its Council for Earth and Life Sciences.

Prof. dr. H.A. (Herman) Verhoef is Professor emeritus of Soil Ecology at VU University Amsterdam. He holds a master's grade and a PhD in Biology, both obtained at VU University, where he was appointed as Associate Professor Animal Ecophysiology in 1986. In 1992, he changed to an Associate Professorship in Soil Ecology, and was subsequently appointed as Full Professor in this specialisation in 2003. Next to his academic career, Verhoef has held a number of social positions at VU University, chairing the Advisory Board on Higher Education HOVO and the Advisory Board on Internationalisation, and acting as auditing member of several Faculty Audits.

Prof. dr. M.J. (Joost) Teixeira de Mattos is Professor of Quantitative Microbial Physiology at the University of Amsterdam and co-founder of Photanol BV. Teixeira de Mattos studied Chemistry at the University of Amsterdam, and obtained his PhD in Chemistry there in 1984. He has held a number of scientific positions before being appointed as Full Professor in 2007. Throughout his career, Teixeira de Mattos has been actively involved in education, teaching subjects in biochemistry, microbiology and biotechnology in programmes ranging from Chemistry to Computer Science. He received the Dupont Award for Higher Education and was chosen by students as Teacher of the Year in Chemistry (twice) and in Biology. Teixeira de Mattos has also been member of the Education Advisory Boards in Chemistry and Biology/Biotechnology and of the Boards of Examiners in Chemistry and Life Sciences.

J. (Jeffrey) Verhoeff BSc. is master's student Biology and Animal Sciences at Wageningen University. In 2013, he obtained his bachelor's degree in Biology, also at Wageningen University. Verhoeff has been member of the Dutch national council of Biology students (Landelijk Overleg Biologie Studenten, LOBS) since 2013, and acts as its chair since 2015. He is member of the Board of the Dutch Institute for Biology (Nederlands Instituut voor Biologie, NIBI). Since 2012, Verhoeff has worked as student-assistant at Wageningen University, acting as teaching assistant in a number of courses and as co-organizer of Open Days for prospective students.

Appendix 2: Domain-specific framework of reference

Domain-specific framework of the masters' programme in Biology

The domain of biology concerns life and its environment: the complete integrated system of biological entities in which regulation, interaction, communication, heredity and evolution are the central concepts. The coherence and dynamics of all these entities, therefore, should be the central themes in every Biology programme. Recently (or the last two decades), biological sciences have experienced tempestuous (booming) developments that have led to a more profound understanding of the dynamics of life and the structural and functional mechanisms that lie at its basis. In this process, integration with other disciplines such as mathematics, physics, chemistry, informatics, and earth sciences has shown to be crucial. Moreover, biology has become an integral science indispensable in the practice of resolving societal issues such as sustainable food production, conservation of biodiversity and the development of "green energy" resources. Biology in the Netherlands plays a key role in the preservation and further reinforcement of the strong international position of the top sectors.

The rapid development of the biological sciences and the plethora of positions for which biologists are required, force biological educational programmes to prepare students for jobs in fundamental research, applied research and technology, communication and policy; both in biology as well as in adjacent scientific fields. More than ever, biology demands the competence to deal with the dynamics and complexity at various levels of organization, such as molecules, cells, organisms, populations, communities and ecosystems. Furthermore, students need to achieve excellent academic skills in scientific writing, oral presentation, critical reading of scientific literature, self-reflection and teamwork.

The MSc Biology covers a two-year programme, offering a deepening of knowledge in one or more biological sub disciplines in the fields of research, policy, management, communication or teaching. In each of these specialisations at least one research component is incorporated. After completion of the masters' programme, students are well equipped to follow a biologically oriented PhD trajectory or to obtain other positions of academic level related to biology.

Demands of (international) colleagues and the professional environment

Biological master programmes have a long and world-wide tradition as a central discipline. In the course of time, attention has shifted from capitalizing factual knowledge in mono-disciplines to the integration of the levels of organization and disciplines. The masters' programme aims to provide students with knowledge and skills in their specific domain and with general academic competences that will enable them to perform in an excellent manner in a broad range of professional environments. Students should be able to explain and reflect on his or her choice for a specialized PhD trajectory, or for another position at the labour market within the area of policy/administration, management, education or communication.

The institutions offering a biologically oriented MSc in the Netherlands participate in the 'Overlegorgaan Hoger Onderwijs Biologie' (Consultative Body of Higher Educational Teaching in Biology). Students are allowed to take courses within the elective part of their master programme from other Dutch biology masters' programmes. Dutch masters' programmes in biology have a good international reputation. Students with a Dutch masters' diploma can enter into all relevant international biologically oriented PhD positions.

What can be expected from a MSc Biology?

1. Knowledge and research skills

The graduate:

- a) is able to make use of the conceptual framework of the discipline in which he/she has specialized in order to explain the state of the art of developing theories and to identify the most important research issues;
- b) can systematically solve scientific problems within the context of relevant biological fields;
- c) can develop, apply and optimize research techniques in biological research;
- d) can independently formulate, initiate and execute a biological research project and analyse and interpret the results.

2. Academic and learning skills

The graduate:

- a) can report orally and in writing on the field of study for a specialist and a general audience;
- b) is able to critically reflect on the performance of him/herself and others in the professional context and to evaluate the societal and ethical consequences of biological research;
- c) can communicate effectively within the chosen field of specialisation.

Appendix 3: Intended learning outcomes

The Masters programme should endow students with sufficient academic knowledge, understanding and skills to independently demonstrate:

1. The ability to recognise, propose and solve problems in the field of Biology
2. The ability to discuss their scientific contributions with colleagues
3. The ability to inform non-specialists in a clear and unambiguous manner about the issues driving their research and the conclusions they have reached
4. The ability to follow a PhD programme successfully within the same discipline or related areas.

Final qualifications of the Masters programme

Each variant within the Masters programme should provide the same final level of general academic qualifications and should also provide access to a PhD programme. However, the variants differ from each other in terms of specific learning outcomes and competences.

Attainment levels

A graduate of the Masters programme should reach the following levels of attainment:

1. Knowledge of and insight into the basic topics in Biology.
2. An extensive knowledge of concepts and methods in an important subtopic of Biology and an understanding of how they are established and can be applied to increase knowledge.
3. Awareness of the major international scientific developments in the said field.
4. An understanding of the relationship between the said field and related fields of science.
5. Ability to carry out an independent analysis of scientific problems and to formulate testable hypotheses that can help to solve such problems.
6. Experience in the design and implementation of relevant scientific research projects based on an independently formulated research plan by conducting a thorough analysis of the relevant literature.
7. Ability to present independently-generated data in a clear manner, both in writing and orally.
8. Proficiency for critical analysis of the scientific literature and the ability to summarise data.
9. An understanding of the societal and ethical background debates concerning the chosen research field.
10. A clear view of the job opportunities and practical applications in the area of specialisation.

For the Masters specialisations “Biology and Sciencebased Business”, “Biology and Science Communication and Society” and “Biology and Education”, the following additional levels of attainment are necessary:

Specialisation Science-based Business :

11. A basic knowledge and understanding of: strategic and marketing management, financial management, project management, organisational management, patents, and quality management.
12. Experience in the design and implementation of organisational research within a company, relevant to the chosen research specialisation.

Specialisation Science Communication and Society :

11. Knowledge and understanding of modern information and communication technologies and the ability to apply these technologies in practical settings.
12. Experience in science communication.
13. Knowledge of ethical, historical and societal aspects in the field of natural sciences.

Specialisation Education :

11. Meets all the requirements for the license to teach secondary education and vocational education classes.
12. An educational vision taking into account the relationship between schools and society, and respecting the values and rules generally accepted in our multicultural society.

Competences

The graduate of the Masters program in Biology should achieve the following competences:

1. Acquires the knowledge and skills that can be expected nationally and internationally of a junior scientist in the field of specialisation.
2. Can contribute to knowledge in the research field with original (basic or applied) research based on knowledge and understanding of the discipline and problem-solving skills.
3. Can write a scientific article in an international journal and contribute to a scientific meeting with a presentation or a poster.
4. Can transfer knowledge about his or her independently conducted research to specialists and non-specialists orally and in writing and can contribute to scientific and socio-political debates in the field.
5. Can function in a single-discipline or multidisciplinary research team and can contribute to the achievement of team objectives based on his or her specialisation.
6. Has the ability to evaluate his or her independent research and the research of others in a critical manner.
7. Can address the societal and ethical issues and responsibilities during the evaluation of research and professional practice.

For the Masters programme specialisations Sciencebased Business, Science Communication and Society and Education in addition the following competences apply:

Specialisation Science-based Business:

8. Can apply organisational and business principles in general, and those concerning the societal use of biological research data in particular.
9. Can develop innovative business enterprises from a biological perspective.

Specialisation Science Communication and Society :

8. Acquires an understanding of science communication and is equipped to develop further as a journalist or communications officer at a university, a museum, in business or in governmental organisations.

Specialisation Education :

8. Can function as a teacher, mentor or coach during learning processes.
9. Has the willingness and ability to participate in organisational activities within the school.
10. Has the willingness and ability to perform individually or in a research team focusing on educational practice or teaching methodology.

Appendix 4: Overview of the curriculum

<i>Research masters Biology 2014-2015</i>			
Year 1		Year 2	
Orientation (3 EC)		If applicable research project 2 and courses of choice	
Genomic Architecture (6 EC)			
Advanced Statistics (3 EC)			
Specialisation course (6 EC)*			
AB: <i>at least 1 of the following courses:</i> <ul style="list-style-type: none"> • Mechanisms of Disease (6 EC) • Development and evolution (6 EC) EBC: <i>at least 1 of the following courses:</i> <ul style="list-style-type: none"> • Conservation Biology (6 EC) • Methods in Biodiversity Analysis (6 EC) • Development & Evolution (6 EC) MB: <i>at least 1 of the following courses:</i> <ul style="list-style-type: none"> • Global Regulatory Networks in Bacteria (6 EC) PS: <i>at least 1 of the following courses:</i> <ul style="list-style-type: none"> • Immune system of plants (6 EC) • Metabolomics (6 EC) • Development & Evolution (6 EC) General Biology Programme: <i>one of the courses:</i> <ul style="list-style-type: none"> • Orientation on Animal Biology and Disease Models (3 EC) • Orientation on Evolution Biodiversity and Conservation (3 EC) • Orientation on Microbial Biotechnology and Health (3 EC) • Orientation on Plant Sciences and Natural Products (3 EC) 			
12 EC out of the courses of other specialisations: Or courses from the list of approved electives			
Research project 1**			
Book exam (3 EC) (in year 1 or year 2)			
Top Lectures (3 EC) (in year 1 or year 2)			
<i>Specialisation Science Based Business, Science communication and Society or Education</i>			
Year 1		Year 2	
Orientation (3 EC)		SBB	SBB Internship (min 25 EC)
		SBB courses (min 15 EC)	
		Science- Based Business or Research-Based Business component: Foundation courses: <ul style="list-style-type: none"> • SBB Fundamentals (15 EC) RBB <i>Foundation courses:</i> <ul style="list-style-type: none"> • Research Based Business Opportunities (5 EC) • Research Based Business Ventures (5 	

	EC) <ul style="list-style-type: none"> • Research Based Business Planning (5 EC) <p>Advancement:</p> <ul style="list-style-type: none"> • Learning from Silicon Valley: Entrepreneurship and New Business Venturing 3 (5 EC) • SBB/RBB Essay (3-7 EC) • SBB/RBB Elective (3-15 EC) <p>Finishing:</p> <ul style="list-style-type: none"> • SBB Internship (25-35 EC) • RBB Assignment (25-35 EC) 		
Genomic Architecture (6 EC)	SCS	SCS Courses (min 20 EC)	SCS Internship (min 23 EC)
	<ul style="list-style-type: none"> • Fundamentals of Science Communication and Society, 17 EC • Project Proposal Communication, 3 EC • Training period Communication, 20-40 EC 		
Advanced Statistics (3 EC)	EDU	EDU Courses (30 EC)	EDU Teaching Practice 1+2 (30 EC)
Specialisation course or approved elective (6 EC)* <ul style="list-style-type: none"> • Orientation on Animal Biology and Disease Models (3 EC) • Orientation on Evolution Biodiversity and Conservation (3 EC) • Orientation on Microbial Biotechnology and Health (3 EC) • Orientation on Plant Sciences and Natural Products (3 EC) <p><i>12 EC out of the courses:</i></p> <ul style="list-style-type: none"> • Mechanisms of Disease (6 EC) • Development and evolution (6 EC) • Immune system of plants (6 EC) • Metabolomics (6 EC) • Global Regulatory Networks in Bacteria (6 EC) • Conservation Biology (6 EC) • Methods in Biodiversity Analysis (6 EC) • Behavioural Biology (3) <p><i>Or courses from the list of approved electives</i></p>	<ul style="list-style-type: none"> • Education: <ul style="list-style-type: none"> ○ Educational Theory (5 EC) ○ Learning and Instruction 1 (5 EC) ○ Learning and Instruction 2 (2 EC) ○ Teaching Methodology 1 (5 EC) ○ Teaching Methodology 2 (5 EC) ○ Design Research (7 EC) ○ Individual Choice (1 EC) ○ Teaching Practice 1 (15 EC) ○ Teaching Practice 2 (15 EC) 		
Research project 1 (at least 36 EC) (not necessary in first semester)			
Book exam (3 EC) (in year 1 or year 2)			
Top Lectures (3 EC) (in year 1 or year 2)			

Appendix 5: Programme of the site visit

Day 1 – 18th of Juni 2015		
From	Till	Panel
12.00	14.00	Preparatory discussions and look through documents (incl. Lunch)
14.00	15.00	Interview with responsible executives <ul style="list-style-type: none"> • Dhr. Prof. dr. J. (Johan) Memelink, Director, IBL/Plant Sciences and Natural Products • Mw. Drs. K.P.G. (Karin) van Wanrooij, Training Office Biology/Study advisor, IBL/Education • Dhr.Dr. T.J. (Tom) de Jong, Coordinator master specialisation Evolution, Biodiversity and Conservation, IBL/Plant Sciences and Natural Products • Dhr.Dr. D. (Dennis) Claessen, Coordinator Minor Molecular Biotechnology, IBL/Microbial Biotechnology and Health
15.00	15.15	Panel consultation
15.15	16.00	Interview with bachelor students Biology <ul style="list-style-type: none"> • Mw. J.F. (Janneke) de Ruyter • Mw. S. (Sanne) Grevink • Dhr. Y.A.F. (Youri) Gorissen • Dhr. M.P.M. (Mike) van Adrichem • Mw. V.F. (Valerie) van der Schrier • Dhr. A.F. (Aram) Swinkels • Mw. K.M. (Kim) Renkens
16.00	16.45	Interview with master students Biology <ul style="list-style-type: none"> • Mw. M. (Mara) Tromp BSc, Animal Biology and Disease Models, Jaar 1 • Dhr. B. (Bas) de Jonge BSc, Evolution Biodiversity and Conservation, Jaar 1 • Dhr. T.M. (Tim) van Leeuwe BSc, Microbial Biotechnology and Health, Jaar 2 • Mw. F. (Frederike) Stock genannt Schroer BSc, Plant Sciences and Natural Products, Jaar 2 • Mw. S. (Saskia) van de Velden BSc, Biology and Science Communication & Society, Jaar 2 • Mw. J.F. (Javiera) Espoz Tapia BSc, Biology and Science-Based Business, Jaar 2 • Mw. B. (Babette) van Soolingen BSc, Biology and Science-Based Business, Jaar 2
16.45	17.15	Panel Consultation
17.15	17.45	Interview with alumni <ul style="list-style-type: none"> • Mw. L.T. (Lizah) van der Aart MSc, PhD student, IBL • Dhr. R. (Ralph) Boland MSc, PhD student, IBL • Mw. A.C.M. (Annebelle) Kok MSc, ZZP-er, Fascimare • Dhr. M.H.M. (Thijs) Groenewegen MSc, Ecologisch advisor, Stichting Waterproef • Dhr. D.P (Dwayne) van der Klugt, Business consultant, KplusV • Dhr. F.K. (Flemming) Diepeveen MSc, Adminsitrive worker,

		Public Ministry <ul style="list-style-type: none"> • Mw. N.L. (Nienke) Vastenhout MSc, Teacher Biology, Teylingen college • Mw. E. (Emma) Stoops MSc, Teacher Biology, Zandvlietcollege
18.30	21.00	dinner (prepare for second day)
Dag 2 - 19 juni 2015		
8.45	9.00	Arrival panel
9.00	9.45	Preparatory discussions and look through documents
9.45	10.45	Interview with teachers <ul style="list-style-type: none"> • Mw. Ing. A.J.G. (Tonny) Regensburg-Tuink, IBL/Algemeen, Molecular Microbiology • Dhr. Dr. M. (Maurijn) van der Zee, IBL/Animal Sciences and Health, Evolutionary Biology • Mw. Dr. A.P. G. (Anna-Pavlina) Haramis, IBL/Animal Sciences and Health, Integrative Zoology • Mw. Prof.dr. A.H. (Annemarie) Meijer, IBL/Animal Sciences and Health, Molecular Cell Biology and Immunology • Dhr. Dr. R. (Remko) Offringa, IBL/Plant Sciences and Natural Products, Molecular Developmental Genetics • Dhr. Dr. C.J.M. (Kees) Musters, CML, Conservation Biology • Dhr. Dr. M.C. (Marco) Roos, Naturalis, Systematische botanie • Dhr. Dr. H.G.J. (Harald) van Mil, Freelance, Statistics
10.45	11.00	Panel Consultation
11.00	11.30	Interview with the Education Committee <ul style="list-style-type: none"> • Dhr. Dr. H.J.M. (Huub) Linthorst, chairman • Dhr.Dr. T.J. (Tom) de Jong, teacher-member (Absent, present at 'Interview responsible executives') • Dhr. Prof.dr. M. (Menno) Schilthuis, teacher-member (Absent) • Dhr. Dr. W.L.M. (Wil) Tamis, teacher-member • Mw. E. (Eline) Rondaij, Student-member, Secretaris (absent) • Mw. L.E.M. (Linda) Cappetti, Student-member, Assessor Education LBC • Dhr. S. (Sven) Ungerer, Student-member • Mw. L. (Liselotte) Rambonnet BA, Student-member • Mw. N. (Noortje) Dannenberg BSc, Student-member • Mw. B.M. (Bernice) Dekker, Student-member
11.30	12.15	Interview with the Board of Education <ul style="list-style-type: none"> • Dhr. Prof. dr. P.G.L. (Peter) Klinkhamer, Chairman • Dhr. Dr. G.P.H. (Paul) van Heusden, Secretary • Dhr. Prof. dr. P.C. (Peter) van Welzen, Member • Dhr. Prof.dr.ir. P.M. (Peter) van Bodegom, Member • Mw. Drs. K.P.G. (Karin) van Wanrooij, Official secretary

12.15	13.00	Lunch and preparation of the final interview with the formal responsible executives
13.00	14.00	Guided tour <ul style="list-style-type: none"> • Mw. J.I. (Janna) Horjus, Praeses Leidse Biologen Club • Dhr. K.J. (Koen) Hokke BSc, Assessor Extern Leidse Biologen Club
14.00	16.00	Discuss preliminary findings
16.00	16.30	Final meeting with faculty and programme management <ul style="list-style-type: none"> • Dhr. Prof.dr. H.J. (Han) de Winde, Vice dean and portfolio holder Education FWN • Dhr. Prof.dr. H.P. (Herman) Spaink, Academic director IBL • Dhr. Prof. dr. J. (Johan) Memelink, Director
16.30	17.00	Rounding up preliminary findings, prepare oral report
17.00	17.15	Oral report preliminary judgement

Appendix 6: Theses and documents studied by the panel

Prior to the site visit, the panel studied the theses of the students with the following student numbers:

1203436	0824607	0740586
0820725	1269380	0645257
1207512	0535869	0674133
1238876	0813818	0828556
0528358	0826669	1313770

During the site visit, the panel studied, among other things, the following documents (partly as hard copies, partly via the institute's electronic learning environment):

- Annual Programme report 2012-2013 and 2013-2014, (including annual report of the Board of Examiners)
- Minutes and annual report of the Programme Committee 2013-2014
- Literature, course manual, exams and evaluation results of the following courses:
 - Genomic architecture (level 400, 6 EC)
 - Conservation Biology (level 500, 6 EC)