



Utrecht University



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Training Plan Quality Control Plan Quality Assurance Plan

update 2017

Graduate School of Life Sciences

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Training Plan

Research-intensive education: a common educational basis for the Master's programmes of the Graduate School of Life Sciences at Utrecht University

Editing: Shirrinka Goubitz, PhD, Pauline Krijgsheld, PhD, Rianne Bouwmeester, PhD

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Summary

This training plan describes the curriculum and training provided by Graduate School of Life Sciences at Utrecht University. It focuses primarily on the curriculum in the Master's phase of the research programmes.

The Graduate School of Life Sciences (GSLS or the School) consists of all life sciences masters and PhD programmes of Utrecht University. The GSLS aims to be more than the sum of a number of programmes plus a shared administration. A shared mission, a strategy to implement that mission, a common educational philosophy, and a consistent policy approach in areas where collaboration is needed to move forward demonstrates the added value of the GSLS. This document demonstrates that the GSLS is a successful Graduate School with a leading international position.

Chapter 1 sets out what the GSLS stands for, gives a brief sketch of the academic and social context of the curriculum at the School, and describes the relationship between the various (inter)disciplinary and international research programmes at the School, as well as the focus areas defined by Utrecht University.

Chapter 2 describes the GSLS as one of the seven Graduate Schools of Utrecht University and provides a broad sketch of the administrative structure of the School in terms of the responsibilities and competencies of the (executive) Board of Studies, Educational Committee, Board of Examiners, Board of Admissions, etc.

Chapter 3 describes details at the curriculum as the core activity of the School. The general qualification targets for the Life Sciences Master's degrees are described, as they apply to all the GSLS Master's programmes. This chapter also discusses the School's educational philosophy, Research-Intensive Education, and sketches the broad outlines of the programme structures.

Chapter 4 sets out in more detail how the School operates.

- Section 4.1 shows how various processes at the School are coordinated;
- Section 4.2 describes internationalisation of the School;
- Section 4.3 discusses the policy concerning information and communications;
- Section 4.4 describes the policy related to application, admissions and enrolment;
- Section 4.5 provides a description and analysis of the curriculum at the GSLS. The School's mission is to train researchers. Therefore, the educational learning process and didactic approach are tailored closely. This is illustrated by the didactic concept of 'Research-Intensive Education';
- Section 4.6 looks at the School's arrangements for academic counselling and monitoring;
- Section 4.7 sets out the underlying principles and teaching methods for quality control at the school;
- Section 4.8 describes how the GSLS works to establish the link of the labour market to the training of students as researchers, whose added value also qualifies them for jobs that are not strictly research-related.
- Finally, section 4.9 describes in brief the future plans of the GSLS.

1. Mission of the Graduate School of Life Sciences

1.1 Utrecht University and Life Sciences

The 21st century could be described as the century of the Life Sciences: research is unravelling the great questions about all aspects of life, health, disease and development. Utrecht University wishes to maintain its position as a leading European research university and so it established seven Graduate Schools, including the Utrecht University, Graduate School of Life Sciences (GSLS). This School brings together all the training in the Master and PhD research programmes focused on micro-organisms, plants, animals, humans, molecules of life, and health & disease.

1.2 Interdisciplinary research and training

Research at the GSLS is highly interdisciplinary. Breakthroughs are taking place in Research Projects where pharmacy, (veterinary) medicine, chemistry, and biology interact. A traditional faculty structure with classic mono-disciplinary degrees is no longer appropriate. The GSLS aims to train Master's and PhD students so that they can engage in independent research in a multidisciplinary setting. For this purpose, the GSLS brings together the research expertise and facilities of the faculties of Medicine, Veterinary Medicine and Science. The School has been structured along the lines of thematic, interdisciplinary programmes that correspond to the strategic themes adopted by Utrecht University in this area. These themes are: Life sciences and Sustainability. The GSLS divides its research into four subthemes: Science for Life, Regenerative Medicine, Personalised Medicine, and One Health. An overview of the subthemes, together with the associated Master's and PhD programmes, can be found in Table 1.

1.3 The mission of the Graduate School of Life Sciences

The primary objective of the GSLS is to train future scientists who will be capable of drawing on their acquired knowledge, understanding and skills to conduct top-class research in an international context. The GSLS also gives Master's students the opportunity to qualify for subject-related, policy and management positions with government institutions and industry, and for positions in the fields of science communication.

1.4 The strategy of the Graduate School of Life Sciences

The ambition of Utrecht University as a leading Research University includes contributing actively to training upcoming generations of new researchers. Internationally accredited, reputed research institutes at Utrecht University support the GSLS research programmes. Here, the international scientific community constitutes the frame of reference. Students are given the opportunity, and are encouraged, to follow parts of their studies abroad. All educational activities are research-intensive and there are strong links with state of the art research and excellent researchers. All the Master's programmes at the School are delivered entirely in English.

1.5 The organisation of the Graduate School of Life Sciences

All of the secondary processes that are important for education (administration, information, recruitment, selection, educational development, examination, quality control and facilities) have been developed to train top (interdisciplinary) researchers. The PhD curriculum at the School has also been organised as thematic PhD programmes within the same line as the Master's programmes. This means that the GSLS is developing on American lines with an internationally recognisable 'Graduate Programme' consisting of Master's and PhD courses (Table 1).

TABLE 1. MASTER'S AND PHD RESEARCH PROGRAMMES OF THE GRADUATE SCHOOL OF LIFE SCIENCES

Subtheme Life sciences	Research Master's Programmes	PhD Programmes
Regenerative Medicine	Regenerative Medicine & Technology	Regenerative Medicine
Science for Life	Applied Data Science Postgraduate Environmental Biology Drug Innovation Molecular & Cellular Life Sciences Science and Business Management Toxicology & Environmental Health	Bio-membranes Computational Life Sciences Environmental Biology Drug Innovation Molecular Life Sciences Toxicology & Environmental Health
Personalized Medicine	Biology of Disease Cancer, Stem cells & Developmental Biology Neuroscience & Cognition Medical Imaging-	Cancer, Stem cells & Developmental Biology Cardiovascular Research Clinical & Experimental Neuroscience Clinical & Translational Oncology Medical Imaging
One Health	Epidemiology Epidemiology Postgraduate Infection & Immunity One health	Epidemiology Infection & Immunity

2. Administrative organisation

2.1 The domain of Graduate School of Life Sciences (GSLS)

Research training needs solid foundation, with internal safeguards for the quality of the training and counselling of young researchers, in both the Master's and PhD phases. At Utrecht University, the profile of and safeguards for the quality of research training are anchored in the different Schools. Internationally, the GSLS has become the dominant organisation model for both external profiling and internal safeguards for research training.

Utrecht University has seven Graduate Schools:

- Arts & Humanities;
- Geosciences;
- Law, Economics and Governance;
- Life Sciences;
- Natural Sciences;
- Social & Behavioural Sciences;
- Teaching

Utrecht University has a matrix organisation structure. Accountability for education and research is organised on vertical lines, passing through the dean, faculty and department. Horizontally, there is collaboration in the areas of education and research in Graduate Schools, and in the strategic themes and focus areas, respectively.

Through the Graduate School, Utrecht University provides an international target group with strong research training consisting of Master's and PhD lines. These degrees rely on the quality of the research in the research institute. Quality of education is the primary responsibility of the Graduate School. To maintain and strengthen our research training, a good match between the Master's and PhD phases is essential.

2.1.1 The administrative organisation of the Graduate School of Life Sciences

Responsibility of the GSLS has been determined on the basis of a joint arrangement from the Deans of the Faculty of Science, the Faculty of Veterinary Medicine and the Faculty of Medicine (the Utrecht Life Sciences deans). The responsibility for quality of education resides with the chair of the School, also chair of the Executive Board of Studies whom is mandated by the deans.

From a legal point of view, the GSLS currently supplies seven separate Master's degrees, each with a CROHO-label and separate accreditation. Four of these degrees, Biological Sciences, Chemical Sciences, Pharmaceutical Sciences, and Science and Business Management, answer to the degree director 'Biosciences'. As for the other three degrees; Biomedical Sciences, Health Sciences and Neuroscience and Cognition, they answer to the degree director 'Biomedical sciences'. Both degree directors are part of the Executive Board of Studies (DB-BoS) and answer to the chair of the Executive Board of Studies

Besides the (DB)BoS, the GSLS has the following bodies for all Master's programmes:

- the Educational Committee (EC);
- the Board of Examiners (BoE);
- the Board of Admissions (BoA);
- the Master's programme committee;
- the Expertise Group Education in Life Sciences (EGELS);
- the Life Sciences Representatives (LSR);
- the Management support team (MT);

These bodies regulate and/or monitor the programmes, whereas the responsibility for the content and implementation resides with the Master's programme committees.

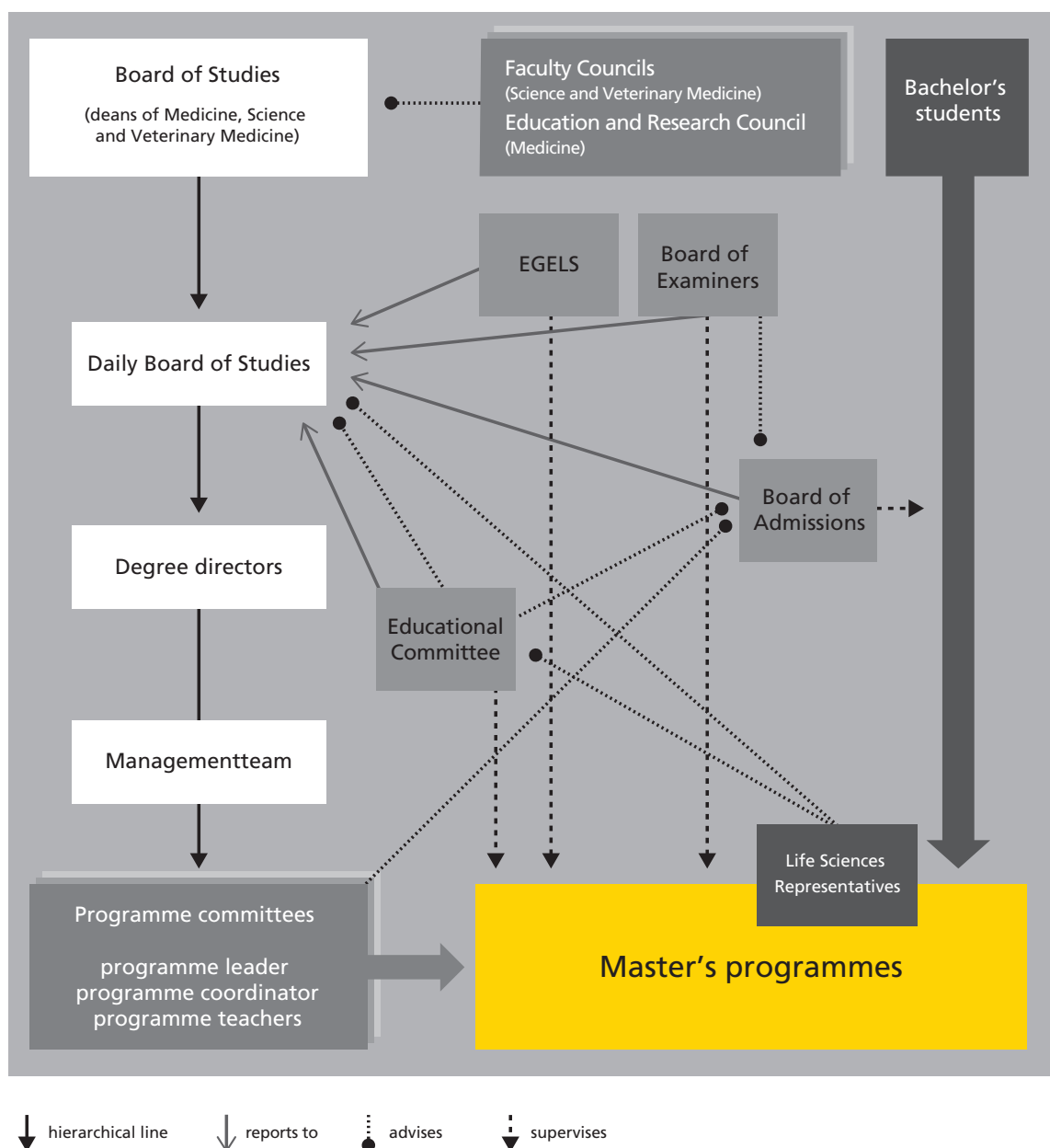


FIGURE 1: ORGANOGRAM OF THE GRADUATE SCHOOL OF LIFE SCIENCES

2.2 Administrative Bodies and Their Competences

2.2.1 Board of Studies

Tasks

The Board of Studies (BoS) is responsible for the organisation and coordination of education and the quality of the Master's programmes.

The BoS monitors the quality of the education according to the Quality Control Plan and the Assessment Policy. This does not only include the quality of the separate programmes, but also the deployment of teaching staff, adequate academic counselling for students, as well as course exchanges and flexibility in study selection. Furthermore, the BoS monitors the tasks of the executive board.

Members

The deans of the faculties of Science, Medicine (UMCU) and Veterinary Medicine (the Utrecht Life Sciences co-deans) constitute the Board of Studies.

2.2.1.2 Executive Board of Studies of the Graduate School

Task

The Executive Board of Studies (DB-BoS) runs the daily affairs of the GSLS and advises the Board of Studies (BoS) about the quality of master and PhD programmes. The DB-BoS meets once a month and discusses and/or decides about all educational affairs within its mandate such as accreditations, educational innovation, new Masters' programmes, changes in curricula or learning outcomes, content of the educational regulations, community events, student supervision, internationalisation, communication, availability of elective courses etc.

The DB-BoS maintains contact with the Educational Committee, Board of Admissions and Board of Examiners and the management of the Master's programmes and PhD programmes. Through annual reports they are in control of annual affairs of the committees and programmes.

The DB-BoS formulates policy decisions to be made by the deans (BoS). The chair of the DB-BoS discusses these items on a regular basis with the BoS. The DB-BoS prepares an annual report for the BoS with management information, annual reports of committees and programmes and action items on quality control.

Members

Pursuant to a nomination from the DB-BoS, the joint deans appoint a chair to the DB-BoS as well as the chair of the Board of Admissions. The DB-BoS is headed by a Chair, who is a professor in one of the Life Sciences areas at Utrecht University or University Medical Centre Utrecht. The DB-BoS further consists of two vice-chairs: the degree directors of Biomedical Sciences and of Biosciences. They are mandated to decide about all academic affairs for Master's programmes in their domain within the framework of the GSLS regulations. Members of the DB-BoS also include three directors of the research master and/or PhD programmes of the GSLS, a student member (the Chair of the Life Sciences Representatives), the Chair of the PhD council, and the administrative secretary of the GSLS. Other members may be appointed based on their specific qualities/interests. The Life Sciences deans appoint members of the DB-BoS for the term of six years. The Degree Directors are supported by Degree Coordinators, who also have an advisory function in the DB-BoS meetings.

2.2.2 Educational Committee

Task

The primary task of the Educational Committee (EC) of the GSLS is to appraise the quality of the studies in the programmes while striving to achieve a uniform approach to monitoring. In this respect, the EC has an advisory role on all academic issues related to quality control.

The EC does not limit its activities to exercising supervision. It also states recommendations about what could be improved pursuant to the results of student surveys. The EC conceive the standard questionnaires for this purpose. The EC reports to the DB-BoS. The EC annually contacts the individual programmes and their Programme Coordinators, to correctly interpret evaluation results and to discuss the subsequent implementation in concrete action. The EC also has formal approval rights on certain aspects of the Education and Examinations Regulations and advises the DB-BoS on this matter. Each year the EC reports to the DB-BoS via an annual report.

Members

Teaching staff and students of all involved master degrees are represented on an equal footing. The student members are also members of the LSR. The members of the EC are appointed by the Dean.

2.2.3 Board of Admissions

Task

The Board of Admissions (BoA) decides about student applications and enrolment. This is partly related to selection (on the basis of advice from the programme committees) and partly an administrative matter dealt with by Admissions Office and the student administrations of the faculties. The Programme Coordinators act as intermediaries and assess the admission files. They consult the programme or selection committee of the programme in question and pass the result on to the administration. The Administrations Office then completes the processing of the application in accordance with the rules agreed at Utrecht University. Admission decisions are signed under the responsibility of the (vice) chair of the BoA. Each year the BoA selects students for scholarships and reports to the DB-BoS via an annual report.

Members

The BoA is comprised of two Degree Directors, the chair of the EC and the chair of the BoE, as well as two Admissions Officers. One of the Degree Directors is appointed by the Deans as chair. Currently, the Degree Director of Biomedical Sciences chairs the BoA. The Admissions Officers are part of Utrecht University learning community on selection and admissions, and function as experts in the field. A secretary supports the BoA.

2.2.4 Board of Examiners

Task

The core activities of the Board of Examiners (BoE) are to:

- ensure the quality of the examinations;
- adopt guidelines and instructions in order to assess and record the quality of examinations;
- assess research projects and the applications selected by students in terms of content, scientific value and relevance, and standards;
- grant exemptions from one or more examinations;
- decide on special requests regarding the study programme,;
- deal with formal aspects concerning fraud or plagiarism;

- assess graduation files on the basis of the examination requirements stated in the Education and Examinations Regulations (EER);
- conceive rules and regulations on the implementation of the tasks and authorities;
- report to the (DB-)BoS via an annual report.

Members

Pursuant to nominations from the BoS, the joint deans appoint the BoE for the GSLS. The BoE consists of a chair and strives to appoint members of all the formal CROHO degrees. Furthermore, the BoE nests an Assessment Panel (AP), consisting of four members and a chair appointed by the chair of the BoE. The chair and vice-chair of the AP are also members of the BoE. This AP exclusively deals with assessment of the quality of tests and examinations.

2.2.6 Master's Programme Committees

Task

The Programme Committees for GSLS Master's programmes are responsible for matters within their own Master's programme. They assess applications for admission on contents and advise the BoA about new admissions. They are also responsible for the content and quality of the Theoretical Courses, and for the coordination of the Research Projects and Writing Assignments conducted by students as part of the Master's programmes. The Programme Coordinators maintain contact with the students relating to their study planning and study approach.

Members

Each programme committee for a Research Master comprises of the Programme Director and Programme Coordinator for the Master's programme in question, together with at least two senior teaching staff who are directly involved in the programme.

2.2.7 Expertise Group Education in Life Sciences (EGELS)

Task

The Expertise Group Education in Life Sciences (EGELS) supports the DB-BoS by research and advice on all educational innovation issues. Advice may be aimed at the DB-BoS itself or any other committee of the School. The EGELS also develops new educational concepts and coordinates the implementation of those concepts with the aid of the management team of the School.

Members

The team consists of two degree coordinators (currently the degree coordinator of from Biomedical Sciences is chair appointed by the DB-BoS), two programme coordinators, and one external member from COLUU (Centre for Teaching and Learning Utrecht) on a project basis. Depending on the projects at hand, the team can invite other temporary members to join the team.

2.2.8 Life Sciences Representatives

Task

Life Sciences Representatives (LSR) is a student-initiative to represent the interests and rights of all Master's students of the GSLS at Utrecht University.

The core activities of the LSR are to:

- represent the interests of all Master's students of the GSLS at the educational level;
- communicate between the student members of the EC and DB-BoS and the rest of the Master's students;
- identify problems Master's students experience within the course of their studies and try to resolve them, either by:
 - reporting and discussing the problems or complaints in the EC, DB-BoS or Programme coordinator meetings;
 - taking direct action or passing on the problem to those who are fit to handle it,
- fill the vacant student positions in the EC and DB-BoS in each new academic year;
- increase the coherence between the different programmes within the GSLS;
- promote the role of the LSR to the new Master's students every year;
- handle the applications of putative new LSR members at the beginning of every academic year.

Members

The LSR consists of at least one Master's student of every programme within the School. All student members of the EC and DB-BoS are part of the LSR. In addition, at least one representative of the Life-Sciences-associated-study-associations is a member of the LSR.

3. The Curriculum of the Graduate School of Life Sciences

The School aims to deliver outstanding independent researchers in the field of Life Sciences. These researchers will be familiar with the latest developments in their field and be able to develop this scientific field further on the basis of scientific and socially relevant questions and challenges. Every Master's graduate should in principle be able to qualify for a PhD position and preferably also have ambitions to pursue a career in scientific research. To achieve this goal, the School supplies advanced research-intensive education, in which education and research go hand in hand. An important underlying principle here is to ensure that students benefit optimally from the presence of top research and top researchers.

3.1 Learning objectives for the Master's training

Graduated students qualify for a PhD position and are capable of fulfilling positions in policy, management, industry and education. These objectives have been stated in terms of the learning objectives in the Education and Examinations Regulations (EER) and are shown below. These learning objectives correspond to the widely used Dublin descriptors for Master's programmes. The descriptors have been stated in terms specific to the entire field of Life Sciences. The individual Master's programmes at the GSLS elaborate these School-wide learning objectives further at a programme level.

1. The Master's degrees aim to:

- provide specialised knowledge, skills and insight in (parts of) the Life Sciences, and enable achievement of the exit qualifications referred to in the second clause below;
- prepare the student for a career in research, regulation, management and/or communication in the Life Sciences.

2. The successful Life Sciences' graduate:

Knowledge and insights

- will be able, with the knowledge of at least one of the specialised subjects of Life Sciences, to make a substantial contribution to the development and/or application of scientific concepts and methods, often in a research context;
- will be able to overview the important, recent developments within the Life Sciences and to point out the implications of these developments on the Life Sciences field and society;
- will be able to adequately use and interpret specialist literature in at least one of the subjects of Life Sciences.

Apply knowledge and insights

- will be able to translate a Life Sciences problem into a relevant research question, suitable for research development, product development, education or society;
- will be able to design a suitable research plan to test the formulated research questions, according to methodological and scientific standards;
- will be able to independently perform research, with the required accuracy. Graduates are able to handle, analyse, interpret and evaluate the empirically derived data in a correct manner.

Judgement

- will be able to discuss the outcomes of empirical research and to link them with scientific theories;
- will be able to indicate the importance of research activities for solving a biomedical question or problem, if applicable from a social perspective;
- will be able to critically reflect on their own research work in Life Sciences, from a social perspective.

Communication

will be able to comprehensibly report research results verbally and in writing, to specialised and non-specialised audiences in an international context;

will function effectively in a multidisciplinary research team.

Learning skills

- will have the skills to reflect on their own development and study career, and, if necessary, to motivate themselves and make any necessary adjustments;
- will have the skills to function independently and result-oriented in a competitive labour market;
- will have the qualification to be eligible for a PhD position or a position in another sector of the labour market.

3.2 Educational philosophy

3.2.1 Research-Intensive Education to achieve the competence target

The mission of the GSLS is to train future scientists who will be capable of using their acquired knowledge, understanding and skills to conduct top-class research in an international context. Direct linkage between education and high-quality international research is therefore important. The curriculum must be research-intensive and students must make the most of the presence of highly qualified researchers in their immediate vicinity. This fits with the positioning of Utrecht University as a Research University. Five strategic themes have been defined at Utrecht University as the focus for research, at the university two themes are covered by the GSLS, i.e. "Life Sciences and Sustainability". The Master's programmes are based directly on these research areas and their subthemes (see Table 1).

Students

The didactic approach to achieve this goal is 'Research-Intensive Education'. Engaging in research plays a key role in learning to conduct research. At the same time, this process must be effective and efficient. Students must acquire the right experience to the right degree: enough to learn from, without things becoming routine. Furthermore, they must process this experience in a conscious way to ensure that the results of the learning process are enduring. Rational planning for the process of learning and development-based counselling are therefore required.

Students must develop domain-specific knowledge and skills in a Life Sciences field. They must also have, and continue to develop, more general and personal traits such as an enquiring attitude, determination and self-reliance. Ultimately, they must be able to design and implement independent scientific research, achieving results that will be published in leading international journals.

Teachers

The teaching staff, who are engaged in research, are role models and they help students to engage with the research culture. The Life Sciences teaching staff has gone through a similar learning process themselves (first as students, later as PhD students and after receiving their PhD degrees). However, this is often an unconscious process in which context-related assumptions and presuppositions are not always explicitly distinguished from didactic principles. Focusing on the learning process that students must undergo in order to become researchers makes assistance and guidance from supervisors more rational and effective. The emphasis is on making the educational vision explicit, together with the objectives, the selection of activities for students

and teaching staff, and the organisation of the programme. There are workshops available to support the Life Sciences teaching staff in this field. Annual curriculum meetings during teacher lunches are organised to allow the various programmes to exchange good practices.

The competence target

The ability to use knowledge actively, for example to acquire new knowledge, is inextricably linked with the role of a researcher. This is therefore the first and most important role that students must learn. They do this by acquiring professional knowledge, methodological knowledge, statistical knowledge etc. in – and on the basis of – the researcher role.

The result is that students in a given field learn to think and act as researchers, formulating hypotheses, asking questions, collecting facts, making analyses, reporting findings etc. These competences are also very important in other professions, i.e. policy advisors, innovation, business, management, communication roles. This means that graduates have the basis for broader career prospects and more wide-ranging careers. A range of surveys of past graduates (including those who have done a PhD) and their employers in the field of the exact sciences have shown that these 'researchers plus' are more than welcome on the employment market.

With this objective in mind, the GSLS wants to train researchers who have developed the capacity to use their expertise and skills in several professional contexts.

3.2.2 The Research Cycle

For the elaboration of research-intensive education, the research cycle is an important tool for providing structure.

Elements of the research cycle covered by the curriculum include:

- translating an observed problem into a concrete study question;
- critically reviewing existing research;
- making a draft of a theoretical framework;
- drafting a research plan;
- select techniques for application;
- implementing a research plan;
- analysing data;
- interpreting data;
- receiving and providing feedback and thinking about research;
- dealing with peer review;
- scientific reporting and presentation of results.

All these elements must be dealt with in a structured way in the Research Projects. The educational learning process must be geared to transforming students into researchers. In all cases, it is important for students to be given enough room to make own decisions.

3.2.3 Broader Development

The research cycle emphasises 'action'. In addition, all sorts of attitudes and personal traits are important for successful 'action' such as Many developments take place where disciplines meet, such as the newly developed Co-challenge course. Students are given the opportunity to see what fellow students and scientists are doing. They are also actively involved in seminars, work discussions and other meetings at which researchers from various fields in the Life Sciences meet. This interaction with researchers must be cultivated as much as possible.

3.2.4 Knowledge Base

A large and up to date knowledge base and broad skills set are required to be able to conduct research. The various programmes at the GSLS deal with these aspect appropriate to the nature of their programme and research field. In some programmes, knowledge is acquired 'at the coalface', while other programmes a thorough theoretical grounding is acquired first. Similarly, some technical skills are offered and learnt on the spot, while other programmes first sketch a clear picture of available and needed techniques, in particular when the selection of those techniques are an important component of the operationalized research question.

3.3 The Curriculum at the Graduate School of Life Sciences

3.3.1 Entrance to the Master's Programmes

The Master's programmes in the GSLS are intended for students who have completed a university Bachelor's degree in Biomedical Sciences, Biology, Chemistry and Pharmaceutics comparable to the degree at Utrecht University, and who have a clear interest in research in the area of Life Sciences and a sound mastery of English.

3.3.2 Master's Programmes at the GSLS

The School has Master's programmes that cover the fields of Life Sciences, from micro-organisms to plants, animals and humans, and from the molecules of life to health and disease. The Master's programmes are part of accredited degrees registered with the Central Register for Training in Higher Education (CROHO).

3.3.2.1 Brief Description Applied Data Science for Health Postgraduate

- Applied Data Science prepares the student for a career as professional data scientist, mainly in the health domain but also in other disciplines.
- Biofabrication prepares the student for a career in multidisciplinary research on the interface of biofabrication, 3D printing techniques, material sciences and clinical applications.
- Bio Inspired Innovation prepares the student for a career in R&D, design- or innovation-related environment.
- Biology of Disease prepares the student for a career in research in a clinical or biomedical setting to gain insight into mechanisms and processes of disease, with the opportunity to focus on cardiovascular topics.
- Cancer, Stem Cells and Developmental Biology prepares the student for a career in research in the field of developmental biology, molecular oncology, signal transduction, stem cell technology and molecular genetics.
- Drug Innovation prepares the student for a career in interdisciplinary research in the field of innovation and management of small molecule and bio- molecular drugs or development of new approaches for evaluating the quality, efficacy, safety, and performance of the drug.
- Environmental Biology prepares the student for a career in molecular and/or ecological research on plants, plant communities, micro-organisms, animals and/or (marine) ecosystems.
- Epidemiology and Epidemiology Postgraduate prepares the student for a career in research in the field of quantitative analysis of the distribution of health and morbidity in populations (human or veterinary) and their determinants.
- Infection and Immunity prepares the student for a career in research in the field of fundamental and clinical immunology, prevention, diagnosis and treatment of infectious diseases, and disorders of immunity.

- Medical Imaging prepares the student for a career in research in the field of medical imaging in the broadest sense, including the physics behind medical imaging acquisition, medical image analysis and applications in science, in the clinic and in industry.
- Molecular and Cellular Life Sciences prepares the student for a career in interdisciplinary research in the field of structural biology, molecular biology and systems biology.
- Neuroscience and Cognition prepares the student for a career in interdisciplinary research in the fields of physiology and pathophysiology of the nervous system and cognition in humans and experimental animals.
- One Health prepares the student for a career in multidisciplinary research on the interface of the health of humans, animals and environment with a clear focus on infectious diseases.
- Regenerative Medicine and Technology prepares the student for a career in multidisciplinary research on the interface of regenerative medicine, technology and clinical applications.
- Science and Business Management prepares the student for a career in a research-related business environment
- Toxicology and Environmental Health prepares the student for a career in research in the field of risk assessment of chemical, physical and biological agents on humans, animals and the environment.

3.4 Structure of the Master's Programmes

Master's programmes last two years; they comprise a total of 120 credits (EC). The two Post-graduate programmes last 1.5 year (90 EC). As shown in Figure 2, the main components of the Master's programmes are two Research projects (internships): a Major project and a Minor project. In addition, each programme supplies one or more specific Master's courses. Students also complete a writing assignment by ways of a literature review or a research proposal. The students start their Master's programme with a communal introduction course for all GSLS students, and follow 10 Life Sciences Seminars. Each programme also includes an elective component that can be used to attend additional courses or can be used as additional research time. However, students with a theoretical deficiency must first clear this gap with part of their electives.

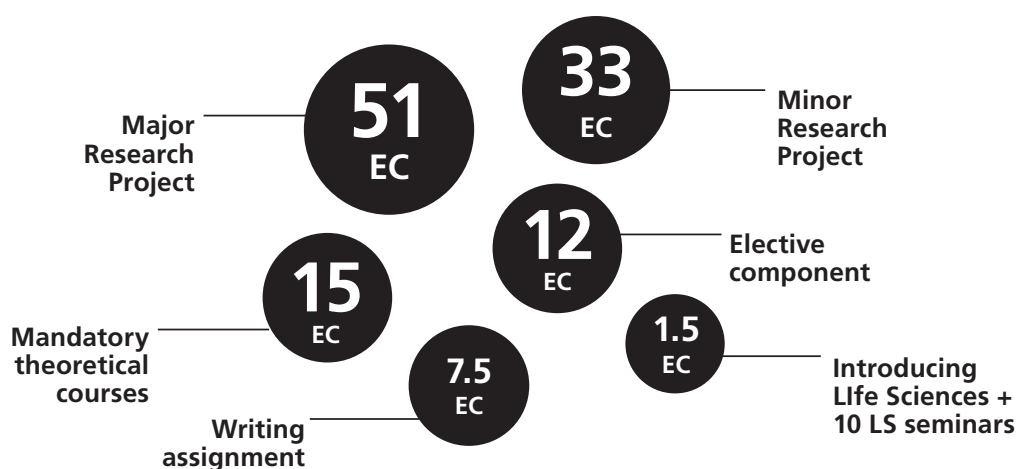


FIGURE 2. GENERAL OVERVIEW OF MASTER'S PROGRAMME OF THE GSLS (2 YEARS, 120 EC).

Although students are allowed to make up their own timetable within the programme's set up, many Master's programmes do start with a specific essentials course. From 2018 onwards, all programmes will start with an essentials course after the introduction week. In general, this applies only to Master's programmes starting in September. Another precondition for the study relates to the Major Research Project, which must be located at Utrecht University or the University Medical Centre Utrecht. For the Minor research project, students can also study elsewhere in the Netherlands or abroad.

Programme-specific theoretical courses primarily serve to enhance knowledge and insight in the field. A number of School-wide elective courses focus more on learning specific skills. For example, English for Academic Purposes, Career Planning and Professionalization, Laboratory Animal Sciences, Radiation Safety, Communicating Life Sciences, Basics of Biostatistics and Training in Educational Skills, each of which emphasise a specific skill. Components such as drafting research questions, conducting experiments and other elements in the research cycle are covered extensively during the two Research Projects.

4. The Operational Organisation of the Graduate School of Life Sciences

4.1 Process Guidance

The GSLS constitutes the administrative and operational setting for a large number of processes. One of the School's main responsibilities is therefore to manage those processes properly.

At an operational level, there are consultations between the stakeholders for each focus area. The main focus areas are: (1) internationalisation and marketing, (2) internal and external information and communications, (3) the process of application, admission and enrolment, (4) the organisation of the educational learning process and didactics, (5) academic counselling and monitoring (6) internal and external quality control and (7) labour market orientation. Sections 4.2 to 4.8 discuss the procedures in the individual focus areas. This section looks at a few general operational processes.

The GSLS works on a supra-faculty basis. The faculties in question (Science, Medicine, and Veterinary Medicine) are responsible for the operational processes. The GSLS draws on the operational facilities of these faculties, and tasks, responsibilities and competences must be determined as unequivocally as possible. Here, a distinction is made between programme matters and questions affecting the School as a whole. Where possible, internationalisation will be coordinated and implemented at the School level so that it can also be used as a marketing instrument for important international contacts and 'preferred partners'.

The School plays an important role in quality control for the curriculum. This primarily involves the field-specific requirements for the degrees, the programme's learning outcomes and the educational learning process. The School does not have any direct responsibility for the quality of the teaching staff. This responsibility resides with the faculties, as they are responsible for the teaching qualifications of their teaching staff (BKO and SKO qualifications), the Result & Development interviews, monitoring the standard of educational and field-related expertise and the adequate availability of staff.

4.2 Internationalisation and marketing

4.2.1 Importance of Internationalisation

Our economy is developing into an international knowledge economy. This requires young, highly trained people who are adequately prepared to operate in an international working environment. The GSLS therefore aims to train researchers who can play a central role in that knowledge economy. That means they must be able to:

- develop scientific knowledge in collaboration with fellow researchers who speak other languages;
- communicate and disseminate this knowledge inside and outside their own field of research;
- take into account international scientific and social conventions;
- build up a network of international scientific contacts and relationships;
- in addition to their own language, to have a mastery of at least English at an 'academic' level.

This means that:

- all the Master's programmes at the GSLS have been designed as international Master's in English;
- the research conditions in the departments linked to GSLS are appealing for international top researchers;
- the target for the number of foreign students with a relevant educational history/background in the Master's programmes is 20%;
- the Master's programmes are dominated by current international research in the Life Sciences - themes closely match recent developments in those fields.

The curriculum of the GSLS is designed so that students increasingly see the study as a preparation for an international scientific career in which 'the international scientific community' is the frame of reference. This is made apparent to the outside world by activities such as mutual exchanges of staff and students (e.g. exchange programmes) the recruitment of foreign teaching staff with specific expertise in one of the core focus areas, the establishment of institutional partnerships with foreign universities or Graduate Schools, exchanges of study components, etc.

This objective will be successful if all the research programmes develop into 'transnational' educational settings in the field of Life Sciences, and students are taught in English. Life Sciences works continuously on its 'Web presence': all sites are in English and make clear choices possible for students and future students. There are customer-friendly services for international students, with particular attention being paid by Utrecht University's international office to accommodation, visa applications, etc.

4.2.2 Furthering International Recruitment and Mobility

In the Life Sciences Master's programmes, the programme coordinators are the people who are particularly involved in the recruitment of foreign students). The GSLS targets 20% foreign students in each Master's programme. This has been achieved on average, but not by all programmes (Annex 1).

Of the students who get trained in other countries, 80% find internships on the basis of a research domain. In this process, the mediation of the research groups is often essential. After finding a Research Project, students can talk to a member of the internationalisation offices about the organisational affairs.

Two international offices have been established, one in the UMC Utrecht and one in the Faculty of Science, where knowledge about internationalisation is being concentrated for the purposes of advising students.

4.2.3 Enhancing International Collaboration

For the purpose of recruiting foreign students, Utrecht University staff annually visits several educational fairs on behalf of all Utrecht University Master's programmes. Another important condition for success is exchange at the PhD and teaching levels. The people involved, act as ambassadors for Life Sciences abroad.

Students can apply for funding and grants. For foreign students outside the EU there is the 'Utrecht Excellence Scholarship' and a National Holland Scholarship. From 2017 also a 'Bright Minds Fellowship' for EU citizens is available. There are also a number of other grants for exchanges within Europe: Leonardo da Vinci for student internships, Marie Curie for researchers, and Erasmus Mundus for Master's courses. Students can also apply for private funds.

4.3 Internal and External Information and Communication

In order to make the role and significance of the GSLS clear to professorial groups, information should be provided. Supplying information about the content of the Master's programmes to potential students requires a different approach. The goal of the internal and external information for potential students is to make sure the right student is in the right place, in the right Master's programme.

4.3.1 Target Groups for Communications

Both inside and outside Utrecht University, target groups have been defined that have either direct or indirect contacts with the GSLS. The following target groups have been defined:

At Utrecht University:

- Participants in GSLS are
 - faculties;
 - professorial groups;
 - members of staff;
 - current Master's students
- Potential participants in GSLS:
 - other Graduate Schools;
 - other faculties;
 - current Bachelor's students (potential Master's students)

Outside Utrecht University the participants are:

- Other universities, Dutch and international students
- Current Bachelor's students not studying at Utrecht University
 - university graduate students (Dutch/international);
 - University College students;
 - HBO Bachelor's students

4.3.2 Organisation and Activities

The GSLS has a communication team consisting of communication staff for the Faculties of Science and Faculty of Medicine, the Secretary of the School, and the coordinators of the different Master's programmes. This team is responsible for internal and external communications. The policy relating to communications for the GSLS is generally formulated at Utrecht University level.

Potential students

At the GSLS, School-wide information has been developed for potential students. The School presents itself as a unit at all external publicity activities (Utrecht University Master's information days, Master's fair etc.). Posters for all Master's programmes are available in a uniform format for use at information events, as are brochures for all Master's programmes to inform all potential students. The GSLS uniform websites for all Master's programmes are updated continuously.

Current students

Every academic year, a digital study guide is offered to the students of all Master's programmes. In addition, some programmes offer current information through their personal websites. Information activities and communications for enrolled students are located primarily at the programme level and are informal in nature. The Programme Coordinators play an essential role in this respect.

Direct GSLS stakeholders

Master's Programme Coordinators are informed through regular meetings (every two months) about the activities of the GSLS. These include the coordination of student guidance matters. Evaluations are conducted to establish any areas of dissatisfaction and to analyse the causes. A plenary GSLS meeting for all teaching staff involved is organised at the beginning of each academic year. In addition, the GSLS organises a bi-annual educational seminar for all staff members. During this day, the staff can participate in workshops, community building and exchange good practices.

4.4 The Process of Applications, Admissions and Enrolment

A range of students join the GSLS Master's programmes: students from our 'own' Bachelor's degrees in Biology, Biomedical Sciences, Chemistry, Pharmacy, Psychology, Liberal Arts and Science (students from the University College). In addition, Dutch students from other universities or applied sciences (HBO), and students from abroad with a relevant BSc join the GSLS. The procedure of applications and admissions aims for students enrolling a suitable Master's programme, which they are able to finish successfully.

The application and admission procedures are components in the overall process of recruiting, selecting, and admitting students that are prone to a successful graduation.

The process of application, admissions and enrolment is complex, involving many people whose roles are highly dependent upon one another. Good communication is key in the process to get excellent students joining a suitable Master's programme. Utrecht University recently updated the admissions process with an online application system. The Board of Admissions (BoA) safeguards the whole process in line with the regulations as stated in the Education and Examinations Regulations (EER). Deadlines and different stages of the process are indicated on the information website for potential students and the individual websites of the different Master's programmes.

4.4.1 Task Distribution in the Admissions Procedure

The BoA has delegated the task of the content assessment of students to the Programme Committees. The Master's Coordinators play a central role in assessment in their capacity as Programme Committee Secretaries. Student Affairs (SA) sends Programme Coordinators the appropriate files of the students who have applied and they make records of the assessments for the Programme Committees. The final assessment is passed on to the Secretary of the BoA for a final decision. Subsequently, the SA finalises the administrative processing.

4.5 The Organisation of the Educational Learning Process and Didactics

4.5.1 A Didactic Approach to Training Researchers

All the GSLS master's programmes are research Master's they differ from other Master's by the emphasis placed on conducting research independently. This is shown, for example, by the fact that in most programmes, 85% of the 120 EC points are earmarked for conducting research in two Research Projects and for writing a literature review or research proposal (see Figure 2). The Master's programmes prepare students for PhD positions at the GSLS or elsewhere. Currently, approximately 75% of the Master's students move on to a PhD.

4.5.2 Education at a Research University

Utrecht University is a leading research university, and this emerges from its high position on a range of international rankings and the presence of renowned research groups and researchers. The university recognises that it has a dual mission: good research and good teaching. To that end, it has, among other things, entered into alliances with other European research universities under the auspices of LERU, the League of European Research Universities.

The presence of top research is an important pre-condition to ensure that the curriculum provides adequate training for the following generation of researchers. A direct link between teaching and research is also important here so that students can make the most of the presence of highly-qualified researchers in the immediate vicinity.

4.5.3 Didactic Approach for Non-PhD Graduates

Apart from students envisioning an academic career, the School also welcomes graduates who wish a career in industry (particularly the pharmaceutical industry) or with a government institution in the field of health care. These students must be equally capable of assimilating the essence of academic research so that, during their subsequent careers, they can act as mediators between the academic, policy and applied fields. Graduates with an academic qualification are expected to have acquired a feeling for what academic research actually involves.

Life Sciences students can opt for one of the two profiles that are not geared towards a Life Sciences PhD (Management, and Communications & Education) or choose the master Science and Business Management. Students studying these profiles must also acquire research experience in the Life Sciences to justify a Master's diploma. The curriculum for this group is therefore not substantially different. All Life Sciences programmes emphasise an awareness of, and affinity with policy and social issues.

4.5.4 The Research Cycle as the Basic Structure

The consensus at Life Sciences is that the development of students as part of the two-year Master's should be primarily structured by the research cycle. The elements of the research cycle are specified in section 3.2.2 (page 18).

All the elements of the research cycle are covered in a structured way during the Research Projects. This has implications for the design and detailing of these Research Projects. Time reserved specifically for reflection and feedback about the current phase of the student's cycle. The evaluation covers not only substantive progress, but also process-related information and study progress. This is because the successful completion of the research cycle depends on the development of attitudes and personal assets such as ambition, autonomy, determination and creativity, communication about progress, results and solutions to problems.

4.5.5 Core Courses and Electives

Most Master's programmes set aside 10 weeks for theoretical courses that are earmarked for the core courses that supply programme-specific knowledge. Some programmes start with an essentials course, to provide students with the basic knowledge required for their field of research. Most courses focus on knowledge development and not on the techniques required for research purposes (laboratory techniques and data-analysis techniques, for example). These skills are generally developed in the students' Research Projects.

Eight additional weeks can be used for personal study requirements. Needless to say, students' opportunities to make decisions of their own will be limited when there are deficiencies to be made up. If no further knowledge is required, students can also use these 8 weeks to extend a Research Project, or to complete an additional mini-project.

4.5.6 Interdisciplinarity

The Master's programmes at the School provide specialist training within a research field in the Life Sciences. The Life Sciences seminars introduce the students to the specialist subject matter of the other Master's programmes. Innovations often result from combinations where disciplines interact; contacts and exchanges are therefore highly important in substantive terms. In plenary Life Sciences meetings issues are discussed as a theme to an increasing extent in a way that students will acquire a better understanding of the wider research field in which they are operating, the social context in which they are engaged, and of other questions and techniques that may be valuable for their own domain. Also the GSLS offers a more interdisciplinary approach through the profiles Bioinformatics, Complex systems or Applied Data Science. Currently the development of a new interdisciplinary GSLS wide elective course is taken up by EGELS.

4.5.7 Accountability

Life Sciences research not only involves fundamental scientific issues, it also interacts directly or indirectly with society as a whole. How questions relating to health, illness, life and death are formulated and answered is also of interest to patients, the public and politicians. In most programmes, special attention is paid to the communication of research findings, both in writing and in oral presentation for a broader public. The ethical side, (e.g. fraud, scientific integrity, ethics) is also covered during the Introduction week of Life Sciences.

4.6 Academic Counselling and Monitoring

4.6.1 Goal, Vision and Study Counselling

The Utrecht University and GSLS provide a study counselling system that is appropriate for the goals of the curriculum. The Master's programmes are entirely geared towards learning to independently conduct high-quality scientific research in 'the forefront of science'. Curriculum topics and teaching methods have been selected to challenge students to develop their autonomy as up-and-coming scientific researchers, in parallel with their professional and methodological development. The programmes include a considerable degree of flexibility and are based directly on the realities of research as much as possible.

The dominant philosophy in the GSLS is that students are considered as trainee academics who, in principle, wish to continue in a PhD programme. Students are stimulated to become autonomous, confident and reflective researchers, who are aware of their own strengths and weaknesses.

The emphasis in training is on supervision by the research staff at the departments and institutes as this is the location for scientific training in conjunction with training as an 'academic' and specialist in a specific domain of expertise. Here, common problems relating to the substance of assignments, collaboration within the team, the problems generated by the research etc. are discussed and resolved in consultations between the supervisor and the student. In addition, Programme Coordinators are a valuable link between the programme and the research in practice. Coordinators may also refer students with problems to academic counsellors for further support. For instance, students experiencing technical problems relating to enrolment or personal problems such as motivation, study selection problems, identity problems, conflicts etc., can refer students to specialist advisors at the School such as the Student Service Centre, the Academic Counsellors and psychologists, or the Career Services. In general, the curriculum includes three processes in which counselling plays a role, each of which has a specific objective:

1. Study selection process: ensuring that the right student ends up in the right place.
2. Personal development process: supporting the well-being of individual students to encourage study progress.
3. Learning process: providing tools for the optimisation of the learning process.

4.6.1.1 Study Selection Process

From a student perspective it is important to be able to follow their interests as much as possible and to maximise their development in becoming a researcher. Students who feel at home in a programme are more likely to be intrinsically motivated, more likely to complete the programme within a reasonable amount of time and to deliver good work. Motivated students are assets for research groups and other institutes, and they also make up a pool of potential PhD candidates. Students are informed about content of the Master's Programme via e-mails and in personal interviews with the Programme Coordinator as well as the Utrecht University website for potential students, brochures and information activities.

4.6.1.2 Personal Development Process

Students can have problems (personal or otherwise) that interfere with study progress. Examples are problems relating to disability, psychological problems and other problems of a personal nature. The first person to whom these students should turn is generally the Academic Counsellor. Particularly because Academic Counsellors have a confidential position, students see them as 'safe' people with whom to discuss what are often sensitive matters. Personal

counselling should be geared to providing students with the tools that they need to tackle the problems themselves. Academic Counsellors must be able to talk to the Board of Examiners in confidence when there are study problems related to a student's personal circumstances. In some cases, the Academic Counsellor will refer students to the Student Service. There are a range of university arrangements that cover, for example, studying with a disability, financial problems and psychological counselling. Experts and contact persons in this area are the study counsellors and psychologists of the Student Service Centre.

The GSLS has two experienced and committed Academic Counsellors who meet frequently and seek to coordinate their work. Utrecht University supports the professional development of Academic Counsellors and provides regular relevant courses.

In addition to the Academic Counsellors, a GSLS complaints coordinator at the professorship level is available to whom students can turn if, despite all the other counselling arrangements, they are dissatisfied.

4.6.1.3 Learning Process

Applications for Research Projects and Writing Assignments are accompanied by a contract that includes agreements between the students and the supervisors and UU examiners about counselling. Both agreements include evaluation interviews that focus explicitly on the learning process. The assessment criteria are listed in Rubrics and used for interim as well as final assessments.

There is a Research Project manual for students and supervisors. Generally, PhD students supervise Master's students during Research Projects. They are given the opportunity to follow the 'Effective student counselling' course. Counselling skills play a prominent role in BKO and SKO arrangements for permanent staff. A course in interview skills is given to these counsellors required to conduct mandatory evaluation interviews.

4.7 Internal and external quality control

One of the main tasks of the GSLS is quality control and quality monitoring of all its Master's programmes. At Life Sciences, the BoS has the ultimate responsibility for quality. Regarding external quality requirements, Life Sciences focuses on the accreditation framework for Master's degrees established by the NVAO. In addition, the BoS ensures that the School's curriculum complies with the internal quality requirements based on the educational vision formulated at the School level. Therefore, the School evaluates the programmes and provides the programme management with information about programme performance, the results achieved by students in those programmes, and the effectiveness of certain teaching methods etc. The results are used to analyse problems and make improvements, supported by the School.

Quality control (see also Quality control plan 2017) at the School can be considered to be adequate if it results in the School working as a 'learning organisation', where a deficiency in quality (problems relating to compliance with given internal or external requirements) are reported, analysed and resolved in good time using the *Plan-Do-Check-Act* cycle:

1. **Plan:** formulating goals and measures
2. **Do:** implementation of the measures
3. **Check:** monitoring the results (measurement and evaluation)
4. **Act:** where needed, new action / other measures

This is primarily a matter of initiating and maintaining the momentum of a process of on-going improvement based on the efforts of all parties engaged in the curriculum: Programme Coordinators, teaching staff, Educational Committee, Board of Examiners and the staff of educational and Student Affairs. The involvement of students is indispensable here.

Quality control at the School is not an autonomous system; it is part of an overarching quality control system that covers several levels:

TABLE 2. THE QUALITY CONTROL SYSTEM OF THE GSLS IS DIVIDED IN FOUR LEVELS.

Level	Activities
1 Utrecht University	Provides the general framework, the Bachelor and Master structure, the regulatory frameworks such as the Education and Examinations Regulations (EER), the administrative structure, representative arrangements, etc.
2 Faculties: Science, Medicine & Veterinary Medicine	General resource allocation, the allocation of authority, the allocation of tasks, the logistical infrastructure, support, the human resources policy, ITC, etc.
3 Graduate School of Life Sciences	Develops programmes that meet all internal and external quality requirements, creates the conditions required for that purpose at the School level. Monitors targets, subject matter, curriculum arrangements etc. to ensure that they comply with the agreed criteria and standards.
4 Programme	Delivers the curriculum resulting in the achievement of the learning objectives for each programme and in the general objectives. Ensures that the programme components (courses, research projects, etc.) comply with the stated requirements.

The cycle of improvement is completed at each of the levels referred to in Table 2. The different cycles are also interlinked. In other words the conditions are created at the higher level to ensure improvements in quality at the adjacent level.

4.8 Labour Market Orientation

4.8.1 Alumni policy

A survey amongst alumni has not been structurally held in the past years. The GSLS has organized an (alumni) reunion in March 2017, and subsequently send out an alumni-survey. From now on, the survey will be send out every year. The responses to the alumni-survey showed that alumni are very positive about their Master's programme's. Graduates of the GSLS quickly find a job. Directly after graduation, 42% has found a job, which increases up to 79% after six months, and to 87% within a year. The majority of the respondents (59%) currently works in universities or academic hospitals, 17% in research institutes, 17% in a commercial organisation/industry, and 3% in a governmental organisation (e.g. secondary school). Other surveys of comparable graduates

show that graduates start to move on to other positions than research after approximately three years. These include consultancy, policy, civil service, management, communications, ICT, PR and scientific journalism.

Employer satisfaction with graduates seems to be primarily related to the ability of past graduates to take on several tasks in a team, whether or not as a researcher, coordinator, or policy consultant, or manager.

The alumni indicate in the survey of 2017 that the theoretical knowledge, practical skills, and academic skills they obtained during their Master's programme prepared them well for their (first) position. General competences that are considered in previous surveys to be very important are precision, stamina, the ability to work well in a team, the ability to work on a project basis, good computer skills, sound presentation skills, and sound presentation skills in Dutch and English.

The School extrapolates these findings to its own programmes. This means that students have to work in depth and that they are given the opportunity during their programme, by choosing electives in the communication or business and management field.

4.8.2 Preparation for the Labour Market

4.8.2.1 Navigation Towards Personal Excellence

Structural guidance of the students towards the labour market and the input from alumni and future employers can still be improved. To this end, all GSLS Master's programmes have implemented Navigation Towards Personal Excellence (NPTE) since September 2016. This project aims to better prepare students for their career. NPTE consists of a series of three workshops, offering the students the insight in different paths or choices they have within their Master's programme. The first workshop, entitled 'study crafting', is scheduled at the start the Masters' programme and stimulates student realisation of the choices they make, help them to match their ideas for the future to current activities, and helps them to get insight into the skills they need to develop.

The second workshop, entitled 'Envisioning your future' is scheduled half way during students Masters' education. In this workshop students are stimulated to think about (career) choices to be made in their final year, for instance considering an internships abroad. Besides that, awareness is created about the skills students already gained and skills that need to be developed. The final workshop, 'Off you go', stimulates students to think about their future career, by hearing stories of GSLS alumni as inspiration. It provides them with practical information about job applications etc. A series of interviews with potential employers form the core of the last workshop at the end of their second year.

4.8.2.2 Introducing Life Sciences

During the first general introductory course for all Master's students or the GSLS, student can go on three speed dates with alumni of all Master's programmes of the GSLS. Alumni that work in either the academic or industrial field are represented here. Students are provided with hints for what competences employers seek.

4.8.2.3 Career Planning and Professionalization

Students still doubting about career decisions can also follow an elective course focused on Career Planning and Professionalization (4.5.6). This course offers an individual approach and intensive

feedback so that students can establish a picture of what they themselves want and can do, and so that they can put a study/career action plan into practice. Career Services of Utrecht University offers a series of additional general courses such as Curriculum Vitae writing and preparing for job interviews.

4.9 Future Plans

Further development of selection criteria and improve study success

The GSLS aims to further develop coherent, transparent and evidence based admissions and selection criteria. For this purpose, a PhD project was developed for a period 2017-2021 with the aim to determine selection criteria that best predict study success in Life Sciences. The BoA will then proceed to translate the research outcomes into adjusted policy for admissions in the GSLS.

Curriculum-Employment Market Advisory Council

In the near future, a Curriculum-Employment Market Advisory Council will be established to allow future employers and Programme Coordinators to discuss the match between the curriculum and employment requirements. New developments in the profession, openings for R&D internships in companies, the competences that employees that graduates need to establish further, will issue recommendations every two years.

Surveys for Adaptation to the Labour Market

As mentioned in 4.8.1 there will be regular surveys of the subsequent careers of Life Sciences graduates and their employers, focusing particularly on the graduates' careers and the competences that they have acquired or perceive to be lacking. The surveys will identify the sectors, fields or professions where graduates are employed after completing their education (MSc, PhD). They will look at graduate and employee satisfaction with the match between training and employment, determining possible knowledge and competence deficiencies. The possible consequences for Master's and PhD education will be raised by the DB-BoS in the Advisory Council referred to here, in the EC and in the various programme committees.

Interdisciplinarity and Diversity

The GSLS aims for a diverse academic community with involved students, employees and alumni. For this purpose events for both MSc, PhD and employees will take place for the whole GSLS community.

As mentioned in 4.5.6 a new electives course focused on interdisciplinary education is being developed. This course encourages participants to appreciate the knowledge and line of reasoning of other disciplines, which broadens skills and knowledge of the students.

Future Strategic Plan

In the near future, the GSLS aims to develop a strategic plan to set up our main strategic goals that we would like to achieve in 5 years of time. For this, we will use the plan of the UU (Strategic Plan 2016-2020) as a template.



Quality control plan

Integrated quality assurance plan for the Master's programmes of the Graduate School of Life Sciences, Utrecht University

Editing: S. Goubitz, PhD



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Summary

We are pleased to present the quality control plan for the Master's programmes of the Graduate School of Life Sciences (GSLS). This plan breaks down into two parts. The first part starts with the reasons for developing our own quality control plan, and continues with a definition of quality factors. How these factors are then included in a cyclical process of quality control in combination with the responsible actors is set out in the *plan-do-check-act (PDCA)* cycles. The second part covers the practical implementation, by taking a detailed look at the different forms of evaluation (course evaluation, programme evaluation, research project, traineeship/internship), the annual reports, and the process of supplying feedback to the Board of Studies of the GSLS.

Part I: Background, definitions and quality assurance as a cyclical process

Section 1 describes why we, as a Graduate School, have established a quality assurance plan. It explains a number of matters, such as the institution-wide accreditation, the administrative hierarchy under which the Graduate School operates, and the benefits generated by an overarching quality control system. The central underlying principle is the adoption of a sound definition of quality education. This is not a definition in a literal sense, but a list of factors that should be an integral part of the education delivered by the Graduate School. These factors can be measured in evaluations or by collating administrative data. The list includes guidelines of the Executive Board as well as the assessment framework of the QANU. The relevant actors (the people responsible as well as the people who are involved in actual implementation) are listed for each factor.

Section 2 lists the quality factors referred to in the section above. The results are visible in annual reports, principally with the aim of facilitating self-study at the curricular level and providing the Board of Studies with the required curricular information about all programmes.

Section 3 addresses the cyclical nature of quality control. All phases of a quality cycle are represented in schedules. Accompanying each phase, there is an actor with operational responsibility, as well as an indication of time planning. These phases have been elaborated for the main quality factors and they are shown in table 1. To provide the actors with a clear picture, we have added a table, table 2, which summarises the tasks for each actor. To provide the actors with a clear picture, we have added a table that summarizes the tasks for each actor (table 2).

Part II: The quality assurance plan in practice

The second part provides practical tools for quality assurance. There are criteria for each type of evaluation (covering courses or programmes) and standard, school-wide, evaluation forms are used. In addition, other formats are available for students and the Board of Examiners with applications for research projects, writing assignments and assessments of these areas of the curriculum. The GSLS also supplies formats for the completion of the annual reports by programme directors and the various GSLS committees.

Part I: Background, definitions and quality assurance as a cyclical process

1. Reasons for a quality assurance plan

1.1 Introduction

This section explains why a specific quality assurance plan was developed for the Master's programmes of the Graduate School Life Sciences (GSLS).

The quality assurance plan follows the guidelines supplied by the Executive Board of Utrecht University (CvB). In short, the CvB wants a system that complies with the following minimum requirements:

- The quality control system is cyclical in nature, which includes all phases of the quality cycle.
- It requires periodical and systematic academic evaluations.
- It requires evaluations of courses and the curriculum as a whole.
- It guarantees that students, teachers, graduates, and future employers are involved in the evaluations of the curriculum.
- It provides all those involved with access to the evaluations.

The above CvB guidelines follow the accreditation system at the institution level. In this system, each institution is required to demonstrate that it has control over the quality of the training it provides. The accreditation system mainly consists of an audit every six years (at the institutional level organised by the Dutch-Flemish Accreditation Organisation (NVAO)). If the institutional audit leads to a positive result, a limited study programme evaluation will be conducted by a panel of independent experts. They will focus on improving substantive quality. However, if the audit on institutional level is negative, there will be a full study programme assessment.

Why is there a quality control system at the Graduate School level?

There are various reasons for this and the most important reasons are summarized below.

- a) The quality control system of the GSLS is a response to the instructions and guidelines of the CvB as quoted above.
- b) The School has an administrative responsibility that is linked to a). This means that the deans of the faculties of Science, Medicine (UMCU) and Veterinary Medicine (the Utrecht Life Sciences co-deans) constitute the Board of Studies and are formally responsible for all education in the GSLS, including quality control in the broad sense. The Executive Board of Studies (DB-BoS) runs the daily affairs of the GSLS and advises the Board of Studies (BoS) the quality of master- and PhD-programmes. The DB-BoS also maintains contact with the committees and programme directors. The DB-BoS is headed by a Chair, who is a professor in one of the Life Sciences areas at Utrecht University or UMC Utrecht. The DB-BoS further consists of two Vice Chairs: the Degree directors of Biomedical Sciences and of Biosciences. They are mandated to decide about all academic matters for Master's programmes in their domain within the framework of the GSLS regulations. Members of the DB-BoS also include three directors of the research master and/or PhD programmes of the GSLS, a student member (the Chair of the Life Sciences Representatives), the Chair of the PhD council, and the administrative secretary of the GSLS. Other members may be appointed based on their specific qualities/interests. The Life Sciences deans appoint members of the DB-BoS for the term of six years. The Degree directors are supported by Degree coordinators, who also have an advisory function in the DB-BoS meetings. The Degree coordinators form a management team, together with the educational policy advisors and other support staff.

- c) It facilitates a number of mandatory activities, such as educational “inspections” (i.e. audits) for accreditation purposes. The DB-BoS of the GSLS is responsible for the coordination of annual reports.
- d) It facilitates a number of good practices: i.e. the dissemination of best practices in the field of education, Academic Community activities, coordination of international recruitment, internships, admissions, the involvement of students, future employers, etc.
- e) Finally, and most importantly the GSLS believes that its primary task is to provide and to safeguard high-quality education. Both elements are embedded in the quality control system. Demonstrating high academic quality requires the support and cooperation of all those involved in the GSLS. Well-defined tasks are established by well-defined bodies so that responsibilities are clear to all.

1.2 Vision on academic quality: a definition

The heart of a quality control system is the definition of what determines academic quality, how this can be legitimately tested and by whom, as well as the description of the cyclical follow-up for the observed quality. The next section, section 3, provides an overview of all academic factors that as a whole determine academic quality. We have broken down these factors into two sub-sections: on the one hand, factors specifically associated with the curriculum or programmes and, on the other hand, factors that cover all the curricula and are embedded/are being embedded in the GSLS. All factors are measurable, usually by applying the classic evaluation approaches. The list below is based on the NVAO accreditation arrangements and the guidelines of the Executive Board of Utrecht University (CvB).

1.3 Quality of the course and the component programmes

1.3.1 Learning Outcomes¹ and admission criteria

The GSLS comprises Master's degrees and programmes. Each degree must meet accreditation requirements. Each degree is responsible for making satisfactory arrangements in the following areas:

- the definition of the learning outcomes for the degree and the associated programme, the statement of the learning outcomes in the programme curriculum or components thereof, i.e. the theoretical courses, research project, writing assignment, seminars and profiles (e.g. research, management, communication), and the approach to assessing how these learning outcomes are achieved. The GSLS will provide standardised GSLS-wide learning outcomes as a framework for the programme specific learning outcomes. The GSLS will also provide the assessment formats for the programme-specific learning outcomes, working formats and assessment methods for each programme component. These assessment plans are approved by the Board of Examiners (through the assessment panel), for each master's programme, ensuring that each programmes fulfils the learning outcome standards as set by the GSLS. The degree directors monitor the implementation for their own degrees.

¹ From the Glossary of the Diploma Supplement: Learning Outcomes: the specific intellectual and practical skills gained and tested by the successful completion of a unit, course or whole programme of study.

- the criteria for admission to a course and a programme expressed in terms of knowledge, insight and skills. These criteria are set out in detail in the School-wide training plan, self-study and/or internal certification application.

The Graduate School takes steps to ensure that it holds the self-study report and the internal certification application for each degree in its possession. The training plan is, in principle, amended pursuant to inspection visits. However, at the request of the GSLS, the plan can be adjusted if evaluations justify such a step or if new quality standards are introduced. Substantive changes to a programme that result in a programme no longer complying with the internal certification requirements must be submitted to the BoS for approval. The procedure for feedback is described in the PDCA cycle (see section 3.1).

A number of the elements listed above can be found in the Education and Examinations Regulations (EER). The EER is a public document that can be accessed on the GSLS website².

Actors involved:

- (DB)BoS
- Degree director
- Programme director and coordinator
- Board of Examiners
- Educational Committee
- Management team

1.3.2 Periodical evaluations of Master's programmes and their components

The GSLS sets out general criteria that are intended to establish a framework for the quality of academic evaluations. The Educational Committee, working together with the management team, designed an evaluation protocol for the yearly evaluations of the various programme components: the courses, research projects and writing assignments. In addition, exit evaluations and profile evaluations are available to cover programmes or profiles as a whole. The student body Life sciences Representatives (comprised of students from all Master's programmes) conduct informal evaluations during the life seminars, and report directly to the management team and to the EC delegates. These evaluations identify different substantive factors, which are set out in detail in part II. In effect, all evaluations establish insight into the educational standards and the secondary factors of the educational organisation as perceived by students. In addition to students' views, the teaching staff, educational committee and outside parties are also involved. Section 3 sets out their involvement in the evaluation process for individual programme components, as well as the programme as a whole.

Actors involved:

- (DB)BoS
- Educational Committee
- Management team
- Programme directors and coordinators
- Teaching staff
- Life Sciences Representatives
- Student administrations/expertise centre UMCU

² www.uu.nl/graduateschools/lifesciences

1.3.3 Assessment and examination

The Board of Examiners (BoE) safeguards the quality of assessments and examinations. It monitors the quality (and the standard) of the appraisal and assessment of all components of a programme in line with the EER and the Rules and regulations that are composed by BoE. The BoE informs the DB-BoS when needed and provides the BoS with annual reports about its activities. The "Act on Higher Education" (WHW) places great emphasis on the responsibility of the BoE for the examinations process and the quality of that process. The BoE has appointed an Assessment Panel (AP) for that purpose. The task of this AP is to: monitor the quality of assessment and the assessment procedures, as well as to act as a think-tank and an advisory body with respect to the quality of examinations and the professionalization of examiners. To support the BoE and the AP of several Graduate schools, an Assessment Advisory Committee of the Science Faculty draws up guidelines and instruments for general use. A test expert and a member of the Life Sciences Board of Examiners contributes to the Assessment Advisory Committee and is chairs of the AP. In this way, optimal exchange of knowledge between the bodies is stimulated. Details of the GSLS assessment policy are laid out in the GSLS Assessment policy document . The learning outcomes per programme, learning goals of each study component, the teaching methods, as well as assessment methods and their cross links are laid out in an Assessment plan document per Master's programme.

Actors involved:

- Board of Examiners
- Assessment Panel
- Science/Life Sciences Assessment Advisory Committee

1.3.4 Management information

Management information includes key figures that provide direction for policy decisions. This section will be limited to information that can be taken directly from OSIRIS, and which is important for the Student administrations of both the Faculty of Science and UMCU. This information will be included in the annual educational reports for the Master's programmes. The information covers individual Master's programmes and individual academic years. It includes figures for students entering individual Master's programmes, and/or for each CROHO label, where new students come from (own BSc students, UU BSc students, UCU, HBO, Dutch BSc students, international students from both EU and elsewhere), average study duration, examination success rates, yields, etc. The Student administrations duties are executive in nature and they are determined in accordance with instructions from the GSLS.

Actors involved:

- (DB)BoS
- Management team
- Student administrations

1.3.5 Staff

The educational institutions of the faculties, under accountability of the dean, are responsible for the staffing of programmes, courses and the teaching workload. The degree directors are responsible for the academic standard of the staff in their programmes. Teaching staff involved in a research Master's should preferably have an active research background and have completed a doctorate degree. Teaching staff responsible for designing courses should have at least a basic teaching qualification (BKO certificate) or be engaged in the application procedure for BKO. A general impression of the quality of the teaching staff is given by student evaluations, and

the results of agreed and implemented quality improvement actions at the course level, the number of BKO/SKO certificates, CEUT courses, the structuring of a course in accordance with the objectives of the programme, etc.

Actors involved:

- Degree director
- Programme directors
- Educational Committee

1.3.6 Admission and continuation

1.3.6.1 Student standard

The standard of the students entering the School is safeguarded by the work of the School's Board of Admissions (BoA). The BoA knows the admissions criteria and the contents of each programme and can, on the basis of the application files and the recommendations it obtains from the programme coordinators, decide whether the student has enough prior knowledge to complete the study successfully within the nominal period of time. During and at the end of the study, the BoE determines whether a student has the knowledge, understanding and skills that are required for the Master of Science degree, in an expert and objective way. Furthermore, students are prepared for the job market after graduation with a series of workshops on career orientation meetings (Navigation towards personal excellence). Career officers are available for individual questions and support students in improving the quality of their curriculum vitae and job interview skills. The programme directors and coordinators play an important role in monitoring study progress and individual planning.

Actors involved:

- Board of Admissions
- Board of Examiners
- Programme directors and coordinators
- Career officers

1.3.6.2 Target yield

The School defines target yields for all its programmes that should be feasible for all students admitted. The goal is that 80% of students who are eligible for the programme should graduate within 2.5 years. The School expects that each student has had at least one discussion at the programme level with their programme director and/or coordinator about the student's individual study programme. Furthermore, there should be at least two evaluation moments during each research project with the examiner of that component. The EC monitors the feasibility of the scheduling of the programmes

Actors involved:

- (DB)BoS
- Educational Committee
- Programme director, coordinator
- Teaching staff

1.3.7 Facilities

1.3.7.1 Practical facilities

The GSLS requires facilities that are adequate for the implementation of the curriculum, such as: timetables, course enrolment, well equipped rooms (chairs, tables, beamers, projection screens, etc.), ICT facilities, lab facilities, and enough workplaces for students in the research phase. The quality of these facilities is assessed in course and programme evaluations.

Actors involved:

- Dean/faculty director
- Student administrations
- Programme director, coordinator
- Educational committee
- Teaching staff

1.3.7.2 Supervision of student monitoring

The GSLS provides a study supervision system that is appropriate for the goals of the curriculum. In the Master's programme, the curriculum is based on independent learning and conducting high-quality scientific research. First-line academic counselling is supplied by the research staff of the UU/UMCU. Second-line support is given by the programme coordinator in terms of the substance and planning of the Master's programme as a whole. Third-line counselling comes from the academic counsellor, who provides help with problems that cross programme boundaries and problems of a personal nature. The academic counsellor can, if necessary, also refer people to specialist advisers at the UU. The goal of supervision is to allow students optimally use the opportunities afforded by the curriculum and also to give them the opportunity to complete their studies as efficiently as possible. This means that the management team provides resources such as internship and writing assignment handbooks for both students and teaching staff/supervisors.

Actors involved:

- Teaching staff
- Programme coordinator
- Academic counsellors
- Management team

1.3.7.3 Rules and regulations

Rules and regulations introduce clarity into the complex educational process. The Education and Examinations Regulations (EER) are revised annually by policy officers and recommendations are made by the programme coordinators and BoE. The EC has formal right of approval on some parts of the EER and formulates also formal recommendations for the DB-BoS and Faculty councils. The EER is ultimately adopted by each of the Utrecht Life Sciences deans. The Rules and Regulations of the BoE and BoA are revised by those boards.

The EER and the Rules and Guidelines are posted on the GSLS website and study guide. The Student Statutes can be found on the site of the Student Service.

Actors involved:

- Management team
- Board of Examiners
- Educational Committee
- Faculty Council
- DB-BoS
- Dean

1.3.7.4 Complaints

Where rules, guidelines and individual discussions between the students and the parties involved prove inadequate, the complaints procedure is available. Students can submit their problems first to the academic counsellor and /or the BoE. The Life Sciences Representatives form an informal student body for student complaints with delegates in the DB-BoS and EC. If no solution is reached, there are two general complaints coordinators to whom students can turn. Finally, students can also submit complaints to the Examination Appeals Board (UU CVBE).

Actors involved:

- Academic counsellor
- Board of Examiners
- GSLS complaints coordinators
- Life Sciences Representatives
- UU CVBE

1.4 General quality elements

Although the sections below go beyond the areas that the Executive Board (CvB) has asked to be included in a quality plan, we believe that all these subjects provide an additional impulse to the quality of the education in their own way and that is why we have included them here.

1.4.1 Vision and strategy

The following actors all play a role in the educational process: the (DB)BoS, the BoA, the Educational council, the BoE, the programme directors and coordinators, the teaching staff, students, student associations, alumni and future employers. Their tasks are set out in section 3 of this document. Vision, strategy, collaboration and clear regulations are important in terms of arriving at an optimal result. The GSLS educational plan from 2011 is entitled: "Research-Intensive Education, a shared educational basis for the Master's programmes of Utrecht University, Graduate School of Life Sciences" describes the mission of the School, the administrative structure and the educational philosophy (page 3 Training plan). This plan is the basis for a GSLS Strategic plan, which will be updated every 4 years for both MSc and PhD education from 2017 onwards.

Actors involved:

- (DB)BoS
- Degree director
- Project group (see 1.4.2)
- Management team

1.4.2 Education innovation

The GSLS is continuously improving the quality of education, adapting to current legislation and incorporating requests from Utrecht University, students and society. The Project Group: Expertise

Group Education in Life Sciences (EGELS³) makes an overview of the most important topics for education innovation annually and prioritizes these for the DB-BoS. These topics cover broad themes such as the educational strategy, assessment quality, career orientation, interdisciplinary, and so on. The EGELS tackle one or more topics each year upon approval of the DB-BoS. Through educational support from Utrecht University (EMP) the group receives additional reinforcement by an educational advisor. Depending on the topic, the EGELS also include other experts from the GSLS staff and consult the students when needed. Implementation of the innovation plans is supported by the GSLS management team.

Actors involved:

- (DB)BoS
- Degree directors
- Project group EGELS (PG)
- Management team

1.4.3 Internationalisation

Internationalisation is important. It results in the enrichment of the knowledge of our own students and in the establishment of an international network of students and researchers. It keeps programme directors alert in terms of appraising the content of the programme on the basis of international standards.

The GSLS ensures that:

- all Master's programmes are structured as international Master's in English and are thematically linked to recent international developments.
- the research environments associated with the GSLS appeal to leading researchers.

The GSLS aims to recruit 20% foreign students with suitable prior training.

The GSLS encourages internationalisation through exchange programmes, the organisation of summer schools, supporting its own students who want to go abroad, national and international promotional activities and the establishment of joint degree programmes. Involvement in funding for educational projects might enhance/stimulate international recruitment. The GSLS also offers a buddy programme for international students coordinated by the Life Sciences Representatives of GSLS.

Actors involved:

- (DB)BoS
- Management team
- Internationalisation officers
- Life Sciences Representatives

1.4.4 Academic Community

The GSLS is an organisation that is in the full process of development, with a clear task for the educational organisation. It extends beyond the boundaries of the familiar classic organisations. It is the wish of the deans to work on the establishment of an "academic community" for students and employees involved in Master's education. Every year, there is a plenary session in which the

3 The EGELS project group consists of two programme coordinators and the degree coordinators, (one from the Science faculty and one from the UMC Utrecht), and an educational expert. For each project other members are added depending on the expertise needed.

most important School-wide issues are examined with all members of staff. Furthermore, a bi-annual Life Sciences teaching event is organised to which all active teachers and research staff of the GSLS are invited. This event includes several professionalization workshops. A workshop Teaching life sciences is offered to all staff twice a year, in order to share knowledge on the GSLS organisation and regulations.

Duration one week, students participate in an introduction course covering all aspects; from administrative issue to scientific integrity and valorisation. The GSLS study guide offers an overview of all educational regulation and components in the GSLS. Over a period of two years student are required to attend ten Life Sciences seminars as a part of their programme. These seminars are organised on a rotating basis by different Master's programmes, which invite reputed speakers to talk about current issues. The master's students' involvement through the student initiative Life Sciences Representatives (LSR) adds an important level to the GSLS wide community feeling. Students of all programmes are represented and members of the LSR are in part members of the EC and provide also the MSc student representative of the DB-BoS. The Master's programmes and the research groups where student spent many months in their individual projects, shape communities on other level.

Actors involved:

- DB-BoS
- Management team
- Project group EGELS
- Programme coordinators
- Life Sciences Representatives

2. Annual Reports

Academic performance is summarised in annual reports. They provide the DB-BoS with the required academic information and provide the courses with the information they need for re-accreditation. The following annual reports can be distinguished:

- the programme annual reports;
- an annual management report;
- an analyses of the National student survey (NSE);
- an annual report from the Board of Examiners;
- an annual report from the Board of Admissions;
- an annual report from the Educational Committee;
- information on PhD programmes.

These reports are sent yearly to all concerned in the GSLS.

3. Implementation of quality control plan

3.1 Introduction

Quality systems in higher education are generally based on the *Plan-Do-Check-Act (PDCA)* cycle of W.E. Deming. This model links up to the way traditional scientific research is conducted.

The iteration process is fundamental to the PDCA cycle. Repetition of the complete evaluation cycle should enhance the achievability of the intended objectives (objectives from the cycle *Plan*) and the associated process (the cycle *Do*).

The GSLS uses the PDCA cycle as follows:

Plan = drafting a plan for the implementation of the process. Establishing standards and objectives

Do = implementing the process

Check = checking the process and recording deviations from the standard.

Act = drawing conclusions and formulating areas for improvement

Section 3.2. provides an elaboration of the Deming cycle (in table 1) for each task (i.e. objective), including the names of the actors and the time when a new task that has not yet been initiated will start and the frequency of the implementation of the tasks. Section 3.3. provides an overview of tasks for each actor extracted from table 1 with the aim of assisting the people responsible for implementation.

3.2 The PDCA cycle in detail

Table 1 lists elements from the quality assurance plan (under the heading “process to be evaluated”) in a PDCA cycle that is part of the area of responsibility of the GSLS.

Abbreviations for actors are listed here:

AC: Academic Counsellor

BoS: Board of Studies, mostly represented by the Daily board (DB-BoS)

BoA: Board of Admissions

BoE: Board of Examiners, including assessment panel

CO: Career officer

CvB: Executive board Utrecht University

DD: Degree Director

EC: Educational Committee

Exp: Expertise Centre UMC Utrecht

IO: International officer

LSR: Life sciences representatives

MT: Management team (degree coordinators, policy advisors and support staff)

PD: Programme director

PC: Programme coordinator

PG: Project Group EGELS

SA: Student Administration

Teacher: teaching staff, also in function as course coordinator or project examiner

VBI: Inspection and Assessment Agencies (such as QANU)

TABLE 1: THE PDCA CYCLE PER PROCESS AND ACTORS INVOLVED

Level	Process to be evaluated	PDCA cycle	Details of process	Actor who does what	Time continuous or deadline
Quality control plan	Quality control plan	Plan:	Update quality plan for Master's programmes for the School	MT	Bi -annually
		Do:	Submit plan for approval to various bodies and implement	MT/BoE	Bi-annually
		Check:	Monitor implementation	EC/BoS	Bi-annually
		Act:	Revise plan	MT	Bi-annually
Course	Course evaluation	Plan:	Drafting of a plan with evaluation criteria at course level. Development of questionnaires and establishment of procedures (who does what and when)	EC	Annually
		Do:	-Implementation of course evaluations -Assessment of results and feedback	SA/Exp EC	Continuous
		Check:	Check whether course evaluations are being conducted according to plan.	EC/BoS	Monthly/annually
		Act:	Evaluate and revise processes.	EC /MT	Annually
	Course adjustment	Plan:	Draft improvement plan/ areas for each course and submit to EC	teacher	Maximum of 2 months after course finishes
		Do:	Implement improvements	teacher	Before start of course
		Check:	Check whether improvements are effective. Reporting to BoS	EC/PD	Maximum of one month after course evaluation
		Act:	Submit improvement process to teacher	BoS	Continuous

Level	Process to be evaluated	PDCA cycle	Details of process	Actor who does what	Time continuous or deadline
	Staffing	Plan:	Establish which courses are given by whom	PD/PC	Feb, annually
		Do:	Assign qualified teachers to courses	DD	Annually
		Check:	Evaluate teachers (through course evaluations)	PD/DD	Continuous
		Act:	Arrange interview with teacher(s) if course rating is less than 3 (on a 5 point scale)	DD	Maximum of 2 months after course finishes
Programme	Programme evaluation	Plan:	Drafting of a plan with evaluation criteria at programme level, Development of questionnaires and establishment of procedures (who does what and when)	EC	Annually
		Do:	Conduct programme evaluations (exit, research, writing assignment and profile) with feedback in accordance with plan	SA/Exp	Annually
		Check:	Checking whether programme evaluations have been conducted in accordance with plan. Feedback to BoS.	EC	November annually
		Act:	Where appropriate, formulation of improvements for the process of evaluations and revisions	EC/MT	Annually
	Programme adjustments	Plan	Submit plan with programme changes to BoS	PD	Before 1 April
		Do:	Implement plan and include advisory reports	PD/PC	Before 1 September
		Check:	Check whether changes in programme content have implications for internal certification and the Board of Examiners, Board of Admissions and PR material in respect of admission criteria and learning outcomes	BoS/MT	Before 1 June or 1 December
		Act:	Submit changes to Board of Examiners, Board of Admissions, OC and EER	BoS/MT	ASAP after above dates
		Plan:	Drafting of a plan with evaluation criteria at programme level, Development of questionnaires and establishment of procedures (who does what and when)	EC	Annually
		Do:	Conduct programme evaluations (exit, research, writing assignment and profile) with feedback in accordance with plan	SA/Exp	Annually
		Check:	Checking whether programme evaluations have been conducted in accordance with plan. Feedback to BoS.	EC	November annually
		Act:	Where appropriate, formulation of improvements for the process of evaluations and revisions	EC/MT	Annually

Level	Process to be evaluated	PDCA cycle	Details of process	Actor who does what	Time continuous or deadline
Programme	Internal certification	Plan:	Determine which internal certification procedure is necessary, identify submission deadlines and issue instructions for implementation to PL and department	MT/DD	2 months in advance of certification deadline
		Do:	Write and submit plan to BoS and department boards	MT/PD	In these 2 months
		Check:	Check whether the process is proceeding satisfactorily, and give and obtain advice to/from EC	MT/BoS	In these 2 months
		Act:	Submit plan to O&O	Dean	Before 1 June or 1 December
	Admissions	Plan:	Update regulations for admissions for GSLS	BoA	Annually
		Do:	Implementation of regulations	BoA/SA	Continuous
		Check:	Check whether regulations are adequate	BoS/DD	Annually
		Act:	Amend regulations if required	BoA	Annually
	Admission requirements	Plan:	Update procedure to establish transparent admission requirements for each programme and course in accordance with CvB guidelines	BoA	October, annually
		Do:	Define admission requirements in accordance with set criteria (knowledge/ understanding/skills) (in EER) and enforce them	BoA/PD/PC	January, annually
		Check:	Checking that admission requirements are transparent	BoA/DD	April, annually
		Act:	Make changes to admission requirements if required, publish admission requirements in EER annexes, website, folder material, etc.	BoA/MT	June, annually

Level	Process to be evaluated	PDCA cycle	Details of process	Actor who does what	Time continuous or deadline
Programme	Learning outcomes	Plan:	Set learning outcomes for each programme and component	DD/MT	Annually
		Do:	Update learning outcomes for each programme and component	PD/PC	Annually
		Check:	Check whether learning outcomes are transparent and testable Monitor implementation process	BoE BoS	Annually
		Act:	Post learning outcomes in Diploma Supplement and education catalogue	SA	Annually
	Assessment	Plan:	Revise rules, guidelines and procedures for the appraisal and standardisation of examinations, research projects and writing assignments	BoE	Annually
		Do:	Random checks on examinations and assessments, as well as research projects	BoE	Annually
		Check:	Check whether learning targets can be tested, whether assessment criteria are applied and whether the quality of the examinations is adequate	BoE	Continuous
		Act:	Evaluation of assessment criteria	BoE	Annually
	Involvement of future employers/former graduates	Plan:	Update plan to involve future employers/former graduates in GSLS and the quality of the training, determine action required	MT	Annually
		Do:	Implement updated plan and involve future employers/former graduates in changes to the curriculum	MT/PD	Annually
		Check:	Check involvement of future employers/former graduates	BoS	Annually
		Act:	Implement actions to improve efficiency in involvement	MT	Annually

Level	Process to be evaluated	PDCA cycle	Details of process	Actor who does what	Time continuous or deadline
School	Accreditation	Plan:	Plan inspection visits and self-study	DD/MT	The starting date is the expiry date for the current accreditation less a minimum of two years
		Do:	Organise inspection visits in collaboration with a VBI, write self-study	MT	The starting date is the expiry date for the current accreditation less a minimum of two years
		Check:	Check whether self-study complies with the NVAO requirements	BoS /DD	Expiry date for the current accreditation less a minimum of 18 months
		Act:	Revise self-study plan	MT	Expiry date less a minimum of 18 months
	Annual academic report for Master's programmes	Plan:	Establish format for annual academic report and forward to PL	BoS	October, annually
		Do:	Draft annual academic report and submit to BoS	PD/PC/MT	January, annually
		Check:	Check whether annual academic report complies with minimum requirements	BoS	March, annually
		Act:	Evaluation of discrepancies and feedback to PL	EC/BoS	April, annually
	Annual report from Board of Admissions	Plan:	Establish format for annual report and submit to BoA	BoS	November, annually
		Do:	Complete annual report	BoA	January, annually
		Check:	Check whether information are adequate	BoS	March, annually
		Act:	Make adjustments/ additions if required	BoA/SA	June, annually
	Annual report from Board of Examiners	Plan:	Establish format for annual report and submit to BoE	BoS	November, annually
		Do:	Complete annual report	BoE	January, annually
		Check:	Check whether information is adequate	BoS	March, annually
		Act:	Make adjustments/ additions if required	BoE	June, annually

Level	Process to be evaluated	PDCA cycle	Details of process	Actor who does what	Time continuous or deadline
School	Annual report from Educational Committee	Plan:	Establish format for annual report and submit to EC	BoS	November, annually
		Do:	Complete annual report	EC	January, annually
		Check:	Check whether information is adequate	BoS	March, annually
		Act:	Make adjustments/ additions if required	EC	June, annually
	Organisation of introductory week	Plan:	Plan organisation of introductory week	MT/LSR	Twice annually
		Do:	Organise introductory week	MT	Twice annually
		Check:	Monitor organisation process	MT	Continuous
		Act:	Revise introductory week	MT/LSR	Annually, after end of introductory week
	Academic community	Plan:	Overhaul plan for academic community activities	MT/BoS	Annually
		Do:	Implement plan in different agencies and organise activities	MT/PD/PC	Annually
		Check:	Evaluate satisfaction/ usefulness of activities	BoS	Annually
		Act:	Revise plan	MT	Annually
	Education innovation	Plan:	Update overview educational innovations and prioritize	PG	Annually
		Do:	Draft a plan for specific innovation topics and implement	PG/MT	Annually
		Check:	Monitor plan and quality projects	BoS	Annually
		Act:	Adjust plan when necessary	PG	Annually
	Management information	Plan:	Identify data that school requires	BoS/MT	October annually
		Do:	Supply required information	SA	November annually
		Check:	Check whether information is adequate for policy purposes	BoS	Annually
		Act:	Make adjustments/ additions to management info	MT/SA	Annually

Level	Process to be evaluated	PDCA cycle	Details of process	Actor who does what	Time continuous or deadline
School	Inter-nationalisation	Plan:	Set internationalization targets and protocols	BoS /MT	Annually
		Do:	Implement actions, protocols such as buddy system, going abroad checklist	MT/IO	Annually
		Check:	Check internationalization targets and evaluate protocols	BoS	Annually
		Act:	Revise protocols and set actions for targets	MT/IO	Annually
	Career preparation	Plan:	Update strategy for career preparation	MT/BoS	Annually
		Do:	Implement career preparation courses and events	MT/PC/CO	Annually
		Check:	Check usefulness career events and student satisfaction on this topic	EC/BoS	Annually
		Act:	Revise strategy when needed	MT/CO	Annually
	Student counseling	Plan:	Set guidelines and provisions for student counseling	BoS/MT	Annually
		Do:	Implement student counseling	AC/PC/MT	Annually
		Check:	Evaluate if counseling provisions and quality is sufficient	EC/BoS	Annually
		Act:	Adjust provisions and guidelines when needed	AC/MT	Annually

3.3 Who does what?

Table 2 is based on the actors, with the most important tasks connected to quality control being derived from the PDCA cycle above. In combination with the PDCA cycle from table 1, each actor knows who is involved in the process and at what stage and when components of the process need to be completed.

TABLE 2: PDCA CYCLE QUALITY RELATED TOPICS SORTED BY ACTOR

Actor	Process	Tasks
(Daily) Board of studies	Quality control plan	-Monitor implementation and revision of plan in GSLS
	Course evaluations	-Check on a plan with evaluation criteria and procedures -Ensure that the EC monitors the process -Implement EC recommendations if necessary -Feedback to PD if necessary
	Programme evaluations	-Check on a plan with evaluation criteria and procedures -Ensure that the EC monitors the process -Implement EC recommendations if necessary -Feedback to PD if necessary
	Programme adjustments	-Appraise changes at the school level -Check whether there have been changes in internal certification
	Internal certification	-Check on process of internal certification -Grant approval for application through dean
	Admission criteria	-Issue instructions for the drafting and publication of transparent admission requirements
	Learning outcomes	-Issue instructions for the definition of learning outcomes for each programme and monitor implementation process
	Future employers	-Check on plan for former graduates/future employers
	Accreditation	-Monitor accreditation deadlines -Check whether self-study complies with the NVAO requirements -Monitor the process
	Reports	-Draft formats and monitor annual reports from programmes, Board of Examiners, Board of Admissions -Feedback annual report to committees and/or PD -Collation of reports and submission to dean
Project group EGELS	Education innovation	-Draft innovation plans -Prioritise projects for BoS -Monitor implementation of innovation projects -Revise plans
Degree director	Quality control	Monitor quality control in degrees for which he/she is responsible
	Teaching staff	Allocation of academically qualified teachers for each course in cooperation with departments/divisions in faculties
	Evaluation interviews	Conduct interview with the course coordinator when course evaluations indicate that this is necessary (final rating for course less than 6 on a 10-point scale)
	Accreditation	Plan inspection visits and check on self-study
	Admissions	Monitors quality of admission in degrees for which he/she is responsible

Actor	Process	Tasks
Management team	Quality control plan	-Draft plan -Implementation of plan in own organisation (Science/UMC Utrecht) -Revise plan
	Course evaluations and programme evaluations	-Regulate evaluation protocol i.c.w. SA -Evaluate procedures in collaboration with EC
	Programme adjustments	-Check adjustments on the basis of/include in rules and guidelines (EER) and other communications
	Internal certification	-Check which procedure is necessary, identify submission deadlines and issue instructions for implementation to PL/department -Check whether the process is proceeding satisfactorily, and give and obtain advice to/from EC -Submit application to O&O through dean
	Admission requirements	-Initiate procedure to establish transparent admission requirements for each programme and course, and to monitor the process -Check adjustments on the basis of/include in rules and guidelines (EER, BoA etc.) and other communications.
	Accreditation	-Write and revise self-study
	Introductory weeks	-Plan and monitor the organisation process
Programme director and coordinator	Course and programme evaluations	-Annual records showing which courses have been evaluated -Interviews with teachers if evaluations are weak -Revise programme content if necessary
	Programme adjustments	-Report on plan to BoS -Implement adaptations
	Student support	-support for individual study planning
	Admission	-Enforce admission requirements and protocol
	Learning Outcomes	Definition of learning outcomes that will be assessed in a programme module and/or course. Adapt if necessary
	Future employers	-Maintain links with former graduates/future employers
	Reporting	-Draft annual academic report and send to BoS
Board of Examiners and assessment panel	Exams and Assessment	-Safeguarding the quality of tests and examinations and the assessments: establishing procedures -Determining the quality of exams: learning outcomes of each degree are translated in assessable learning goals and systematically is checked if the learning goals of each programme fit the learning outcomes of the degree. -Determine in an objective and expert way whether a student has the knowledge, insight and skills required to obtain a MSc degree -Establishment of guidelines and instructions (within the context of the EER) for appraising and recording the results of tests and examinations
	Annual reports	Annual report to BoS
Teacher	Courses	-Provide learning goals and assessment matrix for course -Implement improvement plans and report to programme director. -Take courses for BKO/SKO

Actor	Process	Tasks
Board of Admissions	Admissions	-Draft and revise admission regulations -General coordination and final responsibility for admissions
	Admission requirements	-Formulate and revise admission requirements -Check that admission requirements are transparent
	Annual reports	Annual report to BoS
Educational Committee	Course and programme evaluations	- Monitor process evaluations - Check process improvements - Feedback with findings to BoS - Check teacher satisfaction
	Advice and formal approval	-Advise BoS on all quality-related academic issues -Annually monitor the implementation of the EER -Advise BoS about quality control plan -Formal approval right on: Process of evaluations Content study programmes Requirements on knowledge, insight and skills at graduation Study load and study components Design of practical work Selection for honours programmes
	Annual reports	Annual report to BoS
Students/LSR	Buddy system	Coordination buddy system for internationals in the introductory week
	Academic community	-Involvement in quality improvement, e.g. evaluations -Delegates in BoS and EC -Organisation of community events
Student Administration	Course and programme evaluations	Send, collect evaluations and ask for feedback (at UMCU by Expertise centre)
	Diploma Supplement	State learning outcomes in Diploma Supplement
	Management information	Generate overviews of key figures requested by GSLS
Student support team (academic counsellor, career officer, international officer)	Student support	-personal counselling and advice -referral to professional aid -advice on study programme and time management -advice on going abroad -advice on career preparation
Alumni/ Future employers	Advice	Involved in programme

4. Contact details for Graduate School of Life Sciences

DB-BoS

chair, vice chair, vice chair en secretary

Chair

Prof. dr. J. A.G. van Strijp

Vice-chair of Biomedical Sciences

Prof. dr. H.V.M. van Rijen

Vice-chair of Biosciences

Prof. dr. H.A.B. Wosten

Secretary

Dr. S.B. Ebeling
S.Ebeling@uu.nl

Chair of Board of Examiners

Dr. J.A. Post

Chair of Educational Committee

Prof. dr. I. The

Chairman of Board of Admissions

Prof. dr.H.V.M. van Rijen

Curriculum coordinators

Dr. G. Dilaver (Biomedical Sciences)

G.Dilaver@umcutrecht.nl

and

Dr. S. Goubitz (Biosciences)

S.Goubitz@uu.nl

Student administration

Student administration for Biomedical Sciences
HB1.04, Hijmans van den Berghbuilding

Student administration for Biosciences

1.84 Buijs ballot building

Academic counsellors

Pim Visscher

Biosciences
Studieadviseur.gsls-beta@uu.nl

Jaco de Fockert-Koefoed

Biomedical Sciences
adviseurs@umcutrecht.nl

Isolde den Tonkelear

Department of Biology
Studieadviseur.bio@uu.nl

Jos Koeckhoven

Department of Chemistry
J.N.C.Koeckhoven@uu.nl

Manon Thijssen

Department of Pharmaceutical Sciences
M.Thijssen@uu.nl

Updated details on the organisation of the
GSLs and staff contact details can also be
found on:

[www.uu.nl/en/education/
graduate-school-of-life-sciences](http://www.uu.nl/en/education/graduate-school-of-life-sciences)

Part II The quality assurance plan in practice

1 Introduction

The second part of this plan describes the practical implementation of evaluations at the course and programme level that are important for the programme director/coordinator, EC and the (DB)BoS. It also looks at quality monitoring by the EC.

2 Course Evaluation

2.1 Protocol for course evaluation

1. The programme coordinator provides a course overview for each academic year, including the title, OSIRIS codes and dates.
2. Courses are evaluated annually with a standard questionnaire using Evasys (or Caracal). The standard questionnaire for courses is revised annually at the initiative of the EC. The course coordinator is given the opportunity in advance to add course-specific questions to this standard questionnaire.
3. A quality control employee ensures that the evaluation forms are produced in adequate numbers and sends them to the course coordinator no later than a week before the end of the course. This is done at the expertise centre for the UMCU courses, and in the Student affairs department for the Science courses.
4. The course coordinator is responsible for the correct distribution, completion, collection and returning of the forms to the quality control employee within two weeks after the end of the course.
5. The quality control employee is responsible for the processing of the completed forms within two weeks and sends the results of the evaluation, together with a feedback form for completion, to the course coordinator in question.
6. The course coordinator completes the feedback form and sends it back to the quality control employee within two weeks after reception.
7. The quality control employee sends on all the available documents (the results of the evaluation and the feedback form) to the EC.
8. At the EC, an assessment is made of the course evaluations by a student/teacher pairing and discussed in the meeting.
9. An important item in the evaluation is scoring on assessments items. Negative scores are reported to the AP of the BoE. They check the scores and undertake action when necessary.
10. Repetitive bad scores/ and or lack of feedback by the teacher are reported to the DB-BoS
11. The EC sends an overview of the course assessments annually to the DB-BoS, and the programme directors/coordinators.

2.2 Course evaluation criteria

Each course evaluation includes a number of minimum standard criteria that have been adopted by the School. These criteria will continue to be developed and annual revisions will be made of the questionnaires accordingly.

TABLE 3: CRITERIA FOR COURSE EVALUATIONS

Learning targets	Were the learning targets clear? Were the learning targets easy to find (website, student guide)?
Prior knowledge	Was there a good match between the course and prior knowledge?
Didactic factors	Was there adequate feedback and encouragement? Were the presentation techniques clear etc?
Learning materials	Were the learning materials, such as books, readers, software etc., adequate?
Facilities and organisation	Were there facilities such as classrooms, laboratories, timetables, planning and communications?
Study load	Was the study load (study points) appropriate given the time required? How was the time allocated?
Examination	What type of testing was used? Did this test/final assignment cover the content of the course? Was the test too easy or difficult?
Final score	What was the standard of the course? What did you learn? Final grade on a scale of 1 to 10.

An important area on which to focus is the approach to assessment. The quality of examinations will be one of the most important components of the next accreditation round in terms of the re-accreditation at the course level. The Board of Examiners will play an important role. Student opinions about examinations are a tool that can be used by the Board of Examiners, alongside other data, to make an assessment of whether students match up to the defined learning outcomes for each programme described in the Diploma Supplement. Questions will be checked in the light of this consideration.

3. Programme evaluation

3.1 Protocol for programme evaluations (research, writing assignment, exit and profile)

1. Research projects, writing assignment and the curriculum are evaluated using standard questionnaires. The standard questionnaires are revised annually.
2. A quality control employee ensures that the evaluation forms are made in sufficient numbers and sends them to the student administration before the start of every academic year. This is done at the expertise centre for the UMCU courses, and in the Student affairs department for the Science courses.
3. The student administration ensures that the forms are distributed and collected properly and send the forms back to the quality control employee (once a year after the end of the academic year and before 1 November). Research and writing assignment evaluations are collected when the assessment form is submitted. Exit evaluations are handed out when students initiate the graduation procedure.
4. The quality control employee ensures that the completed forms are processed within a month. The forms are worked out for each Master's programme. The quality control employee sends the results of the evaluation, together with an empty feedback form, to the programme coordinators.
5. The programme coordinators complete the feedback forms and send them back to the quality control employee within two weeks after reception.
6. The quality control employee sends on all the available documents (the results of the evaluation and the feedback form) to the EC.
7. At the EC, an assessment is made of the evaluations by a student/teacher pairing and discussed in the meeting.
8. The EC sends an overview of the assessments annually to the DB-BoS, and the programme coordinators.

3.2 Programme evaluation criteria

Each programme evaluation contains a number of minimum standard criteria that have been adopted by the School. These criteria will continue to be developed and annual revisions will be made of the questionnaires accordingly. The School distinguishes between evaluations of research projects, writing assignment, profile and exit.

TABLE 4 EVALUATION CRITERIA RESEARCH PROJECTS, WRITING ASSIGNMENTS AND EXIT/PROFILES:

Criteria for research project and writing assignment evaluations	
1. Learning targets	Were the learning targets for the research project/writing assignment clear? Were the learning targets discussed?
Knowledge and skills	Which knowledge and skills have been acquired?
Counselling	Who has provided the counselling? Were feedback, encouragement and evaluation opportunities adequate?
Facilities and organisation	Were the facilities, such as the workplaces, ICT, laboratories, literature and the community adequate?
Study load	Was the study load (study points) appropriate given the time required? How was the time allocated?
Examination	Were the assessment criteria known? Do you think the assessment was clear?
Final score	What did you learn? Final grade on a scale of 1 to 10.
Criteria for profile evaluations	
Learning targets	Were the learning targets for the profile clear?
Coordination and usefulness	How coordinated were the study components? Did the profile contribute to employment opportunities?
Didactic factors	How was the quality of the teaching?
Facilities and organisation	Were the facilities, such as classrooms, laboratories and counselling, adequate?
Study load	Was the study load (study points) appropriate given the time required? How was the time allocated?
Examination	What type of testing was used? Did this test/final assignment cover the content of the profile?
Final score	Final grade on a scale of 1 to 10.
Criteria for Exit Evaluations	
Learning objectives	Were the learning objectives for your programme clear?
Knowledge and skills	Which knowledge and skills have been acquired?
Coherence and structure	How well-linked were the study components? What was the structure like? Were there missing components?
Facilities and organisation	Were the facilities adequate? Were the organisation and communications adequate?
Study load	Was the study load (study points) appropriate given the time required? How was the time allocated?
Continuation	What are you going to do in the future? Do you think you are adequately prepared for future employment?
Final score	How was the standard of the programme as a whole? What did you learn? Final grade on a scale of 1 to 10.

4. Assessment of research project and internship

For the research projects, which constitute most of the training and which are assessed by a very wide ranging group of supervisors/teachers, standard assessment criteria have been drawn up in Rubrics for all courses at the GSLS. All assessment criteria and Rubrics can be found in the digital study guide (studyguidelifesciences.nl) and on website for GSLS staff members (www.uu.nl/en/education/graduate-school-of-life-sciences/teachers-and-supervisors/masters-education/training-supervision-of-mscs-students). All examiners and students also receive information by email and a quick guide on the GSLS assessment regulations before the start of each research project/internship. This means that examiners and students are always informed about the GSLS approach to assessment.

Final marks are always determined by the examiner, who is by definition a member of the permanent staff of the UU/UMCU. If day-to-day supervision is provided by a trainee research assistant or, for example, an external supervisor, the mark is determined by the examiner in consultation with this person. A second reviewer, who will not be directly involved with the project, makes a second assessment for the report and the presentation. Exceptions are made for projects at a host institute outside Utrecht University/UMCU where the UU examiner and host supervisor give the marks. The GSLS has regulated that an interim assessment has to be held around 3 months after the start of the project or internship and a final assessment at the end of the project. The Rules and Guidelines describe the weighting of the marks for the various components. The BoE monitors implementation, for example using compulsory assessment forms, and by demanding plagiarism checks and an explanation of grades through Rubrics from the examiners.

Quality monitoring

Examiners and the Board of Examiners of the GSLS are responsible for monitoring the quality of assessment. One way of monitoring assessment quality is to use a second reviewer for the projects and the writing assignments. The independence of this second reviewer is particularly important. This second reviewer should therefore not be involved in the student's project. These various factors are checked when an application is received for the approval of the research projects and theses and when the assessment form is collected. Another item of information that can be used to evaluate the assessments of internships and writing assignments is the frequency of the Cum Laude grade. The BoE works on the principle that this grade should be granted to between 5-10% of graduates. The examiners are expected to give high marks only to very good students. This philosophy is also reflected in the assessment criteria. Finally, the BoE assessment panel makes checks twice a year of the quality of the assessment of a random selection of the final reports for research projects, internships as well as writing assignments.

The forms referred to above can be found in the study guide, with the exception of the assessment forms, which can be obtained from the student administration departments. The procedures are described in the student guide as well.

5. Forms and documents

The forms below are in circulation for the purposes of evaluations and quality monitoring.

5.1 Forms

- Evaluation forms
- Course
- Introduction week and LS seminar
- Research project/internship
- Writing assignment
- Profile
- Exit

Board of Examiners forms

- Planning Master's programme
- General application form
- Interim assessment form
- Assessment form research project/internship
- Assessment form writing assignment
- Graduation application form

5.2 Documents

The documents below are available for quality control

Assessment documents

Assessment policy GSLS

Assessments plans per programme

Annual reports

- Annual academic report for Master's programmes
- Annual report from EC
- Annual report from BoE
- Annual report from BoA
- Annual management report GSLS





Quality Assurance Plan

Quality Assurance Plan for Assessment of the Graduate
School of Life Sciences Utrecht

Editing: Inge van den Berg, PhD



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1. Introduction

The Assessment Panel (AP) aims to secure the quality of assessment of all programs of the Graduate School of Life Sciences (GSLs). To achieve this aim, the AP will monitor the quality of:

- the procedures concerning assessment
- the assessments

The standard programs of the GSLs have a research profile. Programs with a research profile consist of two research projects (51 and 33 EC, respectively), a writing assignment (7.5 EC), electives (12 EC), participation in scientific seminars (1.5 EC) and program-specific courses (15 EC in total). Assessment of Research projects comprises assessment of research performance, of presentation of data and of the written research report. Assessments of courses vary per course.

A student can choose several other profiles instead of the research profile (Management profile, Applied Data Science, Bioinformatics profile, Communication & Education profile, Complex systems profile) by exchanging the 33 EC minor research project for a profile-specific curriculum. They can use (a part of) the elective component to extend a profile with 6, 9 or 12 EC. Composition and assessment of profiles vary per profile.

The AP has categorized the Quality Assurance Plan into four topics: 1) assessment of courses, 2) assessment of research projects and writing assignments, 3) assessment of the programs as a whole, and 4) assessment of profiles with a structure deviating from the general program structure.

This document gives an overview of the *Plan-Do-Check-Act (PDCA)* cycle that will be employed by the AP.

2. Monitoring the procedures concerning assessment

Table 2.1 gives an overview of the general procedures of the GSLS to be monitored, the sources of the required documents and information, the responsible body, the required documents and the frequency of monitoring. Table 2.2 shows the components of the quality assurance plan for assessment of research reports and writing assignments and table 2.3 provides information about the quality assurance plan for assessment of courses.

TABLE 2.1 QUALITY ASSURANCE PLAN FOR GENERAL PROCEDURES

Required	Source of information	Responsible for monitoring	Documents required	Frequency of monitoring
The GSLS has an Assessment Policy	-School (GSLS)	AP	Assessment Policy GSLS ¹	Once every 5 years or upon adaptation of the policy
The GSLS has an actual assessment plan for all programs	-School (GSLS)	AP	Assessment plan or assessment program ²	Yearly
Each individual curriculum component has an actual assessment diagram	-Examiner -School (GSLS)	AP	Assessment diagram curriculum components ³	Linked to monitoring of individual curriculum components

TABLE 2.2 QUALITY ASSURANCE PLAN FOR ASSESSMENT OF PROCEDURES FOR RESEARCH REPORTS AND WRITING ASSIGNMENTS

Required	Source of information	Responsible for monitoring	Documents required	Frequency of monitoring
The GSLS has a procedure concerning assessment of research reports and writing assignments which is known to students and supervisors/examiners	-School -Internship-coordinator -Student evaluations	-Internship-coordinator -policy officer AP (assembly of documents) -AP member	-Guides GSLS -Examples of mails to examiners -Student evaluations of research reports and writing assignments	-Upon adaptation -Yearly -Linked to evaluations of research reports and written assignments
The examiners of the GSLS adhere to the procedures concerning assessment of research reports and writing assignments	-School -Internship-coordinator -student evaluations -BoE	-Internship-coordinator -Policy officer AP (assembly of documents) -AP	-Student evaluations of research reports and writing assignments	-Upon request of the Education committee (EC) -yearly
The examiners of the GSLS use rubrics to provide feedback to the student (and if required) to support their final judgment	-Internship-coordinator -Student evaluations	-Internship-coordinator -Policy officer AP (assembly of documents) -AP	-Student exit evaluations -Examples of judgment forms	-upon request of the EC -yearly

Students have received documented feedback halfway through their internship	-Internship-coordinator -student evaluations -OSIRIS	-Internship-coordinator -Policy officer AP (assembly of documents) -AP	-Overview from Osiris -Examples of feedback forms -Student exit evaluations	-Yearly AP
Judgments are supported by arguments known to the students	-Student evaluations -BoE -Internship-coordinator	-Policy officer AP (assembly of documents) -AP	-Exit evaluations -Judgment forms research reports or writing assignments	-Yearly AP -When monitoring research report or writing assignment (see 3.1)

TABLE 2.3 QUALITY ASSURANCE PLAN FOR PROCEDURES FOR ASSESSMENT OF COURSES

Required	Source of information	Responsible for monitoring	Documents required	Frequency of monitoring
Procedures concerning assessment are documented and made available to students	-Examiner -Course descriptions -Student evaluations -EC	-Policy officer AP (assembly of documents) -AP	-Course manual -Course evaluations	-Newly implemented courses -In case of complaints -After adaptation of the course
Examiner adheres to the procedure described	-Examiner -Student evaluations -EC	-Policy officer AP (assembly of documents) -AP	-Student course evaluations	-Upon request of the EC -Linked to monitoring course assessment (see 3.2)
The course has an assessment diagram and an assessment matrix is present for written tests	-Examiner	-Policy officer AP (assembly of documents) -AP	-Assessment diagram -Assessment matrix test	-In case of complaints -After adaptations -Linked to monitoring course assessment (see 3.2)
Analysis of the reliability of assessment has been performed	-Examiner	-Policy officer AP (assembly of documents) -AP	-Assessment analysis	-In case of complaints -After adaptations -Linked to monitoring course assessment (see 3.2)

- 1 Document comprising the vision of the GSLs concerning assessment, the methods and procedures employed to implement the vision, the tasks and responsibilities of the various bodies, and the quality assurance program for assessment.
- 2 A document relating all learning outcomes of the programs to modes and levels of assessment throughout the curriculum.
- 3 A diagram relating learning goals of individual curriculum components to mode and level of assessment and to learning outcomes of the programs.

3. Monitoring assessment

The AP will monitor assessment and judgment of the following program components:

- Research reports
- Writing assignments
- Assessment of courses and elective components

The overall frequency of monitoring the above mentioned components will be as follows:

- Research reports and writing assignments :
 - 5% of all reports and writing assignments handed in yearly, at least 1 per program.
 - There will be a 3 year cycle: year 1 and year 2 research reports of half of the Master 's programs will be evaluated (reports graded 6-6.5; 7-8; >8.5). In year 3 writing assignments of all programs will be evaluated.
- Assessment of courses: upon request of the EC or BoE in case of doubts concerning the quality of assessment. The assessment of both the current and the subsequent edition of the course will be analysed.

TABLE 3.1 QUALITY ASSURANCE PLAN FOR ASSESSMENT OF RESEARCH REPORTS AND WRITING ASSIGNMENTS

Action	By whom	Required
Select research reports and writing assignments (number/master based on amount of students/master and based on grades)	-Policy officer AP -EC -BoE	-Overview of all research reports and writing assignments
Collect research reports, judgment forms, and student evaluations of research reports and writing assignments	-Policy officer School	-Osiris -Research reports (via School) -Assessment forms and justification
If report is written by more than 1 author: Fact will be part of evaluation New report is selected	-Policy officer School	-Research reports
Anonymize reports	-Policy officer School	
Upload selected reports to Blackboard	-Policy officer School	-Access to BB
Assign research reports and writing assignments to AP and BoE members	-Member AP responsible for reports	
Assessment of report	-Members AP / BoE	-Report, Rubrics, Assessment forms
Collect assessments and compare to judgment of the examiner (including supporting arguments)	-Policy officer AP -Member AP responsible for reports	-Filled out rubrics by AP and BoE members -Overview of supporting arguments

⁴ Overview of the learning goals of the course and the representation of the learning goals per assessment

	Report results to AP (not actual grades!)	-Member AP responsible for reports	
Difference > 1 point	Assessment by an independent AP member	-Member AP	-Report, Rubrics
	Analysis outcome 2nd judgement. If difference 1 è next step. If difference ≤ 1 è go to Difference ≤ 1 pt	-Member AP responsible for reports	
	Feedback to examiner and asking feedback from examiner	-Member AP /BoE	-Format text standard letter inviting examiner for meeting with member(s) AP/BoE
	Report results to AP (not actual grades!)	-Member AP	
	Document all the information, check with examiner for consent. Formulate report + advice and send it to examiner (cc chair BoE and program coordinator)	-Members AP (via Policy officer AP)	-Feedback examiner -Archived diagnoses of discrepancies
Difference ≤ 1 point	Letter to examiner/ tutor (cc chair BoE and program coordinator)	-Policy officer AP	-Format text standard letter
	Improve rubrics	-Members AP, -Internship-coordinator	-Input focus group, -Input users, -Experience AP members

TABLE 3.2 QUALITY ASSURANCE PLAN FOR COURSE ASSESSMENTS

Action	By whom	Required
Select courses based on student evaluations, complaints	-Policy officer AP -BoE -EC -Member AP responsible for course assessments	-Overview courses and their assessment, -Clear procedure for handling complaints -Collaboration EC
Reassess courses revised after previous complaints	-Member AP responsible for course assessments	-Cooperation course coordinator
Inform Policy officer AP about selected courses	-Member AP responsible for course assessments	-List of selected courses

Inform course coordinator and program coordinator that course has been selected for quality assessment by the AP and ask to provide follow up data	-Policy officer AP	-Format text standard letter
Collect course information and assessment material, among others: -Course information in Osiris -Number of participants course -Assessment matrix -Archiving of assessment -Assignments of the exam -Assessment analysis	-Policy officer AP	-Cooperation course coordinator
Upload assessment material to Blackboard	-Policy officer AP	-Assessment material
Distribute workload for AP members	-Member AP responsible for course assessments	-Overview of workload of AP members*
Analyse assessment and write quality report	-Member AP	-Assessment material -Judgment form, -Format quality report
Send quality report to member AP responsible for course assessments If considered necessary, and in consultation with member AP responsible for course assessments, send quality report to Policy officer for discussion by AP members	-Member AP	-AP-meeting
Final check quality report	-Member AP responsible for course assessments	-Proficiency in English language
Send quality report to course coordinator and, if necessary, give oral feedback. Ask for remarks course coordinator.	-Member AP responsible for course assessments	-Format text standard letter -Contact details examiner
Write a final quality report including the remarks of the course coordinator and a letter referring to the quality report.	-Member AP responsible for course assessments	-Feedback examiner -Format text standard letter
Send final quality report and letter to policy officer School	member AP responsible for course assessment	-Final quality report and letter
Use the official paper of the GSLS to send the letter + final quality report to the course coordinator (cc program coordinator and if necessary BoE and/or EC), archive report	-Policy officer AP	-Text standard letter, -Final quality report -Official paper for letters GSLS
If considered necessary, inform BoE about results analysis	-Member AP responsible for course assessments	-Final quality report
Improve quality report assessment format	-Members AP	-Experience members AP -Input from external users

* Overview of workload of AP members will be determined based on the yearly updated assessment plan

4. Monitoring the quality of assessment of the programs as a whole

The AP will monitor whether students fulfil the end qualifications of the GSLS and whether grading in general is similar for all programs. The quality procedures to monitor whether students fulfil the end qualifications are listed in table 4.1. The monitoring process is based on four components: 1) the comparison of the sum of all assessments of an individual student with the required learning outcomes of the relevant program (Annex 1); 2) the analysis of the exit questionnaires; 3) semi-structured interviews with coordinators and graduating students; 4) the outcome of the national students questionnaire of Elsevier. Annex 1 gives an overview of the assessment matrixes of the individual BMS Master's programmes per GSLS learning outcome.

The frequency of the complete monitoring process will depend on the requests of the BoE. Each new program will be monitored in the first year and all programs will be assessed upon implementation of major changes to the program.

The exit questionnaires and the National online Elsevier survey will be analysed yearly.

TABLE 4.1 QUALITY ASSURANCE PLAN FOR ASSESSMENT OF LEARNING OUTCOMES OF THE PROGRAMS AS A WHOLE

Action	By whom	Required
Select core courses, writing assignments and research projects of the program	-Policy officer AP	-List of all program-specific curriculum components
Review all assessments from the program-specific curriculum components in relation to the learning goals and analyse whether all learning outcomes are properly assessed	-Member AP	-Assessment diagrams per curriculum component
Report the findings, place on the agenda, discuss with all members of the AP	-Member AP	-Dedicated time on the agenda; AP meeting
Write final report for BoE	-Member AP	-Format report
Upload exit questionnaires to Blackboard	-Policy officer AP	-Exit questionnaires with relevant questions to ensure assessment quality
Analyse exit questionnaires	-Member AP	-Exit questionnaires
Report the findings from the exit questionnaires and formulate potential actions	-Member AP	-Format report
Place the findings on the agenda and discuss with all members of the AP	-Member AP	-Dedicated time on the agenda; AP meeting
Select former students for programs at random or upon request and invite them for an interview	-Policy officer AP	-List of students graduating per program
Perform semi-structured interviews with recently graduated students and program coordinators concerning end qualifications	-Member AP	-Interview format
Report outcome of interviews, propose putative actions, discuss with all members AP	-Member AP	-Dedicated time on the agenda; AP meeting
Send final report to BoE	-Members AP (via Policy officer AP)	-Format text standard letter/ contact details examiner

Two additional parameters provide insight into aspects of the assessment quality of the program as a whole. Monitoring the mean grades per curriculum component of each program and of the number of students receiving a distinction “cum laude” allow identification of grade inflation and analysis of the consequences of the introduction of rubrics on grading.

TABLE 4.2 QUALITY ASSURANCE PLAN FOR ANALYSIS OF GRADES AND DISTINCTIONS PER PROGRAM

Action	By whom	Required
Analysis of means and SDs per curriculum component per program to monitor the effect of the introduction of rubrics	-Member AP	-Overview of grades per curriculum component per program
Analysis of the number of “cum laude” per program	-Member AP	Overview of number of cum laude per program
Report the findings, place on the agenda, discuss with all members of the AP	-Member AP	-Dedicated time on the agenda; AP meeting
Write final report for BoE	-Member AP	-Format report

5. Monitoring of the quality of assessments of the profiles

1 Applied Data Science

The profile Applied Data Science comprises four courses of 7.5 ECTS, three of which are mandatory. The assessment of the mandatory courses will be monitored as described in table 3.2

The profile as a whole can be monitored using the exit surveys of the profiles.

2 Communication & Education profile

The CE profile consists of three courses of 3.75 EC and an internship of 18.75 EC in a Dutch CE organisation. The profile is offered by the Faculty of Science, Graduate School of Teaching. Quality control of assessment of courses and internship will be monitored by the Faculty of Science. The AP will investigate whether regular quality control of assessment takes place. The profile as a whole can be monitored using the exit surveys of the profiles and included in monitoring the assessment of the programs as a whole.

3 Complex systems profile

The Master's profile is offered as a standard (core) profile of 33 EC or an extended profile (45 EC) for those students with available electives (extra 12 EC) and consists of courses of 15 EC in total and a project of 18 EC. The core courses are 7.5-10 EC. Quality control of assessment of courses and internship will be monitored as described in table 3.2. The profile as a whole can be monitored using the exit surveys of the profiles and included in monitoring the assessment of the programs as a whole (Table 5.1).

4 Management profile

The M-profile consist of a half year of courses: economic environment, organisation & strategic management, marketing, operations management, management accounting, finance, human resources, entrepreneurship, and several workshops provided by companies. Quality control of assessment of courses will be monitored as described in table 3.2. The profile as a whole can be monitored using the exit surveys of the profiles and included in monitoring the assessment of the programs as a whole (Table 5.1).

TABLE 5.1 QUALITY ASSURANCE PLAN FOR ASSESSMENT OF PROFILES

Action	By whom	Required
Upload exit questionnaires to Blackboard	-Policy officer AP	-Exit questionnaires with relevant questions to ensure assessment quality
Analyse exit questionnaires	-Member AP	-Exit questionnaires
Report the findings from the exit questionnaires and formulate potential actions	-Member AP	-Format report
Place the findings on the agenda and discuss with all members of the AP	-Member AP	-Dedicated time on the agenda; AP meeting

LIST OF ABBREVIATIONS

AP	Assessment Panel
BoE	Board of Examiners
EC	Education Committee
GSLS	Graduate School of Life Sciences
PDCA	Plan-Do-Check-Act

Annex 1: Quality assessment of the individual BMS Master's programmes per GSLS learning outcome

General program with research profile	
	Major and Minor Research project
Credits	51 EC and 33 EC
Graduates will have profound knowledge of, and insights into:	
1. At least one of the specialised subjects of Life Sciences. With this knowledge graduates are able to make a substantial contribution to the development and/or application of scientific concepts and methods, often in a research context.	X
2. Important, recent developments within the Life Sciences. Graduates are able to point out the implications of these developments on the Life Sciences field and society.	
3. The way to adequately use and interpret specialist literature in at least one of the subjects of Life Sciences.	X
Graduates will become skilled in:	
1. Translating a Life Sciences problem into a relevant research question, suitable for research development or product design.	X
2. Designing a suitable research plan to test the formulated research questions, according to methodological and scientific standards.	X
3. Independently performing research, with the required accuracy. Graduates are able to handle, analyse, interpret and evaluate the empirically derived data in a correct manner.	X
4. Discussing the outcomes of empirical research and linking them with scientific theories.	X
5. Indicating the importance of research activities for solving a biomedical question or problem, if applicable from a social perspective.	
6. Critically reflecting on their own research work in Life Sciences, from a social perspective.	
7. Comprehensibly reporting research results verbally and in writing, to specialised and non-specialised audiences in an international context.	X
Graduates will display attitudes that enable them to:	
1. Function effectively in a multidisciplinary research team.	X
2. Reflect on their own development and study career. If necessary, graduates are able to motivate and adjust themselves.	
3. Function independently and result oriented in a competitive labour market.	X
4. Be eligible for a PhD position or a position in another sector.	

	Writing assignment	Introducing life sciences course (together with seminars)	Life sciences seminars
	7.5 EC		1.5 EC
	X		
			X
	X		
	X		
	X		
		X	
	X		
		X	
	X		

Annex

Cancer, Stem Cells & Developmental Biology		
	Introducing Cancer, Stem Cells & Developmental Biology	Introduction to stem cells
Credits	3 EC	1.5 EC
Graduates will have profound knowledge of, and insights into:		
1. At least one of the specialised subjects of Life Sciences. With this knowledge graduates are able to make a substantial contribution to the development and/or application of scientific concepts and methods, often in a research context.		X
2. Important, recent developments within the Life Sciences. Graduates are able to point out the implications of these developments on the Life Sciences field and society.		
3. The way to adequately use and interpret specialist literature in at least one of the subjects of Life Sciences.	X	
Graduates will become skilled in:		
1. Translating a Life Sciences problem into a relevant research question, suitable for research development or product design.		X
2. Designing a suitable research plan to test the formulated research questions, according to methodological and scientific standards.		X
3. Independently performing research, with the required accuracy. Graduates are able to handle, analyse, interpret and evaluate the empirically derived data in a correct manner.		
4. Discussing the outcomes of empirical research and linking them with scientific theories.		
5. Indicating the importance of research activities for solving a biomedical question or problem, if applicable from a social perspective.		
6. Critically reflecting on their own research work in Life Sciences, from a social perspective.	X	
7. Comprehensibly reporting research results verbally and in writing, to specialised and non-specialised audiences in an international context.		
Graduates will display attitudes that enable them to:		
1. Function effectively in a multidisciplinary research team.		
2. Reflect on their own development and study career. If necessary, graduates are able to motivate and adjust themselves.		
3. Function independently and result oriented in a competitive labour market.		
4. Be eligible for a PhD position or a position in another sector.		

Annex

Biology of Disease		
	Infection and Immunity	Biomolecular and cellular cardiology
Credits	3 EC	3 EC
Graduates will have profound knowledge of, and insights into:		
1. At least one of the specialised subjects of Life Sciences. With this knowledge graduates are able to make a substantial contribution to the development and/or application of scientific concepts and methods, often in a research context.	X	X
2. Important, recent developments within the Life Sciences. Graduates are able to point out the implications of these developments on the Life Sciences field and society.		
3. The way to adequately use and interpret specialist literature in at least one of the subjects of Life Sciences.		
Graduates will become skilled in:		
1. Translating a Life Sciences problem into a relevant research question, suitable for research development or product design.		
2. Designing a suitable research plan to test the formulated research questions, according to methodological and scientific standards.		X
3. Independently performing research, with the required accuracy. Graduates are able to handle, analyse, interpret and evaluate the empirically derived data in a correct manner.		
4. Discussing the outcomes of empirical research and linking them with scientific theories.		
5. Indicating the importance of research activities for solving a biomedical question or problem, if applicable from a social perspective.		
6. Critically reflecting on their own research work in Life Sciences, from a social perspective.		
7. Comprehensibly reporting research results verbally and in writing, to specialised and non-specialised audiences in an international context.		X
Graduates will display attitudes that enable them to:		
1. Function effectively in a multidisciplinary research team.		
2. Reflect on their own development and study career. If necessary, graduates are able to motivate and adjust themselves.		
3. Function independently and result oriented in a competitive labour market.		
4. Be eligible for a PhD position or a position in another sector.		

	Cardiovascular Immunology	Essentials of Neuroscience
	3 EC	3 EC
	X	X
	X	X
	X	X
	X	X

Annex

Toxicology and environmental health	
	Effects assessment in Toxicology and Environmental Epidemiology
Credits	6 EC
Graduates will have profound knowledge of, and insights into:	
1. At least one of the specialised subjects of Life Sciences. With this knowledge graduates are able to make a substantial contribution to the development and/or application of scientific concepts and methods, often in a research context.	X
2. Important, recent developments within the Life Sciences. Graduates are able to point out the implications of these developments on the Life Sciences field and society.	
3. The way to adequately use and interpret specialist literature in at least one of the subjects of Life Sciences.	X
Graduates will become skilled in:	
1. Translating a Life Sciences problem into a relevant research question, suitable for research development or product design.	X
2. Designing a suitable research plan to test the formulated research questions, according to methodological and scientific standards.	X
3. Independently performing research, with the required accuracy. Graduates are able to handle, analyse, interpret and evaluate the empirically derived data in a correct manner.	X
4. Discussing the outcomes of empirical research and linking them with scientific theories.	
5. Indicating the importance of research activities for solving a biomedical question or problem, if applicable from a societal perspective.	
6. Critically reflecting on their own research work in Life Sciences, from a social perspective.	
7. Comprehensibly reporting research results verbally and in writing, to specialised and non-specialised audiences in an international context.	
Graduates will display attitudes that enable them to:	
1. Function effectively in a multidisciplinary research team.	
2. Reflect on their own development and study career. If necessary, graduates are able to motivate and adjust themselves.	
3. Function independently and result oriented in a competitive labour market.	
4. Be eligible for a PhD position or a position in another sector.	

	Exposure Assessment in Epidemiology	Exposure Assessment in Toxicology	Risk Assessment and Risk Management
	3 EC	3 EC	3 EC
	X	X	X
			X
		X	
	X		
			X
		X	
			X

Annex

Epidemiology		
	Classical methods	Introduction to epidemiology
Credits	6 EC	3 EC
Graduates will have profound knowledge of, and insights into:		
1. At least one of the specialised subjects of Life Sciences. With this knowledge graduates are able to make a substantial contribution to the development and/or application of scientific concepts and methods, often in a research context.		X
2. Important, recent developments within the Life Sciences. Graduates are able to point out the implications of these developments on the Life Sciences field and society.		
3. The way to adequately use and interpret specialist literature in at least one of the subjects of Life Sciences.		X
Graduates will become skilled in:		
1. Translating a Life Sciences problem into a relevant research question, suitable for research development or product design.		
2. Designing a suitable research plan to test the formulated research questions, according to methodological and scientific standards.	X	X
3. Independently performing research, with the required accuracy. Graduates are able to handle, analyse, interpret and evaluate the empirically derived data in a correct manner.	X	X
4. Discussing the outcomes of empirical research and linking them with scientific theories.		
5. Indicating the importance of research activities for solving a biomedical question or problem, if applicable from a social perspective.		
6. Critically reflecting on their own research work in Life Sciences, from a social perspective.		
7. Comprehensibly reporting research results verbally and in writing, to specialised and non-specialised audiences in an international context.		
Graduates will display attitudes that enable them to:		
1. Function effectively in a multidisciplinary research team.		
2. Reflect on their own development and study career. If necessary, graduates are able to motivate and adjust themselves.		
3. Function independently and result oriented in a competitive labour market.		
4. Be eligible for a PhD position or a position in another sector.		

	Introduction to statistics	Modern methods in data analysis	Presentation and writing of research proposal	Research ethicits and society	Study design in ethiologic research
	1.5 EC	4.5 EC	2 EC	1 EC	3 EC
			X		
			X		
			X		X
	X	X			
			X	X	
				X	
				X	

Biofabrication	
	Introduction into biofabrication
Credits	15 EC
Graduates will have profound knowledge of, and insights into:	
1. At least one of the specialised subjects of Life Sciences. With this knowledge graduates are able to make a substantial contribution to the development and/or application of scientific concepts and methods, often in a research context.	X
2. Important, recent developments within the Life Sciences. Graduates are able to point out the implications of these developments on the Life Sciences field and society.	X
3. The way to adequately use and interpret specialist literature in at least one of the subjects of Life Sciences.	X
Graduates will become skilled in:	
1 Translating a Life Sciences problem into a relevant research question, suitable for research development or product design.	X
2. Designing a suitable research plan to test the formulated research questions, according to methodological and scientific standards.	X
3. Independently performing research, with the required accuracy. Graduates are able to handle, analyse, interpret and evaluate the empirically derived data in a correct manner.	X
4. Discussing the outcomes of empirical research and linking them with scientific theories.	
5. Indicating the importance of research activities for solving a biomedical question or problem, if applicable from a societal perspective.	X
6. Critically reflecting on their own research work in Life Sciences, from a social perspective.	X
7. Comprehensibly reporting research results verbally and in writing, to specialised and non-specialised audiences in an international context.	X
Graduates will display attitudes that enable them to:	
1. Function effectively in a multidisciplinary research team.	X
2. Reflect on their own development and study career. If necessary, graduates are able to motivate and adjust themselves.	
3. Function independently and result oriented in a competitive labour market.	
4. Be eligible for a PhD position or a position in another sector.	

Neuroscience and cognition	
	Fundamentals of Neuroscience and cognition
Credits	15 EC
Graduates will have profound knowledge of, and insights into:	
1. At least one of the specialised subjects of Life Sciences. With this knowledge graduates are able to make a substantial contribution to the development and/or application of scientific concepts and methods, often in a research context.	X
2. Important, recent developments within the Life Sciences. Graduates are able to point out the implications of these developments on the Life Sciences field and society.	
3. The way to adequately use and interpret specialist literature in at least one of the subjects of Life Sciences.	
Graduates will become skilled in:	
1 Translating a Life Sciences problem into a relevant research question, suitable for research development or product design.	X
2. Designing a suitable research plan to test the formulated research questions, according to methodological and scientific standards.	X
3. Independently performing research, with the required accuracy. Graduates are able to handle, analyse, interpret and evaluate the empirically derived data in a correct manner.	
4. Discussing the outcomes of empirical research and linking them with scientific theories.	X
5. Indicating the importance of research activities for solving a biomedical question or problem, if applicable from a societal perspective.	
6. Critically reflecting on their own research work in Life Sciences, from a social perspective.	
7. Comprehensibly reporting research results verbally and in writing, to specialised and non-specialised audiences in an international context.	X
Graduates will display attitudes that enable them to:	
1. Function effectively in a multidisciplinary research team.	X
2. Reflect on their own development and study career. If necessary, graduates are able to motivate and adjust themselves.	
3. Function independently and result oriented in a competitive labour market.	
4. Be eligible for a PhD position or a position in another sector.	

Annex

Infection and Immunity		
	Bacterial Pathogenesis	Clinical Immunology
Credits	3 EC	3 EC
Graduates will have profound knowledge of, and insights into:		
1. At least one of the specialised subjects of Life Sciences. With this knowledge graduates are able to make a substantial contribution to the development and/or application of scientific concepts and methods, often in a research context.	X	X
2. Important, recent developments within the Life Sciences. Graduates are able to point out the implications of these developments on the Life Sciences field and society.	X	
3. The way to adequately use and interpret specialist literature in at least one of the subjects of Life Sciences.		
Graduates will become skilled in:		
1 Translating a Life Sciences problem into a relevant research question, suitable for research development or product design.		
2. Designing a suitable research plan to test the formulated research questions, according to methodological and scientific standards.		X
3. Independently performing research, with the required accuracy. Graduates are able to handle, analyse, interpret and evaluate the empirically derived data in a correct manner.		
4. Discussing the outcomes of empirical research and linking them with scientific theories.		X
5. Indicating the importance of research activities for solving a biomedical question or problem, if applicable from a societal perspective.		X
6. Critically reflecting on their own research work in Life Sciences, from a social perspective.		
7. Comprehensibly reporting research results verbally and in writing, to specialised and non-specialised audiences in an international context.		X
Graduates will display attitudes that enable them to:		
1. Function effectively in a multidisciplinary research team.		
2. Reflect on their own development and study career. If necessary, graduates are able to motivate and adjust themselves.		
3. Function independently and result oriented in a competitive labour market.		
4. Be eligible for a PhD position or a position in another sector.		

	Signalling and techniques in Immunity and infection	Symposium I&I	Vaccines	Virology
	4.5 EC	1.5 EC	3 EC	3 EC
	X	X	X	X
		X	X	X
	X		X	
			X	
	X		X	
	X			
		X		
	X			
		X		
	X	X	X	X





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